



AABR walks and talks 2007

The mechanics of site assessment

Vegetation Classification Survey

With Chris Melrose

field day

When: Wednesday September 19 1:00-4:00pm

Where: Field of Mars Reserve Pittwater Road Ryde, Sydney

What: Based on surveys undertaken in 2006 for Ryde Council. Communities and species biodiversity were assessed, surveyed and mapped using quadrats and applying the Braun-Blanquet cover scale. The vegetation was then classified using model developed by Mark Tozer, (currently used by DECC to classify vegetation communities throughout NSW.)

RSVP: Essential as numbers are limited. Chris Melrose 9438-3635 or 0407 705 140

Monitoring

presentation

in association with the Royal Botanic Gardens
Centre For Plant Conservation, and Australian
Network for Plant Conservation.

With Ian Perkins

preceded by AABR AGM

When: Wednesday October 10 7:00pm

Where: Maiden Theatre, Royal Botanic Gardens, Sydney. Access and parking on Mrs Macquaries Road (Art Gallery Rd). The entrance is 100m north of the Art Gallery

Cost: Entry by donation. AABR members and subscribers \$3, others \$5

RSVP: Bookings preferred 0407 002 921 **Supper provided**

Seed Collection

workshop

With Ross Rapmund

When: Saturday November 10 12:00-3:00

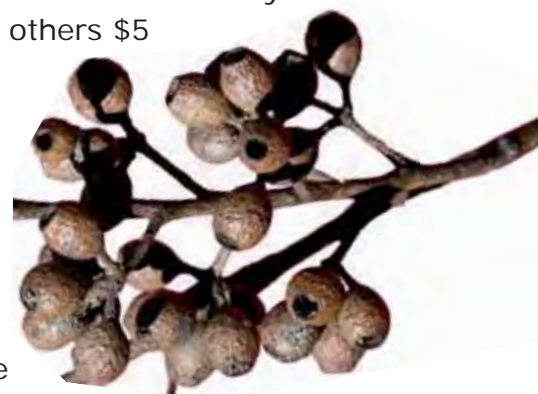
Where: Hornsby Shire Council Community Nursery, (opposite Pennant Hills Oval) Britannia Street, Pennant Hills, Sydney.

What: Should you consider seed collection issues when carrying out site assessments? If you intend to reintroduce local species through planting, what planning is required to ensure the best possible provenance and diversity? How can you avoid the pitfalls of poor seed collection?

Ross will answer these questions and others, and demonstrate best practice procedures and techniques.

Ross is manager of Hornsby's nursery and is well known to many Sydney bush regenerators as the previous manager of the Ku-ring-gai Council Nursery.

RSVP: Essential as numbers are limited 0407 002 921



Inside....

President's perspective	2
Finding Critters in the Bush	4
Bush regeneration: a practitioner's perspective	7
Cryptogams	10
Events and conferences	12

President's Perspectives

What has AABR been up to? Here are some of the recent happenings:

- Seminars and field trips, keeping up to date with the latest techniques etc. Thanks to Bob Makinson/ Centre for Plant Conservation of the Botanic Gardens Trust, and the Aust. Network for Plant Conservation
- Website including Bush Jobs and professional listings etc. improved/updated. Inputs from Danie Ondinea.
- Newsletters
- Tim Baker was on the NCC/Urban Bushland Committee
- Distributed AABR Posters, leaflets to all Sydney's Metropolitan Councils and Catchment Authorities
- Workcover classification: Bush Regeneration is grouped with forestry, causing unnecessarily high workers comp costs. AABR is lobbying for a review.
- Presence at Community Events (when volunteers are available) eg. Ku-ring-gai Council Festival of Wildflowers, Bushcare Stall at the Royal Easter Show, Coast Festival, Gosford.
- Jane Gye & Tim Baker spent a day with Railcorp's Environmental Officer, assessing remnant veg. sites along the main northern line.
- Danny Hirschfeld represented Randwick City Council on the CMA's Biodiversity Panel for the Sydney Catchment Blue Print.
- Tein McDonald applied for grant funding to develop a nationally-adaptable curriculum to guide the delivery of courses under the CLM training package.
- WWF has provided funds to help AABR to produce a report on time/money spent on removal of garden escapes in bushland. To be distributed to governments and media.
- Jane Gye represented AABR at the Greening Aust. 'Vegetation Future' forum in March 2006.
- Tim Baker & Wendy Kinsella represent AABR on the Environmental Trust Grant determination process.
- AABR presents and contributes funds to the Beverly Blacklock Prize for the outstanding student in Bush Regen at Ryde TAFE.
- Membership process and procedures. Danny Hirschfeld spent many hours updating the process.
- National Tree Day - Peter Dixon represented AABR on Planet Ark steering committee
- Bush Regen feature in Australian Geographic. Included consultation with Peter Dixon.
- Contacted Gardening Australia with suggestion to include 'environmental impact' in criteria for garden contests'
- Danny Hirschfeld is on reference Committee for the Birds in Backyards Project. (CMA)

Staying in contact with AABR

- Are you interested in finding out about AABR walks and talks?
- Are you keen to network with other bush regenerators and bushcarers around Australia and New Zealand?
- Are you a professional volunteer coordinator and want to network with others in your field?
- Do you want to get in contact with AABR?

