

# Overview of Symposia for ESA2007

## **SYM 1 Embedding an ecological approach in agricultural landscapes: a way forward.**

**Convenors** Kerry Bridle and Jann Williams

### **Abstract**

Private landholders are active managers of approximately 60% of Australia. The ecological benefits of natural elements in agricultural landscapes are still considered by many to be antagonistic or peripheral to farming interests, while many ecologists consider production landscapes to be inferior to more natural landscapes. Farm management depends on the preservation of natural processes yet for many production-focused land managers, understanding and management of ecological processes as diverse as water cycling, pollination and predation and the conservation of the native biota that perform these roles are seen as peripheral to management rather than being a core component of the farm business. Ecologists and farmers who have developed successful working relationships need to further promote interest in and enthusiasm for an ecological approach to agriculture. To support this aim, the benefits of natural resource and biodiversity conservation need to be measured, acknowledged and celebrated. This symposium aims to present examples of the ways in which 'brown' and 'green' are successfully working together in agricultural landscapes to develop solutions and communicate these efforts to each other and to the wider community.

## **SYM 2 Conserving biodiversity in species-rich temperate ecosystems**

**Convenor** Byron Lamont

### **Abstract**

Southwestern Australia is recognized as one of the 25 biodiversity 'hotspots' in the world. This means it has an exceptionally rich biota under threat from human activities. This symposium aims to do two things: document this biodiversity, and explore its dynamics, at the scales of populations, communities, landscapes and region. The pace and direction of dynamics is mainly controlled by the effects of annual drought (in an increasingly dry region), poor soils, stochastic fire, clearing for agriculture and mining, and biotic interactions involving competition, herbivory, seed dispersal and pollination. A key issue is understanding the mechanisms that allow so many plant species to coexist at the fine scale and the appropriate management requirements for species diversity conservation.

## **SYM 3 Ecology in suburbia: Conservation of biota in urban isolates**

**Convenor** Robert Davis

### **Abstract**

This symposium explores studies of insular biota in urban landscapes, examines the role of urban bushland in maintaining functional ecosystems and defines priority actions to managing urban areas for conservation.

Urban ecosystems have been often overlooked in ecology, yet bushland in urban areas has an important role in maintaining biodiversity as well as educational and aesthetic functions. With Australia's population growing rapidly and focussed on coastal regions, there is a dire need to define the role of urban bushland in biodiversity conservation and to define management priorities for maintaining viable populations.

For insular biota in urban landscapes, the matrix is complicated and diverse, presenting different degrees of permeability to different species dependent on their dispersal capacity and autecology. As in all fragmented landscapes, the maintenance of gene flow through a metapopulation is essential for population viability. Ecological investigations of dispersal and the use of a range of genetic techniques have provided an insight into the value of ecological linkages in urban landscapes and guidance on the design and nature of these connections.

## **SYM 4 Ecological impacts of extreme weather events on Australian ecosystems**

**Convenors** David Gillieson and Steve Turton

### **Abstract**

This symposium will examine impacts of cyclones on tropical ecosystems, drawing on research undertaken in northern Australia, the Caribbean, and the southwest Pacific. Discussion will include impacts on vegetation and fauna, and recovery processes in cyclone-prone terrestrial ecosystems, including likely effects due to climate change. Wind disturbance is an important ecological force in the tropics, especially in the cyclonic zones from about 7 to 20° latitude. Evidence suggests that the incidence of destructive windstorms may increase in the future, as a consequence of increasing sea-surface temperatures associated with global warming. Cyclones may indeed be a major driver of patterns in terrestrial ecosystems, with repeat disturbances on a decadal timescale. Wind disturbance may be especially severe in fragmented tropical forests because of their abrupt margins and exposed surrounding landscapes, which can lead to increased windshear and turbulence near fragment edges. Short- and long-term cyclonic impacts on faunal population size and distribution trends across the Wet Tropics bioregion, will be discussed in relation to implications for 1) future conservation and management of threatened species, and other highly mobile species; 2) potential effects on the quantity and quality of seed dispersal, seedling recruitment and pollination services; and 3) resulting negative and/or positive impacts on ecosystem function and recovery after cyclonic events.

## **SYM 5 Vegetation Condition**

**Convenor** Emma Gorrod

### **Abstract**

Vegetation condition measures quantify the value of land for biodiversity for the purpose of informing decisions. They have recently become an integral part of native vegetation management and land planning policy in Australia. As such, it is important to understand their strengths and weaknesses. At the symposium into vegetation condition at ESA 2005, interesting research into various aspects of vegetation condition measures was presented, including the development of techniques for mapping of vegetation condition, development and implementation of vegetation condition measures and the ecological basis of vegetation condition assessments. Much of this research was in its early stages, and in the interim new research has also commenced. This symposium will update the findings, and discuss future research directions, of ecologists researching vegetation condition.

