Conservation Planning Symposium

Symposium Program and Abstracts

Perth, Western Australia

27-28 September 2006

Southwest Australia
Ecoregion Initiative

Southwest Australia Ecoregion: Australia's only global biodiversity hotspot

A tiny fraction of intact remnants of habitats on Earth—just 2.3% of the earth's surface—is home to more than half of the planet's living species. These areas are also among those that are most threatened. These are the global biodiversity 'hotspots': the richest reservoirs of plant and animal life on Earth. To qualify as a hotspot, a region must meet two strict criteria: it must contain at least 1,500 species of vascular (higher order) plants (> 0.5% of the world's total) as endemics, and it has to have lost at least 70% of its original habitat.

The Southwest Australia Ecoregion is one of 34 global biodiversity hotspots recognised by Conservation International. It is Australia's only global hotspot, recognised worldwide for its wealth of natural diversity, particularly in plants, and the high degree of threat to this important natural resource. The Southwest Australia Ecoregion is thus a significant part of the planet's natural heritage, and the conservation of the biodiversity of this globally significant area is the responsibility of all Australians.

Southwest Australia Ecoregion Initiative

In 2003, a consortium of stakeholders with an interest in conservation planning at an ecoregional scale formed the Southwest Australia Ecoregion Initiative to advance the recognition of the global significance of this highly biodiverse region and the threats to its long-term survival. The consortium comprises relevant government agencies, environmental non-government organisations, universities, research institutions, local government and community representatives. Members of the consortium value the importance of collaborative conservation action across the Ecoregion, and the role of partnerships as the most effective means of undertaking broad-scale, ecoregion-wide conservation planning and action. A dual role for the partnership program has been identified: to provide a collective view on the value of the biodiversity of the Southwest Australia Ecoregion, and to chart a way forward that will ensure the conservation of the Ecoregion and its biodiversity and invaluable natural resources.

Conservation Planning Symposium

The Conservation Planning Symposium presents a number of biodiversity conservation planning approaches and tools to provide information to any individual or organisation engaged in biodiversity conservation planning, threat analysis, target setting and prioritisation. It will also allow relevant stakeholders to make an informed decision about valid approaches and tools to be utilised in developing a biodiversity conservation planning strategy for Southwest Australia.

Cover photograph: Waychinicup National Park, Southwest Australia Ecoregion. The Park has a high diversity of plants and is home to a number of threatened fauna species, including Noisy Scrub-bird (*Atrichornis clamosus*), Western Whipbird (*Psophodes nigrogularis*) and Western Bristlebird (*Dasyornis longirostris*) and one of the few mainland populations of the Quokka (*Setonix brachyurus*). Photograph by Martin Gole.

Conservation Planning Symposium Program

Day 1: Wednesday 27 September 2006

8.00am	Symposium registration - Perth Convention Centre
8.30am	Welcome by Ken Atkins (Department of Environment and Conservation) Welcome to Country by John McGuire
9.00am	Symposium launch Hon. Mark McGowan, Minister for the Environment

Large-scale biodiversity conservation in context

9.15am	*Western Australian State biodiversity conservation* Gordon Wyre (Department of Environment and Conservation)
9.45am	*The Southwest Australia Ecoregion: a global biodiversity hotspot* Richard McLellan (WWF-Australia)
10.15am	Morning tea

Issues in large scale biodiversity conservation planning

10.45am	*Landscape and regional scale stresses and threats* Richard Hobbs (Murdoch University)
11.15am	*Biodiversity values in conservation planning* Ken Wallace (Department of Environment and Conservation)

Biodiversity assets and related conservation planning issues

11.45am	*Floral treasures of Southwest Australia: past, present and future* Greg Keighery (Department of Environment and Conservation)
12.15pm	Lunch

Biodiversity assets and related conservation planning issues (cont'd)

1.15pm	*Wetlands and aquatic invertebrate biodiversity in the Southwest Australia Ecoregion* Stuart Halse (Department of Environment and Conservation)
1.45pm	*Southwest Australia Ecoregion mammals: richness, decline, threats and recovery* Andrew Burbidge (Department of Environment and Conservation)

2.05pm *Conservation planning for birds in Southwest Australia*
Allan Burbidge (Department of Environment and Conservation)

2.25 pm *Geographical patterning of reptiles in Western Australia with a focus on the Southwest*
Mark Cowan (Department of Environment and Conservation) and Ric How (Western Australian Museum)

2.45pm *Frog diversity in Southwestern Australia: the future*
Dale Roberts (University of Western Australia)

3.05pm Afternoon Tea

Systematic conservation planning

3.45pm *Systematic conservation planning: achievements, case studies, and some remaining challenges*
Bob Pressey (University of Queensland)

Conservation planning tools

5.30pm *Optional demonstration workshop: conservation planning tools software*
Bob Pressey (University of Queensland)

Day 2: Thursday 28 September 2006

Conservation planning: theory, tools and application

8.45am *Defining a regional conservation vision and taking action: The Nature Conservancy's approaches for ecoregional assessments and conservation action planning*
Jonathan Higgins (The Nature Conservancy)

9.45 am *Conservation planning software: why you need to use it, and why you need to worry about using it*
Bob Pressey (University of Queensland)

10.45 am Morning tea

Conservation planning: theory, tools and application (cont'd)

11.15 am — *Prioritising conservation actions: how to achieve the biggest bang for our conservation buck*
Kerrie Wilson and Hugh Possingham (University of Queensland)

12.15 pm — *Freshwater ecoregional assessments and planning*
Jonathan Higgins (The Nature Conservancy)

1.15 pm — Lunch

Conservation planning: theory, tools and application (cont'd)

2.15pm — *A practical framework for conservation scenarios and planning for the Southwest Australia Ecoregion*
Kristen Williams (CSIRO), Dan Faith (Australian Museum) and Simon Ferrier (NSW Department of Environment and Conservation)

3.15pm — Afternoon tea

Symposium summary

3.45pm — *Conservation Planning Symposium: a summary of themes, approaches and issues*
John Bailey (Murdoch University and Conservation Commission)

Closing address

4.30 pm — Richard McLellan, WWF-Australia

7.00 pm — Symposium dinner
Metro Hotel, 61 Canning Highway, South Perth

Conservation Planning Symposium Abstracts

Western Australian state biodiversity conservation

Gordon Wyre
Department of Environment and Conservation, Locked Bag 104, Bentley Delivery Centre, Western Australia, 6983. Gordon.Wyre@dec.wa.gov.au

Western Australia is internationally recognised for its unique and diverse biodiversity. The flora, fauna and ecosystems housing these elements of the biota make up the biodiversity of this State, and give the landscape its characteristic appearance. The maintenance of this biodiversity is an important role of the Government and community of Western Australia.

Unfortunately, significant areas of the State have also been severely impacted by past development, and the ongoing impact from a range of threatening processes. These past and present threatening processes have resulted in a large number of flora, fauna and ecological communities being listed as threatened, and a number as presumed extinct or permanently destroyed. Consequently, the Southwest of Western Australia, which is particularly rich in endemic species, and where the most intensive land development has occurred, is listed as the only global biodiversity hotspot in Australia.

To address the conservation of biodiversity in Western Australia, a wealth of research and management programs have been initiated by both the government and community. These programs have placed Western Australia at the forefront of international and national biodiversity conservation, and some of these programs will be outlined in this presentation. However, biodiversity conservation is a long term objective, and requires substantial planning and strategic commitment to be achieved.

The Government of Western Australia is committed to the development of a Biodiversity Conservation Strategy to set the vision for the state of our biodiversity in 100 years, and help guide the approach to be taken to achieve this vision over the next 25 years. An outline of the elements of the proposed State Biodiversity Conservation Strategy will be presented to show the strategic approach that will be taken to achieve the biodiversity outcomes we all hope to achieve.

The State Biodiversity Conservation Strategy will be a document outlining broad objectives and strategies, rather than more specific regional management objectives. The proposed biodiversity conservation strategy that is to be developed for the Southwest Australia Ecoregion will fit under the State Strategy to provide greater strategic detail to achieve these objectives.

The Southwest Australia Ecoregion: A global biodiversity hotspot

Richard McLellan
WWF-Australia, P.O. Box 4010, Wembley, Western Australia, 6913. rmclellan@wwf.org.au

This presentation will consider the global significance of the Southwest Australia Ecoregion. This recognition of global significance is based on high levels of natural diversity, particularly for plants and amphibians, together with high levels of threat to that diversity. The Southwest Australia Ecoregion is recognised by Conservation International as a global Biodiversity Hotspot; by WWF and TNC as a Global 200 Ecoregion; by the IUCN and WWF as a Centre of Plant Diversity; and by Birdlife International as one of the globe's 218 Endemic Bird Areas. Southwest Australia's national significance is also recognised by the Government of Australia: with five of the 15 national biodiversity hotspots of Australia - one of Earth's five most megadiverse countries - being located within the Ecoregion.

There is a recognised need for a conservation strategy for this globally significant region. This strategy will complement the State Biodiversity Strategy and other strategies such as those developed by NRM regions, local government and conservation organisations. The conservation strategy for the Southwest Australia Ecoregion will identify biodiversity assets at appropriate scales and develop a prioritisation and strategic planning process for implementation of biodiversity conservation programs and projects.

In 2003, a consortium of stakeholders formed the Southwest Australia Ecoregion Initiative to advance the recognition of the global significance of this highly biodiverse region and the threats to its long-term survival. The consortium comprises relevant government agencies, environmental non-government organisations, universities, research institutions, local government and community representatives.

The Conservation Planning Symposium presents a number of biodiversity conservation planning approaches and tools to provide information to any individual or organisation engaged in biodiversity conservation planning, threat analysis, target setting and prioritisation. It will also allow relevant stakeholders to make an informed decision about valid approaches and tools to be utilised in developing a biodiversity conservation planning strategy for Southwest Australia.

Landscape and regional scale stresses and threats: Implications for conservation planning

Richard Hobbs
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The Southwest Australia Ecoregion is recognized for its biological diversity and uniqueness. This diversity and uniqueness in itself presents an interesting challenge for conservation planning. However, this is only one facet of the issues to be considered. In addition, the level of threat to each asset from an array of potentially threatening processes has to be considered. Such threats in the Southwest Australia Ecoregion include the impacts of ecosystem fragmentation and modification, hydrological imbalance, altered fire regimes, disease, non-native plants and animals, and climate change. Acquisition and reservation of priority assets can only be one part of an effective conservation planning strategy since these actions in themselves do not necessarily guarantee persistence of the assets. In many parts of the ecoregion, active management is required to alleviate landscape and regional scale threats in order to ensure persistence. At least three variables need to be considered: the value of the asset, the degree of threat it is under, and the probability that management intervention is likely to be successful. The challenge is to develop a comprehensive and meaningful approach which considers not just the assets themselves but also their long-term persistence in the face of numerous serious threats.

Biodiversity values in conservation planning

Ken Wallace
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How humans value natural biodiversity profoundly affects its conservation and sustainable use. Most recently, this is perhaps best recognised through the Millennium Ecosystem Assessment, which drew on the work of over 1,360 biologists representing 95 countries. However, the wide acceptance of the link between biodiversity conservation and human values is also underlined by the fact that all but one of the biodiversity strategies and conservation management texts analysed in preparing this paper contained a section describing important human values of biodiversity.

There are many different ways of structuring the values that humans draw from biodiversity, but most describe the following:

- Consumption values;
- Production values;
- Ecosystem service values;
- Amenity values;
- Belief values (including spiritual, philosophical, intrinsic);
- Leisure values;
- Scientific and education values; and
- Opportunity values.

The amount and type of biodiversity that must be conserved will vary considerably depending on which values are the goal of management. Given the critical role of values in biodiversity management, and their wide recognition in biodiversity strategies and conservation management texts, one would expect to find explicit linkages between values, goals and management strategies. However, this is not the case. To significantly improve the strategic nature of our management, and to better explain the importance of biodiversity to the wider community, it is vital that this situation is redressed.

Floral treasures of Southwest Australia: Past, present and future

Greg Keighery
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Fluctuating climates, a stable landform and isolation have given Southern Western Australia a world class flora of over 8,000 species of flowering plants. Thousands of species are endemic to this area, many still not formally described, ranging from huge trees to tiny aquatic herbs. They are pollinated by a great array of insects and birds which gives the area a spring flowering display unequalled in colour and diversity. Equally diverse are their life histories and regeneration strategies. These species occur together in over 850 structural and several hundred floristic communities across the landscape, some of which are highly localized.

Coupled with this diversity are high levels of species changeover, incredible levels of species richness and localized areas of endemism. Rarity seems to be a common feature of our flora at all levels from sites to regions. Cryptic genetic diversity within apparently uniform widespread species studied is also a notable feature.

Current regional planning has mainly attempted to establish a CAR reserve network for species and communities. However, to ensure that our flora at the three levels of biodiversity (community, species and genetic) has a future, we need to maintain the past into the future by lowering current landscape scale regional threats, including fragmentation, disease, salinity, fire and increasingly land use competition.

Wetlands and aquatic invertebrate biodiversity in the Southwest Australia Ecoregion

Stuart Halse
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The Southwest Australia Ecoregion contains considerable diversity of wetlands and rivers. Freshwater wetlands include coastal lakes, seasonal or episodically filled claypans, swamps and small pools (including those on granite rocks). Many inland wetlands are naturally saline playas, often large and comprising a main waterbody surrounded by satellites. In the intermediate rainfall zone, where cropping occurs, secondary salinisation is prevalent and has affected most wetlands.

Rivers of the Southwest can be divided into two types, according to whether they occur west (or south) of the line of rejuvenated drainage and flow in incised channels or east of that line and consist of flat, occluded channels in palaeodrainage systems. In higher rainfall western zones, rivers tend to be fresh although secondary salinisation may have caused sections of the rivers in agricultural areas to become saline with consequent salinity effects downstream as well. Rivers in palaeodrainage systems are saline and usually consist of large numbers of saline pans connected by poorly defined drainage lines.

The diversity and endemicity of aquatic invertebrates in the Southwest Australia Ecoregion is high but, as a generalisation, rivers and wetlands show contrasting patterns and the most of the interesting Southwest fauna occurs in wetlands. Southwest rivers have often been regarded as relatively depauperate in aquatic invertebrates because of the low numbers of animals found in jarrah forest streams and a low diversity of some iconic stream insect groups. In contrast, recent work is showing that most of the Australian diversity of crustacean groups inhabiting episodically filled inland wetlands occurs in the Southwest. This is particularly true of anostracans (brine and fairy shrimps).

Southwest Australia Ecoregion mammals: Richness, decline, threats and recovery

Andrew A. Burbidge
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Seventy seven species of indigenous mammals occurred in the Southwest Australia Ecoregion of which ten are endemic and two are 'new endemics'. Twenty three species are extinct in the region; eight of these are totally extinct. Consistent with the pattern of mammal attrition across Australia, the more arid parts of the region have lost more species. A recent analysis of factors that have been implicated in the decline of Australia's mammals showed that six variables made significant independent contribution to a model explaining 93% of the variation in regional attrition. Mammal extinctions do not have a single causal factor. Conservation planners and managers need to concentrate on control of feral predators and herbivores, and manage habitat to maintain productivity and vegetation structure. Adequate shelter for those species that live on the ground's surface is vital and appropriate fire management is critical. Highly threatened species require individual monitoring, research and management.

Conservation planning for birds in Southwest Australia

Allan Burbidge
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About 300 non-pelagic bird species occur naturally in the Southwest Australia Ecoregion; about two-thirds of these are terrestrial species and about one-third are waterbirds. About 200 of these species occur in the agricultural zone, which has been subject to massive change since the advent of European colonisation of this region. The Southwest Australia Ecoregion includes one of eight Australian Endemic Bird Areas recognised by Birdlife International. It includes 13 endemic bird species, most of which are also restricted range species. Bird-plant interactions are prominent in the Southwest Australia Ecoregion, and birds play an important role as pollinators of the incredibly rich flora.

The major impact on bird species in the Southwest Australia Ecoregion has been clearance of native vegetation for agriculture and other human activities. This has led to extensive fragmentation and, in some instances, salinisation of bird habitats. Climate change may also be impacting already on the restricted range endemics on the south coast; any such effects would be compounded by fragmentation. Altered fire regimes have had negative impacts in some areas, particularly in relation to the scale of wildfires. Some other factors have also been blamed for declines in bird populations (e.g., weeds, forestry operations, mining, grazing) but these threats either affect few species, are limited in geographic extent or convincing data on their impact are lacking.

Conservation planning for birds in the Southwest Australia Ecoregion must address issues at a range of spatial and temporal scales – across the region in relation to issues such as fragmentation and landscape deterioration, through to local scales in relation to issues such as wildfires threatening small populations of threatened species. Particularly on the south coast, where threatened birds often co-occur with each other and with other threatened animals and plants, research, planning and management must be carefully integrated across taxa.

Geographical patterning of reptiles in the Southwest of Western Australia

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The Southwest region of Western Australia supports an extremely rich and diverse fauna with 47% (224 taxa) of the state's terrestrial reptile fauna and more than 50% (116 taxa) of these being endemic to WA. An analysis of specimen records at the Western Australian Museum in relation to equal area 1: 250 000 map sheets was used to identify and examine major regional assemblage structures, patterning in relation to regional endemism, and threatened taxa. This analysis shows at least six distinct regional assemblages with five of these primarily associated with the coastal and near coastal margins of the Southwest. The map sheets situated over the coast and near coast define 84% of the reptile fauna of the region. The Swan coastal plane and the Geraldton sandplains have the highest levels of endemic reptile fauna with levels of endemism diminishing towards the east and north east of the region. Most threatened taxa occur within close proximity to the western margins of the region.

Important aspects of the reptile fauna, such as diversity and endemism largely coincide with areas of high human impact, particularly in relation to urban development along the region's coastal margins. Habitat fragmentation and habitat alteration, along with predation and altered fire regimes are likely to have long term consequences in the absence of effective conservation and land management.

Given the close association of many taxa with restricted habitat types along the coastal fringes, planning for projected climate change needs to occur while the opportunity still exists.

Frog diversity in Southwestern Australia: The future

J. D. Roberts
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Frog conservation in Southwest Australia faces three challenges:

1. In the presence of salinity what is the nature, use and effectiveness of un-natural water bodies as breeding sites? What do we know about current surface waters in the Wheatbelt and their patterns of use?
2. The frog fauna of WA has been well-known since the 1950s but recent work based on DNA sequence data shows that for several widespread, common species there are deep genetic divisions. How do we conserve that genetic diversity?
3. Can current conservation efforts ever save ecological and evolutionary processes?

Systematic conservation planning: Achievements, case studies, and some remaining challenges

Bob Pressey
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This presentation has three parts. The first traces the development of major ideas in systematic conservation planning since 1983, emphasising progressive improvement of techniques and effectiveness. The second outlines several case studies in which systematic methods, applied with special-purpose software, have made or are making real differences to conservation outcomes on the ground. The third part presents three important challenges for conservation planners, whether or not they use software.

Systematic conservation planning can be dated back to the early 1980s, beginning with work by Jamie Kirkpatrick in Tasmania. Key characteristics of systematic conservation planning include: explicit statements about conservation objectives (usually called "targets"); methods for identifying sets of complementary areas to achieve objectives; and transparency in decisions about how and why individual areas are selected for conservation action. Early methods for systematic planning identified sets of recommended areas without providing planners and managers with information on options for conservation. What other areas outside the selected sets might be suitable, or even better, for achieving conservation goals? This kind of question was answered in the early 1990s with methods that mapped the irreplaceability of areas for achieving objectives. Irreplaceability can be thought of as the likelihood of needing any particular area, ranging from one to zero. Higher values indicate fewer possible replacements. This gave planners options to work with and ushered in decision-support systems that allowed planners to work interactively with stakeholders to negotiate the location and design of conservation areas. A further step began with another question: If conservation resources are limited and implementation of regional plans gradual, and if incremental implementation is accompanied by ongoing attrition of biodiversity, how should planners schedule conservation action? What areas should be protected this year or next year, given that the other areas face some risk of degradation in the meantime? This led to methods for identifying priorities in space and time, along with techniques for simulating future land use patterns to compare alternative approaches to scheduling, depending on budgets and policies.

Four case studies illustrate these ideas: (1) the Regional Forest Agreement process in New South Wales; (2) development of a conservation plan for the Cape Floristic Region of South Africa, a global biodiversity hotspot; (3) planning for conservation on the Amazon floodplain; and (4) using land use simulations in New South Wales to compare different approaches to scheduling the allocation of limited conservation resources.

The final part of the presentation outlines three key challenges for conservation planners: (1) Dealing with biodiversity processes; (2) Implementing conservation plans in the context of socio-economic constraints and opportunities; and (3) moving from targets to continuous benefit functions for biodiversity and other conservation values. This last point is the subject of an ARC-funded project at the Ecology Centre and will lead to a new decision-support system, now on the drawing board.

Defining a regional conservation vision and taking action: The Nature Conservancy's approaches for ecoregional assessments and conservation action planning

Jonathan Higgins
The Nature Conservancy, 301 SW Adams Street, Suite 1007, Peoria, Illinois 61602, United States of America. jhiggins@tnc.org

Ecoregional Assessments identify a vision for conservation success, and create an ongoing process of data acquisition and analyses to conserve the biodiversity representative of each ecoregion. Conservation Action Planning is a process that is applied to develop strategies and projects to conserve biodiversity, and measure their effectiveness in doing so in order to track progress and support adaptive management of actions. Conservation Action Planning is a scale-less approach, and can be applied from single sites to areas greater than ecoregions. The steps, approaches, methods, tools and products of ecoregional assessments and conservation action planning will be presented with examples from a variety of geographies.

Conservation planning software: Why you need to use it, and why you need to worry about using it

Bob Pressey
The Ecology Centre, University of Queensland, St Lucia, Queensland, Australia 4072. r.pressey@uq.edu.au

Like it or not, conservation planning software is here to stay. It has problems, and there is an increasing number of apparently competing systems from which planners have to choose. But planning software has capabilities that make it all but essential to conservation planning at regional and local scales. This presentation outlines the reasons why planners and managers should use software but also summarizes the limitations of software that users need to understand.

The case for using conservation planning software is increasingly compelling. At the World Parks Congress in 1992, a few marginalised scientists working on planning software struggled to be heard in a couple of workshops. At the 2003 Congress, the principles of systematic conservation planning embodied in software, as well as applications of software systems, were prominently displayed and presented. Meetings of the Society for Conservation Biology, the premier gatherings in the field, now typically include many presentations on systematic planning and software applications. These changes reflect much more than a growth area in academic conservation science. More and more people all over the world are using systematic methods and software systems to plan their spending and staffing. In that context, it seems timely to review the main reasons why software systems are being used. It is also timely to review the limitations of software systems that should be understood. There are three kinds of limitations: (1) perceptions of practitioners, perceived and real; (2) limitations imposed by data structures and algorithms; and (3) unresolved conceptual and theoretical issues. A good part of the presentation will concern the perceptions of practitioners. Each of about a dozen perceptions will be mentioned, some right, some wrong, and a few in between.

Prioritising conservation actions: How to achieve the biggest bang for our conservation buck?

[1]Kerrie Wilson and [2]Hugh Possingham

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Multiple global assessments have identified the Southwest Australia Ecoregion as a priority for biodiversity conservation. Given its biological importance and limited funds, a key question is: how should resources be allocated within this ecoregion to achieve the 'biggest bang for our conservation buck'? To solve this problem, we must first clearly define our conservation objective. This objective might be to maximise conservation benefits through investment in a range of conservation actions to abate specific threats, given the constraint of an annual budget. Next, we need to identify the appropriate conservation actions to abate the predominant threats, and determine the costs and benefits to biodiversity from undertaking these actions in different parts of the landscape. The cost data employed must adequately reflect the cost of the relevant conservation actions. The consequences of using inappropriate surrogates for cost will be described using examples from the first systematic prioritisation analysis for Australia. There are alternative ways to incorporate costs into conservation planning. Recently, a quantitative and transparent approach to allocating resources between conservation actions was developed. This allocation approach is based on the marginal return on investment and has been applied to 17 Mediterranean ecoregions, occurring in Australia, South Africa, Chile, and California (for The Nature Conservancy) and to the 34 biological hotspots (for Conservation International). The results of these assessments will be discussed. Overall, it will be shown that the priority areas for conservation investment are not only determined by the biodiversity benefited by the investment, but also by the area requiring investment, and the marginal returns from investment. It will also be illustrated that these priorities are robust to uncertainties in the underlying data on cost, biodiversity benefit, and threat. Finally, it will be emphasised that focussing investments in species-rich and/or highly threatened areas does not necessarily yield the highest return on investment.

Freshwater conservation assessments

Jonathan Higgins

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The overall process of ecoregional assessments applies directly to freshwater biodiversity. Differences between terrestrial and freshwater planning in the types and availability of information, lateral, horizontal and temporal connectedness, upstream contributing areas to downstream habitats, temporal changes in habitat volume, and the types and realms of influence of threats to freshwater biota will be discussed. Methods, tools and products for freshwater ecoregional assessments will be presented from a variety of geographies. Approaches to defining conservation priorities for terrestrial and freshwater biota separately and together and the strengths and cautions for these different approaches will be addressed as well.

A practical framework for conservation scenarios and planning for the Southwest Australia Ecoregion

[1]Kristen Williams, [2]Dan Faith and [3]Simon Ferrier

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Our framework builds on effective use of existing data (plus targeted new data) to provide a practical regional biodiversity "report card", allowing for scenarios that integrate: "overall" and specific components of biodiversity, trade-offs/synergies with other needs of society, "partial protection" provided by various land uses and land condition, plus considerations of the evolutionary history and processes that make this region so special.

An exciting prospect offered by this framework is that the Southwest Australia Ecoregion may be able to demonstrate a world first in addressing Australia's 2010 biodiversity target, a significant reduction of the current rate of biodiversity loss.

Conservation Planning Symposium Speakers and Authors

Associate Professor **John Bailey**'s first foray into conservation work was in the mid-1980s when he jointly convened the Tasmanian Wilderness Society's WA branch before moving to become President of the Conservation Council. Between 1985 and 1993 he was a member of the WA Environmental Protection Authority, and was appointed to the staff of Murdoch University in 1987 to teach environmental impact assessment, policy and law. He was appointed to chair the Conservation Commission in 2001.

Dr **Allan Burbidge** is an ecologist with the WA Dept of Environment and Conservation's Science Division. Most of his work involves him in broad scale biogeographic surveys for nature conservation, but his particular expertise is with birds, and he has many years of involvement in threatened bird research, survey and management.

Dr **Andrew Burbidge**'s interests include island, threatened species, mammal and seabird conservation, the development of a better conservation reserves system, and management of desert ecosystems. He is a WWF Governor and member of its Scientific Advisory Committee. Having retired from the Department of Conservation and Land Management in 2002, he is now a Research Fellow with the Department of Environment and Conservation and a consultant conservation biologist.

Mark Cowan is currently Principal Rangelands Ecologist with the Department of Environment and Conservation. He spent 10 years with the WA Museum's Department of Terrestrial Vertebrates before moving to CALM in 2000. His research and interests include ecology and conservation biology, particularly in relation to terrestrial vertebrates, and this has involved fieldwork throughout much of WA. He has a strong interest in the application of spatial and ecological statistics as well as Geographic Information Systems to biodiversity conservation.

Dr **Daniel P. Faith** is a Principal Research Scientist at the Australian Museum, Sydney. His research interests are in the theory and applications of quantitative biodiversity assessment, extending from the scale of genes to whole countries. Research interests also focus on the best-possible use of Museum collections in regional biodiversity assessment, and on the links to sustainability and economics. A phylogenetic component of his biodiversity research is based on investigations of 'phylogenetic diversity' and conservation. Other work in phylogenetics concerns development and application of phylogenetic methods, philosophy of science and editorial work for the journal *Systematic Biology*.

Dr **Simon Ferrier** is Principal GIS Research Officer in the NSW Department of Environment and Conservation in Armidale, New South Wales. His research interests include biodiversity conservation planning and assessment, including development of landscape-based methods and development of biodiversity surrogates strategies that combine environmental and biotic data.

Dr **Stuart Halse** has been working in the Department of Environment and Conservation, researching wetlands and rivers and providing policy and management advice, since 1985. He is a Senior Principal Research Scientist and his main interests are waterbirds, crustaceans and using invertebrates as indicators of ecological condition. He has recently been working on stygofauna in the Pilbara.

Dr. **Jonathan Higgins** is the Senior Ecologist for The Nature Conservancy's Worldwide Office, Global Conservation Approach Team. He has 11 years of experience developing and applying conservation planning methods and tools, and providing guidance and support to TNC staff and partners around the world in implementing ecoregional assessments. His expertise is freshwater biodiversity conservation planning.

Richard Hobbs is currently Professor of Environmental Science at Murdoch University. He researches vegetation dynamics and management, ecosystem restoration, conservation biology and landscape ecology. He is the author of over 250 refereed publications and author/editor of 14 books. Richard is currently Editor in Chief of the journal *Restoration Ecology* and is a Fellow of the Australian Academy of Science.

Dr **Ric How** is head of the Department of Terrestrial Vertebrates at the Western Australian Museum and has over 30 years' research experience in Australia, Indonesia and China. His research on the biogeography and ecology of mammal and reptile communities has spanned the tropical, temperate and desert regions of Australia and Asia.

Greg Keighery is a Senior Principal Research Scientist with the Western Australian Department of Environment and Conservation. Previously Greg was the Biosystematist at Kings Park and Botanic Garden. Over the past 30 years he has undertaken biological surveys throughout most of Western Australia, including the Goldfields, Kimberley, Nullarbor, Carnarvon Basin, Perth region and most major parks and reserves of southern Western Australia. Greg has published extensively on the biology, phytogeography, ecology and taxonomy of native and weedy plants of Western Australia.

Richard McLellan is the Manager of WWF-Australia's Land Program. He is the Co-Chair of the Southwest Australia Ecoregion Initiative. Richard's background is in native vegetation management, woodland ecology, and broadscale landscape conservation. In addition to the Southwest Australia Ecoregion, Richard has also worked in the Lower Mekong Dry Forests Ecoregion in Cambodia.

Professor **Hugh Possingham** FAA completed a PhD in biomathematics at Oxford University then postdocs at Stanford and Australian National Universities. In 1995 he became Foundation Chair of Environmental Science at Adelaide University before moving to the University of Queensland in 2000 to direct the Ecology Centre. He was the inaugural chair of the Biological Diversity Advisory Council and is a member of the Wentworth Group. His group publishes about 25 papers in the international peer-reviewed literature each year mainly in the area of conservation decision making. Currently Hugh is an Australian Research Council Federation Fellow and a Fellow of the Australian Academy of Science.

Dr **Bob Pressey** has been a professorial research fellow in the Ecology Centre at the University of Queensland since January 2006. Before that he worked as a research scientist with a government conservation agency. His field of work for the last 20 years has been conservation planning. Bob's contributions have been through the development of new ideas, analytical techniques, decision-support software, and practical applications.

Professor **J. D. (Dale) Roberts** has a PhD from the University of Adelaide. He is Head of the School of Animal Biology at the University of Western Australia. Dale's research interests are sexual selection and behavioural ecology, speciation and biogeography, and conservation biology and management but with strong linkages between all three research areas. His work has a strong focus on amphibians but he also has students working on birds, spiders and mammals.

Ken Wallace is currently the Manager, Natural Resources Branch, Department of Environment and Conservation. In this position he is responsible for managing a program to develop native plants for integrated biodiversity conservation, rehabilitation and production benefits; coordinating departmental work in relation to salinity; and facilitating interaction with regional natural resource management groups. Prior to this, he was Regional Manager (Wheatbelt) for the Department of Conservation and Land Management based at Narrogin. Conservation of biodiversity in agricultural landscapes was a major focus of this position.

Dr **Kristen Williams** is an ecological biogeographer with CSIRO. She has over 15 years experience in field botany, quantitative ecology, forest modelling and conservation planning. Her PhD focused on ecophysiological predictors of Tasmanian eucalypt distributions. After five years with the Queensland government in forestry and biodiversity conservation planning, Kristen joined CSIRO to research explicit GIS-based modelling tools and quantitative methods that build on "systematic conservation planning" frameworks. Recent projects include a partnership with Conservation International in Melanesia, and a pilot nature conservation auction in WA; both include consideration of socio-economic trade-offs.

Dr **Kerrie Wilson** is a Post-doctoral Research Fellow at The Ecology Centre, University of Queensland. After undergraduate training and consultancy experience in environmental science in Queensland, Kerrie undertook doctoral studies in conservation planning at The University of Melbourne and The World Conservation Monitoring Centre in Cambridge, UK. Her research interests are varied but focus on incorporating threats and costs into conservation planning and developing frameworks for conservation resource allocation that account for landscape dynamics and returns from investments.

Gordon Wyre graduated from the University of New England, NSW, with a Bachelor of Natural Resources with first class Honours, in 1981. He has worked for the Commonwealth Department of Primary Industry, the Australian National Parks and Wildlife Service, and the National Kangaroo Monitoring Unit. Gordon joined the Department of Environment and Conservation, then CALM, in 1990, working first as the Senior Zoologist and then as Manager, Wildlife Branch. He has been in his current position of Director of Nature Conservation since 2000, where he is responsible for the development and implementation of nature conservation programs.

A vision for the Ecoregion

The vision of the Southwest Australia Ecoregion Initiative for the Southwest Australia Ecoregion is that of

'a diverse and continuous mosaic of natural landscape features distributed across the landscape, interspersed with a diversity of socially and economically productive land uses which support the natural diversity and natural functioning of that landscape.'

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Southwest Australia Ecoregion Initiative

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Greening Australia

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The Nature Conservancy SAVING THE LAST GREAT PLACES ON EARTH

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