AABR runs a number of email groups and list servers. We post information about our events on to the Bush regeneration and Bushcare listservers.

You can join these email groups and a number of others at AABR's networking portal on the AABR website at www.aabr.org.au

Subscribe or renew your current subscription to

Ecological Management & Restoration

Linking science and practice

At \$59.40 (inc. GST), that means a saving of \$18.70 on the normal individual price of \$78.10 (inc. GST).

To renew or subscribe, please visit the Blackwell Publishing site at <http://www.blackwellpublishing.com/emr>



**Blackwell
Publishing**

Affiliated Discount Price:

\$59.40 (inc. GST)

**Subscribe today and
take advantage of the**

**25% discount
for AABR members
and subscribers**

Farewell Julia Robertson

We were sad to learn that Julia Robertson recently passed away, after suffering from cancer. Julia was the 4th president of AABR NSW, serving from 1990 to 1992.

Julia emigrated to Sydney from England in 1968 and quickly developed a fascination for the Australian bush. She devoted much time and energy to protecting it, as a volunteer for community organisations - particularly the Australian Plants Society, and bushcare at Ku-ring-gai Wildflower Garden. She was a hardworking and capable organiser and administrator, an imaginative newsletter editor, and a skilled bush regenerator.

Julia got the job done with good cheer and few complaints, and is greatly missed.

Welcome to new members

Bryan Grant
Amie Raz
Paul Reynolds
Darren Roche
Yoko Shimizu
Marc Stettner
Daryl Wells
Sue Anderson
Robert Spilling
Alan Wynn
Amanda McDonald
Judith Stanley
Ross Wellings
Katrina Young
Glenn Bird
Gerard Proust
Kelly Upton
Kris Grace-Hely
Sarah-Jean Dempster
Sally Matthews
Bob Jarman

Who can join AABR ?

Anyone with an interest in bushland management and conservation issues can be involved.

Our members are people with practical experience in bushland work over a period of at least two years who have completed an approved bush regeneration course. This includes professional bush regenerators and bushcare volunteers, bushland management professionals and others interested in restoring natural ecosystems.

In recognition that people may have relevant bush regeneration competencies without the above qualifications and experience, a competency based field assessment may be performed as an alternative way of applying for membership. AABR Membership is a recognition of knowledge and competency as a bush regenerator.

Our subscribers are those who are interested in bushland issues but do not wish to apply for full membership.

Positions Vacant be part of our web team

AABR is organising a sub committee to oversee our web based activities. We have vacancies for those with experience or those who willing to learn.

As with all the AABR jobs its a voluntary position... but much appreciation and hopefully a sense of achievement will come your way.

For more info ...

Phone: 0407 002 921

Email: enquiries@aabr.org.au

New permit for herbicide use in bush regen for NSW

New Off Label Permit No.9907 allows the use of a range of specified herbicides, which are commonly used in bush regeneration, on noxious and environmental weeds in general. The herbicides may be applied by "persons generally" in "areas of native vegetation" throughout NSW. Refer to the Permit for which herbicides may be applied on which types of weed at what rate via which application methods. The Permit is in force 1 April 2007 to 31 March 2012.

For a downloadable copy of the Permit, go to www.apvma.gov.au and follow the relevant prompts

New project to document all life forms

Many of the world's leading scientific institutions have announced the launch of the Encyclopedia of Life, an unprecedented global effort to document all 1.8 million named species of animals, plants, and other forms of life on Earth. For the first time in the history of the planet, scientists, students, and citizens would have multi-media access to all known living species, even those that have just been discovered.

"The Encyclopedia of Life will provide valuable biodiversity and conservation information to anyone, anywhere, at any time," said Dr. James Edwards, currently Executive Secretary of the Global Biodiversity Information Facility who today was officially named Executive Director of the Encyclopedia of Life.

Over the next 10 years, the Encyclopedia of Life will create Internet pages for all 1.8 million species currently named. It will expedite the classification of the millions of species yet to be discovered and catalogued as well. The pages, housed at www.eol.org, will provide written information and, when available, photographs, video, sound, location maps, and other multimedia information on each species. Built on the scientific integrity of thousands of experts around the globe, the Encyclopedia will be a moderated wiki-style environment, freely available to all users everywhere.

from NCC NSW Biodiversity Email Newsletter

AABR walks and talks: Finding Critters in the Bush

Twenty people joined us for the first AABR walk & talk in 2007 with Arthur White in the Field of Mars Wildlife Refuge in Sydneys North. Chris Melrose prepared this summary.

Kathy Merchant, a member of the Ryde and Hunters Hill Flora and Fauna Preservation Society, opened the afternoon by telling us how residents, concerned that the reserve was going to be used for land fill in the 1960s, banded together to save this important 56 Ha piece of bushland. The Society was formed in 1966 and continues to protect the bush by applying for environmental grants. Many members are also involved in Bushcare groups. They were also instrumental in establishing the Environmental Educational Centre in the mid-80s, which is an important resource for primary and secondary students throughout Sydney.

Arthur followed by telling us that the majority of fauna survey work must be undertaken at night since most native animals are nocturnal. The survey requirements depend upon the brief, some of which may require simple species counts, while others may involve assessment of particular animal populations. Many specialists are now undertaking remote sensing surveys that do not involve animal trapping, an important issue in animal ethics today. Licences must be obtained for trapping animals. All trap-deaths or animal injuries must be recorded and noted to NPWS.