## **SYM 6 Marine Connectivity: mechanisms and scales**

**Convenors** Paul Lavery, Glenn Hyndes and Mat Vanderklift

### **Abstract**

The role of marine productivity in supporting terrestrial productivity is well recognised, largely through the work of Polis and co-workers in the Gulf of Mexico which has led to the concept of 'trophic subsidies'. This recognition of trophic connectivity has led marine conservation managers and ecologists to incorporate connectivity into marine park design. However, our

knowledge on the mechanisms and scales of connectivity, both temporal and spatial, remains rudimentary. Connectivity among marine ecosystems is poorly understood, as are non-trophic connections such as genetic connectivity.

Understanding the connectivity of marine systems and the links between marine and terrestrial systems is crucial to sound management. It has been clearly demonstrated that, unlike many terrestrial systems, the scales of connectivity are large in marine systems ( $10^4 - 10^7$  m). Smaller-scales research reveals high levels of dependence of beach systems and unvegetated benthic ecosystems on inputs from distant marine habitat. Processes that lead to changes in production in those donor habitats, such as over-extraction, climate change or eutrophication, have the potential to affect distant recipient ecosystems. In dealing with change, therefore, it is crucial to understand the nature of ecosystems, including the connectivity to donor and recipient systems.

The symposium is intended to provide a forum for updating our knowledge in three areas:

1. demonstrating trophic or other linkages, either between marine systems or marine and terrestrial systems;
2. elucidating mechanisms of connectivity, especially focusing on comparisons of mechanisms in different ecosystems; and
3. quantifying scales of connectivity, both spatial and temporal.

## **SYM 7 Linking ecology, landscape and people for a sustainable future.**

**Convenors** Rachel Standish

### **Abstract**

The theme of the conference is the role of ecology in our changing world and the way that change is viewed, understood, managed and influenced. This symposium aims to contribute to this by demonstrating the important role that people play and need to play in sustainable natural resource management. Ecologists frequently study the direct impacts of human activities on natural ecosystems, such as changes to fire regime, deforestation, agriculture, and infrastructure development. Perhaps less considered in these studies is how indirect drivers, whether they are ecological, social, or economic, influence the degradation, conservation and restoration of natural ecosystems. Clearing for agriculture or urban development destroys habitat and alters nutrient and water fluxes within landscapes, but ultimately, the development and care of this land is driven by social and economic imperatives operating across a spectrum of scales, from the decisions of individual farmers to the global-scale dynamics of commodity systems. It is now widely recognised that both ecological studies and landscape planning need to be holistic in their approach and should consider multifunctional landscapes and transdisciplinary approaches to problem solving, as well as recognise that people are themselves an important natural asset. Sustainable natural resource management needs to be directed towards not only sustaining biodiversity in landscapes but also the economies and livelihoods that they support. This symposium will assemble a range of ecologists working in urban, rural, tropical and desert landscapes whose interests and expertise highlight the advantages of linking ecology, landscapes and people to achieve these goals in a changing world.

## **SYM 8 Prescribed Burning: Now ...And then?**

**Convenors** Trent Penman and Fiona Christie

### **Abstract**

Fire management is a contentious issue throughout Australia. Land managers attempt to balance economic, cultural, social and environmental factors in order to implement a prescribed burning strategy. If implemented correctly, prescribed burning strategies have the potential to enhance ecological values and protect people, property and assets. There is considerable

debate and limited data regarding what constitutes an appropriate and socially acceptable prescribed burning strategy.

This symposium has three broad aims:

1. To examine the knowledge regarding the impacts of prescribed burning strategies on flora and fauna across Australia;
2. To assess the appropriateness of current prescribed burning practices from ecological, fire control and community perspectives; and
3. Consider the future climate change scenarios and the implications for future prescribed burning practices and ecological processes.

This symposium will bring together fire ecologists from around Australia to discuss prescribed burning regimes. It is acknowledged that current fire management strategies vary across Australia and differences between ecosystems and landscapes should be highlighted. Participants will bring together current knowledge relating to the ecosystem(s) in which they work and present new data, where available. Areas requiring further research should be identified.

