

Urban Royal Botanic Gardens Melbourne 

Spotlight

The Newsletter of the Australian Research Centre for Urban Ecology

Volume 1, Number 1

April 2000

Introduction.....1
Who (Or What) Is ARCUE?1
The ARCUE Team.....3
Additions To The Team.....4
Occasional Papers5
Partnerships.....5
Staff Activities6
ARCUE Research.....6
Upcoming Events7
Interesting Web Sites.....8
Opinion9

INTRODUCTION

Welcome to edition one, volume one of *URBAN SPOTLIGHT*. In this first edition we will introduce readers to the staff and activities of the Australian Research Centre for Urban Ecology (ARCUE). We will explain what we do and discuss current projects. We will also highlight activities we have worked on with other groups and provide a calendar of upcoming events.

After reading *URBAN SPOTLIGHT*, please don't hesitate to pass it on to others. If you would like to receive *URBAN SPOTLIGHT*, please complete and post the form provided on the last page.

WHO (OR WHAT) IS ARCUE?

The Australian Research Centre for Urban Ecology is a Division of the Royal Botanic Gardens Melbourne. With support from The Baker Foundation, the Royal Botanic Gardens created ARCUE in 1998.

The Royal Botanic Gardens decided to develop ARCUE to advance knowledge about, and conserve biodiversity in, natural habitats associated with populated areas, thereby aiding land managers in maintaining natural ecosystems in urban environments and enhancing the quality of life for people living in cities and towns.

Currently ARCUE has office and lab space in the School of Botany at the University of Melbourne and has a field laboratory at the Royal Botanic Gardens, Cranbourne.

WHAT DOES ARCUE DO?

The scope of ARCUE's overall activities encompasses basic and applied research, undergraduate, honours and postgraduate training, long-term ecological studies, community education and training programs, policy and management advice to all levels of government and consultancy services. ARCUE is concentrating its initial work efforts on the ecology of urban areas throughout Australia.

The dictionary defines urban as "*of, relating to, characteristic of, or constituting a city*". Technically, geographers categorise any areas of

the world with over 620 individuals per km² as "urban".

ARCUE takes a broad view of the term urban. The cities and surrounding areas of Melbourne, Sydney, Canberra, Adelaide, Perth, Darwin, Brisbane and Hobart are its principal areas of concern. As these cities expand, the corridors of new developments will also be included in our work.

THE SCOPE OF ARCUE'S ACTIVITIES

Research:

ARCUE is addressing both basic and applied ecological issues in urban and suburban landscapes within a diversity of sub-disciplines. A number of potential research topics we are considering are:

- The physiological response of plants and animals to urban environments;
- The effects of landscape fragmentation on ecosystems; and
- The role of anthropogenic (human caused) disturbance.

Conservation and Restoration:

ARCUE believes that successful conservation and restoration of urban natural areas involves maintaining natural ecosystem processes while minimising human impacts. Three of the most significant issues associated with human impacts on urban natural areas are the alteration of natural disturbance regimes, the naturalisation of non-indigenous species and the preservation of native species. ARCUE is intending to:

- Explore the use of a number of different restoration techniques (such as fire), designed to recreate natural disturbance regimes;
- Explore the complex interactions between non-native plants and animals and the Australian environment;
- Develop conservation and restoration programs that investigate ecologically sound management techniques encouraging the survival of native species and control of invasions by non-indigenous species.

Education:

Educating people about the biological, ecological and social benefits of maintaining viable natural environments in urban areas is an important component of ARCUE's mission. Developing knowledge about the structure and function of urban natural areas is our first step in the education process. Our second step will be to transfer our results into forms that can be readily used by the general public, students of all ages, teachers, government officials and land managers.

DID YOU KNOW?

The Growth of Urban Areas:

Throughout the world the number and size of urban areas are increasing. Today over 80% of the Australian population lives in urban settlements and it is predicted that by the year 2025 it will reach 88%. It has also been predicted that by 2025 over 60% of the world's population will be living in urban settlements. Currently in Victoria, 87% of the population lives in urban areas.

The growth of urban areas in Australia has already produced significant environmental impacts.