Mammal surveys

Mammal surveys are the most time-consuming as traps need to be set, positions marked, then traps checked the following morning. Elliot traps, small and large cages and pit buckets are used for trappings while hair tubes, scat and track ID or spotlighting observations are used if trapping is not required. All traps or tubes are baited with a ball of oats, honey, vegemite and bacon fat. Arthur used hair tubes in the Field of Mars since the area is close to residences and is popular with the public. Hair tubes do not look like traps and so do not cause concern with passers-by.

Elliot traps are metal boxes with spring-loaded doors. When the animal goes into the trap the door closes behind and the animal stays there until it is released. The traps are numbered and a pink marker ribbon with the trap number is displayed so the trap is not forgotten or left unchecked. They are spaced about 20m apart and left in sheltered sites for 4 nights and checked early each morning. Bandicoots and possums are clever enough to reach in and get the bait without getting caught by the door but some animals may get injured in attempting to flee as the door closes. These traps may also be used in population studies where the animal is marked and then released. The traps need to be covered with a soft material cover and then a plastic bag to protect the animal from the cold and/or rain. Some soft material is placed inside the trap so that the captured animal can build a nest during its enforced stay. Other baits used are mushrooms for potoroos and bandicoots "will eat just about anything left over from lunch"!



Kathy Merchant discusses the history of the reserve. Photo C Melrose



Arthur

Elliot traps are not used in western NSW, as many of the animals are too small and can enter the trap by climbing under the spring treadle- so pit traps are useful. The planigale, for instance, is the size of a matchbox and can flit in and out of an Elliott trap without setting it off. Pit traps are mainly used in areas with sandy soil as large holes need to be dug before the buckets are placed; placement of the traps follow a low, drift fence that channels the animals into the pit trap. Pit traps are particularly useful for catching reptiles and small ground animals. One disadvantage is that small mammals are vulnerable to predation by larger mammals and so constant checks are made of the pit buckets and creatures that have fallen in and recovered, identified and released away from the trap line. A GPS unit is also required to record where traps are located or where bones or dead animals are found. Bones are taken to a museum to be identified.

Hair tubes are of a plastic, flat-sided funnel that sits on the ground. When a furry animal sticks its head in to sniff the bait, adhesive on the inside pulls out guard hairs from the neck. Arthur also uses PVC piping to construct hair tubes. The adhesive sheets, containing the guard hairs are sent off for identification by specialists. Hair tubes can't be used for population studies, as there is no way to tell if one or many animals entered the tube. The hair tube may contain hundreds of hairs but they could be from just one or from many animals of the same species.

Elliot traps and hair tubes can also be placed in trees. Arthur suggested to set the traps at about 2-3 m above the ground (above head height). For pygmy possums and gliders, it is beneficial to spray honey water on the trunk to attract the possum to the trap.

Spotlighting at night for possums or bats is a non-interventionist way of surveying these types of

nocturnal animals. Arthur emphasised the need to look over the lamp beam when spotlighting. He suggested first to scan the tree canopy, and when eye-shine is seen, appoint a team member to get closer to spot the animal. Arthur uses a miner's lamp, which has a battery that lasts about 24 hours. The maximum lamp power one can use is 50 Watts and you are only allowed to observe for 10 seconds. Repeated spotlighting in a reserve is not allowed on the same night.

Bats can be trapped in harp traps. It is important to find an often-used bat flyway before setting up the net. When the bat hits the first set of strings in the net the bat loses momentum, is stopped by the second set of strings and drops into a baffled bag. A less stressful way of surveying bats is to use a recorder called an Annabat, which records the bat calls. Bats call at 20-80 megahertz that is beyond our sense of hearing. The recordings are later sent off for specialist identification.

Bird Identification

Birds are identified by call or with binoculars. But they are clever and know you are looking for them and hide! As only conspicuous birds are usually seen, it is useful to know as many calls as possible. The best time for surveying is the first two hours after sunrise when all birds in an area do a roll call. Arthur marks out a 200m transect and records the number of calls along the transects for a maximum of 30 minutes in an area.

Night birds are surveyed using a recording playback with an amplifier. This may take 3-4 nights to do and then you are not allowed to survey using this method for the following month.



ur White with survey equipment. Photo C Melrose



Animal habitat in weedy area. Photo C Melrose

Reptile and invertebrate surveys

It is best to use pit traps for reptile or invertebrate surveys; observation of reptiles basking during warm parts of the day can also be made. Look under rocks and logs; always remember to put them back in the original position. I was always taught to pull the log or rock back toward you so the animal is able to run away from you rather than toward you. Geckos and nocturnal snakes can be seen at night foraging for food.

Don't put pit traps in the open as animals try very hard to be inconspicuous from predators, so they don't travel in exposed areas. The base of a rock shelf provides good shelter and while you are there have a look on/in the shelf for geckos, lizards and their scats.

Frogs and Fish

The best time to survey for frogs is at night when the males are singing. Use the miner's spotlight to spot them. Tapes are also available to identify the calls. Use small nets to catch and then identify tadpoles (see reference list at end of article).

A dip net with an extendable handle is used to capture fish for identification. The use of seine or gill nets requires a licence.