## **SYM 9 Whole of landscape conservation in Australia using WildCountry connectivity principles: approaches and case studies**

**Convenor** James Watson

### **Abstract**

Conservation and restoration of biodiversity is a great challenge facing Australia. In this symposium, we describe case studies based on the WildCountry vision. WildCountry was inspired by the USA Wildlands project and a volunteer council of conservation scientists (the WildCountry Science Council, WCSC) was formed to help develop a sound scientific basis for WildCountry. The central philosophy of WildCountry science is the importance of large scale and long term ecological processes that drive and enhance 'connectivity' between ecosystems and species. In the WildCountry context, connectivity draws attention to large scale phenomena and processes that contribute to the maintenance of landscape ecological function. As such, the WCSC aims to integrate continent-scaled, ecological and evolutionary-time span considerations of ecosystem processes into conservation planning at national, regional and local scales. They also argue that it is imperative that protected areas are embedded within a broader landscape matrix in order to build upon and complement the anchors provided by the protected area network and the need to incorporate the impacts of rapid climate change into conservation planning. This requires cross-tenure and multi-stakeholder approaches to conservation planning on a regional basis.

This symposium will describe a number of projects and regional case studies that utilises the WildCountry conservation science and philosophy.

An important component of landscape-scale approaches to conservation is that they provide examples of collaboration between a range of organisations, agencies, communities, governments and individuals with responsibilities for land stewardship. Ultimately, these projects and case studies reflect the need for (i) significant improvement in off-reserve management and in the extent and management of the protected area network; (ii) community engagement to catalyze and sustain partnerships capable of developing and implementing conservation assessment, policy, planning and action; and (iii) recognition that assessments, policy, plans and management must be based on scientific principles designed to ensure the long term conservation of biodiversity.

## **SYM 10 Long-term Research and its Benefits for Theory and Management**

**Convenors** David Lindenmayer and Mr Julian Reid

### **Abstract**

Customary research, funding and political cycles of one to three years can be a barrier to gaining insights into the ecology of plants and animals that are long-lived or communities and ecosystems that undergo long-period and variable dynamics. Short-term observations and manipulative studies can lead to limited or misdirected conclusions about the most important regulating and driving processes affecting populations and whole ecosystems. In many Australian environments rainfall varies greatly over multiple time scales which in turn leads to highly variable population dynamics and ecosystem behaviour, as a response to a whole host of entrained 'system-driving' (e.g. flooding, drought and fire) and ecological processes (e.g. reproduction, dispersal, mortality, mutualisms, trophic cascades). As the longer term effects of excessive habitat removal and fragmentation continue to bite, and with climate change an accepted reality, how will Australian plants and animals (and the communities and ecosystems they form) respond and adapt? This symposium aims to be an Australian showcase for focussed long-term research and resulting knowledge gains that have added to ecological theory, improved species or ecosystem management, or enhanced ecological understanding of important, long-term dynamics and processes. The value of experimentation within long-term programs will be addressed.

## **SYM 11 Monitoring Ecological Change**

**Convenors** John Kanowski, Sarah Boulter and Carla Catterall

### **Abstract**

This symposium seeks to bring together current approaches to monitoring change in ecosystems and their components. Monitoring lies at the core of understanding both natural and anthropogenic ecological change. Ecologists in the 21st century are faced with an increasing prevalence of human modification and manipulation of environments, together with a growing realisation that even apparently unmodified ecosystems may be in a state of flux, and awareness of the looming but largely unpredictable impacts of global warming. In this context, there is a need to better develop and apply effective approaches to ecological monitoring. To do so involves dealing with complexities such as the identification of appropriate scales of space and time, the choice of meaningful target attributes, limitations in available resources, statistical detection of trend and change, and incompatibilities between the timeframes of research projects and long-term ecological change, and between the needs of policy-makers and the criteria for rigorous research outcomes.

At local scales, monitoring projects have included opportunistic revisits to old research sites, planned long-term ecological research sites (rare in Australia), and attempts to reconstruct history. At wider scales there have been organisational initiatives in regular broadscale assessment of vegetation cover and community-based surveys. Policy-makers are increasingly expecting rigorous monitoring to assist with issues such as state of the environment reporting, threatened species management, and returns on investments in ecological recovery. How effective are current methods, what changes are they revealing, and what is most needed to better monitor and predict ongoing changes and the impact of management? Presentations in this symposium may cover case studies or more general treatments of any of these issues, potentially including:

- indicators
- design and analysis
- spatio-temporal scaling issues
- monitoring tools and initiatives
- community based monitoring
- the role of monitoring and its relationship to process and prediction.