Australians have custodial responsibility for 8% of the world's biota, but for a variety of reasons have poorly protected them.

In the past, clearing land for agriculture caused most extinctions but now many plants and animals under threat occur in urban areas.

In the Melbourne region alone some 70 plant species have already become locally extinct. These extinctions are most likely caused by a loss of habitat. The preservation of Australia's natural heritage within its expanding cities will be a major challenge for the new millennium.

THE ARCUE TEAM

Currently ARCUE includes:

Dr Mark McDonnell - Director

Mr Nick Williams - Research Officer

Ms Emma Leary - GIS Officer

Ms Amy Hahs - PhD Student

Ms Jodi Braszell - Research / Admin Assistant

Ms Gemma Phelan - Honours Student

Mr Ben Hamilton - Honours Student



The ARCUE team from left: Ben Hamilton, Emma Leary, Nick Williams, Jodi Braszell, Mark McDonnell, Amy Hahs and Gemma Phelan

MARK MCDONNELL

B.A., M.S., PhD

Dr McDonnell's role is that of ARCUE Director. He also serves as a Divisional Director at the Royal Botanic Gardens, Melbourne. Mark's interests range widely and include the processes driving vegetation change, landscape ecology, the structure and function of ecological systems in urban and suburban environments and the conservation and restoration of urban and suburban natural areas. He is also an associate editor of *Urban Ecosystems* and is on the Editorial Board of the new Ecological Society of Australia journal entitled *Ecological Management and Restoration*.

Other professional activities have included serving as treasurer of the International Association for Landscape Ecology and on advisory panels for the U.S. National Science

Foundation, the U.S. National Academy of Science and the New York City Department of Parks and Recreation. He has published over 60 scientific papers, reviews, reports and articles and has presented over 100 scientific papers in the United States and around the world.

NICK WILLIAMS

B.Sc. (Hons), B.A.

Nick serves as ARCUE's Research Officer. He is responsible for managing the laboratory and conducting ecological research. His tasks are very diverse and consist of collecting data, preparing and editing reports, assisting with the supervision of ARCUE's Honours students and contributing to the design of our research programs. He played a major role in the preparation of our recently released "Reference guide to ecology and natural resources of the Melbourne Region"

Nick brings to ARCUE extensive knowledge of the theoretical and practical aspects of plant ecology. His studies and previous employment with the Flora Research and Assessment section of DNRE enabled him to develop expertise in the areas of vegetation survey, data analysis and vegetation community mapping. Nick also has a through knowledge of the ecology of many Victorian vegetation communities, particularly those in the Melbourne area. His research interests include the landscape ecology of urban areas, ecological economics and the ecology of restoration and regeneration projects. He has a particular interest in vegetation management techniques and the control of environmental weeds.

EMMA LEARY

B. Surv. (Hons), M. Geom. Sc., Grad. Dip. Environmental Studies

Emma has been employed at ARCUE since May 1999, and in that time has been developing and integrating a Geographic Information System (GIS) within ARCUE. The integration of a GIS allows us to spatially analyse information relating to urban ecology and extract useful relationships from that information. Emma has had over four years experience in GIS applications development since graduating from her Masters degree and in

that time has worked on a wide variety of projects encompassing many fields and techniques.

Emma brings with her experience in; customised mapping projects for environmental-based clients using a variety of GIS software, GIS data structuring and analysis, the application of remotely-sensed image analysis, production of digital elevation models and project management skills.

AMY HAHS

B.Sc. (Hons)

Amy is a post-graduate student. She began her PhD project with us in March 1999. Her project is tentatively titled "*Melbourne's Urban Trees: An Ecological Investigation.*"

Amy has extensive research and horticultural knowledge, particularly the subtle environmental conditions that influence plant distribution and growth. This understanding, coupled with a detailed knowledge of the composition and structure of local indigenous plant communities, provides a solid base for designing and implementing ecologically based landscapes. Amy has also worked in the indigenous horticulture industry, which has enhanced her understanding of the individual plant species found in the basalt plain communities of western Melbourne.