A short, but very rewarding walk

Arthur then took us on a short walk to explore the area. We found a longicorn beetle under the bark of a Eucalypt tree. There were possum claw marks on a Grey Gum trunk and spiders webs in the bark while a leafhopper searched for food. On another tree there were froghoppers with their long sensory cerci. While looking under a log we found a centipede, a millipede, slaters, springtails and a cicada shell. Next, as we

headed over to a sandstone outcrop, someone spotted a dead possum in a tall shrub, evidence of a powerful owl kill. The rock shelf contained antechinus poo, more insects and house mouse nesting material. Arthur told us there would probably be leaf-tailed geckos in the thin horizontal cracks. Tent web spiders covered the upper edges of smaller overhangs.

Arthur also had some advice for bush regenerators. He advised that it is important to do a whole area assessment while doing a site assessment because alternative habitat must be provided for the small ground animals while weeding is taking place. We must always be prepared to provide alternative cover for our animals. Arthur stated that while lantana and privet may be environmental weeds, they are extremely important animal habitat especially for possums and small birds that need to escape from predators. Possum dreys are often located in dense privet forest and small birds love lantana thickets. Therefore, please consider leaving some weed-infested areas before removing them.

He said compost heaps are great because they form a very important component on our bush regen sites: animal habitat. Cover them with black plastic so they provide a warm environment while the heap is composting. All sorts of small fauna will come to live there. Beware, however that red-bellied black snakes also love this sort of environment. However, I've always found that they slither away just as quickly as you pull the cover off to put more weeds on the pile.



Small animal trap. Photo C Melrose



Elliot trap. Photo C Melrose

Best practice management of remnant vegetation – bush regeneration/assisted natural regeneration. A practitioner's perspective.

Presented at the March 2006 "Veg Futures" conference as: Best practice management of remnant vegetation, by Jane Gye, on behalf of AABR

Introduction

The term 'Bush Regeneration' among many involved in restoration of degraded ecosystems seems to be very narrowly interpreted as being associated with Sydney, and restoration of Sydney sandstone vegetation in particular. However most degraded vegetation communities are likely to contain at least some level of natural regeneration potential or 'resilience' (McDonald 1996, McDonald 2000). To avoid the Sydney/urban association and to gain wider acceptance of natural regeneration as an appropriate restoration method, the term "Assisted Natural Regeneration" can be substituted. The latter term is used in the nationally accredited Conservation and Land Management Training Package.

The focus of this discussion is to encourage a broader interpretation and application of the principles, strategies and techniques of natural regeneration. This means thinking of regeneration as being appropriate in varying degrees for degraded remnants in rural as well as urban landscapes; whether on private land or in reserves, including TSRs and utility reserves such as road and rail, and for land which may be over-grazed, weed-infested, eroded or degraded in other ways (Buchanan 1989).

Assisted natural regeneration – ANR - (or whatever term you prefer) is a relatively new land management practice which is adaptable to almost any landscape situation and on any scale, across catchments, roadside remnants, cemeteries or suburban gardens. It requires acute observation, patience and guidance according to ecological principles and strategies; it provides the confidence to undertake restoration projects and know they will be successful; it provides a management regime for vast areas of land patches which have until now been neglected or mismanaged in terms of biodiversity; and it is also applicable to the ongoing management of ecological plantings.

Widespread proficiency in the on-ground application of ANR provides Australians with the practical means of caring for their local natural environments on a long-term basis, and should be considered in place of other forms of land management such as slashing, perpetual spraying and mowing to improve the biodiversity of all elements of ecosystems particularly the lesser considered ones such as lichens, mosses, fungi, grasses, groundcovers and shrubs. Gradually, well

managed natural areas can be extended and perhaps linked to others. Because ANR is clearly defined (yet flexible and adaptable) it means that management can be transferred smoothly from one generation/land manager to the next, ensuring that progress in improving biodiversity outcomes continues, leading to reduced levels of management over time.

Assisted natural regeneration is not simply achieved by removing competing, non-local vegetation. It includes other triggers which maybe appropriate depending on individual site assessment – such as fire (in conjunction with pre- and post-fire weeding), fencing, manipulation of grazing, feral animal control, run-off control, direct seeding, transplanting or soil disturbance such as deep ripping. Planting may be necessary further down the track where, for example, resprouting shrubs cannot regenerate after long periods of grazing or clearing of understorey vegetation.

Potential for approaches that trigger natural regeneration needs to be more generally considered as part of (but a very important part of) an integrated approach to restoration. While natural regeneration cannot always be triggered, too many projects still do not consider it at all. Some land managers use grazing manipulations to allow regeneration of grassland and woody components, but these (and fire manipulations) are still not as widely tried as they should be. (Davidson et al 2005, Davidson 2006). There appears to be an assumption that ecological repair must be done as quickly as possible, leading to a 'Backyard Blitz' approach, which often fails to meet expectations. I suggest that a more gradual approach which taps into a natural system's ability to repair itself is often more effective.

What is Assisted Natural Regeneration?

Assisted Natural Regeneration is the practice of restoring plant communities by utilising, reinstating and reinforcing the ecosystem's ongoing natural regeneration processes.

By stimulating the inherent resilience of individual species that have evolved over millennia, ANR aims to maximise biodiversity and establish a management regime to enable its sustainability into the future.

