Fire and healthy landscapes:
resilient environment, resilient people

THE NATURE CONSERVATION COUNCIL OF NSW'S
9TH BIENNIAL BUSHFIRE CONFERENCE 4-5 JUNE 2013

Nature Conservation Council of NSW

Fire and healthy landscapes:
resilient environment, resilient people

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Anne Miehs • Andrew Quested • Oliver Costello

Welcome

Letter from the Minister

Although unpredictable and unforgiving, bushfires are a fact of life for all Australians – they are a characteristic of our very landscape.

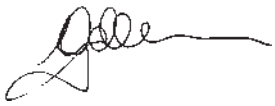
That's why every summer our volunteers and emergency service professionals stand ready to ensure our people, and our landscape, are resilient and ready for the threat of fire.

As the Minister for Police and Emergency Services, I understand the significance of exploring initiatives that centre around sustainable bushfire management.

I thank the Nature Conservation Council for their work in this area and I hope this conference proves both instructive and useful.

The NSW Government is committed to protecting and securing New South Wales from the threat of disaster and serious emergencies.

We welcome the opportunity to hear from experts in their fields, and look forward to contributing to the discussions at this conference.



Hon. Michael Gallacher MLC
Leader of the Government in the Legislative Council
Minister for Police and Emergency Services
Minister for the Hunter

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Dear Distinguished Guests, Presenters, Representatives and Delegates,

On behalf of the Nature Conservation Council of NSW (NCC) and the Bushfire Program, we would like to welcome you to the 9th Biennial Conference – *Fire and healthy landscapes: resilient environment, resilient people*.

We often talk about the importance of resilience in the face of climate change and aim to increase environmental, social and cultural resilience. But are we achieving it? Do we even know what it looks like, let alone how to achieve it? Increasing resilience through appropriate fire management provides even more challenges, in part due to the uncertainty in the variation of the key drivers of fire and the complex effect climate change will have on fuels.

This conference will examine the interactions between environmental, social and cultural resilience and fire. It will explore the debate about how fire should be applied across the landscape and provide examples of how fire could be managed to meet desirable local outcomes. It will feature innovative uses of ecological burning and the role fire can play in integrated land management as well as some of the tools available to strengthen community resilience.

People are part of the environment and the environment and its health impacts on communities. How do we undertake fire and land management that effectively addresses life, property and the environment, and helps build a resilient environment and resilient people?

We would like to express our deep appreciation to our platinum sponsors: the NSW Rural Fire Service, Travers Bushfire and Ecology and the Office of Environment and Heritage. We would not be able to hold these community bushfire conferences without their very generous and continued support.

Anne Miehs, Greg Banks and Michelle Rose
NCC Bushfire Program

CONFERENCE COMMITTEE

Mr Greg Banks
Ms Jane Gye
Ms Kate McShea
Dr Judy Messer
Dr Anne Miehs
Mr Rob Pallin
Ms Waminda Parker
Ms Anne Reeves
Ms Michelle Rose
Professor Don White

Day One – Tuesday 4 June

8.15-9.00 am	**REGISTRATIONS**	
9.00-10.30 am	**SESSION 1 – OPENING ADDRESSES AND KEYNOTE SPEECH**	
	Mr Rob Pallin	**Nature Conservation Council of NSW, Bush Fire Advisory Committee** Welcome
	(To Be Advised)	**Welcome to Country**
	Mr Geoff Provest, MP	**Parliamentary Secretary for NSW Minister for Police and Emergency Services** Opening Address
	Commissioner Shane Fitzsimmons	**NSW Rural Fire Service** Opening Address
	Mr Pepe Clarke	**Nature Conservation Council of NSW, CEO**
	Mr Paul Ryan KEYNOTE SPEAKER	**Interface Natural Resource Management** Resilience thinking for uncertain futures – applying resilience concepts to real world problems
10.30-11.00 am	**MORNING TEA**	
11.00-12.25 pm	**SESSION 2 – RESILIENCE (ENVIRONMENTAL, SOCIAL AND CULTURAL)**	
	Dr Richard J Williams	**Commonwealth Scientific and Industrial Research Organisation (CSIRO)** Interactions between climate change, fire regimes and biodiversity in Australian ecosystems
	Mr Jason Ardler	**Aboriginal Affairs NSW** Healing Country, healing spirit
	Dr Jacki Schirmer	**University of Canberra** Linking community and ecological resilience – how social and environmental wellbeing affect each other
	Panel Discussion	
12.25-1.25 pm	**LUNCH**	