Amy is the co-author of several publications, including the 1999 ARCUE release "A Reference Guide to the Ecology and Natural Resources of the Melbourne Region".

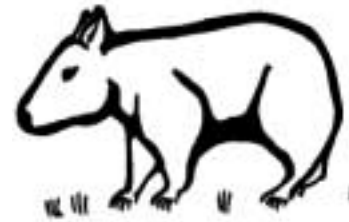
JODI BRASZELL

B.Sc. (Hons), Post-grad. Dip. Environmental Studies

Jodi is our Research and Administration Assistant. She is responsible for the administrative duties of the centre, assists in the production of reports and is also responsible for information and data collection and collation. Other key areas of responsibility include the preparation of educational and promotional materials and the development of content for our World Wide Web site.

Jodi began at ARCUE in November 1999 after five years working as an education and research

officer for the Swinburne University Science Education Centre, the Centre for Environmental and Applied Hydrology and the Institution of Engineers, Australia. She brings with her an extensive knowledge of science communication and education, environmental management research and administration. Jodi has significant knowledge of native fauna, particularly marsupials, and is keenly interested in their ecology in urban areas.



ADDITIONS TO THE TEAM

NEW SCIENTISTS

In early 2000 the ARCUE team will nearly double in size. We will be appointing a Senior Ecologist and a Post-Doctoral Research Fellow. We have recently begun the selection process for our scientists and will have a more detailed report in our next edition of *URBAN SPOTLIGHT*.

NEW HONOURS STUDENTS

We have also recently taken on two new Honours students. Our new students are Gemma Phelan and Ben Hamilton. Through their university studies, work and volunteer experiences, Gemma and Ben have gained a good working knowledge of native flora identification and surveying, plant ecology and monitoring activities.

Gemma's project is titled: "*Effects of Urbanisation on Remnant Heathland in Southeastern Melbourne.*" Ben's project is titled: "*Spartina Distribution and Ecology in Western Port Bay.*"

We look forward to working with them and will update readers throughout the year on their methods and findings.

ARCUE CONTACT DETAILS:

Should you wish to contact us, our details are as follows:

ARCUE

**C/o School of Botany
Melbourne University VIC 3010
Phone: (03) 8344 0146 / 8344 0267
Fax: (03) 9347 5460**

We also have an e-mail address:

E-mail: ARCUE@rbgmelb.org.au

OCCASIONAL PAPERS

BIODIVERSITY BIBLIOGRAPHY

In July 1999 Mark, Nick and Amy completed the compilation of a comprehensive bibliography entitled: "*A Reference Guide to the Ecology and Natural Resources of the Melbourne Region: A Bibliography of the Biodiversity Literature for Scientists, Teachers, Policy Makers, Planners and Natural Resource Managers*".

The *Bibliography* attempts to list all books, scientific journal articles, conference proceedings, consultant and organisational reports and articles in the popular scientific media that relate to the biodiversity within the Melbourne-Geelong Metropolitan area. The *Bibliography* includes published works associated with an area of approximately 14,400 square kilometres in the Melbourne Region.

The *Bibliography* is now available from the Royal Botanic Gardens, Melbourne Bookshop, and the Department of Natural Resources and Environment Bookshop (Victoria Street, East Melbourne) for \$15.

As no project of this kind can be totally complete, we are envisaging that our *Bibliography* will be an ongoing project, and future editions will be compiled. We are encouraging users of our *Bibliography* to contribute to future editions. If you have found a reference we have missed, and it is included in the scope and study area covered by the *Bibliography*, please send its complete details to us via e-mail, fax or post. It will be much appreciated!

PARTNERSHIPS

REVEGETATION FORUM

On the 5th and 6th of May, 1999, an Industry Training Forum titled: "*Directions in Revegetation and Regeneration*" was held at the Greening Australia Training Centre in Heidelberg. The Forum was developed and coordinated by Greening Australia and ARCUE. Its goal was to provide a venue for people to discuss the current state of the revegetation and regeneration industry in Victoria.