The principles and strategies for achieving natural regeneration have been developed over long time frames, commencing with the early work of the Bradley sisters (Bradley 1971). This work represented an innovative approach to management of natural areas and led to the establishment of a bush regeneration arm of the National Trust which ran bush regeneration courses for many years. Subsequently, TAFE NSW developed Certificate courses in Bush regeneration which ran for some 15 years prior to their relatively

recent reconfiguration under the national Conservation and Land Management (CLM) Training Package. While these courses are offered in a small number of regional centres, across Australia opportunities for gaining these skills and knowledge are still very limited.

While reports of ANR projects published in peer reviewed journals are not as numerous as desired, sufficient documentation exists to demonstrate that natural regeneration strategies and techniques can be developed for a range of vegetation types and a range of condition classes and applied successfully (Pigeon & Ashby 1941, Stockard et al. 1985, Rhodes 1987, Woodford 1993, Woodford 2000, James 1994, Pallin 2000, Jensen 2002, McDonald et al 2002, Bower and Parkes 2002.)

What are the principles and where do you start?

The principles on which ANR are based are ecological principles and theoretically can be applied universally on any scale, to any ecosystem (see review in McDonald 1996). It is the commitment to the long term application of ANR management which is essential to achieving and maintaining desirable outcomes. A restoration project does not end, for example, once fencing has been erected or some regeneration of native species has occurred. Subsequent treatments to ensure full recovery are likely to be needed until the vegetation community only requires minimal (but ongoing) inputs to maintain it in a healthy state.

An ANR approach considers all factors – including weeds, runoff, nutrients, feral animals, fire, habitat values (weeds may be the only refuge for some wildlife) and community awareness (essential in public reserves). Its secret weapon is resilience – which can be retained in the form of seed in the soil or suppressed rootstocks (which is why the original soil profile is necessary for regeneration) - or it can exist in the form of surrounding seed sources. An important consideration in predicting a site's resilience is its history. Regeneration (at least of many species) may be still possible even after decades of weed domination or grazing.

To help you predict outcomes, examine the nearby bush to see what are the local species and think through (or get advice on) how they regenerate after natural disturbances to which they are likely to have been adapted. Could they survive (as soil stored seed or rootstocks) after the human-induced impacts the site has undergone? Could they 'seed in' from nearby remnants?

Natural regeneration requires good planning and a systematic and strategic approach. Seasonal conditions will play a large role; little regeneration will occur if there's a drought, for example. At least two and possibly five years is a reasonable time to allow regeneration to occur after applying triggers such as fencing, ripping, fire or weed control. Planting or direct seeding of missing species may end up being necessary but allow time first for regeneration – it's often amazing what pops up!

Look for any residual native plants and generally start in areas where native vegetation is healthiest and work towards the more degraded areas. With the right strategies, regeneration will spread outwards from good areas, gradually expanding the regrowth. This allows nature to do most of the work for you.

Let your resources and the rate of regeneration dictate the rate of progress. Remember that regeneration will be affected by the level of resilience of the native vegetation, weather, seasons, interactions between plants and birds etc. The healthier the native vegetation becomes, the less it will succumb to weed invasion.

Finally (but don't leave this to the end), observe, record and monitor. Adapt your future management in response to the results as the project proceeds.

Why weed management requires a special mention

Learning appropriate strategies and techniques for weed removal is essential to achieving healthy, sustainable native vegetation. With so many weapons of mass destruction such as chain saws, herbicides, bulldozers, brushcutters, and mowers which make short work of weeds (and hidden or unrecognized natives) removing weeds is easy. However re-establishing good bush in their place is the real challenge; weeds are frequently replaced by more weeds, and regeneration of native species may be initially subtle and underestimated.

Some points to consider:

- In some situations it may be beneficial to retain weeds temporarily if they are providing habitat, preventing erosion, providing a buffer against annuals or absorbing nutrients.
- If in doubt don't pull it out (but find out quickly what it is). There are many native and weed species that look similar. Some native species are weeds, and some natives look 'weedy'.
- Ultimately 'comprehensive' weeding (i.e. remove all species) is ideal but not always possible. Consider it for the better areas (Pallin 2000) but target weeding will be appropriate in some situations as long as you are watchful for new (and often more insidious) weeds taking their place.
- Use weed-removal techniques based on minimal effort for maximum effect – this may take longer initially but reduces follow-up treatment.
- When using herbicide in areas with good native vegetation, the herbicide is more commonly applied topically to minimise the chances of killing those 'hard-to-see' regenerating native plants and grasses which are the key to more rapid recovery. Spraying should be done discriminately and by someone with excellent identification skills. Spraying indiscriminately invariably leads to an ever-increasing cycle of spraying, and should be used as a temporary control (Prober et al 2001).
- Regular follow-up is crucial – removing weeds before seeding, for example, is an obvious strategy.

Advantages of Assisted Natural Regeneration over traditional methods

In restoration, it is not a matter of regeneration versus planting. It is not a case of 'either/or'. There is a place for both. However, by encouraging any residual species to regenerate on a site where resilience exists, species diversity is likely to be greater than can be achieved through introducing plants through direct seeding or planting alone. The latter approach tends to be based

on the more commonly and more easily propagated species whereas a natural regeneration approach preserves more closely the uniqueness of Australian ecosystems because plants regenerate and survive in microsites where they are most suited. In extreme cases, inappropriate planting of trees and shrubs may even degrade native communities (especially including grassland). To plant, effort/energy is required for seed collection, propagation, transport, machinery, digging, planting and watering. Survival rates are variable, and weeds have to be managed. Plantings, therefore, need to be warranted to expend all that energy.