Day One – Tuesday 4 June

1.25-3.00 pm **SESSION 3 – GOOD FIRE VS BAD FIRE?**

Mr Mark Tozer KEYNOTE SPEAKER	**Office of Environment and Heritage** Good fire vs bad fire – progressing the debate from value based judgements to evidence-based management
Associate Professor Alan York	**University of Melbourne** What mosaic? Defining vegetation age class distributions for multispecies conservation and ecological resilience
Ms Katherine Giljohann ≡S	**University of Melbourne** Optimal fire management to maximise community diversity in the Murray-Sunset National Park, Victoria
Ms Kirstin Abley ≡S	**Department of Environment, Water and Natural Resources South Australia** Naïve and outfoxed – how unburnt patches affected bandicoot survival
Dr Belinda Kenny ≡S	**Office of Environment and Heritage, NSW National Parks and Wildlife Service** Fire interval guidelines – what's missing?
Dr Kate Hammill	**Office of Environment and Heritage, NSW National Parks and Wildlife Service** The invisible mosaic – fire regimes in one of NSW's most iconic conservation areas

3.00-3.25 pm **AFTERNOON TEA**

3.25-5.00 pm **SESSION 4 – GOOD FIRE VS BAD FIRE?**

Ms Anne Reeves ≡S	**National Parks Association** Burning questions – managing fire for long-term resilience in natural areas
Mr Oliver Costello	**Nature Conservation Council of NSW** Cultural burning – diversity of fire
Dr Samantha Lloyd	**South East Queensland Fire and Biodiversity Consortium** SEQ Roadside Burning Project – solutions that benefit community and environment
Panel Discussion	

5.00 – 6.30 pm **POSTER AND DRINKS SESSION**
NSW Teachers Federation Conference Centre

7.00 pm **CONFERENCE DINNER**
Muum Maam Restaurant, 50 Holt St, Surry Hills

≡S SPEED TALK

Day Two – Wednesday 5 June

9:00-10.15 am	**SESSION 5 – USING FIRE FOR RESTORATION**	
	Mr John Travers	**Travers Bushfire and Ecology** Address
	Dr Tein McDonald KEYNOTE SPEAKER	**Minyumai Land Holding Aboriginal Corporation** Recovery or transformation? The ecosystem property of resilience may be a useful mechanism for both
	Mr Aaron Walker ≡S	**Southern Cross University** The importance of fire for the Eastern Suburbs Banksia Scrub
	Mr Scott Meier ≡S	**Bushland and Rainforest Restoration Consulting** Fire and natural area restoration – on ground experience is key
	Dr Judy Lambert ≡S	**North Head Sanctuary Foundation** Facing the challenges of using fire in urban bushland restoration
	Mr Jim Morrison ≡S	**Bell Miner Associated Dieback Working Group** It sometimes takes more than just fire
10.15-10.45 am	**MORNING TEA**	
10.45-12.00 pm	**SESSION 6 – USING FIRE FOR RESTORATION**	
	Mr Greg Banks	**Nature Conservation Council of NSW** Managing fire for ecological sustainability in the Northern Rivers region of NSW
	Mr David Shevill	**Queensland Parks and Wildlife Service** QPWS planned burn guidelines, a tool to enhance fire management at a bioregional scale
	(To Be Advised)	**Office of Environment and Heritage, NSW National Parks and Wildlife Service** Post fire recovery – assessment of the fire in the Warrumbungles National Park by the new Burned Areas Assessment Team
	Panel Discussion	
12.00-1.00 pm	**LUNCH**	

≡S SPEED TALK

Day Two – Wednesday 5 June

1.00-2:15 pm **SESSION 7 – STRENGTHENING COMMUNITY RESILIENCE**

Dr Trent Penman KEYNOTE SPEAKER	**University of Wollongong** Who can reduce the risk of house loss from bushfires?
Mr Bob Conroy	**Office of Environment and Heritage** Living with fire in NSW National Parks
Dr Simon Heemstra	**NSW Rural Fire Service** Building Impact Analysis – 2012/13 fire season
Ms Iona Cameron ≡S	**NSW Rural Fire Service** Community Protection Plans – helping to improve community safety/resilience

2.15-2.45 pm **AFTERNOON TEA**

2.45-4.30 pm **SESSION 8 – STRENGTHENING COMMUNITY RESILIENCE**

Ms Jennie Cramp ≡S	**Ku-ring-gai Council** Building self reliant communities to improve disaster resilience and sustainability
Ms Toni Domaschenz ≡S	**Streets and Creeks Consulting, LaTrobe University** Are bushfires women's business? A reflection on bras, nappies, chainsaws and suitcases
Mr Glenn Meade ≡S	**NSW National Parks and Wildlife Service** A lesson in time – learning from Community Fire Stories in the Blue Mountains
Mr John Allen	**NSW Rural Fire Service** Hotspots – building community resilience across the landscape
Dr Jacki Schirmer	**University of Canberra** Bringing it all together – tools and techniques for building socio-ecological resilience
Mr Pepe Clarke	**Nature Conservation Council of NSW** Closing Address

≡S SPEED TALK

Official Addresses

MR ROB PALLIN

Mr Rob Pallin is a member of the Nature Conservation Council of NSW (NCC) Executive Board and was the Chairperson of NCC from 2000 to 2005. He is Chairperson of the Paddy Pallin group of companies and a member of the NSW National Parks and Wildlife Service South Coast Advisory Committee. Robert is currently NCC's representative on the Illawarra Bushfire Management Committee, the Lord Howe Island Bush Fire Management Committee, the Bush Fire Coordinating Committee and the Rural Fire Service Advisory Council. Robert was a councillor on Ku-ring-gai Council from 1991 to 1995 and chaired the Hornsby Ku-ring-gai Bush Fire Management Committee. Robert was a member of the Coal and Candle Bushfire Brigade.

MR PEPE CLARKE

Mr Pepe Clarke is the Chief Executive Officer of NCC. Pepe is an environmental lawyer with a background in law, environmental science and community education. He previously spent three years in the Pacific where he played a key role in the establishment of a regional office for the International Union for Conservation of Nature (IUCN) and worked as a consultant to a range of international conservation groups, including WWF, Conservation International and the Wildlife Conservation Society. He was previously the Programs Director for the Environmental Defender's Office (EDO), and has worked as a lecturer and researcher for a number of universities. He has a passion for nature conservation and a strong commitment to working for a just and sustainable future.

MR GEOFF PROVEST, MP

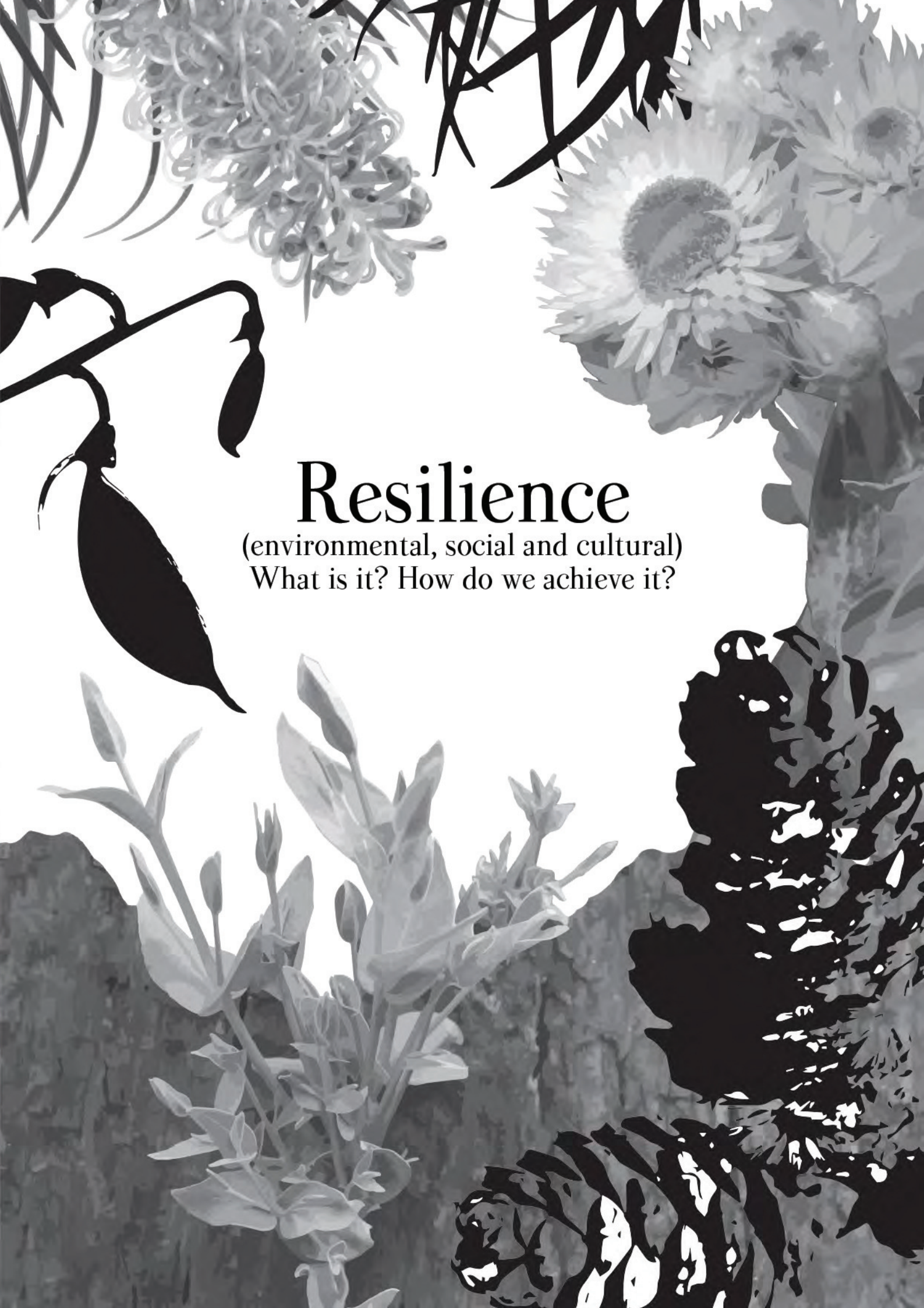
Mr Geoff Provest was appointed Parliamentary Secretary for Police and Emergency Services in late 2011. He is a supporter of police and emergency service personnel at all levels and regularly goes out on night shifts with police and ambulance personnel in his Tweed electorate. Geoff is the Nationals member for Tweed. In Parliament he is known as "Mr 100% for Tweed", because of his fierce advocacy for his constituents. He is a strong supporter of local volunteer community groups and small business families. Earlier, Geoff ran his own consultancy business, and before that he was the General Manager of the Tweed Heads Bowls Club. He has chaired the Regional Salvation Army Red Shield Appeal, the Regional Clean Up Australia Day Committee, Tweed Tourism and Tweed Neighbourhood Watch. His volunteer leadership has been recognised with numerous community awards, including the Centenary Medal and a NSW Premier's Award.

COMMISSIONER SHANE FITZSIMMONS

Commissioner Shane Fitzsimmons has more than 25 years' experience with the NSW Rural Fire Service (RFS) serving as both a volunteer and salaried officer. In 1998 he was appointed an Assistant Commissioner with the RFS and has held portfolio responsibilities for Operations, Strategic Development and Regional Management. In 2004 he was appointed the inaugural Australasian Fire Authorities Council (AFAC) Visiting Fellow to the Australian Institute of Police Management (AIPM) for a period of 12 months. In September 2007 he was appointed Commissioner of the RFS. In March 2008 he was appointed a Director of the National Aerial Firefighting Centre (NAFC) and is currently the Chairperson of the NAFC Board. He is a member of the NSW State Rescue Board and is currently appointed as Chairperson. In December 2009 he was appointed as a Director on the Bushfire Cooperative Research Centre. Shane was awarded the National Medal in 1999 and the Australian Fire Service Medal (AFSM) in 2001.

MR JOHN TRAVERS

Mr John Travers is Managing Director of Travers Bushfire and Ecology. He is a landscape ecologist and specialises in bushfire and ecology. John spent 12 years with NSW National Parks and Wildlife Service in various locations as a Field Manager before joining the Department of Bush Fire Services as Manager of Planning and Research, where he took on the delivery of fuel management plans. The totality of that experience led John towards private practice and the eventual undertaking of many exciting fire/ecological management projects. This year marks John's 32nd year working with fire and ecology and his passion remains strong.



Resilience

(environmental, social and cultural)
What is it? How do we achieve it?

Resilience thinking for uncertain futures – applying resilience concepts to real world problems

MR PAUL RYAN

Principal, Interface Natural Resource Management

KEYNOTE SPEAKER

Resilience thinking is emerging as a new paradigm for managing natural resources and landscapes. This emergence is driven, in part, by recognition that most natural resource management problems are 'wicked', characterised by complex and constantly changing social, economic and ecological dynamics where simplistic, one-size-fits-all solutions typically reveal other problems or cause new ones to emerge.

Resilience thinking offers one pathway for dealing with these complex problems. Integrating concepts from ecological, social and system sciences, resilience thinking helps us to conceptualise the world around us as co-evolving social-ecological systems, where social, economic and ecological systems constantly influence each other and the existence of non-linear dynamics and feedbacks can lead to sometimes abrupt and unexpected changes in the way systems function and recover from disturbances. Importantly, resilience thinking stresses the need for allowing social-ecological systems to evolve and change in the face of disturbance rather than resisting change, trying to hold parts of the system constant or returning it to some 'optimised' state.

Assessing the resilience of a system requires an understanding of its structure, function and disturbance regimes, the limits to how much the system can change before it will shift to an alternate state and the likelihood of recovery from these alternate states. Understanding the governance and decision-making arrangements around these dynamics can reveal how well placed managers are to learn and respond to these dynamics. Management interventions are designed to strategically target 'critical dynamics' and maintain the system in a 'safe operating space' avoiding shifts to undesirable states or, where that is not possible, deliberately transforming the system. Resilience concepts are now being applied by around 20 natural resource management regions around Australia.

Interactions between climate change, fire regimes and biodiversity in Australian ecosystems

DR RICHARD J WILLIAMS

Senior Principal Research Scientist,
Darwin Ecosystem Sciences,
Commonwealth Scientific and Industrial
Research Organisation (CSIRO)

Fire is a key agent of disturbance in Australian ecosystems, and fire regimes (season, frequency and intensity) are likely to be affected by climate change. The risks posed by fire to life, property and ecosystems, and society's capacity to mitigate risk, are also likely to change. However, we have a meagre understanding of the trajectories of change, how we might mitigate risk, and how resilient the landscape may be in the face of changing fire regimes. Changes are likely to be biome-specific. I will illustrate some plausible scenarios of change (and associated responses) from two case studies in SE Australia – sclerophyll forests and alpine grassy heathlands.

For SE Australia, the frequency of relatively warm-dry years is likely to increase between now and 2100. Modelling suggests that this will lead to more severe fire weather. For the sclerophyll forests of the Sydney Basin, this may result in a modest decline in fuel mass, but substantial changes to seasonal patterns of fuel moisture, and a potentially longer fire season. Significant increases in the area treated with prescribed fire are likely to be required to achieve the same level of risk reduction compared with the present situation.

Monitoring of regeneration in alpine grassy heathlands following the 2003 fires indicates they are resilient to occasional landscape-scale fires. The effects of experimental warming on diversity and species composition in grasslands were within the range of temporal and spatial variation measured at multiple reference sites since 1979, suggesting that alpine grasslands may be resilient to modest warming over the coming decades. These findings illustrate the importance of long term experiments, monitoring and ecosystem modelling for managing ecosystems in the face of climate change. Climate change will interact with fire regimes over coming decades, but it is not necessarily doom and gloom for biodiversity.

Healing Country, healing spirit

MR JASON ARDLER

General Manager Head Office,
Aboriginal Affairs NSW

For thousands of years Australia's landscape was subject to a fire regime that formed part of a sophisticated Aboriginal land management practice. This practice not only supported hunting, but enabled fresh growth of grasses and essential bush-foods. It also resulted in a fine-grained mosaic of vegetation which promoted the resilience of a range of plant and animal species – many of which are now rare and endangered.

We are now in a new era of Aboriginal land management. Using historical knowledge and scientific monitoring, many communities are once again managing the land and restoring balance to the environment. Aboriginal people are building resilient communities fuelled by local economic development and enterprise.

In April this year, the NSW Government launched the NSW Aboriginal Affairs plan OCHRE, which presents the Government's new priorities for Aboriginal Affairs. Under OCHRE, Aboriginal Affairs is tasked with developing a revised approach to Aboriginal economic development. This new policy narrative will support socially resilient Aboriginal communities through economic development and a focus on healing and language.

Linking community and ecological resilience – how social and environmental wellbeing affect each other

DR JACKI SCHIRMER, DR HELEN BERRY AND DR LEAN O'BRIEN

Centre for Research and Action in Public Health, University of Canberra

The concept of resilience has gained increasing popularity in a number of arenas in recent years. Different strands of work, generated in fields as diverse as ecology and social psychology, have focused on understanding ecological resilience and human resilience.

The emerging field of socio-ecological systems theory explicitly aims to understand the resilience of systems as a whole, including the interactions between social and environmental wellbeing.

We examine what is currently known about the interactions between human and environmental wellbeing, and the implications of findings of recent studies for achieving the changes in human behaviour needed to address pressing environmental challenges.

Good fire
vs
bad fire?

Managing fire to meet desirable local outcomes

Good fire vs bad fire – progressing the debate from value based judgements to evidence-based management

MR MARK TOZER

Research Scientist, Office of Environment and Heritage

KEYNOTE SPEAKER

While a majority of Australians may agree that fire is a natural component of our ecosystems, there is no popular consensus surrounding its management. Two sources of controversy are identified which have the potential to influence the success of fire management for conservation. At the level of the general population, while most people recognise the potential threat of wildfires to life and property, relatively few perceive the link between healthy, resilient ecosystems and the maintenance of critical resources such as water. Thus, proponents of holistic fire management must continually defend the balance between the requirements of conservation and threat mitigation in the face of strident calls for more hazard reduction burning, which inevitably follow each major wildfire.

At the level of land management, there exists ongoing tension between those who advocate the use of prescribed ecological burns in order to create fire mosaics and those who favour a more flexible approach which allows for unplanned fires. The relative merits of these alternative approaches are discussed as well as their potential application to achieving desirable fire management outcomes at a local level. Using a case study from Royal National Park, I argue that clearly articulated goals and actions, based on an understanding of ecological processes and coupled with appropriate monitoring and evaluation in an adaptive management framework, constitute an effective basis both for sustaining ecosystems and defusing the debate.

What mosaic? Defining vegetation age class distributions for multispecies conservation and ecological resilience

ASSOCIATE PROFESSOR ALAN YORK

Forest and Fire Ecology Research Group, Department of Forest and Ecosystem Science, University of Melbourne

As a measure of the capacity of ecological systems to absorb disturbance and change, resilience represents a form of stability and, as such, is related to the way communities respond to disturbance. Measuring resilience in ecological communities is difficult in practice, as it requires the observation of a change in structure or function. Operationally, maintaining species richness is often seen as one mechanism for conferring resilience, with land management agencies often strongly focussed on this objective. But as a species' persistence in the landscape is related to its relative abundance (i.e. extinction risk), there have recently been attempts to quantify a more robust and effective measure of ecological resilience.

In fire-prone areas of Victoria, 'geometric mean abundance' is currently being used, in conjunction with the diversity of landscape structure and the susceptibility to disturbance, as a measure of resilience. Combined with knowledge about the relationship between an animal's abundance and post-fire vegetation stage, it is possible to determine the composition of fire mosaics (defined by vegetation age classes) that maximise species diversity. The generation of heterogeneous fire mosaics is commonly advocated as a strategy for biodiversity conservation in flammable ecosystems, but it is usually unclear how mosaic properties link to biodiversity outcomes.

Here I present an example from the heathy woodlands of south-west Victoria, using data for 135 species from four taxa (birds, mammals, vascular plants and invertebrates). As a basis for management decisions, the distribution of post-fire age vegetation classes (growth stages) can be optimised to maximise species diversity at a landscape scale. It is also possible explore the degree to which particular taxa can act as surrogates for others. This approach provides land managers with a planning tool that allows them to consider the potential impact of alternative fire management strategies on biodiversity.

Optimal fire management to maximise community diversity in the Murray–Sunset National Park, Victoria

MS KATHERINE GILJOHANN

PhD candidate, School of Botany, University of Melbourne

Management to maintain community diversity is complex when the conditions that promote persistence differ for the species in the community. Accounting for the current state of the vegetation, the requirements of the resident species, and random wildfire occurrence would enhance biodiversity conservation in fire-prone ecosystems.

We determine the optimal fire management strategy for 22 time-since-fire specialists (birds, reptiles and small mammals) in *Triodia scariosa* mallee within the Murray-Sunset National Park. The optimal management strategy that maximised biodiversity was identified using stochastic dynamic programming. This analysis included a model of vegetation community succession (Richards *et al.* 1999), detailed fire history data (Avitabile *et al.* in press), six management actions and a biodiversity index. The index was populated using data on the probability of species occurrence in three vegetation successional stages (Kelly *et al.* in prep), and is correlated with the extinction risk of plant and animal populations (McCarthy *et al.* in review). Furthermore we explored the biodiversity implications of prescribed burning an annual target between 1.5 – 5% of the landscape.

Over a 100 year period the optimal strategy when considering only biodiversity is to suppress all fires. This is due to an association of maximum diversity with mid and late-stage vegetation and the probability of wildfire burning a large extent of the reserve, returning it to an early successional state. When constraining the solution to achieve a 3% prescribed burning target, it is optimal to burn when less than 30% of the reserve is composed of early successional vegetation (<10 years of age). Potential costs from fixed burning targets indicate that over the next 100 years a 5% target could increase the probability of extinction for the 22 species modelled to 7% when compared to the optimal management scenario.

Naïve and outfoxed – how unburnt patches affected bandicoot survival

MS KIRSTIN ABLEY

Fire Ecologist, Department of Environment, Water and Natural Resources, South Australia

Given the increasing use of prescribed burning for both fuel reduction and habitat management purposes, it is critically important to understand how fauna populations respond to such fires, so that effective fire management protocols can be developed. This is particularly the case for threatened species such as the southern brown bandicoot (*Isoodon obesulus obesulus*), whose distribution includes peri-urban areas where prescribed burning is routinely used to manage bushfire risk. Our project investigated the short-term effects of a prescribed burn on the survival rates and site fidelity of a population of southern brown bandicoots, with a focus on the influence of unburnt habitat patches and predation.

One bandicoot was known to have died during the prescribed burn and three others were killed by predators in the following week, despite two of them having reached unburnt habitat. The bandicoots that survived the immediate post-fire period shifted their home ranges into unburnt habitat within their pre-fire home ranges. Six months after the fire, the bandicoot population had decreased by 65%. Predator scat analysis showed an increase in the bandicoot predation rate in the months after the fire.

The post-fire survival of bandicoots in this study appeared to be influenced by the availability of unburnt habitat, the familiarity of individuals with this habitat, and the size of these unburnt habitat patches.

Fire interval guidelines – what's missing?

DR BELINDA KENNY

Fire Science Interpretation Officer,
Fire and Incident Management Section,
Office of Environment and Heritage,
NSW National Parks and Wildlife Service

Fire interval guidelines were developed for NSW vegetation formations in 2003, and became legislation under the Bush Fire Environmental Assessment Code in 2006. By focusing on the table of numbers, has the message in the fine print been lost?

The initial intent with these broad guidelines was that they were not to be seen as prescriptions, but as a starting point for an adaptive management approach. Limitations of the approach (the focus on flora, data gaps, data currency and reliability) were discussed in the report. As was the need to consider spatial extent, variability, other fire regime elements, local expert knowledge, regional variation, accurate fire history mapping, monitoring, and defining fire management goals.

This brief talk is to remind users of the fine print, and give directions for improving fire intervals for local management.

The invisible mosaic – fire regimes in one of NSW's most iconic conservation areas

DR KATE HAMMILL[1], DR LIZ TASKER[2] AND MR CLIVE BARKER[3]

[1]Research Officer, Fire Ecology Unit, Scientific Services Division, Office of Environment and Heritage

[2]Research Scientist, Fire Ecology Unit, Scientific Services Division, Office of Environment and Heritage

[3]Project Officer, Fire Ecology Unit, Scientific Services Division, Office of Environment and Heritage

We showcase the culmination of a number of years' research examining the fire regimes of the Greater Blue Mountains World Heritage Area (GBMWHA). The area is among the most fire-prone on earth, and there is a lot at stake: World-Heritage-listed ecosystems, threatened species, wild rivers, wilderness, and countless adjoining private properties and urban centres. In recent years, the Commonwealth Government recognised the importance of fire in the GBMWHA by funding work to better document its fire regimes—information that is key to ecologically-sustainable and strategic fire management.

We compiled existing fire records held by NPWS, and generated new fire severity maps based on satellite imagery, to produce a comprehensive, multi-decadal picture of the area's fire regimes. We found that by far the greatest proportion is within acceptable ecological thresholds in terms of fire frequency, but certain places and ecosystems have experienced a disproportionate dose of 'too-frequent' fire. In a first for SE Australia, we also identified areas affected by repeated high-severity fires. How do these different combinations of fire frequency and severity actually affect GBMWHA ecosystems? We selectively examined the 'sensitive' wet sclerophyll forests and rainforests of Blue Mountains and Yengo National Parks using a targeted field survey, and present some preliminary findings.

Our work highlights the importance of keeping track of 'invisible' fire patterns as they accumulate across the landscape over time and shows how existing technology i.e. remote sensing enables us to do so. Ultimately, this information is for fire managers, for use in planning future fire operations and in informing immediate post-fire rehabilitation. We highlight that the NPWS has recently used this approach as part of the management of the major Warrumbungle-Coonabarabran fires, in which satellite-based fire severity maps were produced and used to support the response operations.

Burning questions – managing fire for long-term resilience in natural areas

MS ANNE REEVES AND MR IAN BROWN

National Parks Association of NSW

Managing fire to protect people and human assets, and managing fire for ecological objectives are often seen as being in opposition. But does it have to be this way? The critical question is: how can we best build resilience, and learn to live with and manage fire for the long-term wellbeing of our communities without further diminishing the damaged ecological systems on which we all depend?

The National Parks Association of NSW (NPA) considers that ecological resilience must be a basic obligation for managers of conservation lands. Fire is an important lever for influencing the nature of our national parks and other reserved lands, that are a corner stone for biodiversity conservation in an increasingly modified and fragmented landscape. This presentation will highlight elements from an updated position paper that NPA is now finalising, drawing on experience as an actively involved participant on bushfire issues since its establishment over fifty years ago.

Key aspects include acknowledgement of government agency obligations to minimising risk to human life and property as a priority; the need for open and accountable transparency of decision making, more effort to improve the resilience of communities in the face of fire threats, and recognition that within a framework of bushfire management across tenures land managers have differing priorities such that conservation reserve managers are expected to ensure the ecological imperative in core natural areas with high-impact fire management limited to the boundaries where compromise is inevitable.

Cultural burning – diversity of fire

MR OLIVER COSTELLO

Firesticks Project Coordinator, Nature Conservation Council of NSW

Cultural burning is a story of place and has many uses, characteristics and outcomes. So what can we learn from cultural burning about good vs bad fire? Fire's function in the landscape is as diverse as the country and people interconnected with it. Fire is known by many terms in many languages, the Firesticks Project uses the term Cultural burning to describe the myriad of ways fire exists in a cultural context to achieve the same or different objectives as contemporary fire management. The cultural values and practices that manifest as cultural burning are underpinned by the fundamental intent to care for country. Cultural Connections to Country vary among people's, but generally can be understood as interconnected relationships between all elements and beings. Country is more than a tangible landscape. It encompasses all things including Cultural Lore and the stories of that Country which relate to the People, Plants, Animals, Landscape, Water, Sea, Wind and Sun, Moon and Stars.

Aboriginal people's cultural values and practices are increasingly recognised by land owners and managers as important in contemporary natural resource management. The impacts of colonisation has affected Indigenous people's ability to openly implement their cultural practices and pass on Traditional Knowledge in the way it has been done for thousands of years. That is not to suggest that the knowledge has been lost. Across Australia there still exists strong cultural Lore, knowledge of burning practices, connection to country and a physical memory that is present within the landscape. Indigenous peoples living knowledge systems accommodate the application of this knowledge to contemporary fire management concerns facing our society and environment.

How can we share relationships and meaning of fire, people and country to explore common ground on how burning makes us feel? What elements, values, practices and evidence do we need to meet desirable local outcomes? People and Country taught me this story.

South East Queensland Roadside Burning Project – solutions that benefit community and environment

DR SAMANTHA LLOYD AND MR CRAIG WELDON

South East Queensland Fire and Biodiversity Consortium

In some parts of South East Queensland (SEQ) there currently exists conflict between private landholders wishing to conduct roadside hazard reduction burns (adjoining their property) and local councils. Currently, only one council (South Burnett) has a formal process to manage landholder requests. Some councils have a formal roadside fuel management program, but this doesn't generally include requests from landowners. Consequently, landowners in some council areas are becoming increasingly frustrated. At risk from a 'do nothing' approach are tracks of high biodiversity value vegetation, valuable agricultural land and resources, businesses, homes and infrastructure – notwithstanding relationships between council and landowners, cooperation and community resilience.

In response to community concern and a lack of process, the South East Queensland Fire and Biodiversity Consortium (SEQFBC) was asked to investigate options for land managers to efficiently manage requests for roadside hazard reduction burns. In undertaking this project the SEQFBC workshopped the main issues surrounding roadside fuel management: 1. resourcing, 2. biodiversity, 3. insurance and 4. local laws and suggested options for addressing those issues. Further consultation revealed two working models with great potential: 1. The Coordinated Agency Model (comprising a proactive and cooperative approach between Toowoomba Regional Council, Queensland Fire and Rescue Service, Department of Transport and Main Roads and Queensland Parks and Wildlife Service) and 2. The South Burnett Model (including a process for landholders to apply for and conduct roadside burns whilst covered by council insurance). These models are described in greater detail in a final report that has been provided to all councils and relevant land management agencies within SEQ. The SEQFBC concluded that whilst the South Burnett Model was working very well, and council should be congratulated for their forthright approach, the Coordinated Agency Model offered the greatest potential for addressing the issue whilst minimising insurance risk to councils.