Over the course of the two days, a wide range of people presented their experiences and insights in this field. Topics for discussion came under the following themes:

- Practices and approaches used in the revegetation industry (rural and urban);
- Monitoring and evaluation - the different methods of monitoring revegetated sites and how their success is evaluated;
- Policy - the policies of government and non-government organisations towards revegetation and regeneration;
- Future directions - research and analysis issues and future developments in the revegetation industry

RESTORATION ECOLOGY WORKSHOP

Following the success of the Forum, a Restoration Ecology Workshop was held at the Royal Botanic Gardens in early December 1999. The Workshop was again co-sponsored by ARCUE and Greening Australia. A number of presentations were made on revegetation and regeneration techniques and current research. The direction in which future group activities should go was also discussed following the presentations.

A total of 130 people have so far attended the Forum and Workshop events, and a contact list is being compiled. We hope to circulate the contact list to participants once details are complete. The resolutions that have arisen from the Forum and Workshop are currently being collated for publication in a proceedings booklet. This booklet will be a joint publication between Greening Australia and ARCUE. We will advise

readers of its availability once the report is finished.

STAFF ACTIVITIES

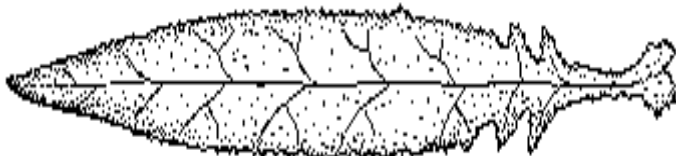
VISITING SCIENTISTS

Drs. Glen Guntenspergen & Janet Keogh:

Between November 21 and 23 1999, ARCUE hosted the visit of Dr Glen Guntenspergen and Dr Janet Keogh, who are Senior Ecologists at the U.S. Geological Survey Patuxent Wildlife Research Centre (Maryland, USA). Both scientists are interested in human impacts on ecological systems and are involved in the development of a research program in Maryland to study the effects of urban sprawl.

Whilst they were here we took them on a tour of native bushland remnants within the Melbourne area and shared our knowledge of urban ecology. All involved in the visit found it to be educational and entertaining and intend to keep the dialogue going between our two research groups.

If you are interested in their research and where they come from, please visit the web site: <http://www.pwrc.usgs.gov/default.htm>



Dr Richard Forman:

Dr. Richard Forman, PAES Professor of Landscape Ecology at Harvard University, was the University of Melbourne's Miegunyah Fellow during Autumn in 1999. He spent his time during his stay in the ARCUE laboratory. While in Australia, Professor Forman participated in field trips, interacted with staff, presented lectures and participated in a workshop at RBG Cranbourne on the topic of the application of landscape ecological principles to conservation management. Professor Forman is one of the leaders in the science of landscape ecology.

Dr Forman has published two seminal books in the field entitled "Landscape Ecology", which he

wrote with Michele Godron, and "Landscape Mosaics".

In June of 1999, the Royal Botanic Gardens hosted a dinner at Garden's House for Professor Forman and his wife Barbara. Guests included Minister Tehan, the Vice-Chancellor of the University of Melbourne and representatives from the Royal Botanic Gardens and the University of Melbourne's School of Botany, the Department of Landscape Architecture and the Department of Civil & Environmental Engineering.

Drs. Colin Meurk and Maria Ignatieva:

Dr. Colin Meurk, Scientist with Landcare NZ and Dr. Maria Ignatieva, Lecturer at Lincoln University, NZ, visited the Centre the week of May 3, 1999 with an interest in starting a similar centre in New Zealand and developing ties with ARCUE. The visit was very successful and we have maintained a close working relationship with both scientists. We will update readers on their activities as they come to hand.

ARCUE RESEARCH

MEASURING THE SUCCESS OF REVEGETATION PROJECTS

Since the late 1970s a growing environmental awareness has resulted in vegetation restoration works taking place in Victoria and other parts of Australia. As riparian vegetation was once extensive and common throughout the Melbourne region prior to European settlement, a number of restoration projects have concentrated on restoring these environments. Restoring riparian zones provides many ecological benefits in urban environments including erosion control, biological filtering, creating ecological corridors and conservation of indigenous species.