With consistent ANR management, maintenance is initially high but is reduced to very low levels in the long-term. The objective is to create a biodiverse natural area, as near as possible to being self-sustaining. So the message is, while you may need to reintroduce species by seeding or planting, before doing these things, examine your site in detail and try regenerating first.

Accessing further information on ANR

If there is an industry-experienced teacher in your area, a course in Natural Area Restoration (Conservation and Land Management) is an excellent place to get started. It is very practical and equally suited to people who administer grants and implement catchment action plans, as well as people working on the ground.

When applying for grants, stipulate involvement by qualified regeneration practitioners. There are increasing numbers of bush regeneration contractors, many of which will travel out of area to work. Form partnerships with tertiary institutions to devise evaluation studies which compare ANR approaches with other approaches. A major issue for achieving good outcomes for Australia's biodiversity is the current funding system which is based on short-term grants which favour planting when natural regeneration which requires longer time frames may be more appropriate.

Join a Bushcare or Landcare group which is supervised by an experienced regenerator to learn the fundamentals. It's the on-the-ground effort which provides the satisfaction of seeing the bush return.

Conclusion

Australia is now a dual landscape - natural (in varying degrees of health) and modified - requiring different management skills. Assisted natural regeneration provides land managers with the skills and confidence necessary to care for natural areas while allowing for flexibility and diversity of approaches, experimentation and new ideas. Whatever the approach, it will necessarily enhance observation and identification skills, encourage a greater understanding of the local native vegetation (and its interactions with fauna), and, importantly, develop an ability to assess its condition. It also helps people to develop a sense of place as vegetation is so variable across Australia and combinations of species are often so unique to particular geographic areas. Degradation of the Australia's natural environments has been occurring over 200 years: it needs a long-term view to turn the tide.

Thanks to Dr Tein McDonald for editing assistance.

References

- Bower H and Parkes T (2002) The Big Scrub Rainforest Landcare Group – Northern NSW. *Ecological Management & Restoration*. 3:1, 73-84
- Bradley J (1971) Bush Regeneration. Mosman Parklands and Ashton Park Association, Sydney
- Buchanan, R 1989 TAFE NSW Bush Regeneration. Recovering Australian Landscapes Davidson I, Scammell A, O'Shannassy P, Mullins M and Learmonth S (2005) Travelling stock reserves: refuges for stock and biodiversity?. *Ecological Management & Restoration* 6:1 pp 5-15
- Davidson, I (2006) Harnessing nature to improve sustainability. *Ecological Management & Restoration*, 7:3 (in press).
- James, T.A., 1994, Observations on the effects of mowing on native species in remnant bushland, western Sydney, *Cunninghamia*, 3:3, pp 515-519.
- Jensen, A. (2002) Repairing wetlands of the Murray River: Learning from wetland practice. *Ecological Management & Restoration*. 3:1, 5-14
- McDonald, M. Christine, 1996, *Ecosystem resilience and the restoration of damaged plant communities: A discussion focusing on Australian case studies*. Ph.D. Dissertation, University of Western Sydney.
- McDonald, T., 2000, Strategies for the ecological restoration of woodland plant communities: Harnessing natural resilience. Pages 286-297 in Hobbs, R.J and Yates, C. J. (eds), *Temperate Eucalypt Woodlands in Australia: Biology, Conservation, Management and Restoration*. Surrey Beatty & Sons, Chipping Norton
- McDonald T, Wale, K and Bear V. (2002) Restoring Blue Gum High Forest: Lessons from Sheldon Forest. *Ecological Management & Restoration*. 3:1, 15-27
- National Trust Bush Regenerators' Handbook: contact www.nsw.nationaltrust.org.au/bush
- Pallin, N. (2000) Ku-ring-gai Flying-fox Reserve Habitat Restoration Project, 15 years on. *Ecological Management & Restoration*. 1:1, 10-20.
- Pidgeon, I.M. and Ashby, E., 1941, Studies in applied Ecology. 1: A statistical analysis of regeneration following protection from grazing, Proceedings of the Linnean Society of NSW, Vol LXV, pp 123-143
- Prober, S.M., Theile, K.R. and Higginson, E. (2001) The Grassy Box Woodlands Conservation Management Network :Picking up the pieces in fragmented woodlands. *Ecological Management & Restoration*. 2:3, 179-188
- Rhodes, D.W. 1987, Vegetation Response and Productivity Improvements Under Waterponding, *Journal of Soil Conservation, NSW*, 43:2, pp 62-67
- Stockard, J., Nicholson, B and Williams, G, 1985, An assessment of a rainforest regeneration program at Wingham Brush, New South Wales, *The Victorian Naturalist*, 103:3, pp 84-93.
- Woodford, R., 1993, Rainforest regeneration on the north coast, Bushland in our Cities and Suburbs - Part 2: Making Bush Regeneration work, Nature Conservation Council of NSW, pp 47-52.
- Woodford, R. (2000) Converting a dairy farm back to rainforest: the Rocky Creek Dam Story. *Ecological Management & Restoration*. 1:2, 83-92.

The Veg Futures conference

Veg Futures: The Conference in the Field was held in Albury NSW in March 2006. It was organised by Greening Australia and Land and Water Australia.

The conference focussed on five questions confronting the management of native vegetation:

- What is the role and value of native vegetation in the regional landscape?
- Who pays for native vegetation management?
- How do we balance conservation and production?
- What are we doing about the threats to native vegetation?
- How do we know if we are making a difference?

The proceedings are available at live.greeningaustralia.org.au/veg-futures/

Cryptogams – fun with mosses, lichens and liverworts

From a presentation by David Eldridge for AABR. August 2006.

Notes and photos by Virginia Bear, with help from Danie Ondinea.

What are Cryptogams ? - plants that produce spores instead of seeds.

David Eldridge's research interest is their ecological role in Australia's arid and semi arid environments where, in healthy ecosystems, lichens mosses and liverworts form living crusts that cover large areas of the soil surface.

Soil Crusts:

- protect soils against wind and water erosion
- provide a niche for animals – eg. mites
- enhance soil nutrition – nitrogen, carbon
- act as sinks for soil carbon
- enhance soil nutrition
- influence water flow through soils
- influence germination and survival of plants (and disadvantage the germination of exotic plants)
- indicate the health of the landscape

When the system is degraded, the crust helps hold the soil together and increase water infiltration. The crust is especially critical on sandy soils, less critical on loamy and clayey soils.

If you keep the soil crust, you keep the soil and the soil nutrients. Lichens provide micro-catchments which capture moving soil and stop it washing or blowing away. Curling and uncurling mosses trap sand and silt.

Where there are clumps of shrubs among the soil crust, the crust channels rainfall to the shrub clumps.

Management (based on work in Western NSW)

Fire: Soil crusts continue to establish for about 15 years, when they reach their maximum extent. If you burn every 15 years you can maintain a good thickness of crust. If you burn every year, you'll destroy the crust.

Fire destroys organic compounds which bond and hold onto sand grains.

In Yathong Nature Reserve, mosses then lichens returned about a year after a fire. One moss comes up immediately after fire.

To aid return after fire, reduce trampling.

Trampling: Trampled areas such as stock water points watering points, or heavily grazed land have no crust, and have high levels of nitrogen from stock dung. Add rain and there will be exotic weed regrowth.

(David noted that it can now be shown that lowering stocking rates can sometimes increase farm income - because the soils and the stock are in better condition.)

Crusts are more resistant to trampling when they are wet. When dry they break easily and too much fragmentation will kill them.

Regeneration of soil crusts: The spores are all around – so leave the soil undisturbed.

David has done experiments to help reestablish moss: putting moss through a blender with milk (high ph) and spreading it onto the soil.

... but generally just leave them - they will come back.

Glyphosate does not affect mosses.

Mosses

Are 3-dimensional. They look like plants; being green, with leaves and stems.

The early stages of moss growth is a "green wash."

Liverworts

Are more 1-dimensional, don't have central vein (mosses, in general do)

- need free water to reproduce
- grow on rocks and branches
- open and close as dry out and rewet
- Some select niches to best harvest rainwater

Liverworts are probably oldest landplants in Australia.

Lichens

Are generally not green.

Lichen = fungi + algae. Sometimes the algal component is a Cyanobacteria e.g. in *Collema*, a black coloured lichen common in Western NSW that produces its own nitrogen and acts as a pioneer in the landscape.

Some have chemicals to stop them being eaten by predators e.g. *Caloplaca* - a yellow lichen found on the coast.

Some reduce their temperature by reflecting light. E.g. Bird Dropping Lichen *Diploschistes*.

Some leafy lichens don't reproduce sexually – bits break off and grow.

Lichens are sensitive to pollution.

Some were used by indigenous Australians as a poultice, etc.

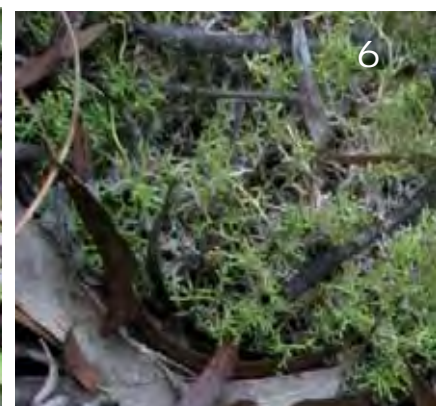
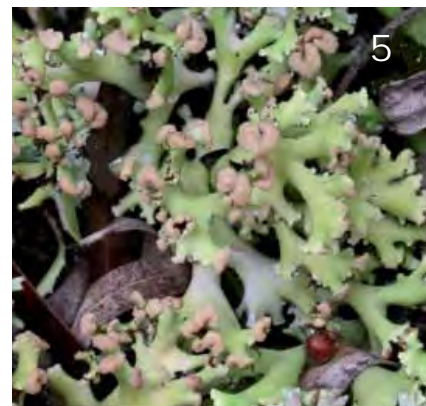
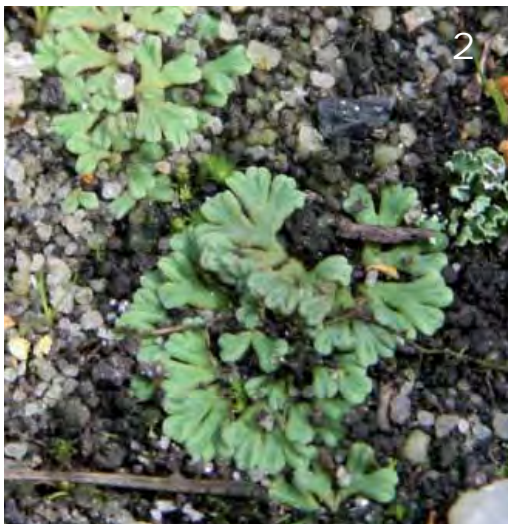
Classification Lichens are classified according to their shape as well as their chemical composition.

Only a tiny proportion of Australia's lichens are endemic. Their tiny spores are carried around the world on air currents. The same species may grow in the Amazon, western NSW, and the site we visited at La Perouse.

Lichenography. Lichens grow at a slow steady pace, and can be used to date objects, e.g. in forensic science. Lichens of known age, such as those growing on gravestones with dates, are measured and compared to those to be dated.

We visited a remnant of Eastern Suburbs Banksia Scrub at Jennifer St, La Perouse (part of Botany Bay National Park) and found a variety of cryptogams including:

- 1 *Campylopus introflexus* one of southern Australia's most common mosses. Upper parts of the leaves taper to a long hair point - these grab water and drag it in.
- 2 *Lophocolia* sp. liverwort
- 3 *Riccia* sp. liverwort
- 4 *Cladonia* sp. lichen with distinctive bright red apothecia (fruiting body)
- 5 *Heterodea muelleri* lichen
- 6 *Cladia* sp. lichen



For a write up of a previous talk given by David Eldridge *Soil Crusts - Nature's Soil Fixers* see AABR news 68 Feb 2000, or the seminar section at www.aabr.com
 Australian National Botanic Gardens has a new lichen site with keys and photos: www.anbg.gov.au.

Events and Conferences

Date	Title / Details	Venue	Organiser	Contact
September	Biodiversity month. Various community events. Free publications and resources available from DEWR.		Dept of Environment and Water Resources	www.environment.gov.au 1800 803 772
September 3-7	Landcare Week			
September 7	National Threatened Species Day. To raise community awareness about the plight of threatened species in Australia and encourage participation in conservation activities. Exhibitions and festivals, displays, guided walks, workshops etc.			Free information kits from DECC environment@environment.gov.au, or freecall 1800 803 772.
September 17-21	9th International Conference on the Ecology and Management of Alien Plant Invasions (EMAPi9)	Hyatt Regency Perth		www.congresswest.com.au
Wednesday September 19 1:00pm to 4:00pm	Walk and Talk: Vegetation Classification Survey Led by Chris Melrose	Field of Mars Wildlife Refuge, Ryde, Sydney.	AABR	RSVP essential as numbers are limited: Chris Melrose 9438-3635 or 0407 705 140
September 25-27 Early Bird Registration June 29	14th Biennial NSW Weeds Conference Outstanding local and national speakers, concurrent sessions a trade display and expo, field trips and practical demonstrations. The Conference attracts researchers and practitioners from all around the State and Australia and provides a wonderful opportunity to meet and extend contacts.	University of Wollongong, NSW	Illawarra District Noxious Weeds Authority, Wollongong CC, Shellharbour CI, Kiama	ICE Australia Pty Ltd 9368 1200 weeds2007@iceaustralia.com www.iceaustralia.com
Saturday October 10 7:00pm	Presentation Monitoring With Ian Perkins preceded by AABR AGM	Maiden Theatre, Royal Botanic Gardens, Sydney	AABR in association with CPC / ANPC.	Bookings preferred www.aabr.org.au or 0407 002 921
November 10 12:00-3:00	Seed collection workshop. With Ross Rapmund.	Hornsby Shire Council Community Nursery, Sydney	AABR	RSVP is essential as numbers are limited. 0407 002 921
December 3-9	Coastcare Week			

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.

AABR C/O Total Environment Centre, PO Box A176 Sydney Sth NSW 1235 Australia,
Ph 0407 002 921 Web: www.aabr.org.au Email: enquiries@aabr.org.au ABN 33 053 528 029

President

Matt Springall
president@aabr.org.au

Treasurer

Paul Ibbetson

Membership Officer

Danny Hirschfeld
membership@aabr.org.au

Secretary

Heather Stolle

Committee

Wendy Kinsella
Jane Gye
Peter Dixon
Elisabeth Dark
Chris Melrose
Bronwyn Englaro
Tim Baker

North Coast Sub Committee

Mike Delaney 02 6621 9588
miked@envite.org.au

Newsletter Committee

Virginia Bear
newsletter@aabr.org.au
Louise Brodie
Warren Jack

To keep in touch and be notified about events subscribe to **Bush Regeneration**, or **Bushcare** List Servers and check out **Solutions**, the Bush Regeneration Bulletin Board. See website for details

AABR Newsletter Subscription

(Open to all interested people)

\$20:00

AABR Membership

(Open to appropriately qualified & experienced bush regenerators)

\$25:00

AABR Contractors & Consultants List

(Open to appropriately qualified & experienced bush regenerators)

\$25:00

Newsletter contributions and comments are welcome, contact Virginia Bear newsletter@aabr.org.au or phone 0408 468 442

Opinions expressed in this newsletter are not necessarily those of AABR