## **SYM 12 Indigenous adaptive management of country: integrating Indigenous peoples' knowledge and practices for sustainability**

**Convenor** Rosemary Hill

### **Abstract**

This symposium will provide insight into Australian Indigenous peoples' knowledge and practices relevant to environmental management. Cultural diversity is a major influence on natural resource management globally. Some highly innovative approaches by Indigenous peoples in applying their ecological knowledge and skills are emerging in Australia. Important examples include Indigenous Protected Areas, sea-country plans, Indigenous natural and cultural resource management plans, integrated culture and conservation frameworks and cultural mapping projects. Many Indigenous peoples' management approaches globally are gaining recognition as sophisticated adaptive co-management systems that have produced sustainable outcomes for bio-cultural diversity over very long periods. These adaptive systems rely on management practices based on Indigenous ecological knowledge, supported by social systems embedded in a profoundly spiritual world view that emphasises reciprocity. Many Indigenous peoples regard culture and customary law as a central foundation to sustainability into the future. However, engagement mechanisms in Australia are still poorly developed and Indigenous knowledge and skills remain marginalised from many of our environmental management approaches. The symposium provides an opportunity for co-learning and the identification of better ways to support sustainable Indigenous management and initiate more effective intercultural engagement processes.

## **SYM 13 Genetic assessment of the effects of environmental change on mating and dispersal.**

**Convenors** David Ayre and Siegy Krauss

### **Abstract**

In response to anthropogenic changes to natural ecosystems, understanding and managing impacts increasingly requires monitoring. Genetic tools and data can provide valuable and sensitive information on impacts that is often unattainable by other approaches. Key population processes impacted by environmental change include dispersal and mating. An understanding of dispersal is critical to an understanding of the viability of populations within fragmented landscapes impacted by climate change. Monitoring of mating systems provides a sensitive indicator of impacts on future levels of genetic variation. In this symposium, case studies from plants and animals will be presented that demonstrate the utility of molecular tools for addressing relatively intractable issues in ecology, in the context of genetic monitoring of impacts of environmental change.

## **SYM 14 Can pastoralism using ungulates be reconciled with conservation of the Gondwanan landscapes of Australia?**

**Convenor** Angas Hopkins

### **Abstract**

The landscapes of Australia are unique in having evolved without the presence of ungulates. Sheep, cattle and goats were introduced at the time of European colonisation and subsequently the so-called rangelands were open up for grazing. The legacy of these decisions is the vast tracts of Australia's Outback that are now degraded, and the critical habitats that have been lost. To what extent is the legacy redeemable, and what potential is there for a pastoral industry to fit landscapes and achieve ecological rejuvenation? Was the late Graeme Caughley correct in asserting that pastoralism and conservation ("wise use") are entirely incompatible? If so, on what basis and which studies support or contradict this conclusion? If not, what options

offer promise and how can they be encouraged? What evidence is there that degradation is not inexorable and beyond the practical limits of feasible intervention?

We propose to organise a forum to discuss four key questions:

1. Is Australia evolutionarily and/or ecologically predisposed to degradation from pastoral activities based on ungulate grazers? Why?
2. Is rangeland degradation inevitable or is there a patterning and method of ecological pastoralism that can care for special features and provide a biodiversity-friendly, connective matrix?
3. What non-ecological drivers exert influence and can they be part of a solution to rangeland degradation? What roles for whom?  
and finally
4. Is, or *can*, the pastoral use of rangelands be in the wider community's interests? What key changes are needed and why?

We plan to pre-circulate papers from invited and submitting presenters to provide background to the forum discussions. Papers will be organised in five themes:

1. Gondwanan evolution of the Outback's in relation to grazing regimes;
2. Fundamental drivers of Australian Outback ecology;
3. The legacy of commercial pastoral development;
4. Caughley's saltpeter or some potential for progress? and
5. Degradation and recovery: an ecological issue or symptoms of wider dysfunction?

Brief overviews of the pre-circulated papers will be given at the commencement of the forum session. Then we will move into a facilitated, open discussion/ forum session to address each of the listed key questions. The facilitator or a scribe will attempt to rapidly synthesise the discussion and draw out conclusions. Finally, a formal report will be developed and sent in draft form to those indicating an interest in reviewing the forum outcomes. We may well then publish these outcomes if that is the general wish of the participants.

## **SYM 15 Who, how, why? The role of the public in ecological science.**

**Convenor** Jason Alexandra

### **Abstract**

Public concern for endemic ecology, 'the environment' and the impacts of climate change are considerable. However, are there channels that this concern can be harnessed via to provide support for science focussed on key threats and issues for evidence based management? The symposium seeks presentations on models and methods for engaging the public and to explore the benefits and limitations of citizenry in science. How does involving people in ecological research benefit science, society, managers and the participants?