In recent times, the Natural Heritage Trust dedicated \$330 million to revegetation projects and protection of remnant vegetation activities. With such large sums of money involved, it is essential that quantitative and repeatable guidelines for the measurement of restoration success need to be developed.

Despite several techniques having been suggested, the success of restoration programs has rarely been methodically assessed in

Australia. Our first student to complete a degree with us, Luke Hynes, based his 1999 Honours project around this problem. Luke's objectives were to develop techniques to assess the success of riparian revegetation projects and use them to evaluate the restoration sites created and maintained by the Merri Creek Management Committee (MCMC).

The MCMC has produced what is widely accepted by the Melbourne community to be one of the most successful riparian revegetation programs. Their aim was to recreate vegetation communities similar to pre-European systems. Luke's assessment of their restoration success was undertaken in two parts:

- Assessing planting survivorship; and
- Comparing the restored plant community to pre-European communities.

Plant Survivorship:

To test for plant survivorship, Luke conducted surveys of 15 revegetation sites along the Merri Creek in the northern suburbs of Melbourne. The number of woody trees and shrubs present in the sites were counted and all plants (including seedlings and mature plants), were identified to species. He then compared plant numbers with those at first planting. The 1999 census found that plant survivorship ranged from 21% to 71%, with an average of 40%.

One of Luke's most important findings was that survivorship of plants is reduced if initial planting densities are high. He found that restorers should consider planting less than 3000 trees and shrubs per hectare to increase their plant survival rate. He also suggested substituting higher densities of grasses and herbs to provide weed suppression.

Community Comparison:

The second part of Luke's project involved describing the vegetation composition of revegetation and remnant sites and assessing the success of MCMC revegetation projects with respect to replicating pre-European vegetation communities. After extensive searching, seven remnant vegetation sites were selected and compared to 11 revegetation sites.

Using transect sampling, plant identification techniques and statistical analysis, Luke found

that there is a significant difference between remnant and created vegetation communities. This suggests that although planting design has changed over time, it has not yet moved towards successfully replicating remnant vegetation.

Luke recommended that changes must be made to current and future restoration projects with respect to planting design. He also suggested that restorers should carefully study the position and density of plants to best achieve restoration success.

Report Success and Availability:

Luke's project was extremely well received by his peers and assessors, gaining him a high first class Honours result. Once Luke has taken a well-earned break, he will be publishing his results. We will inform you of his progress.



UPCOMING EVENTS

CONFERENCES

A number of interesting conferences are coming up in the next few months. Please use the contact numbers or web sites listed if you are interested in finding out more about them.

- **June 1-2, 2000.** *A National Conference to Explore the Benefits And Practicalities of Conserving Biodiversity in Urban Environments. A Blueprint for the Future.*

Hosted by the South Australian Urban Forest Biodiversity Program, this National Conference in Adelaide addresses the need to look at all aspects of biodiversity in the backyard. It will focus on relationships between planning, open space, tiers of government, setting priorities and goals and community involvement. For more information please ring the South Australian

Urban Forest Biodiversity Program on: (08) 8372 0180.

- **6-7 October, 2000:** *Weed Expo/Show*

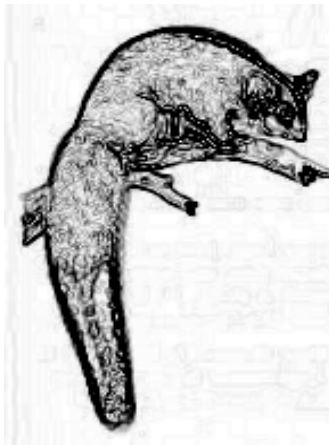
The names and dates are yet to be confirmed, but keep a look out for information on this event. Jointly organised by Greening Australia Victoria and the Weed Science Society of Victoria, it promises to be a large expo with workshops and trade displays.

- **October 18-20, 2000:** *International Conference on Multifunctional Landscapes: Interdisciplinary Approaches to Landscape Research and Management.*

Although not until the latter part of this year, this conference is worthwhile planning for now. Based in Roskilde, Denmark, the conference aims to provide a platform for different disciplines to meet, exchange ideas and methods and formulate recommendations for future landscape research in the next millennium.

For more details, please access the Centre for Landscape Research, University of Roskilde web site: <http://www.geo.ruc.dk/vlb/conference.htm>

If you know of any interesting conferences coming up, please don't hesitate to inform us of them. Send us an e-mail, or phone us with the details.



INTERESTING WEB SITES

In each newsletter we will list three or four relevant and interesting web sites. They are likely to cover a wide variety of topics, ranging

from landscape ecology and urban conservation issues to GIS applications and similar research groups to ARCUE. Again, if you have found a particular web site to be interesting and/or useful, please send us the details so we may share it with others.

- ***The Royal Botanic Gardens***

<http://www.rbgmelb.org.au/>

No first edition of our newsletter is complete without a reference to our own web site! For information on the structure of the Royal Botanic Gardens, its aims and research activities, please check out this site. There is also an ARCUE web site under construction. We will inform you when this comes on line.

- ***Urban Bushland in NSW***

<http://www.nccnsw.org.au/bushland/>

The Nature Conservation Council of NSW (NCC) is committed to the protection, conservation and effective management of urban bushland and biological diversity in NSW. NCC's bushland web site is currently focussed on the Sydney area. However, the site is being extended to provide resources on urban bushland and remnant native vegetation throughout NSW. It provides a very good overview of urban ecology activities in our neighbouring state and is well worth checking out.

- ***Greening Australia***

<http://www.greeningaustralia.org.au/>

Greening Australia is a nationwide organisation dedicated to working with farmers, community groups, land management agencies, schools and individuals to help meet the challenge of protecting and restoring Australia's native vegetation. The site offers links to its state branches and provides valuable information on land revegetation and regeneration, training courses and educates people on other land degradation issues.

OPINION

PRESERVING AND MAINTAINING NATURE IN MELBOURNE

Recent debates regarding urban planning and development proposals have often portrayed the preservation of natural areas and remnant vegetation within urban and suburban areas as being incompatible with any form of development.

Remnant and revegetated bushlands in and around Melbourne provide many societal and ecological services. In a landscape dominated by pavement and buildings, the natural habitats of Melbourne serve as oases of green teeming with a diversity of Australian plants and animals. Some of the most threatened organisms on the Continent still survive in remnant patches of vegetation within several kilometres of Melbourne's Central Business District. Often these distinctive patches of nature provide Melbournians with their day-to-day interactions with Australia's unique plants and animals, and thus serve as important educational resources. From a catchment and regional point of view, these areas provide what scientists call ecological services such as soil stabilisation, air purification, flood control, temperature amelioration, noise reduction and ground water recharge.

There is little doubt that Melbourne's landscape will continue to be altered by the building of roads, residential housing and industrial estates. If natural habitats are so important to Melbournians, how can we do a better job at preserving and managing these valuable resources?

Unfortunately, once native vegetation is destroyed the plants and animals that were once a part of the fabric of a neighbourhood are lost. How we manage these habitats and develop around them in the future will significantly affect how much of Australia's natural heritage we sustain for future generations of Melbournians.

The future debates should not be one of development vs. environment. Instead, we need to bring together citizens, developers, land managers, biologists and ecologists, as well as State and local governments, to create a truly

integrated development process that balances the need to preserve Australia's natural heritage with the economic realities of a growing urban area. A recent local example of this new approach to development is the creation of the Kinfauns Estates outside of Hastings that resulted in an economically viable business venture and the preservation of 80 hectares of remnant bushland.



Saving bushland is not so much an issue of resources, knowledge or abilities, as an issue of human values that focus more on short-term economic return as opposed to the long-term stewardship of the truly unique Australian landscape and its associated diversity of organisms. To maintain Melbourne as one of the most livable cities in the world we need to balance future development with the retention and ecologically sound management of our natural assets

Mark McDonnell - ARCUE Director



Printed on Recycled Paper

Urban Spotlight

To begin receiving Urban Spotlight or change your postal address, please e-mail us
or fill in the details below and post to:

ARCUE
C/o School of Botany
Melbourne University VIC 3010

Name: _____

Address: _____

Please tick box if indicating a change of address: