EcoTAS 2017

The joint conference of the Ecological Society of Australia and the New Zealand Ecological Society

ECOLOGICAL SOCIETY OF AUSTRALIA

NEW ZEALAND ECOLOGICAL SOCIETY

26 NOVEMBER - 1 DECEMBER 2017

CYPRESS LAKES CONFERENCE CENTRE

HUNTER VALLEY • NSW

EcoTAS17 Presenters

Search Search

Kiri (Reihana) Spraggs

EcoTAS abstract

The widespread degradation of water quality and quantity and its state of mauri, is a significant issue for Māori. This issue is represented by widespread degradation of

Open session (1)

Monday, November 27, 2017

3:45 PM - 5:45 PM

Sugarloaf Room

Oral presentation

customary resources, extensive habitat reduction, low flows in rivers and streams, reduction in flora and fauna populations, introduction of invasive species, and poor condition of ecosystems and resources (e.g. Mahinga kai, toanga species, and habitats). The involvement and empowerment of Māori in freshwater decision making can be facilitated by tools that enable Māori organisations such as iwi/hapū to assess the condition of freshwater.
This kaupapa Māori approach can be used to articulate resource condition and impact related to human activities and land management practices. Wai Ora is a kaupapa māori assessment and monitoring tool that asses the organa/health of mahinga kai holistically. This tool enables whanau to measure progress towards restoring and enhancing the mauri of their mahinga kai.
This kaupapa Māori framework has revealed its true value when it was transferred into a digital medium - a mobile app. It is now being transferred to other iwi and its potential future application across environmental domains.

(Reihana) Spraggs K
WAIOra a kaupapa Maori assessment tool

Axton Aguiar

Biography

Axton Aguiar is a PhD candidate at the University of Wollongong. His research interests lie in using facilitative interactions between plants to ameliorate some of the environmental stresses of urban plants.

EcoTAS abstract

Green roofs are harsh environments for plants, as they must cope with shallow soils, low nutrient availability, high solar radiation, low water availability and high

Urban Ecology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Bimbadeen Room
Oral presentation
Aguiar A [1] , French K [1] , Robinson S [1]
[1] University Of Wollongong, Wollongong NSW, Australia
Friends with benefits: effects of vegetative shading on plant survival in

pollution/disturbances. We are investigating if using nurse plants to provide shade affects the survivability of plants on a green roof. To this end 30 green roof mesocosms were set up to simulate green roof conditions for 4 sets of native species (4 nurse plants and 4 target plants). These were arranged into four treatments; naturally shaded with a live nurse plant shading the target plant, artificially shaded with an artificial plant shading the target plant, unshaded natural which had a trimmed nurse plant providing no shade to the target plant and an unshaded treatment with the target plant growing alone. Data on growth of the target plants and soil moisture was collected monthly and biomass data was collected at the end of the experiment. Natural shade treated plants had the highest biomass at the end of the experiment, while unshaded plants had the lowest biomass. Unexpectedly, the shaded artificial and the unshaded natural had a similar moderate biomass. This suggests that while shading was a positive influence on plant growth, there was also a positive influence of growing with a nurse plant which is not accounted for by shading. We discuss the possibility of a below-soil facilitative relationship between nurse plants and target plants.

a green roof environment

Collin Ahrens

Biography

Collin Ahrens is a postdoctoral researcher at Western Sydney University and is broadly interested in how plants interact with their local environment and understanding the various mechanisms that plants use to achieve success.

EcoTAS abstract

SYMPOSIUM: Assisted migration under climate change
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Brokenback Room
Oral presentation

The climate of southwestern Western Australia (WA) is becoming warmer and drier, increasing some species vulnerability to local extinction events. Marri is an important constituent of the south-west forests and woodlands of WA and has already been negatively impacted as demonstrated by recent mortality events. To mitigate further impacts of climate change, knowledge of genetic structure and evolution could be incorporated into adaptive management strategies. Marri populations across the species geographic and climatic distribution were surveyed for landscape genomic analyses. After conservative filtering, a final genomic dataset of 10k SNPs was used to estimate population structure, measure contemporary gene flow, and identify adaptive genetic variants associated with climate. The allelic turnover for SNPs associated with climate were mapped throughout the landscape. The species has low levels of genetic structure (FST = 0.05) with isolation by distance in a north-south orientation. Controlling for population structure, we identified SNPs associated with temperature, rainfall and aridity . For temperature, the allelic turnover occurs in the hotter region of the distribution, while the allelic turnover for rainfall occurs in the wettest or driest parts of the distribution. Annotation of adaptive variants suggests that some functional genes may play roles in the species' adaptation to differential environments. These results indicate that assisted migration could aid local populations devoid of variants associated with hotter and drier climates, increasing the likelihood of the tree's persistence in a changing climate.

Ahrens C [1] , Byrne M [2] , Rymer P [1]

[1] HIE, Western Sydney University, Penrith Nsw, Australia

[2] Department of Biodiversity, Conservation and Attractions, Bentley WA, Australia

Identification of adaptive variation associated with climate for the improvement of adaptive management strategies

Alan Andersen

Biography

Prof Andersen is a Professorial Fellow with Charles Darwin University. He was previously OIC of CSIRO's Tropical Ecosystems Research Centre in Darwin for 20 years. His primary research interests are in the global ecology of ant communities.

EcoTAS abstract

History is a profound but under-appreciated factor driving variation in the structure and function of biological communities. I illustrate this by linking inter-continental variation in savanna ant communities to variation in evolutionary history. I focus on comparisons between northern Australia and Brazil, where savannas have totally contrasting evolutionary origins. Australian savannas have evolved in association with its central arid zone, and its savanna fauna is dominated by arid-adapted elements. In contrast, Brazilian savannas have evolved in association with tropical forest, and its savanna ant fauna is dominated by forest-adapted taxa, as exemplified by an exceptional diversity of tree-nesting species. Such contrasting origins mean that the two savannas have functionally as well as compositionally very different ant communities, as I will illustrate through comparative responses to disturbance and aridity.

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Oral presentation
Andersen A [1]
[1] Charles Darwin University, Darwin NT, Australia
Historical biogeography shapes community ecology: inter-continental contrasts in savanna ant communities

Nigel Andrew

Biography

Nigel is an insect ecologist at the University of New England, interested in ecology, physiology and behavioural

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 1)
Monday, November 27, 2017

responses to climate change. He is also the Managing Editor of Austral Ecology.

EcoTAS abstract

Host plants influence the life history of insect herbivores in terms of time taken to reach maturity, longevity, and fecundity. Generalist insect feeders (ie those insects that can feed on a range of plants across multiple families) may rely on one host plant once they have started feeding, and prefer older leaves when feeding. We examined variations in metabolic rates of a stick insect in response to different rearing diets: Tree Lucerne (Chamaecyisus palmensis), Bramble (Rubus fruticosus) and Eucalyptus species. We used adult male and female spiny leaf insects (Extatosoma tiaratum) to investigate whether diet affects the metabolic rate of these animals across a temperature ramping gradient. We found that adult males had a higher metabolic rate than adult females for all three diet types. Metabolic rates at lower temperatures were not affected by sex or diet type. At higher temperatures, metabolic rates were affected by the sex of the animal and the diet that they were reared on. At 35°C, metabolic rates were affected by sex and diet. Male adults reared on Bramble and Tree Lucerne had a higher metabolic rate than adult females reared on the same diet. Whereas adult females had a higher metabolic rate than adult males reared on the Eucalypt diet. This information is part of the development of a dynamic energy budget for this species which can lead to a better understanding of how they will perform with changing host plant resources under a more variable climate.

11:00 AM - 1:00 PM
Brokenback Room
Oral presentation

Hill S [1] , Silcocks S [1] , **Andrew N** [1]
[1] University of New England, Armidale NSW, Australia

Responses of the spiny leaf insect to rearing on different host plants

Rose Andrew

Biography

Rose is a molecular ecologist with interests in speciation, hybridisation and local adaptation. After working on native sunflowers in North America, her current projects range from eucalypt phytochemistry and paper daisy speciation, to feral animal evolution.

EcoTAS abstract

Phytochemicals serve multiple functions, from herbivore defence to pollinator attraction, and are often characteristic of species. Phytochemical diversity can be shaped by geography and climate, and in turn influence herbivore communities. In Eucalyptus, volatile terpenoids comprise up to 10% of leaf dry matter, often consisting of complex mixtures of monoterpenes and sesquiterpenes. Many eucalypts exhibit variation in composition, with different suites of dominant compounds forming genetically determined “chemotypes”; surprisingly, similar chemotypes are found in multiple (not necessarily closely related) species. The overlapping spatial distributions of closely related species in eastern Australian woodlands give us an unusual opportunity to examine the extent to which chemotype variation is structured by vegetation and environment. To this end, we are surveying leaf terpenoids in ten woodland species of Eucalyptus. We ask whether similar chemotypes in different species are codistributed, using whole-genome sequence data to control for species relationships and hybridisation. This project will help identify the drivers of chemical diversity in a dominant group of foundation species.

Forest Ecology (2)

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Cypress #3

Speed Talk PLUS Poster

Andrew R [1] , Collins T [1] , Janes J [1] , Bruhl J [1] , Borevitz J [2]

[1] University of New England, Armidale NSW, Australia

[2] Australian National University, Canberra ACT, Australia

Terpene diversity in Eucalyptus woodlands – structured by species, habitat, or both?

Jamie Ataria

Biography

Tēnā koutou (greetings). James is a Māori descended from the Rongomaiwahine, Ngāti Kahungunu and Ngāti Raukawa tribes of the East Coast and Central North Island of New Zealand. He is currently employed part-time at the Bioprotection Research Centre (Lincoln University) as a Senior Lecturer where he leads lead a research project entitled ‘Mātauranga Māori (Māori traditional and contemporary knowledge) characterisations of NZ’s biodiversity.’ James began his career as an ecotoxicologist completing his PhD and continuing research into biological effects-based testing as an approach to understand the effects of contaminants on organisms present in the receiving environment. This interest continues today particularly on the topic of emerging chemical contaminants and the management of biowastes. James enjoys conducting his research within multi-disciplinary/multi-organisational programmes that are firmly embedded in Māori issues and process but with strong linkages to end-user organisations. This approach interfaces between science and mātauranga Māori and explores mechanisms that promote mutual understanding in a research context and equality of uptake in environmental resource management policy and decision making. James also has interests in Māori development through business and education. He is a Trustee of a Māori Ahuwhenua Land Trust with commercial interests in energy generation, food production and communication, a Māori business development manager at the Cawthron Institute, and Co-Deputy Director at Ngā Pae o Te Māramatanga (Centre of Research Excellence). James is also a founding member and Trustee on the Establishment Board of Trustees for Te

KEYNOTE PRESENTATION: Jamie Atatria

Monday, November 27, 2017

10:00 AM - 10:30 AM

The Convention Centre

Keynote

Ataria J [1]

[1] Lincoln University, Christchurch, New Zealand

Putting ecology to work – a Māori perspective

Pā o Rākaihautū (Designated Special Character School in Christchurch) which employs a Māori education philosophy.

EcoTAS abstract

The 2017 EcoTas conference theme ‘Putting ecology to work’ can be interpreted at one level as an urgent call for the application of ecological science to elucidate and mitigate anthropogenic induced impacts to local and global environments. In another sense it can also be inferred to challenge how can ecology engage more effectively with endusers of ecological science to create deeper engagement and broader uptake for better environmental, social and economic outcomes? For Māori, the indigenous people of New Zealand, both of these statements have relevance and urgency for a range of issues that confront Māori specifically and New Zealand more broadly. These include, but are not limited to; a) the role and application of mātauranga Māori (Māori corpus of knowledge) alongside western science ecological knowledge; b) how to put ecology to work within Māori communities; and c) the role of ecological sciences within Māori business and enterprise. Key elements of these three areas will be discussed from a Māori perspective however, it is likely that there will be some similarity and resonance with other indigenous cultural experiences and views.

Tony Auld

Biography

Dr Tony Auld, Senior Principal Research Scientist has worked for over 30 years across a range of ecosystems focusing on conservation of biodiversity with a focus on

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

flora, fire, threatened species, risk assessment and implementing management to ameliorate threats.

EcoTAS abstract

Arid and semi-arid ecosystems may have a number of long lived (>100years) perennial tree and shrub species. Persistence of these species is important as they play a key role in structuring habitats for many other species. In Australia, a number of Acacia species dominate the structure of arid ecosystems. We used the IUCN Red List criteria for ecosystems to assess the conservation status of the Acacia loderi Shrubland ecosystem. This ecosystem is restricted to western New South Wales and very small parts of north-eastern South Australia and north-western Victoria in Australia. The major canopy tree is the long-lived perennial A. loderi, while the open understorey comprises a range of perennial shrubs and subshrubs along with many other species (e.g. Asteraceae, Fabaceae, Poaceae and Chenopodiaceae) present as an ephemeral flora. Survival and reproduction in the component species in the system are driven by largely aseasonal and episodic rainfall events. We highlight the interaction between abiotic (fire) and biotic factors (grazing by exotic herbivores including sheep, goats and rabbits grazing by exotic species (sheep, goats, rabbits) in assessing extinction risk on this ecosystem. We found the ecosystem to be Endangered based on the predicted impact (ongoing lack of recruitment combined with adult mortality) on the population structure of the dominant tree (A. loderi). Conservation of this ecosystem and other Acacia dominated ecosystems in arid Australia requires control of exotic grazers, effective management of adverse fire regimes and promotion of recruitment of new individuals of the canopy dominant.

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Auld T [1,3,4] , Leishman M [2] , Denham A [1,4]

[1] NSW Office Of Environment And Heritage, Hurstville NSW, Australia

[2] Macquarie University, NSW, Australia

[3] University of NSW, NSW, Australia

[4] University of Wollongong, NSW, Australia

Assessing risk of collapse for an arid Acacia Shrubland ecosystem from Australia

Bronwyn Ayre

Biography

Bronwyn Ayre is a PhD student at the University of Western Australia and the Botanic Gardens and Parks Authority. She is interested in the use of genetic techniques to help answer questions in ecology and conservation.

EcoTAS abstract

The distance pollen travels can have a major impact on the fitness of progeny in sexually reproducing plants. For animal pollinated plants, patterns of pollen dispersal are thought to be driven by optimal foraging, whereby a pollinator conserves energy by moving between nearby flowers, resulting in near-neighbour pollination. However, different patterns of pollen dispersal have been shown in bird-pollinated plants, with aggressive interactions between pollinators, and high levels of pollen carryover, driving larger, and often random pollen dispersal. Anigozanthos manglesii, the Red and Green Kangaroo Paw, is a perennial wildflower endemic to the South West of Western Australia. Although historically bird-pollinated, it is also visited by the introduced European Honeybee (Apis mellifera). To test the effect of pollen dispersal distance on reproductive success, A. manglesii flowers were emasculated and hand-pollinated with pollen from donors spaced over varying distances: 0m (selfed), <1m, <5m, 5-10m, and >20m. Additional flowers received pollen from multiple donors- applied in a mix or sequentially. Flowers that received pollen from their closest flowering neighbour (<1m), produce on average less seed (49.5 seeds/fruit), with lower germination success (83%) than flowers which received pollen from over a metre away (108 seeds/fruit, 94%). Self-pollinated flowers set seed 10% of the time, with an average of 5.3 seeds/fruit. This suggests that self and

Open session (1)

Monday, November 27, 2017

3:45 PM - 5:45 PM

Sugarloaf Room

Oral presentation

Ayre B [1,2] , Krauss S [1,2] , Roberts D [2,3] , Anthony J [1,2] , Phillips R [1,2,4] , Hopper S [1,3]

[1] School of Biological Sciences, University Of Western Australia, Crawley WA, Australia

[2] Botanic Gardens and Parks Authority, Kings Park WA, Australia

[3] Centre of Excellence in Natural Resource Management, University of Western Australia, Albany WA, Australia

[4] Ecology and Evolution, Research School of Biology,The Australian National University, Canberra ACT, Australia

Importance of pollen dispersal distance on the reproductive success of the bird-pollinated Anigozanthos manglesii

near neighbour pollination- typical of honeybees- are having a negative impact on reproductive success. A greater understanding of the optimal pollination distance of A. manglesii will help us determine the impact of pollination by the introduced European honeybee.

Warwick Badgery

Biography

Warwick badgery is a research leader with the NSW Department of Primary Industries. His research has focused on understanding mechanisms of plant competition and carbon cycling, in grazing and farming systems to determine how they can be managed more effectively

EcoTAS abstract

Serrated tussock (Nassella trichotoma) is a highly invasive perennial grass weed found in the High Rainfall Zone of south eastern Australia. Flupropanate is a herbicide commonly used to control serrated tussock, but it will also damage native grasses (eg wallaby grass - Rytidosperma sp.) that provide competition to reduce future invasion. Previous work identified that the germination of serrated tussock seedlings mostly occurred in autumn and was related to pasture dry matter, yet most of these seedling died over the first summer with mortality higher in perennial than annual pastures (99.7% - perennial, 82% - annual). The AusFarm whole-farm model was used to examine the impact of different combinations of future climate scenarios, stocking rate of sheep, pasture composition and spraying options (eg nil, spot and broadacre). An economic model was then used to conduct a financial analysis. There was a

Open session (1)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Sugarloaf Room
Oral presentation
Badgery W [1] , Millar G [1] , Simmonos A [1] , Behrendt K [1]
[1] Nsw Department Of Primary Industries, Orange Nsw, Australia
Spot spraying serrated tussock to maintain competitive native pastures is uneconomic compared to broadacre control

shift in pasture composition from perennial to annual based pasture when serrated tussock was controlled with boom spraying alone rather than with spot spraying. Spot spraying management options produced the lowest cumulative total gross margins, except for the low stocking rate (4 dse/ha) systems in the wet (MI3) future climate scenario. While the biophysical modelling showed reduced invasion of serrated tussock and less spraying with perennial pasture and lower stocking rates, this advantage was not enough to offset the lower cost of boom spraying, or in some scenarios ‘no control’, when compared to spot spraying that had very high labour costs.

Patrick Baker

Biography

I am an Associate Professor of Silviculture and Forest Ecology and ARC Future Fellow at the University of Melbourne. My research focuses on forest ecology, dendrochronology, and silviculture.

EcoTAS abstract

Disturbances are important drivers of forest ecosystem dynamics. However, due to their rarity and the logistical challenges of directly observing them, disturbances are poorly understood in terms of both the spatial variability of their impacts and the species-specific responses to this variability. We developed a method that simultaneously estimates unobserved disturbance intensity and species-specific susceptibility from observed disturbance severity (defined as mortality conditional on tree species and size). We demonstrate this approach using two very different fire

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Baker P [1] , Trouve R [1] , Oborne L [1]

[1] University Of Melbourne, Richmond VIC, Australia

How susceptible are different species to disturbance-induced mortality?

events—the catastrophic Victorian Black Saturday fires of 2009 and a low-intensity fire in a species-rich seasonal evergreen forest in western Thailand in 2004. In both studies fire intensity and observed mortality were highly spatially variable. Our analyses allowed us to characterise species-specific and size-specific mortality patterns and revealed important differences in how species respond to fire. In the Central Highlands, the eight Eucalyptus species varied greatly in fire susceptibility, particularly for big trees. In the Thai forest, pioneer species were much more sensitive to fire-induced mortality than other life-history groups, but evergreen and deciduous forest species did not differ. Our results provide new insights into patterns of disturbance-induced mortality by explicitly quantifying the effects of spatial variability of disturbance intensity and individual differences in susceptibility to disturbance. Our approach can be readily adapted to other disturbances to generate new insights into how trees die and how disturbances may shape forest ecosystems in the future.

Olivier Ball

Biography

Olivier Ball is a senior tutor at NorthTec in sunny Whangarei, Northland, New Zealand, where he teaches ecology and conservation, and studies invertebrate ecology and landhopper taxonomy.

EcoTAS abstract

In New Zealand, landhoppers play an important role in litter decomposition. They are found in various habitats including tussock grasslands, where fire is used as a livestock

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

management tool. We investigated the responses of landhoppers to experimental fires in southern South Island tussock grasslands. Replicate plots were subject to one of three treatments: spring burn, summer burn and unburnt control. Annual counts of landhoppers from tussock and inter-tussock habitats were conducted over a 15 year period (2-3 years pre-burn, 12 years post-burn). Also, 11 years post-burn, landhoppers were counted in 3 microhabitats: tussock, tussock margin and inter-tussock. The annual counts showed a severe and significant reduction in overall landhopper abundance in the first 3 years after both fire treatments compared to the unburnt plots in tussock and inter-tussock habitats. Recovery started 4–5 years after the fire treatments but was more rapid in the summer burn plots and tussock habitat compared with the spring burn plots and inter-tussock habitat. Two landhopper species were identified from the microhabitat study, Makawe otamatuakeke and Makawe sp. Overall, there were significantly higher numbers of M. otamatuakeke in tussock microhabitat samples compared with margin and inter-tussock samples. Makawe sp showed no significant difference between the three microhabitats. Also, M. otamatuakeke was significantly more abundant in burnt plots compared with unburnt control plots. This study showed that fire adversely affects landhopper populations, and that impacts are microhabitat and species-dependent. We conclude that nutrient turnover is likely adversely affected by fire in tussock grassland habitats.

Ball O [1] , Wing J [2,3] , Barratt B [2,3] , Dickinson K [2]
[1] Northtec, Whangarei, New Zealand
[2] University of Otago, Dunedin, New Zealand
[3] AgResearch, Invermay, New Zealand

Response of landhoppers (Crustacea: Amphipoda: Talitridae) to fire in New Zealand tussock grasslands

James Barker

Biography

Disturbance Ecology (Fire)
Tuesday, November 28, 2017
4:00 PM - 6:00 PM

The presenting author is James Barker, a current PhD student at the University of Wollongong. My area of research interest is the severity of bushfires in the context of the wider fire regime, specifically long-term feedbacks and vegetation interactions.

EcoTAS abstract

The way in which multiple fires interact to create a fire regime is poorly understood, and the relationship between the severities of consecutive fires has not been studied in Australia. By overlaying remotely sensed severity maps, our study investigated how the severity of a fire is influenced by previous fire severity. This was done in dry eucalypt forests of Southeast Australia, over a range of times since fire spanning every major fire season for 30 years. Generalised additive models were fitted to determine the probability of crown fire and understorey fire; time since fire, topography, and weather were also accounted for in the analysis. We found that a crown fire is more than twice as likely after a previous crown fire than previous understorey fire, and understorey fire is more likely after previous understorey fire. Our findings are in line with the results of studies from North America, and suggest that severe fire promotes further fire. This may be evidence of a runaway positive feedback, which can drive ecological change, and lead to a mosaic of divergent vegetation. Our results suggest that a low severity prescribed fire may be a useful management option for breaking a cycle of crown fires.

Cypress #3

Oral presentation

Barker J [1] , Price O [1]

[1] University Of Wollongong, Wollongong NSW, Australia

Positive severity feedback between consecutive fires in dry eucalypt forests of southern Australia

Barbara Barratt

Biography

Barbara Barratt is a Principal Scientist at AgResearch, New Zealand working mainly on biological control, and also grassland invertebrate ecology. She has an interest in biodiversity of invertebrates in pasture ecosystems, and benefits to pest management.

EcoTAS abstract

New Zealand pastures based on introduced plant species are considered to be low in species diversity (plants and invertebrates) compared with those from where many of our introduced pests have originated. This might mean that there is a paucity of natural enemies able to reduce rapid pest population increase, and hence a dependence on a few introduced biological control agents. However, there has been little research carried out to support these hypotheses. A series of trials was established in four dairying areas in New Zealand to measure comparative productivity in dairy pastures with a range of endophytic ryegrass cultivars, sown either with or without white clover, and with low or high levels of applied nitrogen. Invertebrates were sampled annually by soil coring mainly to measure pest and beneficial species. Since all invertebrates extracted from the samples were stored, an opportunity was taken to record numbers of all taxa from three of the cultivars at two of the sites, the northernmost (Waikato) and the southernmost (Southland) 2 and 5 years after sowing. While the data showed large differences between the two sites in invertebrate taxon composition at Order level, and a significant (3 fold) increase in invertebrate numbers between years 2 and 5, the cultivar treatments, addition of nitrogen, or the presence of clover produced no significant effects overall. Natural enemy taxa

SYMPOSIUM: Invertebrate ecology of managed grasslands - addressing the new challenges

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Barratt B [1] , Barton D [1] , Ferguson C [1] , O'Neill K [1] , Goldson S [2] , Popay A [3]

[1] Agresearch Ltd., Mosgiel Otago, New Zealand

[2] AgResearch Ltd., Lincoln Canterbury, New Zealand

[3] AgResearch Ltd., Hamilton Waikato, New Zealand

Invertebrate biodiversity in pasture: can it be enhanced to reduce pest pressure?

(mainly Arachnida, Carabidae and Staphylinidae) comprised a far larger proportion of the community at the Southland site compared with Waikato, and possible reasons and implications of this are discussed.

Sarah Barrett

Biography

Dr. Sarah Barrett is the Threatened Flora Conservation Officer for the Albany District of the WA Department of Biodiversity, Conservation and Attractions. Her work involves threatened flora and threatened ecological community conservation, Phytophthora dieback management, fire ecology and vegetation survey.

EcoTAS abstract

Banksia montana (Proteaceae) from the low peaks of the Stirling Range in Western Australia is considered at very high risk of extinction due to its susceptibility to an introduced soil pathogen, Phytophthora cinnamomi, which has become widespread within its natural range. Less than 40 mature individuals remain in the wild. These plants are colonized by a host-specific scale insect, both now mutually at risk of extinction.
A conservation introduction of B. montana was undertaken in 2003, away from its natural upland habitat. Despite high survival, few plants have successfully reproduced, predominantly due to invertebrate predation. Meanwhile, wild populations continue to experience low natural recruitment and mature plants, some up to 50 years old, are declining. The dwindling wild populations occur in a montane heath community maintained by aerial application

SYMPOSIUM: Novel management interventions for threatened species
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Wattagan Room
Oral presentation
Barrett S [1] , Rathbone D [2] , Dillon R [1] , Cochrane A [1]
[1] Department Of Biodiversity, Conservation And Attractions, Albany WA, Australia
[2] University of Western Australia, Albany WA, Australia
Re-introducing a threatened banksia into a Phytophthora cinnamomi infested montane habitat in Western Australia

of the fungicide Phosphite to reduce the impact of Phytophthora cinnamomi.
Restocking of existing populations is now crucial to prevent extinction of this species in the wild. A precedent has been demonstrated in the re-stocking of a common congener in the same montane habitat, where overall mortality was less than 50% after five years. Surprisingly high survival may be due to the use of Phosphite, to the increased disease resistance of germplasm sourced from plants that have persisted in pathogen-infested areas and microsite choice. But can we do the seemingly impossible? Here we propose to re-introduce a threatened species into a pathogen-infested montane habitat utilising putative intra-specific genetic resistance, environmental parameters and fungicide management to deliver in-situ restoration outcomes.

Samantha Barron

Biography

My name is Samantha Barron and I am a PhD student at Federation University Australia. My main interests include plant ecology, in particular invasive species. I also have a keen interest plant physiology and biogeography.

EcoTAS abstract

Species Distribution Models (SDMs) are correlative approaches to understanding how a species' distribution relates to environmental conditions. However, SDMs often fail to predict plant success in a landscape, especially for invasive species, as they assume that a species in its invasive range is in equilibrium with its environment. In

Invasion Ecology (Plants)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation

Barron S [1]
[1] Federation University Australia, Ballarat VIC, Australia
[2] University of Birmingham, Edgbaston Birmingham, United Kingdom
[3] Parks Victoria, Melbourne Victoria, Australia

contrast, Mechanistic Distribution Models (MDMs) determine habitat suitability by linking the actual environmental space occupied by a species (habitat), to the correlating morphological, physiological, and biological limitations of the species (i.e. its fitness). This study takes a mechanistic approach by modelling the habitat suitability of Acacia longifolia by identify presence and abundance in the field, as well as measuring plant traits, and using stable isotopes δ15N and δ13C, and leaf N per unit area and P concentrations, to relate habitat suitability to plant fitness, and thus success in the landscape. Field observations suggest that Acacia longifolia is tightly associated with water availability. We therefore predict that most habitats will be suitable for Acacia longifolia; however, habitat suitability will decline as distance from water increases. Secondly, we predict that water use efficiency (δ13C) will increase from distance from water but plant fitness will decrease. Lastly, stable isotope analysis for δ15N will reflect the high nitrogen input and fixation by Acacia longifolia, with more invaded sites (abundance) having greater levels of soil N. Preliminary findings show that there is a weak relationship between plant fitness, abundance and distance to water. We are currently collecting field data to further test these hypotheses.

Combining physiology and plant traits to model habitat suitability and plant success of Acacia longifolia

Amber Bateman

Biography

Amber Bateman is a PhD student at The University of Western Australia and Kings Park Botanical Gardens and Parks Authority working in partnership with BHP Billiton

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

studying reconstructed soil substrates in arid-zone mine site rehabilitation.

EcoTAS abstract

Currently, one-third of the world's soils are considered degraded due to large scale landscape disturbance. To improve soil health, arid zone rehabilitation projects use inorganic amendments, such as gypsum or urea, in these degraded soils to increase soil nutrients, water retention and achieve higher seedling recruitment. Although these amendments are currently used in the agricultural and mining rehabilitation industries, limited research has been conducted to determine the impact these amendments have on the soil and seedling recruitment or to test what application rates are most effective. This research aims to assess the effectiveness of inorganic soil amendment to re-instate soil physiochemical and biological properties and, improve seedling development. In a glasshouse experiment, the effects of various rates of inorganic amendments on soil health and seedling growth was assessed across five plant species, native to the Pilbara region of Western Australia. This study found that seedlings grown in degraded soils with high doses of amendments showed improved total biomass. Analysis of soil microbial activity showed that reconstructed substrates with a high dose of gypsum and low dose of urea had a significantly higher amount of microbial activity than substrates with either a low dose or zero gypsum. Overall, responses to amendments varied across species and long-term field studies are required to further assess the use of amendments in a rehabilitation setting. The findings of this study suggest that amendments may be beneficial to both soil microbial health and plant development in the early stages of recruitment.

Bateman A [1,2] , Erickson T [1,2] , Merritt D [2] , Munoz-Rojas M [2,3]
[1] The University Of Western Australia, Perth WA, Australia
[2] Kings Park Botanic Garden and Parks Authority, Perth Western Australia, Australia
[3] The University of New South Wales, Sydney NSW, Australia

Evaluating inorganic amendments in reconstructed arid-zone substrates to improve soil function and seedling development

John Baumgartner

Biography

John Baumgartner is a postdoctoral research fellow in the Beaumont lab at Macquarie University. His expertise is in modelling habitat suitability and population dynamics, with an emphasis on developing tools that support conservation decision-making.

EcoTAS abstract

Online biodiversity databases (e.g., www.gbif.org, www.ala.org.au) have revolutionised analyses of habitat suitability, providing simple and free access to global occurrence records for over 1.7 million species. In recent years, such data have been used extensively to fit correlative species distribution models (SDMs), frequently with the aim of assessing the impacts of environmental change. Unfortunately, species observations are often imperfect, with taxonomic and geographic errors necessitating careful cleaning of data prior to their use in modelling studies. Of particular relevance when fitting SDMs is the accuracy of coordinates describing the observation's location. Since SDMs relate occurrence patterns to spatial environmental data, uncertainty about species' occurrence localities may lead to an incorrect association between the species and unsuitable environmental conditions. This is likely to be particularly problematic in areas with steep environmental gradients, where unsuitable environments might occur in close proximity to occupied habitat. Limited guidance exists regarding best practices for dealing with this type of error. One approach involves omitting records with spatial inaccuracy exceeding some tolerable limit. However, this may have adverse consequences if inaccurate records are environmentally biased, and represents an unnecessary

Ecological Modelling (3)

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Bimbadeen Room

Oral presentation

Baumgartner J [1] , Esperón-Rodríguez M [1] , Beaumont L [1]

[1] Macquarie University, North Ryde NSW, Australia

Handling coordinate uncertainty in habitat suitability modelling

loss of information when environmental gradients are negligible. Here, we demonstrate these problems and present an alternative approach to handling this important form of uncertainty.

Elisa Bayraktarov

Biography

Elisa Bayraktarov is a Postdoc at the NESP Threatened Species Recovery Hub, The University of Queensland. As an ecologist, Elisa's current research aims to develop tracking indices to effectively report on the status of Australian threatened species.

EcoTAS abstract

Understanding the state of threatened species populations is crucial for monitoring progress towards national and global conservation targets, justifying management resourcing, and stimulating a targeted response to environmental problems. To date, most monitoring of, and reporting of trends for, threatened species involves independent programs for individual threatened species. In 2016, the Threatened Species Recovery Hub of the National Environmental Science Programme (NESP), in collaboration with 20 organisations, committed to the establishment of an integrated headline national threatened species index for Australia – analogous to other national performance indicators (e.g. stock market indices, gross domestic product, or unemployment rate). The main purpose of this index is to engage the public and decision-makers. By collating available information on population trends across many Australian threatened birds and analysing that data in a consistent, integrated way, a multi-

SYMPOSIUM: Effectiveness Monitoring (Part 2)

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Sugarloaf Room

Oral presentation

Bayraktarov E [1] , Ehmke G [2,1] , O'Connor J [2] , Driessen J [2,1] , Tulloch A [4,1] , Woinarski J [5] , Avery-Gomm S [1] , Garnett S [5] , McRae L [6] , Barnes M [7,1] , Possingham H [3,1]

[1] The University of Queensland, St Lucia QLD, Australia

[2] BirdLife Australia, Melbourne Victoria, Australia

[3] The Nature Conservancy, Arlington VA, USA

[4] Wildlife Conservation Society, New York NY, USA

[5] Charles Darwin University, Darwin NT, Australia

[6] The Zoological Society of London, London, England

[7] University of Hawaii, Honolulu Hawaii, USA

species composite index reporting on changes in species population trends has been developed. Here, preliminary results are presented and the stages required for the development of an integrated threatened species index described: 1) identifying data custodians, 2) developing protocols for sensitive species data handling, 3) negotiating data sharing, 4) vetting and pre-processing collected data, 5) assessing suitability of data for trend analyses, 6) aggregating data into spatial units used in analyses, 7) producing the index using the Living Planet Index approach, and 8) eliciting expert opinion on produced indices. Once completed, this index can be readily interrogated to report on trends for different regions, jurisdictions and management investments, and has the potential to include additional taxonomic groups.

How are Australia's threatened birds going? Introducing a national threatened species population index

Linda Beaumont

Biography

Linda Beaumont specialises in biological responses to climate change, including shifts in species' distributions, morphology and phenology. Her research focuses on using quantitative tools to identify species vulnerable to climate change, and to guide their management.

EcoTAS abstract

Over the past 120 years, four major droughts have occurred across Australia. Of these, southern Australia's "Millennium Drought" from 2001–2009 was the most devastating on record, and has been partially attributed to anthropogenic global warming. As climate change intensifies, hydrological cycles will be amplified, and the

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? – part 2

Monday, November 27, 2017
3:45 PM - 5:45 PM
Wattagan Room
Oral presentation

frequency and severity of droughts will increase. Such changes have the potential to cause wide-scale tree mortality, with major consequences for ecosystem services and biodiversity. Hence, adaptive land management for climate change requires an understanding of the risk of tree mortality associated with drought. We used correlative ecological niche models (Maxent) to assess shifts in habitat suitability for 14 Australian overstorey tree species in response to the Millennium Drought. We calibrated models using climate and soil data from the pre-drought period (1970–2000), and explored changes in suitability predicted by these models during the 2001–2009 drought period. Our results indicate that drier/warmer conditions associated with the Millennium Drought appear to have been detrimental for some species (e.g., Eucalyptus viminalis, E. pauciflora), but may have benefited others across part or all of their respective ranges (e.g., E. sideroxylon, E. populnea, Allocasuarina torulosa). We describe the extent to which our findings align with results from ecophysiological models and time series of plant productivity derived from satellite imagery.

Beaumont L [1] , Baumgartner J [1] , Esperón-Rodríguez M [1] , De Kauwe M [1] , Medlyn B [2]
[1] Macquarie University, North Ryde NSW, Australia
[2] Hawkesbury Institute for the Environment, Western Sydney University, Richmond NSW, Australia

Modelling potential responses of dominant tree species to the Millennium Drought

Miguel Bedoya-Perez

Biography

Miguel A. Bedoya-Perez's research interests include behavioral ecology and evolutionary biology, specifically, the evolution and ecological significance of behavioral traits and their adaptability to environmental changes (anthropogenic or natural).

EcoTAS abstract

Agro Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation

Conflict between Top End livestock producers and high densities of Agile Wallabies (Notamacropus agilis) on pastoral land has been ongoing for decades. From 2013 to 2016, the density of wallabies varied from 56 ind/km2 (95% CI 42 - 77) to 289 ind/km2 (95% CI 126 - 670), depending on the region. Through pasture biomass loss modeling, we estimated 1 AE to be 26.8 Wallabies (95% CI 0.03-27). We identified the alternative management options for controlling wallaby numbers on pastures as culling (shooting), wallaby-proof fencing and baiting; the first two being the most common methods currently used by landholders. Comparing our estimates of economic losses, the cost of the current alternatives for control, and the potential increase in revenue after management; it appears that wallaby management by culling only, is feasible for properties with wallaby populations higher than 1,854.0 Ind/km2 (95% CI 846.7-3,755.6). However, properties with improved pastures –i.e. higher carrying capacities- a combination of wallaby proof fencing, followed by shooting can be economically feasible (with the return of investment in as little as 5 years) with initial wallaby populations as low as 40.5 Ind/km2 (95% CI 24.6-62.6). It follows that for properties that are or are planning to intensify their production, and currently do not experience high wallaby populations, wallaby proof fencing prior to intensification seems to be the best option.

Bedoya-Pérez M [1] , McMahon C [2]
[1] The University Of Sydney, Camperdown Nsw, Australia
[2] Institute for Marine and Antarctic Studies, Battery Point Tasmania, Australia

Cattle and wallabies. Management of a native agricultural pest

Tanja Beer

Biography

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches

Tanja Beer is an award winning ecological designer, academic and community artist. Her practice-led research explores new forms of environmental arts-science communication through hands-on eco-creative experiences, collaborative crafting and interactive installation design. Her work can be viewed at www.tanjabeer.com.

EcoTAS abstract

As an artist investigating new forms of environmental science communication, I'm interested in how we lead people through a process of ecological understanding that not only engages the intellect but also solicits participatory action through the haptic and creative. Various platforms have demonstrated the value of hands-on activities – such as community gardening and crafting – in making meaningful connections and collective identities. In his seminal book, Flow: The Psychology of Optimal Experience (1990), psychologist Mihaly Csikszentmihalyi describes how these activities can be an opportunity to engage with 'flow' – a highly focused mental state that increases awareness, connectivity and well-being. In their recent book, Through Vegetal Being (2016), philosophers Luce Irigaray and Michael Marder also argue that it is through 'vegetal' (or plant relating) activities in particular (e.g. touching and smelling plants), that our relations with the more-than-human world can be reignited. The authors contend that by enabling shared experiences of 'vegetative life', humans may feel a stronger connection to communities and climates, overcoming both cultural and environmental boundaries. I am interested in how combining these two modes of thought – to enable 'flow' through shared 'vegetal' or plant-based activities – can assist communities in engaging with and tackling ecological issues more collaboratively. This presentation will draw

Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Beer T [1]

[1] University Of Melbourne, East Albury NSW, Australia

Facilitating nature connection and extending biodiversity knowledge through hands-on arts-science experiences

upon a recent practice-led cretaive research project (Refugium, Australia 2016) to explore ideas of using ‘flow’ and ‘vegetal-crafting’ as a way of engaging audiences in biodiversity and urban resilience.

Nathan Beerkens

Biography

Nathan Beerkens, Field Ecologist and Community Coordinator at Arid Recovery. Interested in the conservation and reintroduction biology of threatened animals.

EcoTAS abstract

Kowaris (Dasyuroides byrnei) are rat-sized dasyurids, endemic to central Australia. Currently listed as Vulnerable, the species’ area of occupancy and population size have declined significantly since European settlement, through habitat degradation from livestock and interactions with feral predators. We propose to reintroduce kowaris to Arid Recovery, an established predator-proof reserve in South Australia, to serve as an insurance population and source population for future supplementation and/or reintroductions.

A study was conducted to scope the suitability of the reserve for kowaris, which have not been translocated before. The area proposed is contained within the 123 km² reserve’s 1.8m high predator-proof floppy-top fence. The ground cover is predominately gibber and/or clay pans (72%), interspersed by sand dunes. Areas of both good (5-50mm gibber pavement) and poor (>50mm, uneven gibber)

Conservation Biology (1)
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #3
Speed Talk
Beerkens N [1] , Brandle R [2] , Moseby K [3] , Tuft K [1]
[1] Arid Recovery, Roxby Downs SA, Australia
[2] SA Arid Lands NRM, Port Augusta South Australia, Australia
[3] Ecological Horizons, Kimba South Australia, Australia
Scoping the suitability of Arid Recovery reserve for kowari reintroductions

kowari habitat have been identified. We found there to be bountiful food availability for kowaris, which primarily eat insects, supplemented by small mammals, reptiles and birds. A collective 3204 pitfall trap nights resulted in the capture of 1044 invertebrates, >99% of which were suitable prey. Native rodents are also abundant in the reserve, with populations having increased up to 15 times since the removal of feral predators. We conclude that Arid Recovery could support a population of kowaris and propose a trial reintroduction, where individual survival, dispersal, habitat use and diet can be measured.

Luciano Beheregaray

Biography

Luciano Beheregaray is a Professor of Biodiversity and an ARC Future Fellow at Flinders University, in Adelaide. His research interests are in conservation and evolutionary genetics and genomics of aquatic animals. His work illustrates how natural history can stimulate public interest about the importance of biodiversity. He has worked in several remote ecosystems around the world and his research has featured in >3,200 media releases. In Amazonia, he pioneered the combination of genome scans with landscape genetics to clarify adaptive divergence and speciation. In the Galápagos, he produced groundbreaking findings about the evolution of one of the world's most fascinating radiations. In Australia, he coordinates a multi-institutional team that is linking the distribution and adaptive potential of marine and freshwater biodiversity with key environmental and anthropogenic factors. Luciano received his BSc and MSc in Biological Oceanography at University

KEYNOTE PRESENTATION:
Professor Luciano Beheregaray
Tuesday, November 28, 2017
9:00 AM - 9:45 AM
The Convention Centre
Keynote
Beheregaray L [1]
[1] Molecular Ecology Laboratory, Flinders University, Adelaide SA, Australia
Ecological genomics of adaptation to environmental change

of Rio Grande (Brazil) and PhD at Macquarie University (Sydney, 2001). He worked at Yale University as a ‘Gaylord Donnelley Environmental Research Fellow’ before starting a tenure position at Macquarie in 2003, followed by a move to Flinders in 2009. In the last ten years his lab produced 170+ papers and he graduated 16 PhD students. He is the head of the Molecular Ecology Lab at Flinders University and is currently an Australian Research Council Future Fellow with a focus on ecological genomics of adaptation in fish.

EcoTAS abstract

Understanding whether natural populations will be able to adapt to selective pressures associated with rapid environmental and climatic change is a research priority. In this talk I will present results (and unresolved challenges) from three research programs that study adaptation across the ranges of several marine and freshwater species. These research programs explore natural replicates of the adaptation process by comparing closely related species and populations in geographically separate environments or in shared environments. Our framework to study population adaptations integrates information from population genomic datasets with environmental mapping, trait phenotyping and experiments in wild and captive populations. Some of our results allowed testing general ecosystem-level theories relevant to climatic adaptation and vulnerability; others challenged paradigms in conservation biology. Our key findings include: (i) environmental heterogeneity and natural ecological disturbance influenced levels of adaptive divergence in highly connected metapopulations; (ii) variance in global gene expression (a surrogate for phenotypic plasticity) might contribute to the evolutionary potential of small populations; (iii) populations from more variable habitats

showed higher adaptive resilience to climate change. Strategies for cataloguing adaptive resilience to environmental change in ecologically important non-model organisms are presented.

Lee Belbin

Biography

I am a geoscience graduate and IT postgraduate who has evolved from exploration geology, teaching, research in analytical ecology to management, standards and policy development. I provide management of, and scientific advice to international and national biodiversity-related projects.

EcoTAS abstract

The Spatial Portal of the Atlas of Living Australia has invested well over a person-year to identify and integrate over 500 bioenvironmental layers into its infrastructure. The layers were selected because they either had a likely relationship with species distributions or could provide a useful context for evaluating species distributions. The layers were sourced from over 60 national and international agencies and consequently, metadata, formats and spatial resolution varied widely.

While the Atlas work to integrate biological and environmental data has provided an effective service, a) the Atlas is not a logical home for bioenvironmental data and b) a standardized web service at least for Australian data would seem a more holistic and cost-effective strategy. The Atlas provides an idea of what this could look

Ecological Modelling (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Belbin L [1]
[1] The Atlas Of Lving Australia, Canberra ACT, Australia
A New Paradigm for Australia's Bioenvironmental Data?

like. For example, entering http://spatial.ala.org.au/ws/intersect/el761/-34.43/145.12 into your web browser will respond with the “mean annual temperature – diurnal range” at latitude -34.43 and longitude 145.12 is 13.575c.

Ideally, a small Federally funded (NCRIS?) facility should have responsibility for establishing a standard web service across at least Australian agencies for the provision of bioenvironmental data along the lines of http://bioenvironment.au/ws/intersect/{layerID}/{latitude}/{longitude}. The responsibility for the data would then reside at the source, costly duplication would be eliminated, errors in processing minimized and currency assured. Hopefully it won’t take another 30 years after Professor Henry Nix proposed an “Australian Environmental GIS (AEGIS)” in 1986.

Stanley Bellgard

Biography

Stan Bellgard is a Plant Pathologist at Landcare Research NZ Ltd. His research areas: biocontrol of weeds and the pathology of Phytophthora diseases. Stan received BSc (Hons) from the University of Western Australia and PhD from the University of Wollongong.

EcoTAS abstract

The genus Agathis (Araucariaceae) includes about 13 species of tropical to warm temperate trees which are found from Malesia, through Australia to New Zealand. Kauri (Agathis australis) is a dominant tree in lowland forests of northern New Zealand. Giant individual trees can

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 2)

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Brokenback Room

Oral presentation

Bellgard S [1]

[1] Landcare Research Nz Ltd., Auckland North Island, New Zealand

reach over 4.5 m in trunk diameter, exceed 1,000 years in age, and are cultural icons. In 1972 a Phytophthora species was associated with dead and dying trees in a kauri forest stand on Great Barrier Island, off the northern New Zealand coast. Symptoms included yellowing of foliage, canopy thinning and occasional tree death. In 2006 Phytophthora ‘taxon Agathis’ was reported on regenerating and mature kauri trees in a forest west of Auckland. The original identification of the causative organism as P. heveae was questioned, since the DNA sequence of the ITS region of the newly isolated suspected pathogen was identical to that of P. castaneae. This raised the possibility that the Phytophthora species isolated from kauri was a new species within Clade 5. The ‘Kauri killing’ Phytophthora organism has now been formally described as Phytophthora agathidicida and a national, long-term management plan has been initiated to “Keep Kauri Standing”. Its long-term, landscape-scale effect may be to change the composition of a kauri-dominated forest to forests dominated by podocarps. Evidence from catchment-scale surveillance demonstrates that multiple Phytophthora threats are moving through stream networks. The biology, pathology, ecology, control and management of P. agathidicida are discussed in terms of cultural licence to operate, conservation imperatives and conflicting land use.

New Zealand kauri Agathis australis under threat from Phytophthora, over-utilisation and fragmentation

Peter Bellingham

Biography

Peter Bellingham is a plant ecologist, who works at Landcare Research (a government research institute) in Lincoln, near Christchurch, New Zealand. His research has focused on long-term (decadal) dynamics in forests and effects of disturbances such as hurricanes and earthquakes. He has a long-standing interest in the ecological consequences of biological invasions, and the interactions between biological invasions and natural disturbance, above- and below-ground. He also has a research focus on the ecological restoration of island and coastal ecosystems, often working with the Māori communities that own them. He has been involved in the development and implementation of inventory and monitoring systems for terrestrial biodiversity for New Zealand's national and international reporting and for evaluating the effectiveness of policy and management. Most of his research has been carried out in New Zealand, but he has also conducted studies in Jamaica, Japan, Puerto Rico, Tonga, and Australia.

EcoTAS abstract

New Zealand is a global biodiversity hotspot with high endemism (e.g., 85% of the vascular flora). Its biodiversity is under pressure from biological invasions, land use changes, and climate change. Central and regional government agencies in New Zealand have developed terrestrial biodiversity indicators in response to national and international requirements to report status and trends in biodiversity. Since 2011, concurrent measurements of indicators of plant communities, bird communities, and of some non-native mammals have been implemented across 8.6 million ha (one-third of New Zealand's land area, public land designated for conservation) at sample points located

KEYNOTE PRESENTATION Te Tohu Taiao Award Presentation: Peter Bellingham

Thursday, November 30, 2017

9:00 AM - 9:45 AM

The Convention Centre

Keynote

Bellingham P [1]

[1] Landcare Research, Lincoln, New Zealand

How well is New Zealand doing in reporting the state and trends of its biodiversity?

systematically at the intersections of an 8-km × 8-km grid superimposed across New Zealand. A current challenge is to extend implementation of terrestrial biodiversity indicators across private land, including agricultural landscapes, plantation forests, and urban ecosystems. The same indicators used on public conservation land have been implemented since 2014 in one region. New environmental-DNA-based indicators of belowground biodiversity and plant communities have been implemented. Results of state and trends in components of biodiversity will be presented. There is general agreement for evidence-based decisions and a stated need for better information about trends in biodiversity in New Zealand. Current efforts span multiple agencies and the research community and this talk will also address the need for coordination and sustainability of current efforts.

Peter Bellingham, Elaine Wright, Matt McGlone, Sarah Richardson, Andrew Gormley, Robbie Holdaway, Philippa Crisp, Fiona Hodge

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Emma Bennett

Biography

Emma Bennett is a PhD student with 15 years field based consultancy experience. She has primarily worked in environmental monitoring and compliance and has specialised in using detection dogs to undertake scent based field work.

Conservation Biology (1)
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #3
Speed Talk PLUS Poster

EcoTAS abstract

The use of detection dogs to support conservation survey efforts is growing globally. An increasing number of studies are demonstrating the success of trained dogs in the detection of plants and animals, particularly for rare and difficult to find species. For some conservation projects however, the cost of engaging private contractors with specially trained dogs may be prohibitive. The not for profit Conservation Ecology Centre in the Otway Ranges National Park has been trialling the use of volunteer dog handlers to increase detection opportunities for the elusive Tiger Quoll (Dasyurus maculatus) and the Long-nosed Potoroo (Potorous tridactylus). This pilot study is a world first for conservation dogs and is modelled from volunteer search and rescue dog programs which are well established.

This presentation will provide an overview of how this novel approach contributes to the overall conservation objectives for the Tiger Quoll and Potoroo. In addition, it will explore the benefits and limitations of volunteer dog handlers and provide preliminary results of their detection capabilities.

Bennett E [1] , Moore J [1] , Hauser C [2]
[1] Monash University, Clayton VIC, Australia
[2] University of Melbourne, Parkville Vic, Australia

Volunteers, working dogs and threatened species: A world first for conservation

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Nicole Bezemer

Biography

I am completing the second year of my PhD on the evolution and conservation consequences of bird pollination and genetic insularity in the granite-endemic tree Eucalyptus caesia.

Open session (2)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Bimbadeen Room
Speed Talk PLUS Poster

EcoTAS abstract

In south-west Australia, granite outcrops support hyper-diverse plant communities, some species of which persist as small, genetically insular populations for extremely long periods. Due to the fire-sensitivity and conservation status of some granite endemics, experimental burns are inappropriate. Thus, opportunities to study the impact of fire on plant population genetics seldom arise. Following a wildfire in a stand of the granite-endemic, lignotuberous tree Eucalyptus caesia at Boyagin Reserve, we surveyed genetic diversity, growth and survival, and parentage of seedlings. The entire adult stand (n = 180) plus all seedlings located (n = 115) were genotyped with 15 microsatellite loci. There was low heterozygosity and high fixation in seedlings compared to adults. Seedling mortality was high, with 32 seedlings still alive two years after the fire. Our data did not support expectations of post-germination selection against homozygous progeny. Based on height measurements, seedlings resulting from self-pollination (n = 19) could not be distinguished from outcrossed seedlings (n = 69). Whether these results can be explained by variability in seedling microsites, or purging of deleterious alleles, requires further investigation. Parentage analysis revealed limited seed dispersal (14.6 ± 3.8 m). By comparison, pollen movement was more extensive (67.8 ± 9.4 m), yet still restricted within the stand. Genetic mixing through wide pollen dispersal within stands, and extreme longevity of adults via lignotuber resprouting could retard extirpation in E. caesia. However, poor understanding of recruitment over the long-term, and lack of population age-structure data, represents a significant challenge to appropriate conservation management.

Bezemer N [1,2] , Hopper S [1] , Krauss S [1,2] , Roberts D [1,2]

[1] University Of Western Australia, WA, Australia

[2] Botanic Gardens and Parks Authority, Perth WA, Australia

Sex on the Rocks: Genetic Consequences of Recruitment after Wildfire in a Granite-endemic Tree

Manisha Bhardwaj

Biography

Manisha Bhardwaj is in her final year of her PhD candidature at the University of Melbourne, investigating the impact of roads on insectivorous bats. Her research focuses on investigating and mitigating the impacts of urbanization and urban processes on wildlife.

EcoTAS abstract

Barrier-to-movement impacts of roads on nocturnal species, such as bats, may be amplified by the presence of artificial night-time lighting. Wildlife crossing underpasses are often used to reduce road impacts, however the new design of installing lights in underpasses for human co-use may reduce underpass use by bats. In this study, we introduced light to these structures to evaluate if the presence of light alters the activity within and above the structures. We monitored the level of activity of bats under and above underpass bridges and culverts along a major freeway in Victoria, Australia. When lights were introduced, bat activity was lower under the structures but higher above the structures. This suggests that bats actively avoided the lit passageway, even if that meant potentially accessing “unsafe” habitat such as a roadway. Light can have a significant impact on the behaviour and movement of insectivorous bats and where possible, lighting should be avoided around critical bat habitat and in crossing structures actively used by bats.

Landscape Ecology (2)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Cypress #2

Speed Talk PLUS Poster

Bhardwaj M [1] , Soanes K [1] , Lahoz-Monfort J [1] , Lumsden L [2] , van der Ree R [3]

[1] University Of Melbourne, Parkville Vic, Australia

[2] Arthur Rylah Institute - Department of Environment, Land, Water & Planning, Heidelberg Vic, Australia

[3] Ecology and Infrastructure International, Melbourne Vic, Australia

Artificial night-time lighting influences the use of wildlife crossing structures by insectivorous bats

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Chris Blackman

Biography

I am a post-doctoral researcher in climate change ecophysiology. My research is focused on understanding the impacts of climate change, especially changes in rainfall, on plant function and survival.

EcoTAS abstract

Genetic (i.e., population, family, genotype) variation in phenotypic plasticity within tree species is expected to be a key determinant of their capacity to adapt to climate change, yet the patterns and mechanisms underlying genotypic variation in tree responses to changing rainfall remain poorly understood. We examined genetic variation in phenotypic plasticity in response to water deficit within Eucalyptus camaldulensis (River Red Gum), the most broadly distributed eucalypt in Australia. We grew clones of ten genotypes of E. camaldulensis from populations representing the species' climate range planted in six rainout shelters located at WSU in Richmond, NSW. Within each shelter, two treatments representing low rainfall (300 mm p.a.) and high rainfall (750 mm p.a.) were imposed and growth and physiological responses monitored regularly over the course of ~2 years.

We observed significant variation among genotypes in the growth response of trees to water deficit, with the greatest reduction in growth (total above ground biomass) tending to occur in genotypes from cool-wet climates. Significant variation among genotypes was also observed in the response of leaf level gas exchange, water-use and drought tolerance traits. Overall, these results indicate strong genetic variation in phenotypic plasticity within E. camaldulensis in response to water deficit, with significant implications for the long-term management of the species.

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Blackman C [1] , Aspinwall M [1] , Maier C [1] , Rymer P [1] , Tissue D [1]

[1] Hawkesbury Institute for the Environment, Penrith NSW, Australia

Genetic variation in phenotypic plasticity within Eucalyptus camaldulensis in response to water deficit

Stephen Bonser

Biography

Stephen Bonser is an Associate Professor in Evolutionary Ecology. His research focuses on how plants adapt to new and stressful environments, how biotic interactions shape adaptive strategies, life histories, and community ecology.

EcoTAS abstract

Shade avoidance plasticity is believed to be an important mechanism for plants to increase competitive ability when they are shaded by near neighbours. However, shade-avoidance plasticity is most frequently demonstrated in short-lived species, and we are uncertain if these species could gain competitive superiority over potentially longer-lived competitors. We tested the relationship between shade-avoidance plasticity and competitive ability in a number of studies. First, we conducted an experiment testing if plants exposed to the cues of oncoming competition (through spectral shading treatments) as seedlings express greater competitive ability as adult plants. We found that plants exposed to the cues for competition early in life did not have greater competitive ability late in life. Second, we conducted an experiment testing for a relationship between shade avoidance plasticity and both competitive ability and allocation to reproduction. We found no relationship between shade avoidance plasticity and competitive ability, but a positive relationship between shade avoidance plasticity and reproductive allocation. Finally, we conducted a literature synthesis on studies investigating shade avoidance plasticity, competitive ability and reproduction. We found a negative relationship between the strength of shade

Community Ecology

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Cypress #3

Oral presentation

Bonser S [1] , Simpson-Young C [1] , Fazlioglu F [1] , Pang C [1]

[1] UNSW Sydeny, Sydney NSW, Australia

What is the value of shade avoidance plasticity in plants?

avoidance plasticity and competitive ability, but a highly significant positive relationship between shade avoidance plasticity and reproduction. We demonstrate that our understanding of the adaptive importance of shade avoidance plasticity is incorrect. Rather, shade avoidance plasticity allows plants to quickly reproduce prior to the onset of intense competition.

Mike Bowie

Biography

Mike Bowie is a senior tutor in ecology and has an active interest in restoration ecology and invertebrate conservation. He has worked at Lincoln University for 34 years on a variety of research projects including the restoration of dryland ecosystems within an agricultural landscape.

EcoTAS abstract

The growth of the dairy industry in New Zealand and associated clearing of native remnants and shelterbelts for centre-pivot irrigation use has created a monoculture of grass at the expense of native biodiversity. This is particularly serious on the Canterbury Plains where <1% of the original native flora remain, leaving rare plants and animals vulnerable. In 2008, the Lincoln University Demonstration Dairy Farm (LUDDF) was planted with 6000 native trees in the corners and boundaries of centre-pivot irrigated paddocks. Subsequent research investigated the changes in bird abundance and diversity in the eight years since planting. Pitfall trapping, pan trapping and leaf-litter extraction was undertaken in pasture, double-fenced

SYMPOSIUM: Effectiveness monitoring (Part 1)
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Sugarloaf Room
Oral presentation
Curtis K [1] , Ross J [1] , **Bowie M** [1]
[1] Department of Pest Management & Conservation, Lincoln University, Lincoln Canterbury, New Zealand
Back to the future: restoring Ecosystem Services on NZ dairy farms through native plantings

boundaries and corner plantings to compare the invertebrate fauna found. Five-minute bird counts found 22 bird species and of these, 11 were native. This was an increase of three species compared to 2008, including native pied stilt and pukeko. Over 80 invertebrate species were identified, of which there were 26 spider species collected in pitfall traps. Native planting sites, double fenced corridors and pasture had 22, 13 and 12 respectively. Both native and introduced harvestmen were more abundant in pitfall traps in corner plantings, followed by corridors, and pasture. Pan traps had a higher abundance of parasitic wasps, honeybees and the two predatory hoverfly species in native plantings than corridor and pasture traps. We conclude that a higher diversity and abundance of beneficial invertebrates were found in native planted areas than in pasture, with double-fenced corridor plantings providing a possible dispersal role.

Cris Brack

Biography

Cris has been teaching and researching into forest measurement and management (plantations, native and urban forests) for over 20 years. He has experience with remotely sensed data, advanced sampling theory and modelling tools used in this field.

EcoTAS abstract

The extent of the deaths of trees around the Monaro Plains, NSW, was worryingly large and homogeneous and had been expanding since well before it was formally

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? – part 2

Monday, November 27, 2017

3:45 PM - 5:45 PM

Wattagan Room

Oral presentation

Brack C [1] , Ross C [1]

[1] Fenner School Of Environment And Society, ANU, Acton ACT, Australia

mapped in 2013. Originally thought to be restricted to one species, mapping the extent using remote sensing proved difficult as apparent dieback boundaries often proved to be artefacts of species change. The homogeneity of the deaths was particularly notable given the heterogeneity of the management, recent fire history and disturbance regimes across the region. Although the Eucalyptus weevil was associated with every dieback event in the area, it is not likely to be the primary cause. Despite some commentators suggesting simple or non-provable causes of the dieback (e.g changed fire regime or climate change) observations across the wide range of micro-environments and management regimes suggest much more complex interactions are responsible.

Monaro Dieback: too big and heterogeneous to call

Bernat Bramon Mora

Biography

I'm a Ph.D. student at the University of Canterbury. My research is based around developing new tools for the study of
evolution and the structure of ecological networks.

EcoTAS abstract

Although the concept of evolution was widely accepted by the end of the nineteenth century, the idea of using phylogenetic trees to compare phenotypes across different species has been around for just over 30 years. It has since become a crucial tool in evolutionary biology. To date, however, we have only scratched the surface of using phylogenetic comparative methods to analyze the structure of ecological networks---the representation of species and

Ecological Modelling (1)

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Sugarloaf Room

Oral presentation

Bramon Mora B [1] , Stouffer D

[1] University Of Canterbury, Christchurch Canterbury, New Zealand

Detecting convergent evolution in the structure of ecological communities

the interactions that connect them. Studying ecological interactions as phenotypic traits is reasonable because of the long-held assumption that species' interactions are evolutionarily conserved. This assumption is often made because of (1) the basic observation that phenotypic traits of new species are largely inherited from their ancestors and (2) the widely accepted idea that phenotypic traits constrain species' interactions. Here, we present a method that fits an evolutionary model to predict the structure of an ecological network. In particular, our method focusses on capturing signals of convergent evolution, which is one of the strongest lines of evidence of natural selection. Using this method, we show that convergent evolution likely shapes species' interactions. This implies that the fingerprint of evolution is encoded within the structure of ecological networks. These results shed light on the species' shared evolutionary history and reveal an underappreciated selective pressure underlying the structure of their network of interactions.

Natalie Briscoe

Biography

Natalie's research focuses on understanding how the physiology, morphology and behaviour of animals influences their sensitivity to climate and where they can live. She is part of NESP Threatened Species Recovery Hub project 'Identifying and managing refuges from threats'.

EcoTAS abstract

SYMPOSIUM: Novel methods for identifying and managing refuges across scales and ecosystems
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Wattagan Room
Oral presentation

Feral cats threaten many native species in arid Australia. Although cats are able to persist in regions with no free water, their local distribution and density is likely to depend on the availability of individual-scale micro-refuges that protect them from harsh environmental conditions. Identifying these could help inform better predator control strategies and locate natural refuges from invasive predators. To improve our understanding of how feral cats persist in the arid zone we developed an eco-physiological model that simulates the body temperature, energy and water requirements of feral cats based on their morphological and physiological traits, as well as behaviour. To explore how behaviour and landscape features influence survival of feral cats in the arid zone we simulated a range of different scenarios (timing of activity, use of different microhabitats) and analysed changes in predicted energy and water requirements, as well as risk of mortality from heat stress. We tested model predictions against fine-scale GPS and microclimate data collected from feral cats at multiple field sites. Our results highlight the importance of micro-refuges, including rabbit burrows, for feral cats in the arid zone. In addition to protecting cats from high solar loads, burrows measured in summer were on average 5.4-6.3°C cooler than ambient temperatures, and were used by feral cats to escape very hot surface conditions. Simulations illustrate that this behaviour can substantially decrease water use and risk of mortality, compared to simulations where burrows were not available, although the benefits of this behaviour differs across seasons and locations.

Briscoe N [1] , McGregor H [2] , Roshier D [3] , Kearney M [1]
[1] University of Melbourne, Melbourne VIC, Australia
[2] University of Tasmania, Hobart Tasmania, Australia
[3] Australian Wildlife Conservancy, Adelaide South Australia, Australia

Using eco-physiological models to identify refuges from invasive predators

James Brock

Biography

James Brock is a PhD candidate at the University of Auckland (NZ) researching the influence of tree fern ecology on forest structure and composition.

EcoTAS abstract

Understanding long-term, large-extent patterns in forest structure and composition requires a modelling approach. Forest models typically represent patterns of individual growth and intra-specific competition as a function of secondary growth (production of wood with associated increased girth). Tree ferns, influential growth forms in southern hemisphere forests, however, do not comply with this expression of development. To date, infrequent and token representations of tree ferns in forest models have assumed the growth form of a small understory tree.
Tree fern growth is best expressed as a function of height; therefore, we developed a height growth model for Cyathea dealbata using data from ten permanent vegetation plots in the Auckland and Coromandel regions of northern New Zealand over a 35 year period. We incorporated this height-increment growth model into a gap model derivative representing northern broadleaf-podocarp forests of NZ. Shading and macro-litterfall effects of tree ferns were also modelled.
Drawing on field experiments, we are simulating scenarios to explore the potential long-term influence of tree ferns on forest dynamics comparing: i) presence/absence of tree ferns; ii) varying the initial proportions of tree ferns (5-50%) as stems in the forest; and iii) with and without the effects on the regeneration bank of shading and macro-litterfall.
Preliminary results suggest that tree ferns persist in the forest understory for significantly longer periods (> 1,000 yrs) than understory shrub species that establish at a

Ecological Modelling (Plants)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Sugarloaf Room

Oral presentation

Brock J [1] , Perry G [1] , Burns B [1]

[1] University Of Auckland, Auckland Auckland, New Zealand

Modelling the influence of the silver fern (Cyathea dealbata) in northern New Zealand broadleaf-podocarp forests

similar time. Future considerations for use of this model include assessing the long-term impacts to the forest of selective tree fern harvesting.

Barry Brook

Biography

Barry Brook, an ecologist and modeller, is an ARC Australian Laureate Professor and Chair of Environmental Sustainability at the University of Tasmania. His research focuses on the impacts of global change on biodiversity, eco-evolutionary dynamics, paleoenvironments, energy, and simulation models.

EcoTAS abstract

Predicting future food demand, and forecasting the impact of agricultural development on urban landscapes, is a critical for determining how to tackle the vexing trade-offs between supporting 9 billion people by mid-century, and conserving the world's biodiversity. Decisions on crop and livestock selection, technologies for intensifying agricultural productivity, and choice of land sparing or sharing policies, will have major ramifications for the protection or restoration of habitats for fauna and flora at landscape-to-regional scales. We present: (i) a systematic review of past studies on historical and projected food-demand trajectories through to 2050, (ii) a new multi-model parameterisation and forecasting approach that is able to more rigorously capture local, regional and national variation in crop-demand trajectories, and be readily cross-validated, and (iii) a demonstration of national-level trajectories can be used to pinpoint ecoregions and

SYMPOSIUM: Changing Australia: emerging trends, trade-offs and synergies of landscape transformation in rural Australia

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Brook B [1] , Buettel J [1] , Flies E [1] , Hong S [1] , Blomqvist L [1]

[1] University Of Tasmania, Hobart TAS, Australia

[2] The Breakthrough Institute, Oakland California, U.S.A.

Forecasting global land-use change due to future food demand

landscape types that will likely benefit from, or be damaged by, future shifts in food policies.

Susanna Bryceson

Biography

Susanna Bryceson is exploring the paleo-ecological effects of C4 grasses on Australian ecosystems.

EcoTAS abstract

C4 photosynthesis is thought to have arisen in about 60 independent plant lineages. In the grass family, Poaceae, this capability has developed at least 14 times, giving C4 grasses a clear advantage in open and drier habitats. In the past 10 million years, C4 grasses created Earth's youngest biome – savanna and grassland.

As Australia drifted closer to Asia, a swathe of C4 grasses migrated into our ecosystems about 5 million years ago, when endemic Australian plants and animals were either adapting to or retreating from increasing aridification.

This study is seeking out those lineages or genera which became ecological dominants and were instrumental in creating our savannahs and grasslands. We present findings of current research into grass lineages that developed C4 photosynthesis from endemic Australian C3 grasses. We compare their distribution in Australian ecosystems with the spread of more recent C4 grass immigrants, and with endemic C3 grasses. We look at a number of factors including latitude and rainfall seasons,

SYMPOSIUM: Vulnerability and resilience of grasslands in Oceania to climate change

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Brokenback Room

Speed Talk PLUS Poster

Bryceson S [1] , Morgan J [1]

[1] La Trobe University, Bundoora VIC, Australia

Light and shade: investigating paleo- and neo-grasses, dappled light, and ancient Australian flora

but also from a new perspective of sunshine, shade and intermittent light.

Jessie Buettel

Biography

Jessie Buettel, an ecologist and modeller, is the Director of research, education and outreach for DEEP and CABAH, University of Tasmania. Her research focuses on global change, conservation and the interrelationships between process and pattern in anthropogenic and natural landscapes.

EcoTAS abstract

The human footprint is expected to grow substantially during this century. Among the most pervasive and widespread anthropogenic threats to ecosystems is land-use change (due to expanding areas of cropland, pasture, biofuel plantations, plantations forests, mining and urbanisation). Drivers, such as population, consumption and technology, can alter the state of environmental variables and impact biodiversity. Reducing the momentum of these changes, while still allowing for ongoing human development, is a key aim of modern conservation. We present: (i) a synthesis and analysis of historical changes in land use across Australia, using IBRA sub-regions as strata, and (ii) a simulation model that can be used to identify the imprint of dynamic processes on contemporary landscape patterns and structure. We focus on a case study of tall eucalypt forests and their interaction with fire and climate. We demonstrate how this approach can be used for detecting the signatures of past disturbances, and

SYMPOSIUM: Changing Australia: emerging trends, trade-offs and synergies of landscape transformation in rural Australia

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Buettel J [1] , Ondei S [1] , Brook B [1]

[1] University Of Tasmania, Hobart TAS, Australia

Modelling land-use change in Australian IBRA regions

as a tool for projecting future change needed for landscape and conservation planning.

Ana Bugnot

Biography

Dr Ana Bugnot is a Research Fellow at the University of New South Wales. She investigates anthropogenic impacts and mitigation strategies in urban areas. She is interested in producing information that can directly inform the management of marine environments.

EcoTAS abstract

Built infrastructure is replacing natural habitats at an accelerated rate, resulting in the loss of biodiversity and ecosystem services. Understanding and managing the impacts of built infrastructure locally and worldwide by spatial planning and the development of accurate global health indices require detailed mapping of the extent of infrastructure across land and sea. Monitoring of land-based infrastructure relies on maps generated from remote sensing, GIS and database management systems. Mapping of marine infrastructure has lagged behind because of poor data management practices and because many structures extend underwater so cannot be remotely detected. We reviewed the information available on the location and extent of marine infrastructure and evaluated knowledge gaps using information collected from a) official agencies and peer-reviewed publications, b) private companies and news articles, and c) amateur databases. The estuaries and oceans of China, the United States and Europe have the most built infrastructure, whereas other

Urban Ecology (2)

Monday, November 27, 2017

3:45 PM - 5:45 PM

Bimbadeen Room

Oral presentation

Bugnot A [1] , Mayer-Pinto M [1,2] , Johnston E [1] , Heery E [3] , Lincoln C [4] , Sheehan E [5] , Elizabeth S [2] , Morris R [6] , Loke L [7] , Bishop M [4] , Airoldi L [8] , Coleman R [9] , Dafforn K [1,2]

[1] School of Biological, Earth and Environmental Sciences, University Of New South Wales, Kensington NSW, Australia

[2] Sydney Institute of Marine Science, Mosman NSW, Australia

[3] Department of Biology, University of Washington, Seattle Washington, USA

[4] Department of Biological Sciences, Macquarie University, Sydney NSW, Australia

[5] School of Biological and Marine Sciences, Marine Institute, University of Plymouth, Plymouth, UK

regions support the majority of artificial reefs (e.g. Caribbean) and islands (e.g. Japan). Our review suggests that the total estimated area of seascape occupied by infrastructure worldwide is approximately equivalent to the surface area of Cyprus. These results are, however, an underestimation as the availability and quality of information on the global “footprint” of coastal and marine infrastructure is patchy and varies greatly among the types of structure and geographic region. The development of new technologies and open source data will be crucial to understand and mitigate infrastructure impacts on marine systems, and therefore protect the important services provided by these systems.

[6] National Centre for Coasts and Climate, University of Melbourne, Melbourne Victoria, Australia
[7] Department of Biological Sciences, National University of Singapore, Singapore, Singapore
[8] Dipartimento di Scienze Biologiche, Geologiche ed Ambientali & Centro Interdipartimentale di Ricerca per le Scienze Ambientali (CIRSA), University of Bologna, Bologna Ravenna, Italy
[9] Centre for Research on the Ecological Impacts of Coastal Cities, University of Sydney, Sydney NSW, Australia

The global “footprint” of marine infrastructure: current spatial extent and management challenges

Bruce Burns

Biography

Dr Bruce Burns is a Senior Lecturer in Plant Ecology at the University of Auckland, His research interests focus on the abiotic and biotic factors driving plant community composition and change. Such factors include disease, species traits, and environmental gradients.

EcoTAS abstract

Limiting damage of non-indigenous invasive pathogens requires a robust understanding of host range and

Invasion Ecology
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation

Burns B [1] , Brock J [1] , Ryder J [1] , Perry G [1]
[1] University Of Auckland, Auckland Auckland, New Zealand

Effects of Phytophthora agathidicida infection on the composition and

susceptibility, means and rates of spread, and predictions of ecosystem changes. Agathis australis forest within New Zealand is currently under threat from Phytophthora agathidicida, with A. australis as it’s currently only recognised host. Critical questions we sought to answer were how A. australis ecosystems are changing as a result of infection, were other species alternative hosts of this disease, and how quickly does the disease spread within stands. We compared plant composition and structure in samples of infected and uninfected A. australis forest to indirectly indicate potential impacts. We also directly followed changes occurring in several large (50m x 40m) plots over five years within infected A. australis stands to investigate the epidemiology of this disease. Infected and uninfected stands showed distinct compositional dissimilarities that were not related to environmental differences. Also, several species other than A. australis (e.g. Astelia trinervia, Knightia excelsa) were lower in abundance in infected stands, suggesting they may be alternative disease hosts. Change in stands monitored over five years indicated slow disease progression with marginal changes to tree health but little additional tree mortality. A. australis populations retained individuals in all size classes including seedlings and saplings, and symptomatic and asymptomatic individuals were often close neighbours. Consistent reductions (e.g. Leucopogon fasciculatus) or increases (e.g., Dacrydium cupressinum) in abundance of other species indicate the identity of further candidates for investigation as alternative hosts, and new potential dominants in the post-disease forests respectively.

structure of Agathis australis forest

Emma Burns

Biography

Executive Director of LTERN, Director of the new Sustainable Farms Initiative, and a member of the Australian Ecosystem Science Council. A PhD in conservation genetics. Has worked in various roles in consulting, research, and government (both State and Commonwealth).

EcoTAS abstract

We applied an ecosystem risk assessment to the mountain ash forest ecosystem of the Central Highlands of Victoria (hereafter "mountain ash forest"), south-eastern Australia, using the IUCN Red List of Ecosystems Criteria. Using this methodology, we quantified: (1) key aspects of the ecosystem's historical, current and future decline in spatial distribution; (2) the extent of occurrence and area of occupancy for the mountain ash ecosystem; and (3) the decline in key abiotic and biotic processes and features for historical, current and future time periods. Finally, we developed a probabilistic model of tree growth stages to estimate the risk of ecosystem collapse within 50 to 100 years in the mountain ash forest.

Our overall ranking of risk of collapse for the ecosystem was Critically Endangered. We are confident that this risk category is appropriate because all 39 scenarios modelled indicated a ≥ 92% chance of ecosystem collapse by 2067.

Our findings highlight the important need for timely policy reform to facilitate improved management of the mountain ash ecosystem in Victoria. In particular, there needs to be greater protection of remaining areas of unburned forest, and restoration activities in parts of the forest estate. In this

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Burns E [1,2] , Lindenmayer D [1,2] , Stein J [1] , Blanchard W [1]

[1] Fenner School of Environment and Society, The Australian National University, Canberra ACT, Australia

[2] Long Term Ecogical Research Network, Terrestrial Ecosystem Research Network, Canberra ACT, Australia

A mountain ash forest ecosystem assessment highlights extreme risk of collapse within 50 years

talk will cover what impact this research has had on policy to date.

Kevin Burns

Biography

K.C. is an evolutionary biologist interested in how life evolves on isolated islands.

EcoTAS abstract

Species that are endemic to isolated islands often differ dramatically in size from their mainland relatives, for reasons that are poorly understood. Here, I test for changes in plant stature, seed size and leaf area in a woody shrub (Alyxia ruscifolia, Apocynaceae), which inhabits both the continent of Australia, and Lord Howe Island, a subtropical island located 600 km off Australia's east coast. Results showed that island plants became reproductively mature at earlier stages of ontogeny than mainland plants, and that mature plants were taller on the mainland, providing a rare example of dwarfism in plants. Conversely, island plants produced larger seeds, which might make them more competitive as seedlings. Seeds produced by island plants were also less circular and more oblong in shape than their mainland counterparts, perhaps to facilitate their dispersal by avian frugivores with limited gape sizes. Lastly, island and mainland plants had similar average leaf sizes. However, juvenile plants on the mainland produced smaller, more needle-shaped leaves with larger terminal spines relative to adult plants, which may help protect them against large, ground-dwelling herbivores. On the other hand, island plants showed weaker ontogenetic shifts in leaf morphology in the

Forest Ecology (2)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation
Burns K [1]
[1] Victoria University Of Wellington, Wellington New Zealand, New Zealand
Size changes in island plants: independent trait evolution in Alyxia ruscifolia on Lord Howe Island

absence of large herbivores. When interpreted jointly, results indicate that stature, seed size and leaf area are on separate evolutionary trajectories in A. ruscifolia, which appear to be determined by a complex suite of disparate selection pressures between Lord Howe Island and the mainland.

James Buxton

Biography

James Buxton is a PhD candidate in the department of Ecology, Environment and Evolution, La Trobe University. He is exploring the colour diversification of ants from a functional perspective in order to identify associations between colour traits and the environment.

EcoTAS abstract

The functional importance of animal colouration has long been of interest to ecologists, but it is only the relatively recent accessibility of robust digital photography techniques that has seen colour trait-environment associations explored on a global scale. However, the influence of preservation method is not often considered, with many studies using museum specimens, which may offer a considerably different reflectance profile when compared to fresh material.
We compared the reflectance of freshly killed ants to those preserved with three long-term preservation techniques (air drying, immersion in 70% ethanol, and freezing at -20°C) using digital image analysis. This also included a comparison of the variation among nests of Camponotus

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Speed Talk
Buxton J [1] , Bulbert M [2] , Elgar M [3] , Gibb H [1]
[1] Department of Ecology, Environment and Evolution, La Trobe University, Melbourne Victoria, Australia
[2] Department of Biological Sciences, Macquarie University, Sydney NSW, Australia
[3] School of BioSciences, University of Melbourne, Melbourne Victoria, Australia
The preservation of ant colouration

consobrinus, as well as yearly differences of ethanol-preserved species over 18 years and seasonal differences over three years.
There was variation between long-term preservation techniques and freshly killed specimens, but only on the pronotum between dried specimens and both recently freeze-killed and long-term frozen specimens in the red channel, and between freeze-killed specimens and all other treatments in the UVb channel. Significant differences were also observed among nests of C. consobrinus.
Our work provides the first exploration of the influence of preservation on ant colouration and should inform future research involving the measurement of ant colour traits. It is recommended that studies employ long-term preservation techniques only when necessary, as both colour variation and specimen degradation increased with time preserved. Freezing alters reflectance in the UVb channel, and should be avoided when ultraviolet reflectance is expected.

Margaret Byrne

Biography

Dr Margaret Byrne undertakes plant conservation and evolutionary genetics research with a current focus on climate adaptation, and is responsible for science and conservation policy as Executive Director, Science and Conservation, Western Australian Department of Biodiversity, Conservation and Attractions.

EcoTAS abstract

SYMPOSIUM: Assisted migration under climate change
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Brokenback Room
Oral presentation
Byrne M [1] , Hopley T [1]
[1] Department of Biodiversity, Conservation and Attractions, Perth WA, Australia

Analysis in a wide range of species and habitat contexts is needed to determine the extent of climate adaptation in plant species. One habitat context that has not been investigated to date is riparian systems, that often traverse climate gradients. We used genotyping by sequencing to investigate signals of adaptation to environmental variables in two species along the Warren River that have differing distribution and different patterns of genetic structure, gene flow and connectivity. We found no signals of adaptation to climatic gradients in Astartea leptophylla that is restricted to the banks of the main river where there is less reliance on rainfall for moisture availability, decoupling of local and regional climatic features, and high levels of gene flow. High gene flow allows maintenance of standing genetic diversity providing a basis for plastic response to changing environments without need for gene migration among distance populations. In contrast, the more widely distributed Callistachys lanceolata showed a strong signal of adaptation to bioclimatic variables, particularly precipitation variables associated with extreme time-periods. Low gene flow and high genetic differentiation in this species provide conditions for development of local adaptation across a climatic gradient since genome mixing is restricted. Assisted gene migration/climate-adjusted provenancing would be a climate adaptation strategy that would mimic historical gene flow and maintain genetic diversity required for adaptation to changing climates. Our study found interacting facets of environment, gene flow and genetic structure influence development of adaptation in these riparian species.

Effects of gene flow and connectivity on signals of adaptation in two riparian plants

Corey Callaghan

Biography

Corey Callaghan is a PhD student at the Centre for Ecosystem Science at UNSW Sydney. His work investigates the nexus of birdwatchers and ecology.

EcoTAS abstract

There is increasing recognition that the world's ecosystems offer valuable direct and indirect economic services to humanity. Despite this growing recognition, there is generally poor application of economic environmental value into conservation decision-making because of limited data. Consequently, uncosted environmental values are often discounted in favor of costed development. Avitourism has a recognized economic value, sometimes driven by the occurrence of individual rare birds whose economic value remains largely unknown. Using the travel cost method in a readily-quantifiable environment, combined with a questionnaire, we estimated that a vagrant Black-backed Oriole in Pennsylvania, United States of America, generated $223,851 USD or about $3,000 per day over 67 days. A subset of birdwatchers value rare birds, contributing significant time and financial resources to their viewing. Such significant economic value from avitourism, one of the fastest growing sectors of ecotourism, should be incorporated into conservation decision-making.

Socio-ecological Interactions / Open session
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Wattagan Room
Speed Talk PLUS Poster

Callaghan C [1] , Slater M [2] , Major R [1,3] , Morrison M [4] , Martin J [1,5] , Kingsford R [1]

[1] Centre for Ecosystem Science, UNSW Sydney, Sydney NSW, Australia
[2] Not Applicable, Mohnton Pennsylvania, United States
[3] Australian Museum Research Institute, Sydney NSW, Australia
[4] Faculty of Business, Charles Sturt University, Bathurst NSW, Australia
[5] Royal Botanic Gardens and Domain Trust, Sydney NSW, Australia

A bird in the bush is worth $223,851 in the hand

Abbey Camaclang

Biography

Dr Abbey Camaclang is a postdoctoral research fellow with the National Environmental Science Programme's

Conservation Biology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM

Threatened Species Recovery Hub at Monash University. Her research focuses on the use of decision tools to optimise the management of threatened species and ecological communities.

EcoTAS abstract

Alpine and subalpine peatlands are listed as a threatened ecological community in Australia, and are vulnerable to multiple threats such as climate change, changing fire regimes, feral horses, deer, and pigs, grazing, introduced weeds, infrastructure development, and various recreational or extractive uses. Peatland conservation and recovery therefore depend on the effective management of threats and their impacts on peatlands. To help improve peatland management, we developed a decision framework that considers both the effectiveness and the costs in selecting optimal management strategies. We estimated the effectiveness of different peatland management strategies by modelling: 1) the occurrence and severity of threats in the Victorian Alps over time, 2) the impact of varying threat severity on peatland state, and 3) the effect of different management strategies on either threat severity or peatland state. Models are based on peer-reviewed publications, theses, and technical reports on peatland ecology in Australia, and developed in consultation with Parks Victoria managers and with peatland ecologists. Cost estimates were also elicited from Parks Victoria managers. By accounting for both the estimated effectiveness and costs of management strategies, our decision framework can identify the set of strategies for a given budget that would maximise the conservation benefit for peatlands. Alternatively, we can estimate the level of investment needed to achieve the desired management outcomes. Finally, sensitivity analyses can help identify model parameters with the most

Cypress #2

Oral presentation

Camaclang A [1] , Moore J [1]

[1] School of Biological Sciences, Monash University, Clayton VIC, Australia

Models and decision frameworks for optimal threat management in alpine and subalpine peatlands of Victoria

influence on which management strategies will be considered as optimal; these parameters should therefore be the focus of future research and monitoring efforts.

Samantha Capon

Biography

I am a Senior Lecturer at the Griffith School of Environment where I teach and research ecology, conservation and restoration. My main expertise is in the ecology and management of riparian and wetland ecosystems, especially in agricultural and urban landscapes.

EcoTAS abstract

Riparian ecosystems are widely recognised for their capacity to provide vital refuges from a broad range of pressures to both terrestrial and aquatic species. This function of riparian ecosystems can be expected to become progressively more important under climate change, especially in human-dominated landscapes where riparian zones often comprise the only significant vegetation remaining in otherwise heavily modified environments. In such landscapes, riparian ecosystems are also increasingly managed for a variety of other functions, particularly riverbank stabilization and water quality regulation. Indeed, riparian restoration has become a significant global industry with considerable effort directed towards prioritizing, implementing and, to a lesser degree, monitoring a range of common interventions, e.g. fencing, weeding, planting and environmental watering. There is an urgent need, however, for such interventions to be conducted in a more holistic and integrated manner to avoid perverse outcomes

SYMPOSIUM: Novel methods for identifying and managing refuges across scales and ecosystems

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Wattagan Room

Oral presentation

Capon S [1]

[1] Griffith University, Nathan QLD, Australia

The thin green line: managing riparian zones as refuges for biodiversity in human-dominated landscapes

and potential maladaptation. The refugial value of riparian ecosystems to terrestrial biodiversity may be particularly vulnerable to negative impacts resulting from more anthropocentric management of riparian zones. Here, I will draw on a range of recent studies to synthesise current understanding of the refugial function of riparian ecosystems and factors influencing this at multiple scales across a range of urban and agricultural landscapes. I will also survey a variety of approaches to riparian management, both conventional and novel, and their potential implications for the role of riparian ecosystems as biodiversity refuges.

Yohay Carmel

EcoTAS abstract

The competitive exclusion principle is one of the most influential concepts in ecology. The classical formulation suggests a correlation between competitor species similarity and competition severity, leading to rapid competitive exclusion where species are very similar; yet neutral models show that identical species can persist in competition for long periods. Here, we resolve the conflict by examining two components of similarity – niche overlap and competitive similarity – and modeling the effects of each on exclusion rate (defined as the inverse of time to exclusion). Studying exclusion rate, rather than the traditional focus on binary outcomes (coexistence vs exclusion), allows us to examine classical niche and neutral perspectives using the same currency. High niche overlap speeds exclusion, but high similarity in competitive ability slows it. These predictions are confirmed by a well-known

Ecological Modelling (1)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Sugarloaf Room
Oral presentation
Carmel Y [1] , Kunin W [3] , Suprunenko Y [2] , Cornell S [2]
[1] Faculty of Civil and Environmental Engineering, The Technion, Haifa, Haifa, Israel
[2] University of Liverpool, UK
[3] University of Leeds, UK
Recasting the competitive exclusion principle

model of two species competing for two resources. Under ecologically plausible scenarios of correlation between these two factors, the strongest exclusion rates may be among moderately similar species, while very similar and highly dissimilar competitors have very low exclusion rates. Adding even small amounts of demographic stochasticity to the model blurs the line between deterministic and probabilistic coexistence still further. Thus, focusing on exclusion rate, instead of on the binary outcome of coexistence versus exclusion, allows a variety of outcomes to result from competitive interactions. This approach may help explain species coexistence in diverse competitive communities and raises novel issues for future work.

Angus Carnegie

Biography

Angus Carnegie is a Principal Research Scientist with NSW Department of Primary Industries and Chair of the Forest Health and Biosecurity Subcommittee. His interests include forest health surveillance, biosecurity, fungal taxonomy and the impact of myrtle rust on native ecosystems.

EcoTAS abstract

Austropuccinia psidii (myrtle rust) has long been considered a significant threat to Australian plant industries and ecosystems. A. psidii was detected for the first time in Australia in April 2010. The distribution of A. psidii continues to expand, with detections extending from Tasmania, along the eastern coast of Australia to Cape York Peninsula, and most recently in the Tiwi Islands and

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 2)

Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Brokenback Room
Oral presentation

the Northern Territory. The current host list for Australia includes 347 species from 57 genera. Our studies have demonstrated severe impacts of myrtle rust on plant communities and the potential for A. psidii to negatively affect Australia's biodiversity in the short- and long-term. A. psidii has caused significant disturbance in wet sclerophyll environments, where Myrtaceae dominate the rainforest understorey, and regeneration of coastal heath following wildfire. Significant dieback caused by repeated A. psidii infection has seen once dominant species in severe decline with little evidence of potential for regeneration. Impacts on keystone species such as Melaleuca quinquenervia include tree death, decline in tree vigour and reduced flowering rates. Future research programs are required to identify and monitor species and plant communities at greatest risk of decline. The implementation of a disease screening and tree breeding program may be required for some species as without human intervention regaining lost genetic diversity within these species populations may not be possible. Already, as a direct result of myrtle rust, two species have been recommended for legislative listing as being critically endangered with more likely to follow.

Carnegie A [1] , Pegg G [2] , Giblin F [2]

[1] NSW Department of Primary Industries, Parramatta NSW, Australia

[2] Queensland Department of Agriculture and Fisheries, Brisbane QLD, Australia

Myrtle rust – impact on native Australian Myrtaceae and associated plant communities

Alexandra J. R. Carthey

Biography

I am interested in how ecological and evolutionary processes shape novel species interactions, communities and ecosystems. In particular, I study animal behaviour, invasion ecology, species interactions and chemical communication among animals and between animals and plants.

Invasion Ecology

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Cypress #2

Oral presentation

EcoTAS abstract

Plants emit a huge number of organic chemical compounds that become volatile when exposed to ambient air and often produce a distinctive odour. Plants use volatile organic compounds (VOCs) to interact with their environment and other species in order to attract pollinators, deter herbivores and pathogens, cope with stressors and communicate with other plants. Exotic plant invasions cost billions of dollars to manage in Australia each year and the conservation threat they pose to native ecosystems is well-documented. Given the importance of VOCs in plant growth, protection and defense, it is surprising that few studies have investigated the role of VOC emissions in exotic plant invasiveness. At the same time, atmospheric CO_2 concentration has been rising steadily since the Industrial Revolution from ~270 ppm to current levels of ~400 ppm and this increase is predicted to continue under a range of emission scenarios. Invasive exotics are quite responsive to elevated CO_2 in many aspects that increase their fitness (e.g. biomass production and reproductive output), meaning we might expect them to benefit from elevated CO_2. We report results from an experiment comparing VOC emissions from phylogenetically paired native and exotic plant species under ambient and elevated CO_2.We found that Australian native species emit greater amounts of VOCs than do exotics, and that both native and exotic species drastically reduce their emissions under elevated CO_2. We discuss the implications of our research for exotic plant invasions and interactions with herbivores under current and future levels of atmospheric CO_2.

Carthey A [1] , Manea A [1] , Leishman M [1]

[1] Department of Biological Sciences, Macquarie University, Sydney NSW, Australia

Australian native and exotic plant volatile organic chemicals under ambient and elevated CO2

Laura Castaneda-Gomez

Biography

Laura Castaneda-Gomez is a PhD-candidate at the Hawkesbury Institute for the Environment at Western Sydney University. Her work is currently focused on the influence of root symbionts
(mycorrhizae) on soil organic matter decomposition under increased atmospheric carbon dioxide concentrations.

EcoTAS abstract

Ectomycorrhizae (EM) and Arbuscular mycorrhizae (AM) are two of the most common fungal symbionts colonising plants' roots, providing them with nutrients in exchange for carbohydrates. Recent research has observed that mycorrhizae may play an important role mediating the decomposition of soil organic matter (SOM), one of the greatest carbon sinks on earth. If that is the case, they could have a major influence in the global carbon cycle and earth's climate, especially under future increased CO2 conditions, where their abundance and activity is expected to rise.
EM and AM have specific foraging strategies which lead them to colonise different substrates. How these fungal symbionts explore the soil matrix and colonise nutrient sources belowground, might shed some light on their potential role on SOM decomposition. While EM prefer organic materials and mine for nutrients; AM are more dependent on soluble nutrients, which they scavenge for. An experiment was implemented at the Eucalyptus Free-Air Concentration Enrichment facility (EucFACE), based on the endangered ecosystem of the Cumberland Plain Woodlands. Mesh bags with different substrates were used to assess preferential colonisation of EM and AM and

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 1)

Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Brokenback Room
Oral presentation

Castaneda-Gomez L [1] , Carrillo Y [1] , Powell J [1] , Walker J [1,2] , Pendall E [1] , Ellsworth D [1]
[1] Hawkesbury Intitute for the Environment , Western Sydney University, Penrith NSW, Australia
[2] Institute of Biological and Environmental Sciences , The University of Aberdeen , Aberdeen City Aberdeen, Scotland

Mycorrhizal belowground substrate preferences overt time: Does elevated CO2 matter?

measurements of the decomposition rates of the materials were carried out over time and CO2 conditions (ambient vs elevated).
Elevated CO2 marginally increased decomposition rates with more AM presence in all materials at the beginning and end of the decomposition process; however, with elevated CO2, EM abundance tends to increase at the C-rich substrates over time. EM and AM abundance was not affected by elevated CO2.

Iadine Chades

Biography

Dr iadine Chades provides informed guidance to decision makers and stakeholders who are confronted with uncertain and changing futures. iadine has devised new value of information and adaptive management methods to solve novel decision problems.

EcoTAS abstract

There are more than a thousand species and ecological communities at risk of extinction in NSW. The best way to manage and improve the status of these entities are often uncertain and may be improved by adaptive management programs. However, resources to improve management efficiency are limited and should be directed to resolve the uncertainties that will lead to the greatest benefit. Indeed, it is likely that adaptive management programs targeting some selected threatened entities or some Key Threatening Processes (KTP) would have a higher return on investment than others. We develop a value of information approach across a selected set of species,

Conservation Biology (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #2
Speed Talk
Chades I [1] , Brazill-Boast J [2] , Gorrod E [2] , Nicol S [1]
[1] CSIRO, Brisbane Qld, Australia
[2] OEH, Sydney NSW, Australia
Maximising the value of information from adaptive management under the Saving Our Species program

ecological communities and KTPs to determine which monitoring and adaptive management projects are most likely to benefit NSW listed entities. Value of Information analysis provides the expected value (in terms of improved species persistence) of resolving different uncertainties. Our approach can therefore be used to list adaptive management studies that will result in the highest return on investment across the KTPs and threatened entities considered.

Anthea Challis

Biography

Anthea Challis is a PhD student at the Hawkesbury Institute for the Environment, Western Sydney University exploring physiological tolerance to extreme climates in a tree species. She is interested in physiological responses to low water availability and heatwaves in trees.

EcoTAS abstract

Heatwaves coupled with soil water deficit have been attributed to many large scale mortality events in forests throughout the world in recent decades. Heatwave events have been projected to increase in intensity and severity throughout many regions around the world. Plants that are highly plastic in response to heatwave events may be more likely to survive under a hotter future climate.
This study focuses on the impacts of heatwaves on a widespread canopy species, Corymbia calophylla from South Western Australia (SWA). We assessed the intraspecific capacity for phenotypic plasticity and adaptation in physiological traits and growth in C.

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017
11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Challis A [1] , Ruthrof K [2] , Rymer P [1] , Tissue D [1] , Hardy G [3]
[1] Western Sydney University, Richmond NSW, Australia
[2] Botanic Gardens and Parks Authority, West Perth WA, Australia
[3] Murdoch University, Murdoch WA, Australia

Are trees from warm climates more tolerant to extreme heatwave events than cool-origin trees?

calophylla trees to heatwaves of different intensities. We sought to determine whether plants from warmer provenances were more tolerant of heatwave events than those from cooler provenances and whether plants perform best when grown under conditions similar to their climate of origin.
To test these hypotheses, C. calophylla seedlings from eight provenances throughout its distribution in SWA were grown under ‘cool’ (26 °C maximum) and ‘warm’ (32 °C maximum) growth conditions in a glasshouse. Seedlings were subsequently exposed to two consecutive five day heatwaves at either 40 or 46 °C in a fully factorial reciprocal temperature design. Leaf gas exchange, growth and leaf damage were monitored throughout the experiment. Soil water content was maintained at field capacity for the duration of the experiment.
Initial results suggest that plants from cooler provenances exposed to the 46 °C heatwave experienced the most severe impacts on growth and had the highest levels of leaf damage.

Heidi Chappelow

Biography

Heidi Chappelow, B. App. Sci. (Social Ecology) is a TAFE student and a volunteer at Miromaa Aboriginal Language and Technology Centre. Heidi is intending to study Master of Disaster Resilience and Sustainable Development at UON in 2018.

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Chappelow
Ecological Humans: Making Newcastle’s Cycling and Recycling

EcoTAS abstract

As a social ecologist I'm working on barriers to cycling and recycling in Newcastle. I'd like to improve system design so busy people can benefit from cycling and recycling.

'Cycling' = anything other than a personal car: carpooling, walking, public transport, cycle, scooter, mixed mode.

'Recycling' = reduce consumption, re-use and recycle, business responsibility for product lifecycles.

I'm supporting social and personal transformation for sustainability. Working with communities, I want to build indigenous leadership and prepare for the impacts of climate change using the United Nations Sustainable Development Goals (SDG's).

Physical and psychological change is required. In Australia we need to re-discover how to live simply so that others can simply live. Climate change is bringing mass movement of species, including humans. Resource sharing and consideration of future generations need to be an easy choice.

But how do we change behavior and culture? Right now I see a big opportunity in creating Newcastle as a cycling-recycling city. In this space there are big gains to be made for small changes.

Cycling and recycling are meaningful working edges: accessible to all, and interfacing with business, planning, education and infrastructure.

Community resilience and the UN SDG's are important for

'Possible not Punishing' and why it Matters

people and ecology now, and more vital looking into the 21st and 22nd centuries.

Making Newcastle's cycling and recycling 'possible not punishing' is just the beginning of increasing capacity for residents' ecological agency…

RESULTS
Specific cycling and recycling pathways will be tested. I'll report on barriers and comment on functional improvements that can be generalised.

Kaining Chen

EcoTAS abstract

An introduced Nymphoides peltata population is expanding quickly in Lake Taihu, China. The question addressed in this study is whether the seeds of N. peltata contribute to this expansion. The buoyancy and germination of N. peltata seeds and the development of N. peltata seedlings were studied from Lake Taihu. The results indicated that a low wind velocity of 2.4–3.0ms−1 had a slightly negative effect on seed buoyancy. After 19 and 67 h of gentle stirring, 50% and 90%, respectively, of the N. peltata seeds had sunk. Few seeds floated again after sinking, but these refloating seeds sank soon with disturbance. The N. peltata seeds did not germinate without stratification, but the stratification of seeds for a two-week period resulted in a high germination rate (63.3%) at a light intensity of 20 mol photons m−2 s−1. Both the light and stratification treatments stimulated seed germination. A high germination rate (74%) was observed for the seeds that

Invasion Ecology
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation
Chen K [1] , Wei H
[1] Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, Nanjing, China
The contribution of seeds to the recruitment of a Nymphoides peltata population

laid on the water-sediment interface; however, nearly all of the germinated seeds floated on the water surface after germination. Only a small fraction (14%) of the buoyant seedlings could re-establish in shallow water (less than 3 cm). In the eighth week of the experiments, the buoyant seedlings that failed to re-establish rotted. Sufficient light was important for both seed germination and seedling development. It was found that sexual reproduction is likely to have little direct contribution to the rapid expansion of N. peltata towards the centre of this large shallow lake.

Brendan Choat

Biography

Brendan Choat is an Associate Professor and Future Fellow at Western Sydney University. His research centers on the physiological ecology of plants with a primary focus on plant hydraulics, water relations and functional anatomy.

EcoTAS abstract

Severe droughts have caused widespread tree mortality across many forest biomes with profound impacts on ecosystem function and carbon balance. Climate change is expected to intensify regional scale droughts via the effects of higher temperatures and evaporative demand. There is evidence to suggest that amplification of drought stress by anomalously high temperatures is already occurring. Recent high profile examples include extreme droughts in Australia and the US, which have killed hundreds of millions of trees over short time scales. Mass tree mortality due to drought is not restricted to arid regions and has been documented across all forest biomes including the

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Choat B [1]

[1] Western Sydney University, Penrith NSW, Australia

Physiological mechanisms of drought-induced mortality in woody plants

world’s most productive tropical ecosystems.

These events have focused attention on the physiological underpinnings of drought-induced tree death. Catastrophic failure of the plant hydraulic system is now recognised as a principal mechanism causing tree mortality during drought. Plant hydraulic failure is caused by the formation of gas emboli in the xylem conduits of leaves, roots and stems. Recent work has advanced our understanding of this process and identified species-specific physiological thresholds for tree death. I will explore our current understanding of tree response to drought and the potential application of hydraulic failure thresholds to process-based models predicting mortality.

Biography

Rosana López is a Marie-Curie fellow at iNRA (France) and the Hawkesbury Institute for the Environment (Australia). My research examines forest species adaptation to drought, with a focus on the genetic variability and phenotypic plasticity of plant hydraulic traits.

EcoTAS abstract

Trees display a set of interdependent and coordinated morphological, anatomical and physiological traits to prevent water loss and the development of increasingly xylem tensions during drought. Until recently, variability between populations within the same species has been neglected in most studies of functional diversity despite its importance defining the range of a species’ tolerance and competitiveness. In this study we analyze the intraspecific variation of drought related hydraulic traits across a precipitation gradient of two species of Hakea, a genus

SYMPOSIUM: Assisted migration under climate change

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Brokenback Room

Oral presentation

Lopez R [1,2] , Cano F [3] , Cochard H [1] , **Choat B** [3]

[1] PIAF, INRA, Clermont-ferrand, France

[2] Sistemas y Recursos Naturales, Universidad Politecnica de Madrid, Madrid, Spain

[3] Hawkesbury Institute for the Environment, Western Sydney University, Richmond NSW, Australia

Coordination of hydraulic traits in two Hakea species growing across a climatic gradient

endemic to Australia. Hakea leucoptera is widely distributed in dry and xeric areas whereas Hakea dactyloides is restricted to wet and temperate areas. Our results show that structural acclimation, i.e. changes in the allocation pattern between conducting and transpiring tissues, and the rate and efficiency with which their stomata close during water stress are the dominant processes by which the hydraulic system responds to drought. As expected, H. leucoptera exhibited a xylem more resistant to cavitation than H. dactyloides but within species, vulnerability to cavitation appears to be a canalized trait. These results suggest that both species maintain water status within the xylem functional limits by adjusting the minimum water potential to a relatively constant value. The low phenotypic variation in vulnerability to cavitation compared with ongoing rapid changes in the environment such as the increased occurrence of extreme droughts and heatwaves with the concomitant reduction of water potential will pose serious risk if individuals are not able to adjust the minimum water potential within a range preventing mortality.

Steven Chown

Biography

Steven L. Chown works in Biological Sciences at Monash University. He was Head of School from 2013 to mid-2017. His work covers ecology, physiology and conservation biology, with an emphasis on the biological impacts of the major global change drivers.

EcoTAS abstract

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

The Strategic Plan for Biodiversity, adopted under the auspices of the Convention on Biological Diversity, provides the basis for taking effective action to curb biodiversity loss across the planet by 2020 - an urgent imperative. Yet, Antarctica and the Southern Ocean, including Australian Antarctic Territory, and which encompass 10% of the planet's surface, are excluded from assessments of progress against the Strategic Plan. The situation has, until recently, been a lost opportunity for biodiversity conservation globally. Here, we provide such an assessment. The evidence suggests, surprisingly, that for a region so remote and apparently pristine as the Antarctic, the biodiversity outlook is similar to that for the rest of the planet. Promisingly, however, much scope for remedial action exists. We show how such remedial actions can be taken forward - including through the red listing of species and ecosystems. In addition, we outline the essential biodiversity variables that can be used to monitor conservation progress in the region.

Chown S [1] , McGeoch M [1] , Monaco Assessment Group
[1] Monash University, Melbourne VIC, Australia

Antarctica and the Strategic Plan for Biodiversity 2011-2020

Hannah Cliff

Biography

Hannah's PhD research is a collaboration between researchers at the University of Tasmania and Landcare Research (NZ). After working with Tasmanian lizards, and in conservation programs across Australia, she is keen to explore the intersection of these interests in NZ.

EcoTAS abstract

The drylands of Central Otago represent some of New Zealand’s most heavily modified and threatened ecosystems. Within these systems agricultural

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation

Cliff H [1,2] , Norbury G [2] , Pech R [2] , Johnson C [1] , Jones M [1]
[1] University Of Tamania, Hobart TAS, Australia
[2] Landcare Research, Alexandra Otago, New Zealand

development and a plethora of introduced mammals including feral cats, ferrets, stoats, hedgehogs, rats, mice and rabbits threaten numerous native species including a number of native lizards. Understanding how species interact within an ecosystem allows for more effective conservation outcomes. However, despite long-term predator control programs in these systems, we do not understand many of the processes that pre-dispose lizards to predation, such as anti-predator behaviour and the role of habitat refugia. This research seeks to understand the vulnerability of lizards that have not evolved with mammalian predators. The perception of predation risk by lizards will be investigated through behavioural trials, and the distribution of predation risk, both temporally and spatially, will be assessed by recording attack rates on model lizards placed in different dryland habitats. By bringing together this information, we will increase our understanding of where predator-lizard interactions are likely to be occurring, and provide insights into the potential importance of evolutionary history and vegetation complexity in mediating the impacts of these potentially lethal interactions.

Interactions between native lizards and introduced mammals in New Zealand's dryland ecosystems

Fiona Clissold

Biography

I am a Postdoctoral Research Associate interested in insect nutritional and thermal ecology. My research aims to integrate physiology, morphology and behaviour to understand host plant choice, movement and ultimately population dynamics of insects.

EcoTAS abstract

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Population dynamics of herbivorous insects are strongly correlated with climate, largely through the influence of temperature and diet on physiological processes. Research on one of the major insect herbivores, locusts, has demonstrated growth, rates of development, reproduction and survival is optimized across a fairly narrow temperature range when ingesting an ideal diet. While diet quality can be quantified using chemically defined foods, measuring the chemical composition of leaves does not provide an indication of the quality of that leaf to an insect herbivore. We found the efficiency with which the major macronutrients, protein and carbohydrate are digested by locusts varied independently and non-linearly with temperature. As a consequence, host plant quality is temperature dependent, or conversely, dietary fitness is optimized at a specific temperature for a given plant. The next challenge is to understand which leaf traits influence the nutritional outcomes for insects eating leaves. I will present experiments which set out to bridge this gap between plant composition and nutritional quality, using locusts as a model herbivore.

Clissold F [1]
[1] The University Of SydneyThe University of Sydney, Charles Perkins Centre, School of Life and Environmental Sciences, , The University Of Sydney NSW, Australia

Host plant quality for insect herbivores is more than just leaf chemistry

Anne Cochrane

Biography

Dr. Anne Cochrane is a Senior Research Scientist and manager of the WA Department of Biodiversity, Conservation and Attractions' conservation seed bank. Her research interests revolve around the study of seed responses to changing environmental conditions.

SYMPOSIUM: Novel management interventions for threatened species
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Wattagan Room
Oral presentation

EcoTAS abstract

Many fire-sensitive plant species store their propagules in the soil, developing a persistent soil-stored seed bank that is an important resource for post-fire regeneration. Ecological burns conducted to assist the regeneration of populations of these fire-sensitive species need to choose the appropriate combination of intensity and duration of heat sufficient to break dormancy and stimulate seed germination of target species. Fires of low intensity and short duration may contribute to poor regeneration; on the other hand higher intensity fires of longer duration may cause seed death. Understanding a seeds' tolerance to heat may be crucial to a successful outcome.
This study examined the response of fresh and stored seed of a physically dormant Western Australian obligate-seeding threatened species (Acacia awestoniana) by testing a range of laboratory-applied fire-related temperatures over two durations. The results suggest that short duration fires of moderate intensity do not successfully overcome dormancy of fresh seed, but are quite effective in overcoming dormancy in stored seed. However, if temperatures exceed 110°C for 10 mins, mortality of both fresh and stored seed is likely to be high. Developing fire regimes that have specific ecological objectives are a key challenge for conservation managers. When populations of threatened species are small, resources are limited and management actions lack species-specific supporting evidence is it possible to use the results of laboratory-based investigations to shed light on 'fire' conditions that will elicit the most effective germination response?

Cochrane A [1]
[1] Department Of Biodiversity, Conservation And Attractions, Perth WA, Australia

Are laboratory-based investigations enough to support on-ground management actions in a resource-limited space?

Amy Coetsee

Biography

Amy Coetsee is a threatened species biologist at Zoos Victoria, specialising in Eastern Barred Bandicoot recovery. With 12 years' experience working with this species, Amy's current interests include assisted colonisation to islands and community engagement.

EcoTAS abstract

The wild population of mainland Eastern Barred Bandicoots (EBBs) has been decimated through predation by red foxes and habitat loss. In 1989, in response to a rapidly declining population, the EBB Recovery Team was formed and set about removing EBBs from the wild, placing them at sites with suitable habitat where foxes could be controlled. Whilst there were some initial wins, by 2005 there were thought to be just 100 EBBs left in Victoria.

EBBs are a simple species to reintroduce: as long as their basic habitat requirements are met, they can adapt to different habitat conditions, allowing them to persist through periods of drought and overgrazing by overabundant herbivores. Successful population establishment has just one requirement: sites must remain fox free.

For the last decade, establishing EBBs in fenced, fox-free reserves has been the priority for the Recovery Team and has prevented the extinction of the EBB, but fences alone cannot recover this species. Bold moves and out of the box thinking is required to secure the EBB long into the future. Gene widening and guardian dog trials are now underway to determine their effectiveness, but the real game changer is assisted colonisation to islands beyond the historic range. Whilst not a simple process when islands are also

SYMPOSIUM: Novel management interventions for threatened species

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Coetsee A [1] , Sutherland D [2]

[1] Zoos Victoria, Parkville VIC, Australia

[2] Phillip Island Nature Parks, Cowes VIC, Australia

On the cusp of recovering the mainland Eastern Barred Bandicoot

inhabited by people, if successful, these fox-free islands will see the EBB return to the wild and have the potential to significantly increase population size. For the first time in 28 years we are on the cusp of recovering the EBB!

Nicole Coggan

Biography

Presenting major findings from PhD research project. Come for the aesthetically pleasing slides. Stay for the conclusions.

EcoTAS abstract

Severe biodiversity declines are depleting functional diversity, thus impacting on ecosystem processes. Declines of native mammal fauna in Australia have had largely unmeasured impacts on ecosystem functions and the productivity and stability of habitats, particularly in arid environments. We examined the impacts of restoring native mammal functions on the community composition, abundance and function of invertebrate detritivores using manipulative experiments and observations of termites and dung fauna across three reintroduction sanctuaries and one remnant mammal location. Reintroduced mammals had significant impacts on termite abundance, community composition and ecosystem function, primarily through ecosystem engineering pathways. In contrast, dung fauna communities were not affected by declines, although the impacts of mammal extinctions remained uncertain. Termite responses to mammal reintroduction have important implications for conservation sanctuaries, and the difficulties of measuring the impacts of mammal extinctions

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 2)

Monday, November 27, 2017

3:45 PM - 5:45 PM

Brokenback Room

Oral presentation

Coggan N [1] , Hayward M [2,3] , Gibb H [1]

[1] La Trobe University , Melbourne VIC, Australia

[2] Bangor University , Wales, United Kingdom

[3] Australian Wildlife Conservancy, Australia

What are the implications of mammal declines for invertebrate function and diversity?

on dung fauna communities raise discussion of appropriate baselines for conservation globally.

Luke Collins

Biography

Dr Collins is an Research Fellow at La Trobe University and the Arthur Rylah Institute investigating patterns in fire and drought refuge and their ecological importance.

EcoTAS abstract

Wildfire refuge is essential for the persistence of many fire sensitive species across forested landscapes globally. However, there has been little quantitative assessment of factors that determine the distribution of fire refuge across space and time, which restricts efforts to protect this critical habitat. The inability to reliably map refuge over large areas at a suitable resolution has been a major impediment to progress in understanding refuge dynamics. Our research (i) investigates a novel method to map fire refuge at 'fine' resolution (30 m) using Landsat imagery and (ii) examines the relative effect of landscape and climatic factors on refuge patterns across numerous large wildfires occurring in southeastern Australia. Fifteen large (>2500 ha) wildfires were used to investigate the potential application of Machine Learning classification of Landsat imagery for refuge mapping. Random Forest classification improved the detection of unburnt areas within wildfire perimeters, resulting in >90% overall classification accuracy, a 20% increase when compared to standard fire severity mapping techniques. Wildfire refuge was associated with topographic features (e.g. gullies) and was less likely under

SYMPOSIUM: Novel methods for identifying and managing refuges across scales and ecosystems

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Wattagan Room

Oral presentation

Collins L [1,2] , Newell G [2] , White M [2] , Griffioen P [3]

[1] La Trobe University, Bundoora VIC, Australia

[2] Arthur Rylah Institute, DELWP, Heidelberg VIC, Australia

[3] Ecoinformatics Pty Ltd, Heidelberg VIC, Australia

Mapping and modelling patterns in wildfire refuge using satellite imagery

extreme fire weather conditions. Results suggest that increased occurrence of extreme fire weather conditions under future climate change is likely to lead to a contraction of wildfire refuge across forests of southern Australia. However, some refuges may remain somewhat fixed due to the bottom up effects of landscape. Protection of areas likely to provide fixed fire refuge will be an important step towards maintaining the ecological integrity of forests under future climate change.

Jemima Connell

Biography

Jemima Connell is a PhD candidate in the Landscape and Conservation Ecology (LACE) group, La Trobe University. Her PhD investigates how major ecological disturbance processes influence the persistence, distributions and dynamics of a semi-arid bird community.

EcoTAS abstract

Fire is a major environmental driver that operates over large temporal and spatial scales to shape species' distributions. Its occurrence drives changes to vegetation structure and associated resources, which have been shown to vary with post-fire succession, or 'time since fire'. There is little understanding of how climatic extremes interact with disturbance processes like fire to influence species' distributions. We tested whether extreme drought and rainfall modified the time-since-fire preferences of bird species in a semi-arid Victorian ecosystem. We conducted repeated sampling over ten years to capture bird responses to fire in three major climatic periods: during a

Disturbance Ecology (Fire)
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Cypress #3
Oral presentation
Connell J [1] , Watson S [1] , Bennett A [1,2] , Clarke M [1]
[1] La Trobe University, Bundoora Victoria, Australia
[2] Arthur Rylah Institute, Heidelberg Victoria, Australia
Come hell or high water: Do climatic extremes influence bird responses to time since fire?

severe and prolonged drought (2006-08), drought-breaking rainfall (2011-12), and a return to below average rainfall (2014-15). Generalised additive mixed models (GAMMs) were used to develop species fire-response curves across a time-since-fire chronosequence, from 1 to 100 years post-fire, in each period. Specifically, we asked: do climatic extremes influence the association of bird species with time-since-fire? And, are potentially changed habitat associations during drought-breaking rain temporary or sustained in the years post-rainfall? We found that the occurrence of rainfall had a massive and lasting effect on the bird community, and birds displayed high variability in their association with time since fire. During and following rainfall, a greater range of response types were detected, however across periods, older post-fire successional stages remained important. Understanding the potentially dynamic response of species to the temporal interaction between climatic extremes and fire history is important for guiding the appropriate timing of fire management actions for biodiversity conservation.

Alicia Cook

Biography

Alicia Cook is a PhD candidate at the University of Technology Sydney with a passion for how plants survive extreme conditions. Current research focuses on the temporal variation of desert plants ability to tolerate and recover from extreme high temperatures.

EcoTAS abstract

Open session (1)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Sugarloaf Room
Oral presentation
Cook A [1] , Brown J [1] , Leigh A [1]
[1] University of Technology Sydney, Sydney NSW, Australia
Heat and repeat: the effects of multiple heat stresses on leaves

Plants experience high temperature events in nuanced time frames over the course of a single day. When leaf stomata close for water conservation and the wind drops, leaf temperature can rise rapidly above air temperature. We know that sustained high temperature events can be stressful, cause permanent damage to leaf photosystems and lead to cell and leaf death. But what happens when short heat stress events occur multiple times throughout a day? If a leaf is given short periods of reprieve, can it handle repeated excursions to high temperatures? We addressed these questions using an Australian arid zone plant by measuring the health of photosystem II (Fv/Fm) in response to heat stress of varying intensity (48-52^{0}C), duration (5-30 minutes) and repetition (1-6, with and without 10 minute reprieve periods).

We found that short reprieves appeared to provide little benefit for surviving extreme high temperatures; however, for high temperatures close to the plant's innate physiological threshold, reprieves did help to mitigate tissue damage. This supports theory suggesting that if a heat wave close to a plant's thermal threshold is accompanied by light wind gusts, leaves are more likely to survive it. We also found that when leaves experienced temperatures close to their maximum thermal threshold, the duration of that stress became an important contributor to the level of damage incurred. Being able to link a range of high temperature events to physiological damage is imperative for predicting the potential survival of plants to future heat stress events under a warming climate.

Garry Cook

Biography

Garry is an ecologist who has worked with CSIRO in northern Australia for nearly three decades. His focus is on vegetation dynamics and biogeochemical cycling in frequently burnt tropical savannas, but he has broad interests in issues affecting Australian woodlands.

EcoTAS abstract

A theory of “nutrient poverty/extreme fires” has been proposed to explain Australian ecology. The theory argues that Australian soils are nutrient poor, the vegetation carbon rich, mammalian herbivores small, scarce and of low metabolic rates and consequently the vegetation is not adapted to mammalian herbivores, but rather to invertebrate activity and extreme fires. Under the theory, Australian vegetation has few adaptations to prevent mammalian herbivory, with spininess of leaves mainly a physiological adaption to climate. The failure of large placental mammals to colonise Australia in geological time is seen to provide further support for this theory – they could not survive on the poor offerings growing in the impoverished soils of Australia. But what if this theory is wrong? What if, prior to the late Pleistocene extinctions Australia had not only a diverse megafauna, but one that provided top-down control of the vegetation? Are the Australian ecosystems that we know haunted by the ghosts of long-gone herbivores? What should we be looking for as evidence of a different paradigm for Australian ecology? Diprotodons were big, able to handle poor quality food and capable of strong top-down control, and they weren’t alone. Many plants are structurally defended. Others show heteroblasty – spikey and cage-like up to 2-3 metres and open and non-spikey above that. What could cause that other than a defence against browsers? In this paper we

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Oral presentation

Cook G [1] , Williams R [1] , February E [2] , Bond W [2]

[1] CSIRO, Winnellie NT, Australia

[2] University of Cape Town, Cape Town, South Africa

The ghosts of extinct megafauna still influence Australian ecology: What is the evidence?

examine the evidence that the ghosts of a strong top-down control by megafauna are out there – and continuing to influence Australian ecology.

Melinda Cook

Biography

Melinda Cook, has just completed her Master degree and is currently working with colleagues at the City of Melbourne council and CSU to bring mistletoe back to the urban forest of Melbourne.

EcoTAS abstract

Urban mistletoes may have a bad reputation as pests and tree killers, but what do we know about their diverse range of benefits for urban ecosystems? What if mistletoe in urban areas played the same biodiversity enhancing, ecosystem facilitating role as mistletoe in woodland areas? Could the propagation and encouragement of mistletoe growth increase the biodiversity value of urban street trees? How can we test this theory? In this partnership between Charles Sturt University and the City of Melbourne, we are inoculating Plane trees with Creeping Mistletoe and measuring outcomes of biodiversity pre- and post-inoculation. In this presentation, I'll outline what we currently know about mistletoe growing in urban areas and highlight research gaps. I'll introduce the objectives and experimental design of this study (the largest mistletoe inoculation ever undertaken) and summarize some of the anticipated benefits of bringing mistletoe back to Melbourne. In addition to boosting resource availability for wildlife, adding mistletoe to the urban forest will increase amenity of streetscapes for Melbournians, adding

Urban Ecology (2)

Monday, November 27, 2017

3:45 PM - 5:45 PM

Bimbadeen Room

Oral presentation

Cook M [1] , Watson D [1] , Harrison L [2] , van der Ree R [2]

[1] Charles Sturt University, NSW, Australia

[2] City of Melbourne, Melbourne VIC, Australia

Diversifying the urban forest: bringing mistletoe back to Melbourne

indigenous plants to one of the most highly-modified areas on the continent.

Will Cornwell

Biography

I am an associate professor in the School of Biological, Earth and Environmental Sciences at UNSW. I am interested in species interactions and ecosystem processes, especially within plants and fungi.

EcoTAS abstract

Community ecology has in recent years exploded with a range of important strands of theory. Similarly trait-based ecology has exploded with an array of both physiology--based theory and empirical data that offers an increasingly complex picture of the functional traits of microbes, plants, and animals across the world. A current goal of the field is to connect these two sub-disciplines, both theoretically and empirically. While there has been progress in building these links, one impediment has been the vast array of different theory strands in community ecology, each with different assumptions and explicitly--included processes. One single theory cannot do everything: instead, each one explicitly includes some but not all ecological processes (e.g. resource and population dynamics). The choices of which processes to model explicitly is often made for valid theoretical reasons, but as a consequence, these process--level choices structure the ways in which that community-level theory strands can be connected to trait ecology. To better help build these connections in the future, we present a review of the recent community ecology literature, explicitly examining which processes are

Ecological Modelling (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Cornwell W [1] , Falster D [1]
[1] UNSW, Sydney NSW, Australia
Connecting community ecology theory to traits

explicitly considered in each theory/model. The resulting map of the recent literature will help us draw better links between the three key pieces of the puzzle: community ecology theory, theoretical trait ecology, and empirical data. Given the assumptions within some theory strands, all connections are not possible, but we hypothesis that clearly identifying the set of possible connections will facilitate progress on a wide range of important problems in ecology.

Oliver Costello

Biography

Oliver a Bundjalung man from Northern NSW works for the NSW National Parks and Wildlife Service in Aboriginal Heritage and Joint Management. Oliver leads the Firesticks Initiative he co-founded in 2009 and has a broad range of experience in Indigenous fire practices, Aboriginal Joint Management partnerships, Indigenous Natural Cultural Resource management and Indigenous governance. He is also an advisor or director with several organisations and projects. Oliver is passionate about Indigenous leadership, empowerment, partnerships and recognition of cultural knowledge and practice through community led mentorship on country.

EcoTAS abstract

Working with Aboriginal communities to manage National Parks and Nature Reserves is important to NSW National Parks and Wildlife Service (NPWS). Aboriginal communities are custodians of their culture and Country. Fire has spiritual significance and is used by Aboriginal people to express and maintain their culture, kinship and identity; to enhance and protect natural and cultural values;

SYMPOSIUM: Indigenous Ecological Knowledge

Monday, November 27, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Costello O [1]

[1] NSW National Parks and Wildlife Service

Cultural Fire Management on NPWS managed lands in NSW

and to continue millenniums of sharing knowledge and practice. A new NPWS cultural fire management policy supports Aboriginal community aspirations to connect to and care for Country through cultural fire management. The policy enables partnerships between NPWS and Aboriginal communities for cultural fire management in NPWS lands. The term cultural fire management covers the full spectrum of Aboriginal community involvement in NPWS Fire Management, from consultation on policy, programming, locating and planning activities through to community presence on the fire ground for (low risk) cultural burning activities and monitoring and afterwards, the monitoring and reporting off results. The policy supports culturally informed burning. These burns have cultural objectives with Aboriginal community and NPWS partnering in their planning and approval. New guidelines are now being trialled that enable non-fire fighters from the Aboriginal community to participate on the fire ground in approved, low risk planned burns. The aim of the policy and guidelines is to balance NPWS responsibility for safety with the socially inclusive methods traditionally used by Aboriginal people. In sharing our knowledge and abilities while planning, conducting and monitoring burns together, we aim to build capacity and respect between Aboriginal communities, fire agencies and the broader community.

Tyler Coverdale

Biography

Tyler Coverdale is a PhD candidate in the Ecology and Evolutionary Biology Department at Princeton University.

Forest Ecology (2)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation

His research focuses on plant defenses and their broader ecological impacts in African savannas.

EcoTAS abstract

Plants in African savannas face intense top-down pressure from large mammalian herbivores. In response, many species produce conspicuous spines and thorns that reduce their vulnerability to browsers, while others rely indirectly on the physical defenses of neighboring plants for protection. This latter strategy, known as an associational defense, has been documented in nearly every ecosystem worldwide and may be particularly common in savannas: the discontinuous and often well-defended nature of savanna tree communities provides ample opportunity for understory species to find refuge from native herbivores beneath tree canopies. We compared browsing damage on several understory species growing in and out of association with Acacia trees at Mpala Research Centre, Kenya, and found evidence for a strong associational defense. Trees reduced browsing damage by >30% on underlying plants, and experimental removal of tree branches caused a 35% increase in browsing damage. The effects of this associational defense, however, were not limited to reducing herbivory. Using surveys and manipulative field experiments, we found consistent differences in the phenotype and defense strategy of well-defended understory species that suggests the presence of an associated “defense syndrome” in African savannas. Most notably, plants beneath tree canopies produced 50-80% fewer defensive spines and lost the ability to induce defenses in response to browsing damage. The striking differences in defense morphology and investment between associated and unassociated plants underscores the efficacy of associational defenses in arid lands, and provides insight into the evolution of flexible defense

Coverdale T [1] , Grabowski K [1] , Culver B [1] , O'Connell R [1] , McGeary I [1] , Kartzinel R [1,2] , Pringle R [1]

[1] Princeton University, Princeton New Jersey, United States

[2] Brown University, Providence Rhode Island, United States

Good defenses make good neighbors: exploring the broader implications of associational defenses in savannas

strategies in ecosystems with variable herbivory risk.

Ben Cranston

Biography

I am a PhD student at the University of Auckland studying ecophysiological responses of kauri trees to drought. My interest in this topic is the partly the product of having a chemistry background as well as love for the outdoors.

EcoTAS abstract

Prolonged and seasonally variable drought presents a threat to forest ecosystems worldwide with New Zealand-native forests proving no exception. Most NZ-native tree species, having adapted to sub-tropic oceanic conditions, are not especially well-suited to cope with the effects of drought; however, there exists very little Aotearoa-specific data to inform the degree of damage that future events might inflict on our forests. Kauri (Agathis australis), holds immense value – cultural, ecological, economic– to the country and yet this species' resilience to water-stress remains largely unaddressed in the literature. I am in the process of establishing a throughfall exclusion experiment on native-forest kauris in the Waitakere Range in western Auckland. Precipitation around plot trees will be diverted before reaching the forest floor to simulate year-round drought conditions. Physiological indicators such as DBH, sap flux density, litter composition, leaf water potential and leaf gas exchange will be monitored then coupled to meteorological data to help in describing tree systems' perturbations as well as their causes and severity. This experiment will be the first of its kind in New Zealand and

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation
Cranston B [1]
[1] University Of Auckland, Auckland, New Zealand
Throughfall Exclusion on New Zealand Kauri towards Assessing Drought Tolerance and Response Mechanisms

will aid in answering which systems are most prone to hydrodynamic failure in kauri. Furthermore, as rainwater constitutes only one of two crucial sources of water uptake (the other being atmospheric water vapour), it should be interesting to gauge how droughted trees will prioritise ever more limited water resources.

Michael Cripps

Biography

Michael Cripps is a scientist at AgResearch NZ. His research concerns the influence natural enemies on plant populations, primarily in the context of biological control of weeds. His current research has a particular emphasis on biocontrol of thistle weeds.

EcoTAS abstract

Thistles are among the worst weeds of temperate grasslands of the world. Globally, the thistle tribe (Cardueae) is comprised of approximately 2500 species, of which 339 species are considered weeds. In New Zealand (NZ), at least 63 thistle weeds have been introduced, of which nine species are considered economic weeds, and the remainder can be considered ‘sleeper weeds’. Since there are no native thistle species in NZ, a management option is the novel use of classical biological control agents that specialise on the thistle tribe, rather than specific target species. In 2007, the leaf-feeding beetle, Cassida rubiginosa, was released in NZ as a biocontrol agent against Cirsium arvense (Californian thistle), its primary host plant, although most thistle plants are potential hosts. To determine the beetle’s potential for thistle control its

SYMPOSIUM: Invertebrate ecology of managed grasslands - addressing the new challenges

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Cripps M [1] , Hettiarachchi D [2] , Rostas M [2]

[1] Agresearch, Lincoln Canterbury, New Zealand

[2] Lincoln University, Lincoln, New Zealand

Thistle phylogeny determines host plant utilisation and biocontrol potential of Cassida rubiginosa

performance, host preferences, and long-range host-finding ability were tested in a series of phylogenetically controlled experiments. Our results show that as phylogenetic distance from the primary host plant increases, beetle performance, preference, and host-finding ability decreases. Furthermore, larval performance and adult beetle preference and host-finding ability are correlated, indicating that adult choices are adaptive, and that host plant utilisation is a highly conserved trait. The emerging picture is that there is limited potential for broad-range thistle control, although altered selection pressures (e.g. enemy-free space) in the novel range of NZ may promote increased utilisation of thistle species closely related to C. arvense (i.e. Cirsium and Carduus spp.).

Peter Cuneo

Biography

Dr Peter Cuneo is Manager Seedbank & Restoration Research at the Australian PlantBank (Australian Botanic Garden Mount Annan) and leads the seedbank and threatened species program. Peter's current research interests are threatened species translocation and ecological restoration using direct seeding.

EcoTAS abstract

The urban development and settlement pattern of Sydney has resulted in significantly reduced, and highly fragmented remnant native vegetation. Despite this vegetation fragmentation, isolated populations of threatened plants still occur and are now surrounded by urban development. The

SYMPOSIUM: Novel management interventions for threatened species

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Cuneo P [1] , Emery N [1] , Errington G [1] , Sherieff A [2]

[1] Royal Botanic Gardens & Domain Trust, Mount Annan NSW, Australia

[2] NSW Office of Environment & Heritage, Hurstville NSW, Australia

A new life away from the airport runway? – translocating Hibbertia puberula subsp. glabrescens

critically endangered Hibbertia puberula subsp. glabrescens is only known from one small population occurring at a managed open grassland adjacent the Bankstown Airport runway. Facing an uncertain future and extremely high risk of extinction, this species has been identified by the OEH Saving our Species program as a priority for management actions; including translocation and establishment of new populations. This presentation will outline the ecological planning, seed science and strategy behind this challenging translocation in a highly urbanised setting.

Calum Cunningham

Biography

Calum is a PhD candidate at the University of Tasmania. He is investigating the ecological effects of the disease-induced decline of the Tasmanian devil, with emphasis on changes to the abundance and behaviour of other mammals.

EcoTAS abstract

Top carnivores are essential to healthy ecosystems and their loss can cause large shifts in ecosystem state. Scavenging is a widespread phenomenon in food webs and is an important energy transfer pathway. Tasmania's largest mammalian predator and top-order scavenger, the Tasmanian devil, has declined by ~90% across much of its range as a result of Devil Facial Tumour Disease (DFTD). We firstly used a space-for-time framework to investigate how DFTD has affected devil population densities by deploying ~20 camera traps at 12 study sites, spanning a

Conservation Biology (1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Cypress #3

Oral presentation

Cunningham C [1] , Johnson C [1] , Jones M [1]

[1] University Of Tasmania, Hobart TAS, Australia

Disease-induced top carnivore decline has cascading effects on carrion acquisition in the scavenger guild

disease gradient from long-term diseased to disease-free. We used unique markings to identify individual devils and estimated population densities using a spatially-explicit mark-resight model. Next, we experimentally placed a total of 96 Tasmanian pademelon carcasses with remote cameras at these sites to investigate how devil density affects carrion persistence in the environment and carrion acquisition in the scavenger guild.
Preliminary results indicate that devils have suffered severe population declines at long-term diseased sites, although the extent of decline was variable. Carrion persisted in the environment substantially longer at sites with few devils. Mesopredators, such as feral cats, spotted-tailed quolls and ravens, consumed substantially more carrion in areas where devil decline was severe. Greater carrion consumption by opportunistic scavengers may present a mechanism for previously observed population increases in some mesopredators, which could lead to cascading effects throughout the entire community: for example, larger raven populations could result in more song bird nest predation, and more cats could result in more predation on small mammals.

Tim Curran

Biography

We are a group of fire ecologists and fire scientists from NZ studying plant flammability, including methods used to measure it, how it has evolved, the traits that influence it, and how to use this information to reduce fire hazard.

EcoTAS abstract

Open session (1)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Sugarloaf Room
Oral presentation

Flammability is an important plant trait, but there is debate about how best to measure it. Plant flammability can be measured at multiple scales (leaf, shoot, whole plant) and in different fuel types (litter, canopy). A recent advance was the development of a device that allows for the rapid assessment of flammability of 70 cm shoots. This approach has been recommended in key guidelines on trait methods, and is becoming more widely used. However, we do not know how this low-tech, rapid assessment approach to measuring flammability compares to standard techniques. To address this, we designed a novel shoot-level flammability device that is fully enclosed, allowing us to capture the gaseous emissions and measure flammability using oxygen depletion calorimetry. We compared the flammability of 25 native and exotic species from New Zealand using both shoot-level methods and also to rankings of plant flammability based on expert opinion. The rank flammability derived from each method was significantly correlated with each other and also with the ranking based on expert opinion. Furthermore, particular components of plant flammability were correlated between shoot-level techniques; for instance, heat release rate measured using calorimetry was correlated with maximum temperature recorded on the rapid assessment device. These findings demonstrate that the rapid assessment device is suitable to measure flammability of many samples of a wide range of species. Changes in flammability are an important plant- and ecosystem-level consequence of tree mortality. The techniques described here can help assess how dead and dying trees influence shoot-level flammability.

Curran T [1] , Fleischmann C [2] , Spearpoint M [2] , Perry G [3] , Wyse S [4]

[1] Lincoln University, Lincoln Canterbury, New Zealand

[2] University of Canterbury, Christchurch Canterbury, New Zealand

[3] University of Auckland, Auckland, New Zealand

[4] Royal Botanic Gardens, Kew, London, United Kingdom

Building a better plant BBQ: a novel method to measure shoot flammability using standard calorimetry

Kaye Currey

Biography

I completed a Bachelor of Conservation Biology and Ecology at La Trobe University before commencing a Master of Environment at the University of Melbourne. I have a keen interest in the social aspects (human dimensions) of wildlife conservation issues.

EcoTAS abstract

Human-wildlife conflict is a significant issue in many parts of the world due primarily to increased competition for space and resources as the human population expands. In Australia, significant habitat loss is thought to have caused flying-foxes (Pteropodidae) to increasingly utilise resources in urban areas. Urban roost sites (camps) vary significantly in size, ranging from a few hundred to many thousands of individuals, and the noise, smell, mess and fear of disease risk associated with flying-fox camps can often result in conflict between the needs and wants of the local communities and those of the flying-foxes. Land managers have been using a range of management approaches in attempts to mitigate some of the tension caused by flying-fox camps. Qualitative and quantitative methods were used to synthesise knowledge from land managers to determine the relative cost and effectiveness of management strategies, as well as the issues / constraints surrounding decision-making and implementation of those strategies. Some important findings are that: i) vocal minorities and community expectations are potentially having an important influence on management decisions, ii) creation of buffers (primarily via vegetation modification) is the most common management strategy currently in use, and is considered to be moderately effective in mitigating conflict, and iii) community education is potentially an important tool in

Socio-ecological Interactions / Open session

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Wattagan Room

Speed Talk PLUS Poster

Currey K [1] , Lentini P [1] , Kendal D [1] , van der Ree R [1,2]

[1] University Of Melbourne, Parkville VIC, Australia

[2] Ecology and Infrastructure International, Melbourne VIC, Australia

Mitigating human-wildlife conflict at urban flying-fox camps.

mitigating conflict yet is often being under utilised by councils. As well as helping inform future decisions by flying-fox camp managers, this study highlights the importance of considering the human dimensions of human-wildlife conflict in mitigation strategies.

Ellen Curtis

Biography

Ellen is a Ph.D. student studying at the University of Technology Sydney interested in plant-environment interactions. Her current work examines how arid-zone species vary their thermal thresholds in time and space.

EcoTAS abstract

Physiological measures of plant thermal tolerance can be used to indicate species' vulnerability to high-temperature stress. Some leaf structural attributes, e.g., thick or high LMA leaves and spectral reflectance, also confer greater thermal protection, but are rarely considered in this context. We investigated relationships among structural traits influencing leaf thermal dynamics and a physiological measure of thermal protection, T_{50}. Objectives were to: 1) identify the major axes of trait variation among 47 Australian arid-zone plant species and 2) determine if species' preferred native microhabitat could predict their positions in multi-trait space. Leaf metrics were quantified in winter, spring and summer, with principal component analysis used to determine potential leaf trait syndromes relating to thermal protection. Scores were extracted along two principal components (PCs) for each season and compared against native microhabitat. Leaf structural traits

Global Change

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Cypress #2

Oral presentation

Curtis E [1] , Knight C [2] , Leigh A [1]

[1] University of Technology Sydney, Ultimo NSW, Australia

[2] Calfornia Polytechnic State University, San Luis Obispo California, USA

Do thermally protective traits of arid-zone plants covary with physiological thermal tolerance in multi-trait space?

covaried with T_{50}, with the strength and configuration of relationships varying seasonally. Microhabitat preference predicted species' placement along PC1, which was consistently driven by variation in LMA and T_{50}. PC2 was driven by variation in visible reflectance and somewhat by T_{50}, but was independent of microhabitat. Our findings suggest there are two key thermal protection strategies among arid-zone plant species. The association of LMA on PC1 aligns this strategy with the leaf economics spectrum; the consistent co-occurrence of LMA with T_{50} along this axis suggests a strategy where leaves are protected both structurally and physiologically. Identification of trait-based thermal protection strategies offers important insight into predicting which species might be most resilient under a changing climate.

Evan Curtis

Biography

Evan is employed by NSW OEH as an Assistant Project Officer in the Ecosystem Management Science Branch. He is interested in the practical application of ecological knowledge and remote sensing in sustainably managing the environment.

EcoTAS abstract

High stem density stands of River Red Gum (RRG) forest have become more widespread on the Murray River over the last 150 years. When Murray Valley National Park was gazetted in NSW in 2010, River Red Gum canopy condition was declining across the landscape and there were concerns about stand health and the risk of tree death,

Ecological Modelling (Plants)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Sugarloaf Room
Speed Talk
Curtis E [1]
[1] NSW Office Environment & Heritage, Hurstville NSW, Australia
Does intra-stand competition drive E. camaldulensis canopy condition in Murray Valley National Park, NSW?

particularly in the context of a drying climate into the future. We aimed to investigate whether stem density influenced trends in remote-sensed canopy condition. We hypothesized that intra-stand competition would be greater in high stem density stands, and would have a deleterious effect on canopy condition. We used an eight-year Landsat data series (2008-2016) and Generalised Linear Mixed Effects Modelling to determine the drivers of RRG canopy condition at the plot-level. Canopy and understorey drivers were discerned by decomposing the series into trend, seasonal and noise constituents. Canopy condition dynamics were driven by different variables under different climatic phases. Climate and water availability at the plot and regional scale were the primary drivers of trends in RRG canopy condition. Increased demand for water caused by stem density was not found to be a significant driver of RRG canopy condition, although live basal area was. Findings from this study provide a baseline understanding against which ecological restoration actions can be evaluated and a foundation upon which an ongoing monitoring program can be developed.

Marie Dade

Biography

Marie Dade is a PhD candidate at the University of Queensland. Her current research focuses on developing more effective methods to identify and assess ecosystem service trade-offs and synergies to enable for efficient landscape planning and policy implementation.

EcoTAS abstract

Urban Ecology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Bimbadeen Room
Oral presentation

Urban greenspaces provide multiple cultural ecosystem services that are critical to human health. With urban populations growing rapidly, it is crucial the supply of these services increases alongside population growth, to maintain human wellbeing. To ensure urban greenspaces are designed to optimise the number of cultural ecosystem services they can provide, we must first understand drivers of the demand given the supply of these services. This study aimed to identify the drivers underpinning the demand of cultural ecosystem services within urban greenspaces, focussed on four services: exercise, social interactions, relaxation and nature interactions. We used the Brisbane Local Governmental Area in Queensland, Australia, as a case study. We first conducted an online recreation survey, to identify which greenspaces people visited to undertake different activities related to the four different services, and collected data on the characteristics of all public greenspaces within Brisbane. Statistical models were then developed to identify which urban greenspace characteristics influence the type and number of different cultural ecosystem services the space is used for. These results suggest that facilities present within greenspace, environmental characteristics and location of the greenspace do act as drivers underpinning where people go to receive different cultural ecosystem services. Furthermore, the drivers differ between the different services, highlighting trade-offs and synergies amongst the supply of different cultural ecosystem services within urban greenspaces. These results will enable the design and management of more functional urban greenspaces that optimise the supply of cultural ecosystem services to maintain human wellbeing.

Dade M [1,3,4] , Brown G [1,2] , Rhodes J [1,3,4]

[1] School of Earth and Environmental Sciences, University Of Queensland, St Lucia QLD, Australia

[2] Department of Natural Resources Management & Environmental Sciences, California Polytechnic State University, San Luis Obispo California, United States of America

[3] Centre for Biodiversity and Conservation Science, The University of Queensland, St Lucia QLD , Australia

[4] ARC Centre for Excellence for Environmental Decisions, University of Queensland, St Lucia QLD, Australia

Identifying the drivers and trade-offs of cultural ecosystem service supply in urban greenspaces

OEH/ESA Outstanding outreach award recipient 2016 presentation

Wednesday, November 29, 2017
3:20 PM - 3:30 PM
The Convention Centre
Award Presentation
Dade M
OEH/ESA Outstanding outreach award recipient 2016 presentation

Esther Dale

Biography

Esther Dale is a PhD candidate with Landcare Research and Department of Botany at the University of Otago working on diversification of plant lineages and the role of biomes.

EcoTAS abstract

Biome niche conservatism suggests that species are generally specialised to a single biome and that biome boundaries present a barrier to speciation into different habitats. Previous work has indicated shifts between biomes are rare and occur more frequently between similar biomes. If biome shifts are uncommon we would expect to see within-biome diversification.
We investigated diversification in relation to biomes and tested for biome niche conservatism using the hyper-diverse genus Acacia (Fabaceae). We predicted species distributions for 526 Acacia species in Australia using a process-based species distribution model, and identified which biomes they occupied (using two independent biome concepts, WWF Biomes and Functional Biomes). To assess diversification patterns in relation to biomes, we identified 20 clades based on a published Acacia

Open session (2)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Bimbadeen Room
Oral presentation
Dale E [1,2] , Lee W [1,3] , Larcombe M [2,4] , Higgins S [5]
[1] Landcare Research, Dunedin, New Zealand
[2] Department of Botany, University of Otago, Dunedin, New Zealand
[3] School of Biological Sciences, University of Auckland, Auckland, New Zealand
[4] School of Biological Sciences, University of Tasmania, Hobart Tasmania, Australia
[5] Plant Ecology, University of Bayreuth, Bayreuth, Germany
Diversification is not associated with biome niche conservatism in Australian Acacia

phylogeny and determined biome occupancy and niche size of each clade.
We found few biome specialists, most species were distributed across multiple biomes. Clades also occurred in many biomes and clade diversity was not related to biomes occupied. Niche size was positively influenced by clade diversity and number of biomes occupied. Both biome concepts displayed consistent trends.
Biome boundaries did not present a barrier to Acacia at the species or clade level and diversification was not structured by biomes. This suggests an absence of biome niche conservatism in Acacia. This indicates biome boundaries may present less of a hurdle to species expansion or diversification into novel habitats than previously thought. Whether this is restricted to hyper-diverse lineages like Acacia or has more general relevance remains to be tested.

Florence Damiens

Biography

Florence Damiens is a PhD student at RMIT University working with Ascelin Gordon, Libby Porter and Sarah Bekessy. With a background in social sciences, she is studying how socio-political contexts are shaping biodiversity offset policies and their ecological consequences.

EcoTAS abstract

Biodiversity offsetting is generally presented as a biodiversity conservation tool created to compensate for biodiversity losses due to development. While the political

SYMPOSIUM: Putting ecology to work at the land development frontier
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Sugarloaf Room
Oral presentation
Damiens F [1] , Porter L [1] , Bekessy S [1] , Gordon A [1]
[1] Rmit University, Melbourne VIC, Australia
What have we been offsetting? Understanding the evolution of

origin of biodiversity offsetting and its international success have already been documented, little research has been done to understand how and why the concept of biodiversity offsetting has actually changed through time once materialized in different socio-political contexts; and to link these changes to their ecological consequences.

This study participates in filling this knowledge gap. We use a policy analysis approach and qualitative methods (semi-structured interviews with key actors involved in the field of offsetting and document analysis) to understand how and why the definition of offsetting, its objectives and its mechanisms have been changing through time in two key socio-political contexts: Australia (Victoria) and France.

This analysis allows us to investigate how and why the idea of offsetting has been differently interpreted across time in both contexts and to discuss the ecological consequences of these interpretations and their changes. The study provides new insights to understand state, national, international and global trends associated with conservation in general and offsetting in particular. It shows how the way offset policies have been defined and implemented in the studied contexts are intimately related to social representations, institutional legacy as well as political and governance shifts occuring at different scales. Far from being consensual, biodiversity offset policies reflect the power dynamics present in the contexts they are embedded in, leading to uncertain long-tem ecological consequences.

biodiversity offset policies in France and Australia

Richard Davies

Biography

PhD at Flinders University, studying conservation biology of endangered mound spring plant. Post-Doctoral Research Fellowships at CSIRO & Flinders University, researching grazing and fire ecology of soil seedbanks. 37 years experience working as plant ecologist for government, industry and NGOs.

EcoTAS abstract

The EPBC-listed Swamps of the Fleurieu Peninsula ecological community provides habitat for over 120 plant species which are threatened at the national, state or regional level, including six EPBC-listed species. Natural Resources AMLR & SAMDB are using a range of approaches to recover these swamps and their threatened flora. Within the AMLR region, work has focused on Stipiturus Conservation Park, the largest conserved Fleurieu swamp. Drains previously constructed for agricultural purposes, have been blocked to restore the parks original hydrology, this benefitting a multitude of threatened wetland plants.

Ecological burns of dense senescent swamp vegetation in the park have been implemented to facilitate the regeneration of a number of endangered ground-stratum species. Future swamp burns in the park and on private land are planned to facilitate regeneration of two EPBC-listed critically endangered plant species, Prasophyllum murfetii and Hibbertia tenuis, each currently confined to two populations of less than 50 individuals. The need for such burns for the Hibbertia is supported by the findings of soil seedbank PhD research at Adelaide University, funded by

Disturbance Ecology (Fire)

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Cypress #3

Oral presentation

Davies R [1] , Van Weenen J [1] , Moritz K [2] , Trezise J [3]

[1] Natural Resources Adelaide & Mt Lofty Ranges, Dept. Environment, Water & Natural Resources, Adelaide SA, Australia

[2] Natural Resources SA Murray Darling Basin, Dept. Environment, Water & Natural Resources, Adelaide SA, Australia

[3] University of Adelaide, Adelaide SA, Australia

A multifaceted approach to recovery of endangered plants in endangered South Australian swamps

Natural Resources AMLR & SAMDB.

Translocation planning and implementation activities for a variety of endangered flora species have been undertaken in partnership with recovery program partners and the community. The success of such works have significantly reduced the threat to some species.

Importantly, a variety of threat management activities such as herbivore and weed management have also been required to maximise the success of other recovery initiatives.

Orsolya Decker

Biography

Orsi Decker started her PhD in Australia in 2015 to investigate how native mammal extinctions might impact ecosystem functioning.

EcoTAS abstract

Species extinctions often result in changes in ecosystem functioning through cascading effects. Many of Australia's range restricted vertebrates have important soil functions such as nutrient cycling via their foraging activity, microflora distribution and predation on soil arthropods.
Decomposition of organic material is the most important process in nutrient cycling. Breaking down organic material is done by bacteria, fungi and arthropod detritivores. The decline of insectivorous and digging mammals influences arthropod communities and alter soil microbe and fungi species abundance. The declining numbers of native

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 2)

Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Brokenback Room
Speed Talk PLUS Poster

Decker O [1] , Gibb H [1]
[1] La Trobe University, Melbourne (aus) VIC, Australia

Digging and cycling – How native mammals' decline impact nutrient cycling in Australia?

mammals therefore might have cascading effects leading to changed organic material decomposition. Previous studies showed that litter decomposition differs in the foraging pits of native mammals (bilby, bettong and echidna) and soil microflora species composition changes depending on native mammal presence or absence. Our study investigates the top – down impacts of native insectivorous and digging mammals on nutrient cycling. We executed a landscape-level study along a rainfall gradient in south-eastern Australia testing plant litter decomposition rates and soil microflora composition at four sanctuaries (animals present) and their adjacent unfenced (animals absent) sites. We expect to find higher decomposition rates where native animals are present due to the burial of plant litter by the digging mammals. A different microflora composition inside sanctuaries and unfenced sites is hypothesized given that native mammals distribute specific microflora via their faeces. The results of our study will add a strong evidence of possible cascading effects of native mammals on ecosystem services such as nutrient cycling in different habitat types.

Jane DeGabriel

Biography

Jane DeGabriel is a program manager for the Saving our Species program at the Office of Environment and Heritage. Her research focusses on plant-animal interactions and she now applies ecology to inform policy and program development for biodiversity conservation.

EcoTAS abstract

SYMPOSIUM: Functional roles of plant silicon: how plants get it and what they use it for

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Brokenback Room

Oral presentation

Silicon is an effective anti-herbivore defence in many plant species, although the predominant focus has been on insects feeding on crops. Scaling-up studies to mammalian herbivores and wild grasses is inherently difficult, but limited results suggest the impacts of silicon differ amongst classes of mammals, likely reflecting differences in body size, digestive physiology and behaviour. Laboratory studies in the UK and recent field experiments in Poland showed that grazing by voles can increase grass silicon concentrations, thereby reducing digestibility and limiting animals' ability to absorb nitrogen, which is essential for growth and reproduction.
We conducted glasshouse and manipulative field experiments in northern England and demonstrated that grazing by field voles Microtus agrestis is sufficient to induce silicon uptake by the grass Deschampsia caespitosa, but only once a threshold of grazing intensity is reached. We also demonstrated that induction and post-grazing relaxation of silicon are time-lagged processes. Remarkably, we found the patterns of induction to be quantitatively similar at both scales. We also tested the effects of past grazing on vole growth rates and reproductive success. Females feeding on grasses previously exposed to high levels of grazing grew faster than those in ungrazed plots, but this was not mediated by silicon and there were no effects on other life history traits. We concluded that sustained high levels of grazing are required to induce silicon defences in wild grasses, but contrary to the Polish study, our results did not provide evidence to support the hypothesis that silicon induction drives vole population cycles.

DeGabriel J [1] , Lambin X [2] , Hartley S [3]
[1] Office Of Environment And Heritage, Hurstville NSW, Australia
[2] School of Biological Sciences, University of Aberdeen, Aberdeen, United Kingdom
[3] York Environmental Sustainability Institute, University of York, York, United Kingdom

Patterns and effects of induction of silicon defences in grasses by wild mammalian herbivores

Matthias Dehling

Biography

Matthias Dehling, Postdoctoral fellow at University of Canterbury. Research interests: Community Ecology, Functional Diversity, Ecological Networks, Macroecology, Herpetology, Ornithology.

EcoTAS abstract

We present a novel approach to measuring functional diversity, the diversity of species' functional roles in an ecosystem. Instead of the common practice of inferring species' functional roles indirectly from their trait adaptations, we propose to assess functional roles directly from species’ resource use and their interactions with other species in a given ecological process. This definition of the functional role is based on the concept of the Eltonian niche. Accordingly, we characterize the functional role of a species by the traits of its interaction partners. Our approach has several advantages over existing approaches. For instance, it facilitates the inclusion of all species that contribute to an ecological process, regardless of their own morphology, and the assessment of each species' contribution to functional diversity.
We introduce our new approach together with a complete methodological framework. We also present a study in which we applied the framework to an empirical dataset to compare the diversity and turnover of functional roles of seed-dispersers between local species assemblages on a regional scale to continental scale. We show that despite large geographic distances between the assemblages and an almost complete species turnover, the diversity and composition of functional roles were similar in all the assemblages. The vast majority of functional roles was fulfilled by a surprisingly small number of species. We

Ecological Modelling (1)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Sugarloaf Room
Oral presentation
Dehling M [1] , Stouffer D [1]
[1] University of Canterbury, Christchurch Na, New Zealand
Assessing the functional roles of species and their contribution to functional diversity

discuss the implications of our results for the conservation of ecological processes.

Yanbin Deng

Biography

Yanbin Deng is a terrestrial ecologist at Waikato Regional Council, New Zealand. Yanbin's job involves providing expertise, and information on issues relating to terrestrial ecology and also evaluating data to quantitatively characterise the biodiversity "hot spots" in the Waikato region.

EcoTAS abstract

Kahikatea (Dacrycarpus dacrydioides) forests are iconic Waikato ecosystems which provide core and stepping stone habitats for native fauna and flora, and also serve as nutrient sinks. However, their extent is now greatly reduced (0.67% Kahikatea forests left comprising 867 remnants with average patch size 1.5 ha) and highly fragmented within a landscape which is largely intensively farmed. These under-represented forest types are threatened by weeds, edge effects and agriculture development.

Addressing the ongoing loss of indigenous forest remnants has been identified as one of the important biodiversity protection strategies for the Waikato Regional Council. A monitoring plan for forest fragmentation is part of the Council's 2018-2028 Long Term Plan.

Forest Ecology (2)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation
Deng Y [1] , Beard C [2] , Tait D [1]
[1] Waikato Regional Council, Hamilton Waikato, New Zealand
[2] Department of Conservation, Hamilton Waikato, New Zealand
Restoration and monitoring Kahikatea forest remnants in the Waikato region

We demonstrate here how we plan to use inventory tools including maps (historical and pre-human (Singers 2014), current (aerial photographs), plot photos, and Significant Natural Areas data along with an adapted version of the SERA-evaluation-wheel tool (Society for Ecological Restoration Australia, 2016) to assess and track ecosystem recovery in remnant kahikatea ecosystems in the Waikato Region.

Six components are assessed: 1. Threats (over-utilization, weeds/animal pests, grazing, edge effects, climate change); 2. Physical conditions (landform, drainage, rivers/wetlands); 3. Species composition (threatened species, desirable plants/animals, species richness); 4. Community structure (ecosystem integrity, vegetation zone, spatial mosaic); 5. Ecosystem function (habitat and plant-animal interactions, resilience); 6. External exchanges (landscape flows, habitat links).

Key study sites have been identified to test the monitoring system. This tool helps target work by Council and landowners to protect and restore kahikatea forest remnants within the Waikato Region.

Andrew Denham

Biography

Andrew Denham is a Research Scientist who works on understanding ecological processes to minimise threats to biodiversity in a range of ecosystems including fire-prone habitats and arid rangelands.

Conservation Biology (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation

EcoTAS abstract

Seed predation leads to a reduction in the number of propagules available for population maintenance or expansion, but will have minimal impact on populations if sufficient seeds remain to saturate available microsites for establishment. In closed forests, plant species have three common strategies – establish long-lived soil seed banks, establish shade tolerant seedling banks, or to produce seeds with high dispersal capacity to maximise the probability of reaching gaps produced by small scale disturbances. On world heritage Lord Howe Island, we used exclusion experiments to demonstrate that introduced black rats remove and often consume fruits and seeds of 24 plant species including endangered mountain palms. For mountain palms, we compared standing size distribution data between areas baited to reduce rat abundance and areas where no baiting has occurred. We found a clear link between rat baiting and the abundance of small and medium sized palms. However, with no delineation of baited and unbaited areas in the lowland it is challenging to determine the impact of seed predation by rats. To help understand potential impacts, we estimated standing size distribution of 17 common species across the lowlands. We found considerable variation in size structures, with some evidence of recruitment limitation. These data also provide a basis for predicting and monitoring change to plant population structure after the planned rodent eradication in 2018.

Denham A [1] , Auld T [1] , Hutton I [2]
[1] Nsw Office Of Environment & Heritage, Hurstville NSW, Australia
[2] Lord Howe Island Museum, Lord Howe Island NSW, Australia

What impact does black rat seed predation have on plant populations on Lord Howe Island?

Jayna DeVore

Biography

Invasion Ecology

Wednesday, November 29, 2017

Jayna's current research focuses on how the evolution of plastic responses to environmental variation facilitates invader success in novel environments. She is also interested in how anthropogenic processes (including nonnative species invasion) influence ecosystem processes and native fauna.

EcoTAS abstract

Cannibalism simultaneously reduces intraspecific competition and provides trophic resources and is therefore incentivized in populations that experience resource limitation. Individuals that can target conspecifics during vulnerable life stages should have an advantage in these environments. However, targeted attacks are likely to promote defensive mechanisms that minimize risk; where cannibal densities are variable these defenses may be mediated through plastic responses. Cane toads routinely lay thousands of eggs and reach extremely high densities, but asynchronous breeding combined with the rapid development and metamorphosis of their tadpoles frequently results in tadpole densities that are variable across both time and space. We used field and lab manipulations to investigate interactions between cane toad tadpoles and recently hatched younger cohorts. Field trials showed that cannibalism is a major mortality risk for hatchlings. Targeted cannibalism by older conspecifics drives this risk, as they are quickly recruited to the immobile hatchlings by chemical cues and graze upon them. This window of vulnerability is specific to the hatchling stage, after which the now active tadpoles are invulnerable to cannibalism. Hatchlings can detect chemical cues produced by approaching conspecific tadpoles and accelerate their development in response to this risk, thereby reducing this period of vulnerability. However, the carry-over effects of this acceleration are

11:00 AM - 1:00 PM
Cypress #2
Oral presentation

De Vore J [1] , Crossland M [1] , Shine R [1]
[1] The University Of Sydney, Camperdown NSW, Australia

Their own worst enemy: Targeted cannibalism incentivizes high-cost developmental acceleration in cane toad hatchlings

dramatic and significantly affect survival, development, growth, and morphology during the tadpole stage. Notably, the magnitude of this developmental acceleration varies significantly between clutches and directly predicts the magnitude of developmental costs incurred during the tadpole stage, highlighting the trade-off between current and future risk.

Kelly Dixon

Biography

Kelly has a strong interest in monitoring and evaluation of native species and ecosystem processes. Her research investigates how monitoring data inform management in protected areas through worldwide interviews, a global online survey, and an ecological case study in Australia.

EcoTAS abstract

Managing fuel hazard with fire is complex. The effects of prescribed burning may be short-lived, vegetation flammability can increase post-fire, habitat attributes may decline, and forests may largely exist in an early seral stage thereby impacting biodiversity. It is widely acknowledged that fuel hazard increases with time-since-fire, thus long-unburnt forests are often assumed to exhibit higher fuel hazard than those burnt more recently. However, ecological theory and field evidence shows that, after many years without fire, understorey in some forests will naturally diminish, leading to lower fuel hazard.

We conducted overall fuel hazard assessments and reptile surveys in wet and dry sclerophyll forests and sub-alpine

Landscape Ecology (1)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Cypress #2
Oral presentation
Dixon K [1] , Cary G [1] , Worboys G [1] , Gibbons P [1]
[1] Australian National University, Canberra ACT, Australia
Is prescribed burning increasing fuel hazard and decreasing biodiversity? A case study from south-eastern Australia

woodlands in south-eastern Australia at sites spanning <2 to >96 years since fire. Long-unburnt sites exhibited lower overall fuel hazard and higher reptile abundance. Overall fuel hazard was highest 6-12 years after fire and lowest >96 years after fire. The probability that a fire would be beyond suppression thresholds in severe to extreme fire danger rating conditions was highest 2-12 years after fire and zero >96 years after fire. Reptile abundance was strikingly higher >96 years after fire (78.5% of individuals) than 0-12 years after fire (21.5%).

Managing for low fuel hazard in these forests and woodlands requires very frequent burning or excluding fire for the long term. Any strategy between these options is likely to perpetuate high fuel hazard. Of these alternatives, only long-unburnt vegetation will maintain higher reptile abundance. However, excluding fire until fuel hazard naturally declines will be a significant management challenge.

Margaret Donald

Biography

Margaret graduated Master of Applied Statistics (Macquarie University, 1991) and Ph.D (QUT, 2011) and is an Astat (working as a statistician since 1989). Her statistical interests include Bayesian methods, graphical models, and any modelling which might reasonably represent observed data.

EcoTAS abstract

Conservation Biology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Cypress #2
Speed Talk PLUS Poster
Donald M [1,2] , Clements A [1]
[1] Anne Clements & Associates; , Newport Beach NSW, Australia
[2] Statistical Consulting Centre, Sydney Universtiy

Small sites need small quadrats for accurate vegetation mapping

Data from a floristic survey of a small suburban bush site (area 1.166 ha) adjacent to a national park show that small quadrats (.01 ha) are more accurate for mapping vegetation than larger quadrats (.04 ha). The site required a floristic survey since it might have contained fragments of an endangered ecological community (EEC).

NSW Department of Environment and Conservation (2004) suggest that 0.04 ha quadrats should generally be used (while indicating circumstances where both larger and smaller quadrats may be more appropriate), but does not mandate this size. However, local councils (and others) are often of the view that the 0.04 ha quadrat is mandated, and equally, fail to understand that while random sampling is important for finding unbiased estimates, systematic sampling, too, gives unbiased estimates.

Use of smaller quadrats gives more precise and accurate results than obtainable when using larger quadrats, and we graph these effects across the site using the geoadditive spline models of (Kammann & Wand, 2003). Fitting such models gives estimate for the response variable for every point on the site.

To illustrate the greater accuracy we show contour maps for three variables:
1. The number of listed EEC species /.01 ha;
2. The log of the odds ratio of a point belonging to the EEC community versus another community mapped to the same area
3. Percentage native cover at a point.
using the 58 .01ha quadrats, and also the values from .04 ha quadrats formed from four .01 ha quadrats.

Tanya Doody

Biography

Dr Tanya Doody has significant experience in quantifying vegetation water use to improve our understanding of the effect of flood regimes on the health of water dependent ecosystems on the Murray-Darling Basin floodplains, undertaking research to underpin water management decisions.

EcoTAS abstract

Drought has always been a feature of arid and semi-arid floodplain systems across the world, where floods are required under a natural regime of drying and wetting, to sustain riparian ecosystems. The value of healthy functioning floodplain ecosystems are significant and varied, including the provision of biologically rich habitats. However, due to over-allocation of water resources for increased consumptive use, floodplain trees in the Murray-Darling Basin, Australia have been dying. The iconic riparian River Red Gum (Eucalyptus camaldulensis) has shown significant rates of decline and mortality since the early 2000's in relation to the 10 year Millennium Drought. Depending on their position on the floodplain, it is thought these trees require overbank flooding every 2-5 years under a natural flow regime. Until recently, the water requirements of River Rad Gum had not been quantified using field data, so from 2010-2012, water use of Red Gum across a flood gradient was measured. Field sites included Red Gum watered every 2, 5 and 10 years over a 10 year period, with measurements taken before and after the extended natural flood that occurred in late 2010. Results indicate that trees watered every 2 years had significantly higher water use rates and leaf area, while trees watered every 5 years had a substantially reduced ability to uptake

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? – part 2

Monday, November 27, 2017

3:45 PM - 5:45 PM

Wattagan Room

Oral presentation

Doody T [1]

[1] Csiro, Adelaide SA, Australia

Why floodplains need to flood

water. Trees watered 10 years ago held few leaves. A threshold of 7 years without flooding was identified as a critical point after which Red Gum resilience substantially declines, demonstrating the importance of floods to floodplains.

Christopher Doropoulos

Biography

Christopher Doropoulos is a marine ecologist working as a Postdoctoral Fellow in CSIROs Oceans and Atmosphere flagship. His work aims to understand how ecological interactions and environmental drivers shape the responses of habitat forming species during early life-history stages.

EcoTAS abstract

Severely disturbed populations require the recruitment of new individuals for maintenance and recovery. For many plants and animals, this involves (a) the passive dispersal of tiny propagules followed by (b) specific cues to induct settlement into particular microhabitats that (c) optimise post-settlement growth and survival. Each phase can be considered a demographic bottleneck to recruitment and involve ecological and environmental interactions that influence success. Here, we combine field, laboratory and modelling approaches to test the recovery of the habitat forming Acropora, the most abundant reef building coral, using Exmouth Gulf and Ningaloo Reef in Australia's north-west as a model system. This region has recently been subjected to multiple cyclone and thermal stress events with many reefs in historically coral-depauperate states.

Marine and Freshwater Ecology
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation

Doropoulos C [1] , Gómez-Lemos L [2] , Salee K [1] , Feng M [1] , Slawinski D [1] , Tebben J [3] , van Koningsveld M [4] , Babcock R [1]
[1] CSIRO Oceans and Atmosphere, Australia
[2] School of Environment, Australian Rivers Institute - Coast & Estuaries, Griffith University, Australia
[3] Alfred Wegener Institute, University of Bremen, Germany
[4] Van Oord Dredging and Marine Contractors, The Netherlands

Predicting coral reef recovery potential by quantifying meso- to micro-scale recruitment bottlenecks

Reefs in the west and northern end of the system are fully open to propagule supply, but recruitment limited by extremely low post-settlement survival due to competitive interactions with turf algae and smothering by sediment. In contrast, recruitment appears limited by supply in the southern 2/3 of the Gulf, with negligible effects of space availability on settlement, or competition and predation on the success of newly-settled and juvenile corals. Most surprisingly, extreme temperatures, low light, and terrigenous sediment input did not reduce the growth and survival of coral recruits in the southern Gulf. Ultimately, all areas are predicted to have long recovery periods due to inherently low recruitment, but the quantification of how recruitment bottlenecks vary spatially can be used to advise management the best policies to optimise restoration.

Annalie Dorph

Biography

Annalie Dorph is currently a PhD student with the University of Melbourne. She is investigating fire-related impacts, such as time-since-fire and fire severity, on habitat availability and fauna diversity in Victoria.

EcoTAS abstract

Due to increased niche space heterogeneous landscapes will often support a more diverse biota than homogeneous landscapes. In flammable regions it is often assumed that fire-mediated heterogeneity (pyrodiversity) will benefit biodiversity, but it can be difficult to separate the effects of fire from biophysical drivers of heterogeneity, such as

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Dorph A [1] , Di Stefano J [1] , Swan M [1]

[1] Fire Ecology and Biodiversity Group, School of Ecosystem and Forest Sciences, University Of Melbourne, Creswick VIC, Australia

climate, soils and topography. In part one of this study we decompose landscape heterogeneity into fire-mediated and biophysical components. In part two we ask if fire-mediated heterogeneity drives temporal biodiversity change after taking biophysical factors into account.

Decomposing heterogeneity: do animals respond to landscape variation caused by fire or biophysical factors?

Bernard Doube

Biography

Dr Bernard Doube is the Principal of Dung Beetle Solutions International. He has extensive international-local research experience with dung-beetles, ticks, dung-breeding flies, earthworms and the biological basis of soil health. He has published extensively on ecological aspects of soil health.

EcoTAS abstract

A CSIRO-MLA-DBSI-CC (2012-1017) program has sponsored the introduction of two new dung beetle species (Onthophagus vacca and Bubas bubalus) to Australia from southern Europe. The original CSIRO dung beetle program introduced and released 43 species of which 23 have established. Most of these have now reached the geographic and seasonal limits to their distribution. Despite this, there remained a major spring gap in dung beetle activity across southern Australia and bush flies remained a significant pest in spring in many southern regions. The new species were selected to fill this seasonal gap with the intention of controlling fly breeding and improving pasture production.
Adults of both species were collected in the European spring of 2012 and 2013 (France and Spain) and reared in the CSIRO quarantine laboratories. A small number of both

SYMPOSIUM: Invertebrate ecology of managed grasslands - addressing the new challenges

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Doube B [1] , Dalton G [2]

[1] Dung Beetle Solutions International, Adelaide SA, Australia

[2] Creation Care, Strathalbyn South Australia South Australia, Australia

Selecting, introducing and establishing two new dung beetle species in southern Australia

species were placed in field nurseries at three locations in South Australia: both species prospered in the SA nurseries at Strathalbyn. A total of 37 female O. vacca entered the nurseries in October 2014 and several hundred B. bubalus entered in August2015. We anticipate (based upon a 6-fold generation-to-generation increase in 2016-17) a spring 2017 emergence of about 30,000 O. vacca and about 8,000 B. bubalus.
A spring 2017 southern Australian release and evaluation program has been designed. Implementation will be reported in December 2017. This program will form a model platform for the release-and-evaluation of additional new species for southern Australia as part of the recently-funded 2017-2022 $23 million RR&DfP dung beetle project.

Margreet Drijfhout

Biography

Margreet Drijfhout is in the third year of her PhD, studying both ecological and social issues regarding overabundant koala populations in Victoria.

EcoTAS abstract

The question of how to best manage overabundant koala populations in southern Australia has led to heated debates for years. While culling is regularly used to manage overabundant kangaroos and possums, culling is rarely considered in managing koalas.
It is unclear why koalas are treated differently than other iconic, but locally overabundant species. Anecdotally, it is the conviction of managers and policy makers that the public strongly opposes the culling of koalas, more than

Socio-ecological Interactions / Open session
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Wattagan Room
Oral presentation
Drijfhout M [1] , Kendal D [2] , Green P [1]
[1] La Trobe University, Bundoora VIC, Australia
[2] University of Melbourne, Burnley VIC, Australia
The koala conundrum: Managing overabundant koalas and public opinion

other species. However, there is little empirical evidence to support or refute this.
Here we tested managers' and the public's acceptability of culling in managing overabundant koalas, kangaroos and brumbies, using a nationwide survey (n= 154 and n=1,148 resp.).
We found that the culling of koalas is significantly less acceptable than culling kangaroos or brumbies. However, providing the public with information on the impact of overabundant koalas can make culling koalas significantly less unacceptable. The managers on the other hand found culling koalas to be acceptable.
We also identified underlying values and beliefs of respondents to understand how these shape the acceptance of culling.
Ultimately, the decision whether or not to cull animals is not just a technical one, but one that depends on societal values and conservation objectives. These results provide empirical evidence to support decision making on this sensitive topic. This will aid managers and policy makers in engaging the public on this topic, and lead to better conservation outcomes for the koala.

Don Driscoll

ESA PRESIDENT'S ADDRESS
Wednesday, November 29, 2017
9:00 AM - 9:25 AM
The Convention Centre
Oral presentation
Driscoll D
ESA President's Address

Simon Ducatez

Biography

PhD from the MNHN in Paris, Simon conducted research in behavioural and evolutionary biology on a variety of model species (butterflies, birds, amphibians...) using a diversity of approaches (lab, field work, comparative analyses). Now a postdoc in Rich Shine's lab.

EcoTAS abstract

(Re-)introduction success largely varies across species, but the actual mechanisms explaining these differences remain poorly understood. For example, although life history is known to affect (re)introduction success, the establishment of populations actually occurs in several steps. How life history affects each step still needs to be investigated to understand the underlying mechanisms as the specific effects of life history on early mortality, late mortality or reproduction success remain largely unknown. In reintroduction biology, post-release monitoring programs provide data that could enable a mechanistic understanding of (re)introduction success. Using a database compiling more than 1,000 reintroduction events with post-release monitoring in more than 100 bird species, we investigated how life history affects the different steps of population establishment. We tested whether body mass, clutch size, longevity, number of clutches per year and age at maturity predicted early and late survival and breeding success. Species with smaller clutches survived better over both short and long term, whereas species that live longer were more likely to survive the first month after release. Long-lived species and species that mature later were less likely to breed successfully. Finally, although clutch size did not affect breeding success, breeding success increased with the number of clutches laid per year. Therefore, both

Global Change

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Cypress #2

Oral presentation

Ducatez S [1] , **Shine R** [1]

[1] University Of Sydney, Sydney NSW, Australia

Towards a mechanistic understanding of colonization success using monitoring data from reintroduction programs

species position on the slow-fast continuum and the number of breeding events seem to predict population responses to demographic and environmental stochasticity. Our results illustrate how conservation programs can provide empirical data to test life history theory which, in turn, can inform future conservation actions.

Remko Duursma

Biography

Remko is a plant ecophysiologist interested in modelling vegetation function and structure, including the effects of environmental drivers such as drought, CO2 and temperature. In his work, he develops process-based models, and analyzes and synthesizes lots of data.

EcoTAS abstract

Plant species vary widely in their sensitivity to drought. While mild drought leads to a reduction in growth, stomatal conductance and photosynthesis rates, extreme drought - when the soil is very dry and allows no water uptake - eventually leads to plant desiccation and death. While the response of plants to mild drought is well studied, and many models have been developed and tested against data, the process of slow desiccation to death is not yet well represented in models. When the soil is very dry, leaf stomata are closed but transpiration rate continues at a minimum rate, as water is lost through the cuticle and leaky stomata. Eventually, this low water use rate outstrips the plants' ability to extract water from the soil, thus drawing water only from plant tissue. The plant dies when a critical low water content is reached. We implement this process in

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017
11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Duursma R [1] , Blackman C [1] , Medlyn B [1]
[1] Western Sydney University, Penrith NSW, Australia

Death by desiccation: a dynamic model incorporating overlooked traits involved in plant drought tolerance

a dynamic model that solves for stem and leaf water content (and water potential), using well-known traits such as the P50, and overlooked traits including capacitance, plant water storage, and the minimum leaf conductance (gmin). We use a sensitivity analysis to rank these traits in terms of their importance in determining drought tolerance, incorporating the typical variation in these traits among species. We present a literature compilation on the minimum conductance (gmin), a key trait in determining the desiccation rate, and find that this overlooked trait shows remarkable plasticity in response to growing conditions and large differences between plant functional types.

John Dwyer

Biography

My research focuses on applied and theoretical questions in restoration, invasion and community ecology. I study Australian plant communities, both human-impacted and natural, to better understand the processes that maintain diversity and ecosystem function.

EcoTAS abstract

Some secondary forests are characterized by a few species that germinate or resprout at high densities and maintain dominance for extended periods. Thinning the dominant species is known to accelerate tree growth and carbon sequestration, but little is known about how climate influences thinning responses. I will present growth data from a thinning trial established in dense Acacia harpophylla regrowth in southern Queensland. The mean density before thinning was 15,700 stems ha -1, around 10

Restoration Ecology (1)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Bimbadeen Room
Oral presentation
Dwyer J [1]
[1] CSIRO and UQ, Brisbane QLD, Australia
Intra-specific competition slows tree growth more than low rainfall in secondary brigalow forests

times the density of nearby mature forests. Four treatments were applied across 16 plots in a randomised block design (no thinning and 1 000, 2 000 and 4 000 stems ha-1). Thirty randomly chosen A. harpophylla stems in each plot were then regularly monitored for 10 years, during which time annual precipitation varied from 300 mm to 730 mm. Annual basal area (BA) increments were modeled as a function of intraspecific neighbor density, local shrub density and precipitation using linear mixed-effects models. Results indicate that an average stem in an average neighbourhood grew twice as fast in wet years than in dry years. Regardless of rainfall however, strong intraspecific competition reduced growth rates by more than 70%. The local density of shrubs had no discernable effect on A. harpophylla growth rates. These results indicate that competition is the strongest driver of growth rates in dense brigalow, but declining rainfall predicted for much of the region could also substantially slow recovery rates.

Eleonora Egidi

Biography

Dr. Eleonora Egidi is a postdoctoral researcher at the Department of Physiology, Anatomy and Microbiology, La Trobe University. Her research focuses on investigating the ecology and biodiversity of soil fungi and their role in natural ecosystems.

EcoTAS abstract

Australian tussock grasslands represent one of the most threatened biomes in Australia. These unique ecosystems span the continent, from arid to temperate areas,

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 1)

Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Brokenback Room
Oral presentation

harbouring many different communities of indigenous plant species. Yet, little is known about the biogeographical patterns and drivers of diversity of their microbial counterparts, despite their predicted role in maintaining ecosystem health. In this study, we investigated the diversity and composition of 52 fungal communities across 17 types of natural tussock grasslands, from both arid (n=8) and temperate (n=9) areas, retrieved from the ‘Biomes of Australian Soil Environments’ (BASE) database. We found a distinct composition and diversity at the community level in relationship with both sampling location and ecological region. Fungal diversity positively correlated with vegetation cover, with large and small diversity values corresponding to temperate and arid grasslands, respectively. Similarly, both atmospheric and terrestrial climate variables correlated with changes in diversity. Communities from the arid region were characterized by a lower richness and diversity of fungi, while harobouring an increased relative abundance of fungi with traits associated with resistance to environmental stresses, such as melanization and thick cell walls. These results indicate that soil fungal communities are driven by shifts in climate and vegetation, suggesting that a microbe–vegetation–climate relationship exists. In a period of rapid, global environmental change it is therefore critical that diversity assessments, as well as conservation, monitoring and rehabilitation strategies, consider microbial communities and their inter-relationships in order to maintain the important ecological roles they provide.

Egidi E [1] , Wood J [1] , Celestina C [1] , May T [3] , Mele P [1,4] , Bowd E [5] , Edwards J [1,4] , Bissett A [2] , Franks A [1]

[1] La Trobe University, Melbourne VIC, Australia
[2] CSIRO, Hobart Tasmania, Australia
[3] Royal Botanic Gardens, Melbourne Victoria, Australia
[4] Department of Environment and Primary Industries, Melbourne Victoria, Australia
[5] Australian National University, Canberra ACT, Australia

Unraveling the Australian Grassland Mycobiome: diversity and distribution of soil fungal communities from grassy ecosystems

Elizabeth Elliot-Hogg

Biography

Elizabeth E. Elliot isa PhD candidate at the University of Waikato. Her areas of research interest include urban restoration ecology, human-wildlife interactions in urban areas and urban wildlife ecology.

EcoTAS abstract

Studies have highlighted the great potential cities have to act as refuges for native flora and fauna. Habitat restoration in cities has further been championed as a means to improve bird conservation and reconnect city residents with native nature.
My research combines ecological and social science to evaluate the contribution that restored native forests in urban areas in New Zealand can make to native bird conservation and reconnecting urban residents with native nature. The purpose of the research is to identify which factors among local habitat variables, landscape characteristics, site age and predation levels determine the ability of native New Zealand bush birds to benefit from urban restored forests. The study further investigates how the resources provided by these forests change over time since restoration.
Through the use of qualitative, semi-structured interviews, the study explores the question whether frequent use of restored forest, either as a restoration volunteer or simply as a city resident, can re-establish a relationship between people and native nature and lead to greater support for biodiversity conservation. An online survey investigates the role native birds play in re-establishing this relationship and, more specifically, whether appreciation for native birds can promote wildlife gardening efforts and other pro-conservation behaviours.

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Elliot-Hogg E , Clarkson B [1] , Stolte O [1] , Innes J [1]

[1] The University of Waikato, Landcare Research, New Zealand

The capacity of restored urban forests to support native birds: Ecological or social restoration?

David Ellsworth

Biography

Professor David Ellsworth is Professor at Western Sydney University. He is a specialist on the effects of climate change and elevated CO2 on trees, and has published many papers on topics related to the ecology and physiology of trees.

EcoTAS abstract

Over a third of the world's soils have low plant-available phosphorus. Phosphorus might constrain forest productivity and growth on these soils, with tropical forest growth processes limited by P. However, relatively few studies have examined relationships between productivity and/or photosynthesis and phosphorus across a broad geographical swath and a wide number of diverse plant families. With numerous key data contributors, we compiled a large global dataset of leaf nutrient concentrations and photosynthetic function, comprising over 550 species from six continents from over 120 plant families to examine whether there were broad relationships between leaf photosynthesis and leaf P, and explore the physiological phenomena underlying these relationships. We used the biochemical photosynthesis model of Farquhar et al. (1980) and subsequent revisions to parameterise relationships between photosynthetic function and leaf phosphorus, considering soils and site phosphorus status, leaf nitrogen and leaf mass per area as variables that could modulate this relationship. Our dataset contains plants with some of the lowest leaf P concentrations measured (<1 mg/g), as well as plants from habitats where phosphorus was not considered limiting or where leaf N:P ratio was low. We found significant overall relationships between both leaf photosynthetic capacity and leaf phosphorus, and leaf

Forest Ecology (2)

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Cypress #3

Oral presentation

Ellsworth D [1] , Crous K [1] , De Kauwe M [2] , Verryckt L [3] , Wright I [4]

[1] Western Sydney University, Penrith NSW, Australia

[2] ARC Centre of Excellence for Climate Extremes, Sydney NSW, Australia

[3] Antwerp University, Drie Eiken Antwerp, Belgium

[4] Macquarie University, Ryde NSW, Australia

Phosphorus limits photosynthesis in tropical and subtropical trees on four continents

RuBP regeneration capacity (Jmax) and leaf phosphorus across the four continents in the tropics. The relationships we observed suggest that global plant productivity models should consider soil or plant phosphorus as a potential constraint to photosynthesis, and to the extent possible employ triose-phosphate limitations in simulating photosynthesis across the globe.

Nathan Emery

Biography

I am a scientific officer at the Australian PlantBank. I currently work on plant conservation research programs involving several Persoonia species, each with a translocation component. My research interests include plant ecology, seed biology and entomology.

EcoTAS abstract

Persoonia pauciflora (North Rothbury Persoonia) is a critically endangered species, comprising around 1,000 scattered individual plants confined to a 29 ha area in the lower Hunter Valley region of NSW. Since 2015 we have translocated 392 plants across three planting events as population supplementations and assisted colonisation, forming an important component of a conservation research program. Currently, plant survival among translocations ranges from 67% to 100%. Concurrent with these plantings have been concerted efforts to better understand the species' ecology. I will outline the research undertaken on the North Rothbury Persoonia, focusing on two important aspects designed to guide and improve how

SYMPOSIUM: Novel management interventions for threatened species

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Emery N [1] , Offord C [1]

[1] The Australian Botanic Garden Mount Annan, Mount Annan NSW, Australia

The ecology informing translocations of the critically endangered Persoonia pauciflora

the translocations would be planned, executed and subsequently monitored. The experimental investigations focused on: (1) reproductive biology, including pollinator surveys and the breeding system; and, (2) seed biology, including germination and longevity, and endocarp degradation in the soil. I then describe how the translocation events were scientifically designed to meet the ecological requirements of the North Rothbury Persoonia.

Emilie Ens

Biography

Dr Emilie Ens is a lecturer and cross-cultural ecologist who has conducted collaborative research with Aboriginal people across Australia, but especially in Arnhem Land, since 2008. She was co-leader of the ACEAS Indigenous biocultural knowledge working group (with Gerry Turpin) which won the 2014 Banksia Award for Indigenous Leadership in Sustainability. Her work with the Ngukurr community of SE Arnhem Land has built up to be known as the Ngukurr Wi Stadi bla Kantri Research Team who have been finalists in the 2016 and 2017 Eureka Prize for Innovation in Citizen Science. Emilie also teaches in 1st and 3rd year Environmental Management at Macquarie University.

EcoTAS abstract

Over the last few years the Ngukurr Wi Stadi bla Kantri Research Team has been building local and scientific capacity to better understand the biodiversity assets and threats in remote SE Arnhem Land. The Team comprises of

SYMPOSIUM: Indigenous Ecological Knowledge

Monday, November 27, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Ens E [1] , Ngukurr Wi Stadi bla kantri (We study the Country) Research Team , **Gaykamangu J** [2] , **Murrungun B** [3]

[1] Macquarie University, Sydney NSW, Australia

[2] Ngukurr Wi Stadi Bla Kantri Research Team

[3] Ngukurr Yangbala Group

Cross-cultural biodiversity surveys in SE Arnhem Land

the Yugul Mangi Rangers and ecologists from Macquarie University in collaboration with Ngukurr Language Centre and Ngukurr School. We do a range of activities to bolster cross-cultural biodiversity knowledge at local to national levels including: on-Country field surveys, recording knowledge with local Elders, developing a local field guide in 10 different languages and creating online education tools through the Atlas of Living Australia. This talk will present some of our recent work for which we have been Eureka Prize finalists in 2016 and 2017 in the Innovation in Citizen Science Category.

Hannah Etchells

Biography

Hannah is a PhD candidate with a not-so-secret past life. After studying design and working in the arts, she decided to go back to uni to study botany and ecology, researching the ecological impacts of catastrophic wildfires in southwest Australia.

EcoTAS abstract

Wildfires in the forested regions of southwest Australia are predicted to increase in both frequency and severity with projected changes in climate. While karri (Eucalyptus diversicolor) forests are considered relatively fire tolerant, there are few published studies of karri forest response to high severity fire and their capacity to persist under future fire regimes is uncertain. In January 2015, the largest and most severe karri forest fire on record burnt 98,000 ha near Northcliffe, Western Australia, including extensive areas of

Forest Ecology (2)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #3
Speed Talk
Etchells H [1] , Grierson P [1] , McCaw L [2] , O'Donnell A [1]
[1] The University of Western Australia, Perth WA, Australia
[2] Department of Parks & Wildlife, Manjimup WA, Australia
Karri (Eucalyptus diversicolor) forest regeneration following catastrophic wildfire

old-growth karri forest. This study quantified the effects of differing fire severity on the recruitment and survival of karri seedlings, the mortality of mature karri trees, and the composition of the understory plant community following the fire. Mature karri tree mortality was 87% greater at high fire severity sites than at other sites, indicating that karri trees may have an upper limit to their fire tolerance. Burnt sites had significantly different understorey community composition than unburnt sites, and dominant understorey shrub, Trymalium odoratissimum, was entirely absent from one extremely high fire severity site. Fungal community composition also appeared to be considerably altered by extreme severity fire. These findings suggest that karri forests may have a fire resilience threshold, which is consistent with recent studies undertaken in different fire-adapted forest types burnt by severe fire, both in Australia and elsewhere. This study further highlights the need for long-term research into the effects of climate change and severe wildfire on forest ecosystems worldwide.

Megan Evans

Biography

Megan Evans is an interdisciplinary researcher with interests spanning environmental policy, governance and economics. The overarching goal of her research is to achieve better outcomes for the environment and society through an understanding of the policy process: design, implementation and evaluation.

EcoTAS abstract

SYMPOSIUM: Putting ecology to work at the land development frontier
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Sugarloaf Room
Oral presentation

Environmental offsets now routinely form part of the conditions of approval for urban, mining and industrial developments in Australia and internationally. As is the case with environmental impact assessment, the potential benefits derived from offsets are frequently undermined by a lack of long-term, holistic planning at the landscape scale. Here, I draw on semi-structured interviews with policymakers, practitioners and industry proponents to describe what opportunities and challenges exist for taking a more strategic approach to environmental offsetting in Australia. I identified factors which inhibit or enable strategic offsetting at each stage of the offset policy process; and classified each factor as informational, organizational, institutional or political. My results indicate broad agreement across stakeholder groups on the desirability of strategic offsetting to ensure both long-term environmental outcomes and economic efficiency, and widespread concern for the “piecemeal” outcomes resulting from current policy arrangements. Several factors currently inhibit strategic outcomes, namely: lack of interaction and information flow within and between federal, state and territory government departments; the “focal species” approach of federal and state threatened species legislation; policy uncertainty and inconsistency; and a lack of capacity to coordinate and align efforts across multiple jurisdictions and tenure. Nonetheless, I found evidence of large-scale, “strategic” offsets being designed and implemented by some commercial operators in absence of government intervention. Future research should examine how current examples of strategic offsetting are being implemented, to draw out lessons which can be applied to offset policy and practice more broadly.

Evans M [1,2]

[1] The University Of Queensland, Brisbane Queensland, Australia

[2] The Australian National University, Canberra ACT, Australia

Enabling strategic offsetting in Australia: lessons from current policy and practice

Roland Eveleens

Biography

Roland is currently studying towards a BSc(Hons) in ecology at the University of Canterbury, working with the Freshwater Ecology Research Group. His research interests include the effects of disturbance across environmental harshness gradients, ecosystem connections and landscape ecology.

EcoTAS abstract

Predicting the ability of ecosystems to respond to change requires an understanding of the underlying mechanisms determining community composition, including the role of disturbance. Both disturbance history and type are likely to structure communities through filtering processes selecting for particular species traits. For example, the history of flooding disturbance in braided river systems likely leads to communities resistant to floods. However, these communities are likely susceptible other types of disturbance. Consequently, understanding the separate influences of disturbance history and type and the effect of the interaction between them on community composition is necessary to understand community resistance to future disturbances. This was investigated using an in-stream channel experiment to test the resistance of invertebrate communities to disturbance. Using a split plot design, channels were placed in five stable spring fed streams and five highly disturbed streams (disturbance history) and nested within each stream three channels were used to manipulate disturbance type including flooding, drying and no disturbance (control) treatments. Our results showed disturbance type (drying vs flooding) affected community composition but there was no effect of disturbance history (stable vs disturbed streams) or interaction between

Open session (4)

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Oral presentation

Eveleens R [1] , Warburton H [1] , McIntosh A [1]

[1] University Of Canterbury, Christchurch New Zealand, New Zealand

Does the past matter? The influence of disturbance history on community resistance to future disturbances

disturbance type and history. In general, both flooding and drying disturbances significantly reduced invertebrate abundance and species richness compared to the control, which was also reflected in trait based analyses. Therefore, our results suggest that disturbance type plays a greater role in determining community structure than disturbance history and determining this experimentally demonstrates the separate roles of disturbance type and history in influencing ecosystem resistance.

Susan Everingham

Biography

Suz Everingham is a PhD student at The University of New South Wales studying plant ecology. She has an interest in the distribution of and environmental effects upon native flora across Australia and applying these results to global ecological theories.

EcoTAS abstract

There is an enormous body of literature on plant invasions, including many investigations of the types of introduced species that are most likely to invade native ecosystems. In this study we turn invasion biology upside down, and ask what sort of native species colonise novel anthropogenic habitats such as roadside lawns, road shoulders, railway embankments and fire trails. We surveyed 1 m2 quadrats to quantify native species richness and cover in roadside lawns and infrequently tended road shoulders in five regions of New South Wales, Australia. The native vegetation in these regions included sclerophyll forest, fertile and infertile Eucalypt-dominated woodlands,

Community Ecology
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #3
Oral presentation
Everingham S [1] , Hemmings F [1] , Moles A [1]
[1] UNSW, Sydney NSW, Australia
Native plant colonisation in urban, disturbed habitats.

rainforest, and semi-arid woodland. We performed a complementary survey of sites spanning five disturbance levels within the region containing sclerophyll forest vegetation. A total of 136 native species were found in novel habitats. Most of these were in sites with low levels of disturbance, however, 35 native species were found to colonise roadside lawns, our most highly-disturbed vegetation type. There was a significant negative relationship between the disturbance level in novel habitats and the number and cover of native species. Native species that colonised novel habitats were disproportionately likely be generalist species and evolved in both high and low light and disturbance conditions. The native species colonising novel habitats also tended to have traits associated with a fast life-history, including short stature and small seeds. A surprisingly high number of native plant species are colonising novel, anthropogenic habitats.

Daniel Falster

Biography

Daniel uses a combination of maths, computer models, and large data sets to test fundamental ideas about the processes shaping forests.

EcoTAS abstract

Trees die from a variety of causes and at a wide range of rates. Statistical inference regarding tree mortality is inherently difficult because 1) trees are long-lived, 2) the outcome (alive vs dead) is binary, 3) there may be many possible covariates to consider, and 4) most studies are

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017
11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Falster D [1] , Camac J
[1] University of New South Wales, Sydney Nsw, au

Five recommended techniques for modelling tree mortality

observational. In this talk I introduce five techniques that should be seriously considered by anyone looking to model tree mortality. First, I explain why any analysis of mortality should always be directed towards estimating an instantaneous hazard function, so that sampling period is controlled for. Second, I explain why you should ignore many of the main statistical techniques applied in medical research, and instead should adopt an "additive hazards" model. Third, I introduce the idea of hierarchical models, and explain how these help you estimate species-level differences (or other random effects). Fourth, I introduce the idea of K-fold cross validation for testing and comparing alternative models. And finally, I explain why you might consider fitting models via MCMC sampling. The 5 techniques will be briefly illustrated using data from BCI long-term plot in Panama. Combined, these techniques offer ecologists a powerful toolbox for inferring drivers of mortality in forests.

Colin Ferguson

Biography

Practicing agricultural scientist with AgResearch and its predecessors for 39 years. Main research interest is understanding invertebrate pasture pest ecology to predict the cost of pest impact and determine options for mitigating that impact.

EcoTAS abstract

New Zealand pastures are turbulent ecosystems, encompassing very few forage species and a mixture of

SYMPOSIUM: Invertebrate ecology of managed grasslands - addressing the new challenges

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Ferguson C [1] , Gerard P [2]

[1] Agresearch Ltd, Mosgiel Otago, New Zealand

[2] Agresearch Ltd, Hamilton Waikato, New Zealand

indigenous and exotic invertebrates, which undergo regular catastrophic disturbance via cultivation. This causes the breakdown of natural population regulation of these invertebrates and allows a few to become significant economic pests. One of these is Wiseana copularis, an endemic soil dwelling foliage feeding caterpillar responsible for up to $500M lost farm income annually. In undisturbed habitats W. copularis rarely causes noticeable plant damage. In cultivated pastures high larval numbers cause pasture production losses and valued plants are killed allowing weeds to invade before natural regulation re-establishes. This reduces pasture persistence and necessitates pasture renewal, usually involving cultivation, beginning the cycle again. Pest tolerant, or resistant, pastures may restrict W. copularis numbers, extend pasture life and allow more stable ecosystems to develop. Most non-graminaceous pasture plant cultivars, however, have not been assessed for resilience against invertebrate pests. This investigation examined the suitability of 21 Trifolium sp. cultivars and the pasture herb Plantago lanceolatum for larval growth and survival of two haplotypes of W. copularis. While no intra-species cultivar differences were found, larvae performed better on T. pratense than T. repens and equally well on a T. repens X T. ambiguum hybrid with all being more favourable than T. fragiferum. Of particular significance was the very poor larval survival and growth when given P. lanceolatum.

Does current forage germplasm have the potential to develop more persistent agricultural ecosystems?

Laura Fernandez

Biography

Invasion Ecology
Wednesday, November 29, 2017
11:00 AM - 1:00 PM

Laura did her Bachelor thesis in Biological Sciences in Argentina, then a Master in Ecology in Brazil and is currently a PhD student at Macquarie University, Sydney. She enjoys studying invasive species and has an especial interest in conservation biology.

EcoTAS abstract

Austropuccinia psidii (myrtle rust) was detected in Australia seven years ago. It spread through the east coast and was recently found in New Zealand. It infects young growing tissues of the Myrtaceae family resulting in defoliation, stunted plants and reduction of reproductive fitness, leading to death in the most susceptible species. So far in Australia 380 species have been found to be susceptible. Control is not feasible at large scales. A few studies have assessed myrtle rust impacts at species-level in the field but none at community-level. To study the impact of myrtle rust on native vegetation, 60 2m x 2m plots were established in three NSW sites where Rhodamnia rubescens (a highly susceptible rainforest species) is present. Our hypotheses were: 1) A. psidii infection leads to defoliation and even death of adult individuals; 2) A. psidii infection of adult plants leads to reduced canopy cover that affects understorey species composition and 3) A. psidii infection of seedlings affects seedling recruitment directly. We performed 4 treatments: I) Control tree, control understorey; II) Control tree, fungicided understorey; III) Fungicided tree, control understorey and IV) Fungicided tree, fungicided understorey. We sprayed fungicide monthly in order to control for A. psidii. Every four months we assessed composition and abundance of understorey species and took canopy pictures to assess transparency. Although fieldwork is still under way, preliminary results show that canopy openness is greater in control plots,

Cypress #2

Oral presentation

Fernandez Winzer L [1,2] , Berthon K [1] , Entwistle P [3] , Pegg G [2,4] , Carnegie A [2,5] , Leishman M [1]

[1] Macquarie University, North Ryde NSW, Australia

[2] Plant Biosecurity Cooperative Research Centre (PBCRC), Bruce ACT, Australia

[3] North East Agricultural Services, McLeans Ridge NSW, Australia

[4] Horticulture and Forestry Science, Department of Agriculture & Fisheries , Brisbane QLD, Australia

[5] NSW Department of Primary Industries, NSW Forest Science , Parramatta NSW, Australia

Is the invasive pathogen myrtle rust having an impact on Australian native vegetation?

supporting hypothesis 1 (Treatment*time, p=0.0467), while no effect has been detected for hypothesis 2 and 3.

EcoTAS abstract

Austropuccinia psidii (myrtle rust) is an invasive fungus native to South and Central America that was first detected in Australia seven years ago. It infects young growing tissues of the Myrtaceae family, which is dominant in Australia, and can cause defoliation, reduced reproductive fitness and death depending on species' susceptibility. Susceptibility status is only known for 380 species, with 363 showing susceptibility. We chose 11 species whose distribution overlaps with myrtle rust, for susceptibility testing in order to increase our management capability of this biosecurity pest. Tested species were ten Eucalyptus species (E. amplifolia, E. camphora, E. castrensis, E. copulans, E. largeana, E. macarthurii, E. magnificata, E. pachycalyx (subsp. pachycalyx and waajensis), E. parvula, and E. scoparia) and Callistemon megalongensis. Unfortunately, all tested species showed to be susceptible to myrtle rust, with high degree of variation in susceptibility. Resistance within Eucalyptus spp. varied between 6 – 94 %. These are promising results, especially as an opportunity to look for resistance genes. This study adds 11 species to the national host species list, taking the total number to 379 in Australia. As these species all have an overlapping distribution with myrtle rust, they are very likely to become infected in their native communities. It is necessary to assess the impacts and severity levels of these affected plants in order to guide management decisions to maximise their persistence in the wild. Monitoring of susceptible species' populations in the wild and seed collection for seed banking would be the first

THE NEED FOR SPEED: Featured Speed Talks

Wednesday, November 29, 2017

2:45 PM - 3:20 PM

The Convention Centre

Speed Talk

Fernandez Winzer L , **Fernandez L** [1] , Leishman M , Berhton K , Sandhu K

[1] Macquarie University

The Need for Speed: Endangered Australian vegetation species deal with an extra threat

steps towards their conservation.

Jonathan Finch

Biography

I am currently studying pollination mutualisms for my PhD at Western Sydney University. I am interested in entomology, co-evolution and molecular ecology.

EcoTAS abstract

Obligate pollination mutualisms (OPMs) are specialized forms of pollination interactions in which female pollinators transport pollen between the male and female flowers of a single plant species and then oviposit eggs within those same flowers. The pollinator offspring hatch and feed upon some or all of the developing ovules pollinated by their mothers. In return for this resource, pollinators provide a highly specific pollination service. Historically, the strong trait matching seen between plants and their pollinators in OPMs contributed to a widespread assumption of strict sense co-speciation. This in turn led to the assumption of reciprocal specificity i.e., a single pollinator species using a single plant species and vice versa. The co-diversification of Epicephala and their Phyllanthaceae hosts is perhaps one of the best examples of those processes occurring between plants and pollinators, yet we do not have detailed knowledge of Epicephala diversity at the host species level . We set out to investigate the number of species of Epicephala sp. moths involved in pollination mutualisms with Breynia oblongifolia, a widespread Australian plant species occurring primarily along a coastal strip of land from Northern Queensland to Southern New South Wales.

SYMPOSIUM: Insect Ecology
Research Chapter - insects punching above their weight (Part 2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Speed Talk PLUS Poster
Finch J [1] , Cook J [1] , Power S [1] , Welbergen J [1]
[1] Hawkesbury Institute for the Environment, Western Sydney University , Richmond NSW, Australia
Obligate Pollination Mutualisms in the Australian Phyllantheae

We used molecular barcoding to identify the number of species involved in the pollination mutualism and determine the genetic relationship of pollinator species. We found two co-occurring, non-sister species of pollinator at all sites, demonstrating a breakdown of the reciprocal specificity assumption. Our results are important in the context of explaining the evolution of OPMs and understanding co-evolutionary processes.

Paul Foreman

Biography

Paul Foreman is a PhD candidate at La Trobe University. His research focuses on the influence of Aboriginal burning on lowland, mesic grasslands of south-east Australia. Paul is also an Ecologist with Blue Devil Consulting, specialising in grassy ecosystem conservation.

EcoTAS abstract

It has been argued that multiple lines of evidence are needed to test for the ‘fingerprint’ of Aboriginal burning in the formation and maintenance of lowland, mesic grasslands of south-eastern Australia. First, that ‘natural’ grasslands exist in climatically–edaphically unexpected places; second, that fine-scale patterns and dynamics are at least partly due to fire; and third, that the fire regime has been influenced by Aboriginal burning. This paper presents the results of analyses under five of the nine evidence lines proposed under the framework (grouped under the themes: Archival Benchmarking, Palaeoecology, Phytoecology, and Ethnology and Archaeology). (1) The coverage of grasslands across northern and central Victoria was

Disturbance Ecology (Fire)
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Cypress #3
Oral presentation
Foreman P [1,2]
[1] La Trobe University, Bundoora VIC, Australia
[2] Blue Devil Consulting, Casltemaine VIC, Australia
Multiple evidence of Aboriginal burning in lowland, mesic grassy ecosystems of south-eastern Australia

compiled from early historical plans providing evidence of grasslands in areas where trees are expected; (2) Targeted field assessment showed historic mesic grassland areas have a lower density of tree cover (c.f. non-grassland areas) and support grassland remnants often dominated by Kangaroo Grass (Themeda triandra); (3) Comparison with detailed soil patterns (%clay of topsoil) showed that in mesic regions, grasslands were widely associated with a mix of soils suggesting a greater influence of 'top-down' processes such as burning; (4) The historic distribution of mesic grasslands in northern and central Victoria are shown to be closely linked to proxies of human habitation (where food resources were richest); and (5) There is some evidence in the documentary archives, especially the diaries and journals of explorers and other European pioneers, of the targeted, purposeful and frequent use of fire by Aborigines in these mesic regions.

Claire Foster

Biography

Claire is a postdoctoral fellow at the Fenner School of Environment and Society at the ANU. Her research focuses on ecological disturbances and species interactions, and in particular, how interactions between different processes affect ecosystem structure, function and composition.

EcoTAS abstract

Macropods and wallabies have become highly abundant in many of Australia's reserves and natural areas as a result of changes in land use, creation of reliable water sources and reduced predator densities. Recent studies have

Community Ecology
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #3
Speed Talk
Foster C [1] , Barton P [1] , Strong C [1] , Lindenmayer D [1]
[1] Fenner School of Environment and Society, ANU, Acton ACT, Australia
Ecosystem consequences of highly abundant macropods

revealed that these high macropod densities can have effects on a wide range of other species, including plants, invertebrates, reptiles and other mammals. However, the long-term ecosystem effects of elevated macropod densities remain poorly understood. We conducted a five year, randomised blocked experiment to study ecosystem effects of macropod exclusion on both unburnt and recently burnt sites in a dry sclerophyll forest ecosystem. We found understory vegetation responded strongly to macropod exclusion, especially after fire. Fabaceae species were particularly responsive, with Fabaceae species richness 1.9 times higher and cover 6.3 times higher in exclosure sites compared with unfenced sites. We explore the consequences of these changes for soil nutrient availability, as Fabaceae are the predominant nitrogen-fixing species in our study system. Our study reveals that elevated macropod densities could have far-reaching consequences for ecosystem dynamics.

Eleanor Fox

Biography

Eleanor completed her Bachelor of Applied Science (Environmental Management) with honours (herpetology and ecology) at Federation University. Elle worked in the field as a Landcare Coordinator for 7 years before returning to tackle her PhD.

EcoTAS abstract

Eucalyptus yarraensis (Yarra Gum) and Eucalyptus strzeleckii (Strzelecki Gum) are endemic to Victoria. Both species had a wider distribution prior to severe habitat fragmentation which came with European colonisation,

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Fox E [1] , Hogan F [1] , Wright W [1] , Schultz N [1]

[1] School of Applied and Biomedical Science, Federation University Australia, Ballarat VIC, Australia

urbanisation and agriculture. Both species are listed as rare, with discontinuous populations through central Victoria. This project seeks to evaluate the impact of fragmentation on the genetic diversity and fitness of these species.
We will use microsatellite markers and genetic techniques to analyse the genetic diversity among existing populations (including recent recruitment) to test for genetic isolation or bottlenecking. Eucalyptus seed stock used in commercial revegetation projects will also be tested to establish if the current commercial seed bank is connecting the remnant populations with genetically diverse stock or further perpetuating low genetic diversity, which may potentially lead to divergence or the failure of populations. As life span of these species is longer than the time since fragmentation, we will compare the genetic diversity of recent recruitment to older populations to test for time-lags in the effect of fragmentation.
This study will contribute to the conservation strategy for these species. We aim to provide direction for future restoration projects which include these species. The study will also contribute to our knowledge of how the landscape structure of plant populations contributes to patterns of genetic variation, informing our understanding of the potential effects of fragmentation on a range of rare or threatened plant species.

A genetic investigation of two rare, fragmented Eucalyptus species endemic to Victoria

Kris French

Biography

Kris French is an ecologist at the University of Wollongong with a research program interested in teasing apart the mechanisms of weed invasion. Recently she has focused

Invasion Ecology (Plants)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation

on how below-ground relationships influence invasion rates and growth of plant species.

EcoTAS abstract

Lianas are known to compete intensely with trees, reducing growth and recruitment. Invasive lianas have the potential to be particularly harmful as they possess a competitive life history that may be coupled with more competitive qualities of invasiveness. We investigated interactions at the early stages of growth between native and invasive lianas with a common rainforest tree of temperate Australia rainforests under different light conditions. Invasive lianas, as a group, were not more competitive than native lianas in reducing growth of a native rainforest seedling. At this stage in the life cycle most lianas were as competitive as a conspecific seedling. However, one invasive liana, Anredera cordifolia, was particularly competitive and reduced biomass. When lianas were grown with a rainforest tree seedling, three liana species overyielded, while one species was unaffected. Overyielding was coupled with a strong negative effect on native tree seedlings which is probably mediated through below-ground processes. We discuss the potential for these interactions to be facilitative, parasitic or competitive; certainly they represent a special interaction that steps outside our usual conceptual framework. We therefore show that interactions early in the life of rainforest species can be complex mixtures of interactions which are likely to influence the ability of lianas to dominate rainforests.

French K [1] , Robinson S [1] , Smith L [1] , Watts E [1]
[1] University Of Wollongong, Wollongong NSW, Australia

Special Relationships: Lianas feed off young tree seedlings

Adam Frew

Biography

Adam completed his undergraduate studies at the University of St Andrews before joining Western Sydney University for his PhD under the primary supervision of Dr Scott Johnson. Adam recently joined Charles Sturt University as a Postdoctoral Research Fellow.

EcoTAS abstract

The nutritional quality of plants is dependent on soil nutrients, but also on co-evolved microbial symbionts such as arbuscular mycorrhizal (AM) fungi. These fungi associate with most plants and can impact plant nutrient uptake, including silicon (Si). High Si concentrations can increase plant resistance to insects through multiple mechanisms, including reductions in plant nutritional quality. The growth and immune function of herbivorous insects is dependent on the quality of their host plants, which highlights the potential impacts of AM fungi and Si on insect growth and immunity via changes in host plant quality. This was investigated using two sugarcane varieties (Saccharum spp. hybrids) grown under fully factorial treatment combinations of ±Si and AM/non-AM, and the root-feeding canegrub (Dermolepida albohirtum). Canegrubs fed on the plants and their immune function was assessed in a bioassay, while growth and root consumption were assessed in a feeding trial. This study found Si decreased canegrub growth and root consumption, the latter by 71%; AM fungi reduced canegrub growth only when Si was not applied, and only in one variety. AM fungi increased canegrub immune function by 62%, which negatively correlated with canegrub growth. This suggests that AM fungi can impact insect performance via changes in plant Si concentrations, but also by stimulating insect immunity which, due to a growth-

SYMPOSIUM: Functional roles of plant silicon: how plants get it and what they use it for

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Brokenback Room

Oral presentation

Frew A [1,2] , Powell J [1] , Hiltpold I [3] , Allsopp P [4] , Sallam N [4] , Johnson S [1]

[1] Western Sydney University, Hawkesbury Institute for the Environment, Richmond New South Wales, Australia

[2] Charles Sturt University, Faculty of Science, Wagga Wagga New South Wales, Australia

[3] University of Delaware, Entomology and Wildlife Ecology, Newark Delaware, United States of America

[4] Sugar Research Australia Ltd., Indooroopilly Queensland, Australia

Mycorrhizal mitigation of root menaces: arbuscular mycorrhizal fungi increase plant silicon and stimulate insect immunity

immunity trade-off, results in growth reduction. This study highlights the efficacy of Si-based root defences against insect herbivores, and suggests possible direct interactions between insect herbivores and plant symbiotic fungi which share the soil environment.

Richard Fuller

Biography

Richard Fuller is an Associate Professor and ARC Future Fellow at the University of Queensland. He studies how people have affected the natural world around them, and how some of their destructive effects can best be reversed. To answer these questions, the lab group works on pure and applied topics in biodiversity and conservation. Much of the work is interdisciplinary, focusing on the interactions between people and nature, how these can be enhanced, and how these relationships can be shaped to converge on coherent solutions to the biodiversity crisis. See www.fullerlab.org and www.facebook.com/fullerlab

AERA PRESENTATION: Dr Richard Fuller

Wednesday, November 29, 2017

2:00 PM - 2:45 PM

The Convention Centre

Award Presentation

Fuller R [1]

[1] University of Queensland

Conserving mobile species

EcoTAS abstract

The distributions of many species are dynamic in space and time, with movements ranging from regular and predictable migrations to enigmatic, resource-driven nomadism. Conserving mobile species is challenging because they ignore political boundaries, and the impact of threats or conservation actions at one site depends on what is happening at other sites that may be thousands of kilometres away or in another jurisdiction. I will cover some

of the theoretical underpinnings of mobile species conservation, and illustrate some of the ecological and institutional challenges of conserving mobile species with case studies including the latest research on nomadic birds in Australia's interior, the global coordination of protected area designation, and the collapsing populations of shorebirds that migrate between the Arctic and Australasia. I conclude by outlining how progress can be made to achieve smart, joined up conservation for mobile species, emphasizing the need for improved international collaboration, smart protected area planning, and strategies for dealing simultaneously with multiple threats.

Josie Galbraith

Biography

Josie Galbraith. Current role: Project Curator in Natural Sciences at the Auckland Museum, New Zealand. Main areas of research interest are ornithology and urban ecology, focusing on invasive species, community ecology, conservation, human–wildlife interactions, and science communication.

EcoTAS abstract

Recent studies have revealed the potential for detrimental impacts of garden bird feeding. However, information on the ubiquity of these impacts among and within feeder-visiting species is scarce. Individual birds and species that make frequent use of feeders are more likely to experience both the benefits and detrimental impacts of supplementary food. We investigated patterns of feeder use by garden birds visiting experimental feeding stations in Auckland,

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Galbraith J [1,2] , Jones D [3] , Beggs J [2] , Parry K [4] , Stanley M [2]
[1] Auckland Museum, Auckland, New Zealand
[2] University of Auckland, Auckland, New Zealand
[3] Griffith University, Nathan Qld 4111, Australia
[4] Massey University, Palmerston North, New Zealand
Inequality at garden bird feeders: who gets more than their fair share?

New Zealand, with the specific aim of determining whether use of supplementary food was consistent or variable among individuals and species. We also considered whether supplementary food use is modified by interspecific interactions or seasonality. We used camera traps as well as Radio Frequency Identification (RFID) technology to examine intra- and interspecific feeder visitation patterns and to discern species associations. Eleven bird species were detected using feeding stations, however, two introduced species (house sparrow Passer domesticus and spotted dove Streptopelia chinensis) dominated visitation events. Significant associations were detected among a number of species, suggesting interspecific interactions are important in determining feeder use. We also found within-species differences in feeder use for all focal species, with individual variation greatest in house sparrows. Exploitation of supplementary food by a few species and by a subset of individuals within species has important implications at both the population and community levels.

Rachael Gallagher

Biography

Rachael Gallagher is a plant ecologist and conservation biologist based at Macquarie University in Sydney.

EcoTAS abstract

I present a new continental-scale analysis of the vulnerability and adaptive capacity of Australian vegetation to climate change. Using data on the realised temperature and rainfall niche limits of ~19,000 species I derive

Global Change
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation
Gallagher R [1]
[1] Macquarie Univeristy , Niagara Park NSW, Australia
Quantifying the vulnerability of Australian vegetation to climate

measures of vegetation sensitivity to projected changes in climate by the year 2070. The aim is to show how much warmer, or drier, conditions can become before a typical species in a location would need to be replaced via turn-over. Spatial analyses show that more than 60% of Australian vegetation may exceed the realised temperature niche limit of its average species by 2070. Across the Australian landscape, the ‘safety-margin’ for climate warming varied between 0.2 - 7.6ºC. The smallest margins are found in equatorial regions. For instance, exposure to climate change exceeds sensitivity in 100% of the current extent of Tropical Eucalypt Woodlands. I discuss the implications of this research for predicting the long-term composition of Australian vegetation.

change using realised niche limits

Georgia Garrard

Biography

Georgia Garrard is a Senior Research Fellow in RMIT's Interdisciplinary Conservation Science Research Group. She is currently working as part of the NESP Threatened Species Recovery Hub to improve messaging for better community buy-in to threatened species conservation.

EcoTAS abstract

The words and ideas we use to talk about something (frames) can change the way people respond to it. Some people know this (i.e. politicians, advertisers, marketers) and use it to help their cause. But those of us who hope to look after animals and other living things that are not human (conservation scientists) are still learning to make the most of it. In this study, we looked at how using different

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Garrard G [1] , Kusmanoff A [1] , Bekessy S [1]

[1] RMIT University, Melbourne VIC, Australia

We need to talk about talking about triage OR The way we say stuff matters

ideas (or frames) to talk about a (threatened) animal made people think about how important that animal is and whether its place in the world (i.e. its existence) is more important than building a new mine. We found that the type of person they were changed the way people responded to different words and ideas (frames), but that suggesting that it is alright to give up on the animal (i.e. using a species-triage frame) almost always made people think the animal was less important.

This abstract has been prepared using the Up-Goer Five challenge. Words in brackets are not within the top ten hundred most used words in the English language, but may be useful in helping to provide some conservation context in this example.

Sjirk Geerts

Biography

Sjirk Geerts is a Senior Lecturer in ecology at the Cape Peninsula University of Technology, South Africa. Main areas of research interest are invasive alien plant ecology, fire and pollination; focusing on bird pollination in urban areas, fragmented habitat and on threatened plant species. More recently also a focus on the link between pollination and population viability as well as citizen science

EcoTAS abstract

Pollinator specialisation through exploitation barriers (such as long floral tubes) does not necessarily mean a lack of

Conservation Biology (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation
Geerts S [1]
[1] Cape Peninsula University of Technology, Cape Town, South Africa
Bird pollination in fragmented habitats: long term demographic consequences for their dependent plants

pollination when the favoured pollinator is rare or absent. Theory predicts that suboptimal visitors will contribute to plant reproduction in the absence of the most effective pollinator. Here I address these questions within a long-tubed guild of plant species in the Cape Floristic Region that is reliant on one species of pollinator, the long-billed Malachite Sunbird. In contrast to short-billed sunbirds, the Malachite Sunbird occurs in lower abundance or is absent in transformed landscapes. Experiments assessing seed set after single flower visits were performed to determine whether thieving short-billed sunbirds can act as substitute pollinators. Unexpectedly, short billed sunbirds are unable to act as substitute pollinators, and seed set is significantly lower in the flowers that they visited, compared to flowers visited by long-billed sunbirds. This is substantiated on a landscape scale, where fruit production could artificially be increased by 35% in transformed landscapes, but not in natural areas. An important question in plant ecology is whether these reduced pollination levels translate into population decline. By using population projection analyses, population fates under different pollination intensities are assessed. I show that the previously found link between pollination intensity and seed set can be extended to population growth rate, so that pollination intensity predicts population growth rate with a decline in the most pollen limited populations. These findings have important consequences for the management and conservation of long-tubed bird-pollinated plants in recently transformed landscapes.

Claire Gely

Biography

Claire Gely is a PhD student at Griffith University, focusing on the impact of climate change on insects. She has been doing research in France, England and Australia and is particularly interested in entomology and forest ecology.

EcoTAS abstract

Understanding and predicting the impact of climate change on species and ecosystem processes in rainforests is a critical scientific challenge. Climate change scenarios mostly predict an extended dry season in Australian tropical rainforests. Increased drought has severe impacts on rainforests ecosystems, resulting in widespread tree death and reduced plant growth. In this study I examine how increased drought may affect insect abundance and diversity, as food resources decrease in quantity and quality with intense droughts.
This project takes advantage of a unique drought experiment set up on a 0.5 ha plot in Cape Tribulation, Queensland. Framed plastic sheets placed above the ground between the trees prevent rainfall from reaching the ground, thus creating an experimentally increased drought. Insect assemblages have been collected every month for 15 months by beating leaves to dislodge insects from trees located at the drought experiment site and at a control site. A canopy crane present on the site allowed to collect insects from both the canopy and the ground levels. Insects (ants particularly) were found to be more abundant under increased drought conditions at the canopy. Insects abundance variations were dependant on the species of the host plant: some tree species endured an increase of insect abundance under increased drought conditions (probably due to weaker plant defences), whereas some other tree species were confronted to a decrease of insect abundance with an increased drought (probably due to a decrease in food availability, with fewer sap and foliage

SYMPOSIUM: Insect Ecology
Research Chapter - insects punching above their weight (Part 2)

Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Speed Talk

Gely C [1] , Stork N [1]
[1] Griffith University, Brisbane QLD, Australia

How will increased drought affect herbivory-based insect communities in Australia's tropical rainforests?

provided by the host plants).

Philippa Gerard

Biography

Dr Pip Gerard, a graduate of Lincoln and Waikato Universities, is an experienced grassland entomologist specialising in classical biocontrol, insect: plant interactions and insect ecology. Based at Ruakura, she currently leads projects focused on mitigating impacts of forage pests.

EcoTAS abstract

Black beetle (Heteronychus arator) is a subtropical maize and pasture pest of southern African origin that has spread to South America and Oceania. In New Zealand the pest is confined to North Island districts with a mean annual surface air temperature of at least 12.8oC. Historically, black beetle outbreaks have been sporadic, and generally associated with La Niña weather patterns. However, since the last major widespread outbreak across the Waikato and Bay of Plenty regions from 2007-2010, the pest has become a persistent problem for many farmers in the Waikato region.

The last decade in Waikato has been characterised by warmer and often drier than average climatic conditions. We use both historic and new data from black beetle field studies collected during this period to investigate and demonstrate how these climatic conditions favour black beetle survival and reproduction. In addition, we discuss

SYMPOSIUM: Invertebrate ecology of managed grasslands - addressing the new challenges

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Gerard P [1] , Kean J [1]

[1] AgResearch, Hamilton Waikato, New Zealand

From sporadic to persistent: the rise in pest status of Heteronychus arator in New Zealand

how these conditions can cause shifts in pasture biodiversity which can amplify pest impact in spite of the widespread use of ryegrasses with black beetle–deterrent endophytes.

Andrew Gherlenda

Biography

Andrew Gherlenda research interests include; plant-insect interactions particularly in response to climate change, insect immunity, and insect mediated nutrient transfer.

EcoTAS abstract

Silicon often promotes plant growth and can play a critical role in the defence of plants against insect herbivores. There are two main forms of silicon supplementation often given to plants for insect herbivore defence; sodium silicate (NaSi) or calcium silicate (CaSi). But do these two forms of silicon supplementation confer the same anti-herbivore defence? We tested the effects of NaSi or CaSi on the performance of an above- and below- ground insect herbivore feeding on several wheat cultivars. Silicon addition had a positive effect on wheat photosynthesis and biomass. Greater concentrations of silicon were found in the shoots and roots of augmented plants. Both NaSi and CaSi significantly altered plant metabolome. Interestingly, the form of silicon had opposite effects on insect performance. NaSi slightly decreased the performance of the above-ground herbivore, but not the belowground herbivore. However, insect performance slightly increased when silicon was applied in the form of CaSi. Plants may utilise silicon in different ways depending on the binding

SYMPOSIUM: Functional roles of plant silicon: how plants get it and what they use it for

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Brokenback Room

Oral presentation

Gherlenda A [1] , Esveld J [1] , Gurr G [2] , Reynolds O [3] , Johnson S [1]

[1] Hawkesbury Institute For The Environment, Western Sydney University, Penrith NSW, Australia

[2] Graham Centre for Agricultural Innovation, Charles Sturt University, Orange NSW, Australia

[3] Elizabeth Macarthur Agricultural Institute, Narellan NSW, Australia

Disarmed by defence: is silicon silicon and do insect herbivores care?

molecule resulting in either an increase or decrease in anti-herbivore defences. Metabolomic analysis indicates different chemical compounds are either up- or down-regulated following silicon supplementation, which may provide clues into the effectiveness of herbivore defences. Meta-analysis showed that CaSi is an effective defence across different plant species. Our experimental results suggest this is not universal and further work is needed to understand the underlying mechanisms for how silicon protects the plant. This study highlights that the form of silicon is important when considering anti-herbivory defences.

Heloise Gibb

Biography

Associate Professor Heloise Gibb is a Future Fellow at La Trobe University, Melbourne. Her research interests include community ecology and conservation and she works predominantly on terrestrial invertebrates.

EcoTAS abstract

In arid areas, precipitation limits ecosystem productivity. “Boom” years tend to be relatively infrequent, so long term data is necessary to understand how species respond to large productivity pulses. Despite their functional importance, the long-term responses of social insects to climate are poorly understood. Using a twenty-two year dataset, we asked: over what timeframes do ants respond to precipitation and are responses regulated by temperature, vegetation, position (dune or swale) or season (spring or winter)? We used wet pitfall traps to

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 2)

Monday, November 27, 2017

3:45 PM - 5:45 PM

Brokenback Room

Oral presentation

Gibb H [1] , Dickman C [2] , Grossman B [1] , Wardle G [2]

[1] La Trobe University, Melbourne VIC, Australia

[2] The University of Sydney, Sydney NSW, Australia

Long term responses of desert ants to climate

collect ants biannually at five paired dune and swale sites at Ethabuka Station in the Simpson Desert, Queensland. We collected 106 species in 20 genera and 35 990 individuals, 82% of which were Iridomyrmex (I. chasei and I. rufoniger gp.). Ant assemblages differed between crest and swale habitats, were distinct in wetter periods and changed directionally over time (although climate did not). Models showed that both climate and vegetation determine the total activity of ants and of seed harvesters. For species density, generalist foragers and sugar feeders, models that included only climate were a better fit to the data. Exponential relationships with precipitation in the year prior to sampling indicate that populations expand rapidly in response to high precipitation (population booms), but do not crashed to undetectable levels. We suggest that the colony structure of ants may provide resilience to variable productivity, preventing population 'busts', but allowing ants to expand activity to benefit from resource booms.

Casey Gibson

Biography

Casey is a first year PhD student at the University of New South Wales. A combination of her love of the mountains and all things botanical led to a research project focused on alpine plants, snow, and climate change.

EcoTAS abstract

Seasonal snow cover is a key feature of many alpine ecosystems worldwide with important effects on the

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation

distribution and life-history of alpine flora. Importantly, with climate change the timing, extent and depth of snow cover is changing. Reduced snow depth and earlier melt shifts the winter and spring microclimate experienced by alpine plants from relatively stable to highly variable, with increased exposure to both hot and cold temperature extremes. Exposure to low temperatures, especially during spring can be damaging and even lethal to plants. On the other hand, early onset of spring may afford some plants a head-start on growth and reproduction, allowing them to benefit from altered snow regimes under climate change. Compared to countries in the Northern Hemisphere, the winter ecology of Australia's unique alpine plants remains understudied.

During June 2017 above the tree-line in the Snowy Mountains, we commenced a snow manipulation experiment with a fully factorial design comprised of six blocks of four 1m² plots to determine how survival, growth, and reproduction of alpine plants will respond under the scenarios of (1) reduced winter snowpack; (2) early spring snow melt; and (3) a combination of (1) and (2). To capture any variation in soil and air temperatures between treatments, thermologgers have been installed above and below ground in three blocks. Preliminary results on microclimate, early phenological responses, and frost exposure throughout the first winter and spring will be presented.

Gibson C [1] , Keith D [1,2] , Cornwell W [1]
[1] University of New South Wales, Kensington New South Wales, Australia
[2] Office of Environment and Heritage, Hurstville New South Wales, Australia

Winter climate change and shifting snow dynamics: How will Australia's alpine flora respond?

Michelle Gibson

Biography

Landscape Ecology (2)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM

I'm a PhD student studying ecology of arid zone Australian birds jointly between Durham University and the University of QLD. I'm particularly interested in inter-annual movement patterns and the extent of nomadic and sedentary behaviour within the arid bird community.

EcoTAS abstract

In arid regions of the southern hemisphere, nomadism is a dominant form of movement for many species in response to irregular climate-driven fluctuations in resources. Australia’s arid interior contains one of the highest proportions of nomadic bird species worldwide (30-46%) but is also one of the most data deficient regions for bird species abundance and occurrence. Here we report on the first survey globally aimed at understanding how the distribution and abundance of arid zone birds changes over a five-year period in one of the driest parts of Australia. Annual distance sampling survey data were collected over a series of long-distance (800km+) transects from 2012-2016. We use a two-pronged approach to assess shifts in species occurrence and inter-annual abundance and critique the existing paradigm of species movement classifications. Species occurrence and abundance showed a continuous range of variation and the majority showed low site persistence and low variability in abundance over the five-year survey period. Our approach revealed differences in movement classifications from some of the most widely cited literature sources for over half of the species assessed. Findings highlight the importance of using standardized monitoring and empirical evidence to assess patterns in species dynamics and that caution should be used when assuming status quo classifications across a widespread and data-poor assemblage. This study is the first of its kind to contribute empirical evidence of large-scale multi-species dynamics

Cypress #2

Oral presentation

Gibson M [1,2] , Runge C [3] , Stephens P [2] , Willis S [2] , Fuller R [1]

[1] School of Biological Sciences, The University Of Queensland, St Lucia QLD, Australia

[2] Department of Biosciences, Durham University, Durham, United Kingdom

[3] National Center for Ecological Analysis and Synthesis, Santa Barbara California, USA

Where nothing stands still: evidence of widespread fluctuations in Australian arid-zone birds

for this little-studied region and provides a critical first step toward developing a more informed conservation management framework for Australian arid-zone birds.

Valerie Gibson

Biography

Valerie Gibson graduated from Chinese Academy of Science in 2016 with a MSc in Environmental Management. She was accepted as a PhD candidate at Latrobe University in 2017. Her main research interest is in developing methods to assess health outcomes.

EcoTAS abstract

Human health and wellbeing is the result of a complex interaction of human and natural factors. Increasing change and loss of biodiversity and ecosystems has contributed to changing health patterns at individual and community level. An integral measure of how ecosystems and landscape structures might affect community health and wellbeing is needed. An urban food system index with 10 indicators was used to investigate the links between urban and rural food systems and life expectancy. The index used twenty-four data sets from the National Bureau of Statistics for provincial China. The indicators, based on preferred ecosystem characteristics for favourable health outcomes, were Locality, Climate, Biodiversity, Infrastructure, Transport, Population structure, Livelihood, Recreation and Socialisation, Personal security and Communication. The best model explained that population characteristics and livelihoods related to food systems can account for much of life expectancy as a health outcome. To deepen our

SYMPOSIUM: Changing Australia: emerging trends, trade-offs and synergies of landscape transformation in rural Australia

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Wattagan Room

Speed Talk

Gibson V

[1] Latrobe University, Melbourne VIC, Australia

Community health and wellbeing with landscape transformations in Australia

understanding of the links between landscapes and health outcomes, we could apply this index and indicators to Australia to predict how landscapes might affect individual and community health and wellbeing. Using this approach, data from different landscapes, at different stages of landscape transformations, could be analysed. This index could be the basis of program evaluation and management and would advance and complement current measures of community health and wellbeing.

Megan Good

Biography

Megan Good studies landscape scale vegetation patterns and tree dynamics in semi-arid and arid floodplains and agricultural landscapes, although is currently full time parenting.

EcoTAS abstract

Mundulla Yellows is a tree dieback disorder, characterised by interveinal yellowing of the leaves and eventual death of eucalypts and other species in southeast South Australia. There are two main theories about the cause of Mundulla Yellows. One theory is that the yellowing is actually lime chlorosis, caused by limestone from roads leaching into soil, increasing the pH, and converting nutrients (specifically iron and manganese) into unavailable forms. The other is that Mundulla Yellows is caused by an irreversible and transmissible biotic pathogen. A simple test of the lime chlorosis theory is to relieve the nutrient deficiency, but nutrients added to the soil would also become unavailable to plants. We overcame this problem by inserting nutrients directly into the trees using systemic

Open session (1)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Sugarloaf Room
Oral presentation
Schultz N [1] , **Good M** [1]
[1] Federation University Australia, Ballarat VIC, Australia
Greening trees: nutrient implants reverse symptoms of Mundulla Yellows in South Australia

nutrient implants. We hypothesized that nutrient injections of iron and manganese would increase chlorophyll synthesis and result in leaves becoming greener. We treated affected trees across ten sites, and after 14 weeks there were significant increases in leaf greenness and crown health, compared to controls, when trees received either iron or iron + manganese implants. This experiment adds further weight the lime chlorosis hypothesis. Nutrient implants are unlikely to be a viable management strategy due to their cost and short-term benefits. Revegetation or natural passive regeneration of trees away from affected roadsides will likely be needed to replace inevitable tree loss from these valuable corridors.

Ascelin Gordon

Biography

Ascelin is a research fellow at the Interdisciplinary Conservation Science Research Group at RMIT University. His interests are in decision-making for allocating conservation resources and modelling conservation policies.

EcoTAS abstract

The decline of biodiversity globally has resulted in many governments, banks and corporations developing policies designed to achieve “no net loss” of biodiversity in the face of development, often utilizing offsets. Evaluating the outcomes of such policies poses significant challenges. This is due to the different time scales involved in generating biodiversity losses and gains, along with a lack of resources to collect evaluation data at appropriate

SYMPOSIUM: Putting ecology to work at the land development frontier

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Sugarloaf Room

Oral presentation

Gordon A [1] , Bekessy S [1] , Peterson I [1]

[1] Rmit University, Melbourne VIC, Australia

The challenge of no net loss: a framework for evaluating biodiversity offset policies

scales. In these cases, the use of ex-ante evaluation—designed to predict the future outcomes of a policy—is the most viable evaluation option, necessitating the use of modelling and simulation approaches. Here we develop a formal approach for evaluating no net loss policies, focusing on the use of biodiversity offsetting. We provide ex-ante evaluations based on simulations to illustrate the following key issues: (i) the importance of defining appropriate counterfactuals for determining the development impact and the additionality of the offset, and the consequences of inappropriate choices of counterfactuals; (iii) the fact there are three scales at which offsetting activities can be evaluated (site, program and landscape), and how the this choice of scale affects the evaluation of policy outcomes; (iii) the implications of different types of offset activities (such as delivering restoration gains or generating avoided losses) for delivering no net loss. We discuss these issues in the context of offset policies in Australia, and the key challenges they imply of achieving no net loss of biodiversity into the future.

Emma Gorrod

Biography

Emma Gorrod is a Principal Scientist in the NSW Office of Environment and Heritage. She is a community ecologist whose research aims to assist decision making for conservation outcomes.

EcoTAS abstract

Forest Ecology (2)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation
Gorrod E [1]
[1] Office of Environment and Heritage, Dangar NSW, Australia

High stem density River Red Gum (Eucalyptus camaldulensis) forest has become more widespread on the Murray River over the last 150 years, primarily as a result of commercial logging and river regulation. High stem density stands are characterised by heavily right-skewed tree size class distributions and reduced structural diversity. On gazettal of Murray Valley National Park in 2010, the NSW Office of Environment and Heritage was concerned about widespread paucity of hollow bearing trees. A process model was used to document knowledge about high stem density River Red Gum forest characteristics and key driving processes. The model proposed that self-thinning of high stem density stands was delayed by intra-stand competition for water and other resources. Consequences of continued competition may include hollow bearing trees are slow to develop in the medium-long term. We surveyed stem density, size class distributions and hollow bearing trees in 66 sites stratified across a range of stem densities and a across proxy for flooding frequency (Site Quality). Results confirmed a paucity of hollow bearing trees across the landscape. There was an inverse relationship between stem density and number of live hollow bearing trees, and fewer live hollow bearing trees occurred in drier sites. Interestingly, hollow bearing trees in drier sites tended to have more hollows per tree. These results will be used to inform decisions about managing high stem density stands of River Red Gum forest in Murray Valley National Park for conservation outcomes into the future.

Trees and hollows in River Red Gum forests

Chris Green

Biography

Dr Chris Green has worked for the Department of Conservation for 30 years after gaining his PhD in entomology through a study of tortricid leafroller pests. His current role is as a technical advisor, threats, involving advice into pest eradication programmes within New Zealand and beyond. Chris has led a 16 year programme to successfully eradicate Argentine ants from Tiritiri Matangi Island, and been an advisor to Argentine ant eradication programmes on Santa Cruz Island, California, and Norfolk Island. He has also designed and implemented island pest surveillance programmes to identify new pest incursions. Chris has considerable experience as a member of many Technical Advisory Groups set up to guide eradication of new to New Zealand pests including successful campaigns against Painted Apple Moth, Red Imported Fire Ant, Fall Webworm, Asian Gypsy Moth and most recently Large White Butterfly. Chris has demonstrated the positive outcome of rodent eradications on islands through measurement of the ground invertebrate fauna. As part of island restoration programmes Chris has restored threatened invertebrate species to islands following rodent eradication. This includes the successful 12 year programme to re-establish two new populations of the Little Barrier Island Giant Weta on two islands within its previous range.

EcoTAS abstract

New Zealand is a world leader in island pest eradications and subsequent transfer of fauna species to restore island ecosystems. These programmes have been important contributions to the recovery of threatened endemic species. The eradication of Argentine ant (Linepthema

KEYNOTE PRESENTATION: Chris Green

Thursday, November 30, 2017

9:45 AM - 10:30 AM

The Convention Centre

Keynote

Green C [1]

[1] Department of Conservation, Auckland, New Zealand

2016 NZ Ecology in Action Award Presentation: Pest eradication and returning lost species leads to successful island restoration

humile) and reintroduction of wetapunga, a giant weta (Deinacrida heteracantha) have contributed to the ongoing restoration of Tiritiri Matangi Island in the Hauraki Gulf, Auckland, New Zealand. Argentine ant was first discovered in March 2000 and delimiting surveys revealed a 10ha infestation, extended to 11ha in 2009 after a second incursion. An eradication programme commenced in February 2001 with paste baits (a.i. 0.01% fipronil) spread manually in a 2 x 3 metre grid over the entire area. The second year employed a 1 x 3 meter spacing. The same toxic bait was used throughout the programme to kill residual colonies and a non-toxic version used to intensively monitor progress. Eradication from the island was declared in 2016 after absence for 3 consecutive years. Wetapunga were previously distributed throughout Northland and Auckland regions including islands in the Hauraki Gulf. Habitat loss and exotic predators resulted in a decline in distribution to just Te Hauturu-o-Toi / Little Barrier Island. To secure the species a recovery programme aimed to set up additional island populations. Small numbers were collected to breed and provide progeny for release onto Tiritiri Matangi. Releases in 2011, 2014 and 2015 to 3 separate release sites have been monitored visually and with tracking tunnels to verify establishment.

Aaron Greenville

Biography

Aaron Greenville is a Research Associate with the Desert Ecology Research Group at the University of Sydney. His research interests are desert ecology, population biology and trophic ecology

SYMPOSIUM: Enabling Ecosystem Surveillance Monitoring across Australia – putting ecology to work

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

EcoTAS abstract

An unprecedented rate of global environmental change is predicted for the next century. How ecosystems around the globe will respond to this change is highly uncertain. Therefore, it is critical to understand the potential ecosystem drivers and mechanisms of change in order to develop more reliable predictions about the emerging biodiversity crisis. Here, we first compare climatic variables recorded at five ecosystems monitored by the Australia's Long Term Ecological Research Network. Then, using our unique long-term datasets (total 117 survey years) as a series of case studies, we test the following two hypotheses: 1) there will have been an increase in extreme weather events for each plot network over the last decade, as compared to prior survey years, and 2) trends in biodiversity will be associated with environmental drivers, such as rainfall, temperature, snow depth or wildfire. In line with hypothesis 1), there was an increase in extreme climate events within the last decade for each plot network. This occurred at all long-term study sites for temperature variables, but only at some sites for rainfall. For hypothesis 2), we found that climate, wildfire, or both were important correlates for trends in biodiversity for each ecosystem. However, the influence of climate or fire was context-specific suggesting that, although the climate for each biome has changed over the last decade, the influence of climate change on species within each ecosystem will be different. Our results highlight the need to establish and resource long-term monitoring programs across representative ecosystem types.

Oral presentation

Greenville A [1,2] , Burns E [2,3] , Dickman C [1,2] , Keith D [2,4,5] , Lindenmayera D [2,3] , Morgan J [2,6] , Heinze D [2,6] , Mansergh I [2,6] , Gillespie G [2,7] , Einoder L [2,7] , Fisher A [2,7] , Russell-Smith J [2,8] , Metcalfe D [2,9] , Green P [2,10] , Hoffmann A [2,11] , Wardle G [1,2]

[1] University of Sydney, Sydney NSW, Australia

[2] Long Term Ecological Research Network, Terrestrial Ecosystem Research Network, Australia

[3] Fenner School of Environment and Society, The Australian National University, Canberra Australian Capital Territory, Australian

[4] Centre for Ecosystem Science, School of Biological, Earth and Environmental Sciences, University of New South Wales, Sydney New South Wales, Australia

[5] NSW Office of Environment and Heritage, Hurstville New South Wales, Australia

[6] Research Centre for Applied Alpine Ecology, Department of Ecology, Environment and Evolution, La Trobe University, Melbourne Victoria, Australia

[7] Department of Land Resource Management, Darwin Northern

Territory, Australia
[8] Darwin Centre for Bushfire Research, Charles Darwin University, Darwin Northern Territory, Australia
[9] CSIRO Ecosystem Sciences, Tropical Forest Research Centre, Atherton Queensland, Australia
[10] Department of Ecology, Environment and Evolution, La Trobe University, Melbourne Victoria, Australia
[11] School of BioSciences, Bio21 Institute, The University of Melbourne, Melbourne Victoria, Australia

Biodiversity responds differently to increased extreme environments in grassland, savanna and forest biomes.

Emily Gregg

Biography

Emily is a PhD student in RMIT's Interdisciplinary Conservation Science Research Group and the NESP Threatened Species Recovery Hub. She is currently working on improving messaging for threatened species conservation, with a focus on garnering support for non-charismatic species.

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Wattagan Room
Speed Talk PLUS Poster

EcoTAS abstract

Five-Goer Challenge Title: What is stopping people from saving animals?

Saving animals is important for both the world and us, and we need normal people to understand this and play their part for everything to work out. But first we need to understand what exactly is stopping people from doing things to help save animals. I looked at possible problems and suggest that they fit into three types: how people look at the world, being far away from the problem, and whether there is a clear thing to do. I believe that using the right words and ideas in our writing can help with all three types of problems. Understanding what is stopping people from helping is important for our work and should help us make better calls about how to write and speak to people about saving animals.

Gregg E [1] , Garrard G [1] , Bekassy S [1]
[1] Interdisciplinary Conservation Science Group, School of Global, Urban and Social Studies, RMIT University, Melbourne VIC, Australia

What are the barriers to community buy-in of threatened species conservation in Australia?

Rebekah Grieger

Biography

Rebekah recently completed her Bachelor of science in ecology and conservation biology and is currently a PhD candidate at Griffith University. She is currently studying the resilience of coastal freshwater wetland vegetation to climate change along Australia's east coast.

EcoTAS abstract

Coastal Freshwater wetlands are highly vulnerable to climate change. Investigating the resilience of wetland vegetation to projected changes, can assist in predicting potential impacts on these ecosystems. Using the Boondall Wetlands in south-east Queensland as a case study, I

Conservation Biology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Cypress #2
Oral presentation

Grieger R [1] , Capon S [1,2] , Hadwen W [1,2]
[1] Griffith University, Nathan QLD, Australia
[2] Australian Rivers Institute, Nathan QLD, Australia

Resilience of Coastal Freshwater Wetland vegetation in the face of rising sea levels.

investigated responses of understorey vegetation and key canopy species categorising four major habitat types (Sporobolus marsh, Casuarina woodland, Melaleuca forest and Eucalypt forest) to salinity and flooding. The contribution of the soil seed bank to vegetation dynamics and the potential effects of rising sea levels and altered hydrological regimes in this system were examined via a germination experiment. Furthermore, the influence of salinity and flooding on major canopy species was investigated through an experiment testing the responses of seedlings to contrasting salinity and water treatments. Species richness of plant communities establishing from soil seedbanks did not differ between extant habitat types. However, the composition of assemblages establishing from soil seedbanks of the Sporobolus and Casuarina habitats differed from the other habitats. Emergent species richness was significantly greater in the Eucalyptus habitat and also in the fresh-waterlogged treatment. The composition of emergent species did not differ between habitats or treatments, suggesting that extant vegetation is unlikely to be reliant on the soil seedbank in this system. Seedlings subjected to salinity and flooding treatments reacted strongly to salinity with decreased health recorded overall. The results suggest rising sea levels may lead to habitat shifts within coastal wetland landscapes with a greater prevalence of Sporoblous marshes and decreased extents of Eucalyptus and Melaleuca forests.

Samantha Grover

Biography

SYMPOSIUM: Changing Australia: emerging trends, trade-offs and

Dr Samantha Grover is a soil scientist with a background in Chemistry and Political Science. Transdiciplinary research projects around peatland restoration in Australia, Indonesia and Tibet enable Grover to collaborate widely to find solutions to interlinked human and environmental problems.

EcoTAS abstract

Transdisciplinary research is most successful when focused around solving a common problem. Landscape transformation across rural Australia is the problem of a ‘system out of balance’. Economics and agriculture have dominated the modus operandi since Europeans arrived. Traditional knowledge around landscape management has been largely ignored. This approach has brought economic wealth to the country, at the expense of the landscape and the Traditional Owners. The landscape costs include reduced biodiversity, extinctions, salinity, acidification, desertification, and air and water pollution. Disciplines including ecological economics, ecology, biology, and environmental science have projected that continuing “business as usual” will significantly reduce the landscape’s capacity to provide critical ecosystem services, such as food and carbon sequestration.

Solving the problem of a ‘system out of balance’ requires transdisciplinary perspectives. A holistic approach requires bringing together disciplinary expertise, indigenous knowledge and creativity at the one table, and learning new ways to work together. Social scientists and indigenous voices are essential to solving the problem. In this paper, we draw on key concepts of integration science to address the problems, focusing on the development and communication of narratives, developing partnerships, and building consensus amongst all the stakeholders. These are essential to move beyond provision of scientific synergies of landscape transformation in rural Australia

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Wattagan Room

Poster presentation

Grover S [1] , Hames F [2] , Kubiszewski I [3] , O'Connell D [4]

[1] La Trobe University, Melbourne VIC, Australia

[2] Arthur Rylah Institute for Environmental Research, Melbourne VIC, Australia

[3] The Australian National University, Canberra ACT, Australia

[4] CSIRO, Canberra ACT, Australia

Transdisciplinary research processes as applied to landscape transformation

information, and influence the way scientists speak to people’s core values and their hearts, and engage and in a genuine dialogue. This is one important, but little explored, component of creating different, more positive, outcomes in future decisions about landscapes management.

Joshua Grubb

Biography

Joshua is a PhD student with research interests in insect ecology, physiology and genetics. He is currently investigating the drivers behind species' recovery following forest fires, from four detritivorous taxa (Diplopoda, Amphipoda, Isopoda, Lepidoptera).

EcoTAS abstract

Fire is a crucial factor in many ecosystems worldwide, altering many ecosystem services. Especially important is the impact of fire on decomposition, as decomposition affects the fire regime by regulating fuel loads. In turn, fire consumes plant matter and kills decomposers, affecting future decomposition. Invertebrate detritivores are important decomposers, and are often sensitive to desiccation and high temperatures. Thus, post-fire changes to habitat and microclimate could limit detritivore recovery through physiological stress. To investigate this feedback between fire and detritivores, we tested three hypotheses eight years after a severe, largescale forest fire in Victoria, Australia: 1) fire alters microclimate; 2) detritivores from burnt forest are more tolerant of higher temperature and lower humidity than those from unburnt forest; and 3) microclimate interacts with physiological traits to influence detritivore recovery after fire. We measured temperature

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Grubb J [1] , Gibb H [1] , Murphy N [1] , Marchant R [2]

[1] La Trobe University, Melbourne VIC, Australia

[2] Museum Victoria, Melbourne VIC, Australia

In for the long game: Long-term fire impacts do not affect trait-mediated detritivore distributions

and humidity across burnt (n = 24) and unburnt (n = 6) forested sites. We also measured four traits across thirteen species (from Diplopoda, Isopoda and Amphipoda): wet weight, CTmax, and behavioural humidity and thermal preference. We found that microclimate and most species' traits did not differ between burnt forest and unburnt forest. However, microclimate and species traits interacted to affect detritivore distributions, largely independent of burn status. In addition, long-term habitat differences between burnt/unburnt forest were not associated with specific traits. This suggests that, although detritivore recovery might be limited in the short-term by microclimate and habitat, detritivores are robust to the long-term effects of high severity fire in this system.

Xiao-zhi Gu

EcoTAS abstract

A slow warming process has been observed in Taihu Lake with global warming since the 1970s, and a sharp rise in mean annual temperature has occurred since 1991. A significant increase in degree day accumulation could be caused by minor increases in water temperature, and this can affect the growth and reproduction of aquatic plants. In the present study, controlled experiments were employed to investigate temperature -related differential responses of water warming(from 24 to 32℃) on Nymphoides peltata's seed germination, vegetative growth, photosynthesis, and competitive potential with submerged plants. The results showed N. peltata's germination rate decreased significantly when the temperature was too high or too low, and reached a peak rate at 30℃（P<0.05）. The rates of

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Shi X [1] , **Gu X** [1] , Chen K [1]

[1] Nanjing Institute of Geography and Limnology, Chinese Academy of Science, Nanjing, China

Influence of slow warming process on expansion of Nymphoides peltata population in Taihu, China

shoot initiation in N. peltata stolons significantly increased (P <0.05) with the water warming in the range from 24℃ to 30℃, and these temperatures are favorable for plant morphogenesis and root biomass accumulation. N. peltata showed a larger accumulation of biomass and plant height under higher temperature conditions (30℃). By analysis of root morphology, a more developed root system was observed with warming conditions, but the growth of N. peltata was lower at 32℃. In the process of photosynthesis, the maximum photosynthetic rate (Amax), transpiration rate and stomatal conductance showed significant differences between different temperatures, and reached a peak at 30℃, decreasing above or below this temperature. The competition results between N. peltata and other co-existing submerged plants with water warming showed that N. peltata had an apparent competitive advantage due to its larger leaf area and higher growth rate in the process of community succession.

Guyo Gufu

Biography

Guyo is a year 2 PhD candidate at Macquarie University. He is interested in global change ecology. He is currently conducting experiments to compare responses of native and invasive exotic freshwater plant species to environmental and climate change.

EcoTAS abstract

Freshwater systems are considered particularly vulnerable to human impact, through changes to water regimes and

Invasion Ecology
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation
Gufu G [1] , Manea A [1] , Vorreiter L [2] , Leishman M [1]
[1] Macquarie University, NSW, Australia
[2] Sydney Water, Parramatta NSW, Australia

quality, exotic species and climate change. Using published and herbarium records, we conducted a descriptive analysis of the naturalised freshwater plant species in Australia. There are 56 naturalised freshwater plant species comprising 13 invasive and 14 declared weeds, introduced mainly through the aquarium trade. The greatest number of exotic species are in New South Wales (88%), Victoria (68%) and Queensland (66%). The dominant families are Plantaginaceae, Poaceae and Cyperaceae. We then conducted experiments to assess the comparative responses of native and exotic freshwater plant species to increased nutrients and elevated CO2. We investigated the growth responses of two invasive exotic (Egeria densa and Salvinia molesta) and one native (Vallisneria spiralis) species to additional low nitrogen (NO3-N) concentrations. Egeria densa and V. spiralis produced more biomass under higher nitrate concentrations as hypothesised but S. molesta biomass production was greatest at the mid-range nitrate concentrations (0.05 – 0.1 mg NO3-NL-1). In a second experiment, we compared growth responses of two native species (Azolla filliculoides and Vallisneria spiralis) and Salvinia molesta at ambient and elevated CO2 concentrations. Preliminary results suggest that biomass production of S. molesta was significantly higher under elevated CO2 while that of the native species was unaffected by elevated CO2. We conclude that exotic species are now an important component of Australia's freshwater systems and that human impact, through eutrophication and climate change, is likely to further facilitate exotic plant species in these ecosystems.

Global change impacts on freshwater systems

Lydia Guja

Biography

Lydia’s research focuses on seed conservation, biology, ecology and stress tolerance in Australian plants. Lydia is a research scientist at the Centre for Australian National Biodiversity Research, CSIRO, and manager of the National Seed Bank, Australian National Botanic Gardens, Canberra.

EcoTAS abstract

Fire maintains biodiversity in endangered south-east Australian grassy ecosystems. In contrast to other fire-prone landscapes, the seeds of grassy-ecosystem species are commonly considered non-dormant (i.e. germinate readily). However, results of published germination studies and anecdotal evidence from restoration practitioners suggest there may be many difficult-to-germinate species among the grassy-ecosystem flora. Little is known about whether germination of these seeds can be increased with fire cues such as smoke or heat, which often promote germination of Australian species. We conducted a meta-analysis of temperate south-east Australian grassy ecosystem literature (laboratory germination studies and studies of field recruitment) to determine 1) the incidence of seed dormancy among grassy ecosystem flora and 2) the germination responses of species to dormancy alleviation or germination promoting treatments, in particular fire cues. We found a high incidence of dormancy (2/3) among the 143 species studied. This is higher than expected for south-east Australia but commensurate with the global grassland flora. Overall, most treatments (including smoke and/or heat) did not increase germination of dormant seeds relative to controls. However, we found both positive and negative effects of fire cues on germination and these effects differed among life forms (C_3 graminoids, C_4

Restoration Ecology (2)

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Bimbadeen Room

Oral presentation

Guja L [1,2] , Nimmo D [3] , Hodges J [2,3] , Vening G [2,3] , Price J [3]

[1] Centre for Australian National Biodiversity Research, CSIRO, Canberra ACT, Australia

[2] National Seed Bank, Australian National Botanic Gardens, Canberra ACT, Australia

[3] Institute for Land, Water and Society, Charles Sturt University, Albury NSW, Australia

Seed dormancy is unexpectedly common among grassy ecosystem flora: a meta-analysis

graminoids, legumes and forbs). These results suggest that restoration programs could improve propagation by alleviating dormancy to increase germination and by considering the use of fire cues carefully. Our ecological research is valuable for understanding regeneration dynamics in some of Australia's most endangered plant communities, and has practical application in restoration.

Joanna Haddock

Biography

Joanna Haddock is a PhD candidate in the Integrative and Urban Ecology at The University of Sydney. She focuses on the impacts of artificial light on nocturnal fauna and trophic interactions, and is interested in how evidence-driven planning can improve outcomes for both urban nature and human residents.

SYMPOSIUM: Integrating ecological knowledge and applications across the aquatic-terrestrial divide

Convene a Symposium

Haddock J [1] , **Hanford J** [1] , **Bugnot A** [2] , **Dafforn K** [2] , Hahs A [3] , Lowe E [4]

[1] The University Of Sydney, Camperdown NSW, Australia

[2] The University of New South Wales, Kensington NSW, Australia

[3] The University of Melbourne, Melbourne VIC, Australia

[4] The University of Auckland, Auckland NSW, Australia

Exploring the nexus of marine, freshwater and terrestrial systems in urban landscapes

Amy Hahs

Biography

Amy’s research interests include spatio-temporal dynamics of urbanisation, understanding their impact on the ecology of organisms and ecosystem processes, and applying this knowledge to create resilient cities and towns.

EcoTAS abstract

Urban ecology research has made great progress over the past twenty years, and our understanding of the impacts of urban environments on marine, terrestrial and freshwater systems has expanded greatly. However, the research conducted within each of those systems rarely directly examines the interactions with other systems, and this represents a missed opportunity for shared learning and more integrated decision-making.

One of the fundamental areas that is central to the research conducted in each of these systems relates to the frameworks used to conceptualise disturbance and other urban impacts. This presentation examines the similarities and differences in how these impacts are conceptualized in the three systems, and proposes some potential avenues through which these frameworks can be used to better integrate urban ecology research across the three realms.

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Speed Talk PLUS Poster
Hahs A [1,2] , Bugnot A [3] , Walsh C [2]

[1] Urban Ecology In Action, Ballarat VIC, Australia
[2] The University of Melbourne, Melbourne VIC, Australia
[3] The University of New South Wales, Sydney NSW, Australia
Conceptualizing urban impacts across the terrestrial, freshwater and marine realms

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Robin Hale

Biography

Rob Hale is a Research Fellow in the School of BioSciences at the University of Melbourne. His main

Restoration Ecology (2)
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Bimbadeen Room
Oral presentation

current research focus is on exploring the links between behaviorual ecology and habitat restoration/management.

EcoTAS abstract

Ecological restoration is an essential activity to arrest the risks that habitat loss and transformation pose for animals. Despite massive investment in time and resources worldwide, restoration frequently fails to provide intended benefits for animals. Restoration is often based on human assumptions of what constitutes suitable habitat for animals, usually in terms of structural components such as vegetation type. What happens though when anthropogenic notions of habitat poorly reflect how animals perceive and respond to the environment? Can these mismatches compromise restoration success?

We explore how restoration can fail when animals respond in unexpected ways to changes in habitat conditions. One possibility is that habitats in restored sites improve but animals fail to detect these changes and thus fail to colonise restored sites. Alternatively, restoration may inadvertently create ‘ecological traps’ - habitats that are preferred by animals but where their fitness is reduced. Using a series of case studies, we show how ecological and perceptual traps can arise and compromise restoration efforts. We highlight when traps are most likely to arise during restoration, and when animals will be most affected.

Improving our understanding of how animals perceive and respond to habitats is important to better guide future restoration efforts. We conclude by discussing ways to maximise the likelihood that animals respond adaptively to habitat restoration efforts.

Hale R [1] , Swearer S [1]
[1] University Of Melbourne, Parkville VIC, Australia

Mitigating maladaptive habitat selection to improve ecological restoration

Casey Hall

Biography

Casey Hall is a postdoctoral researcher at Western Sydney University working on the role of silicon in priming plant defence against insect herbivores under elevated CO2 with Dr Scott Johnson.

EcoTAS abstract

The genus Flindersia (Rutaceae) comprises 17 species of mostly endemic rainforest trees, however four species have evolved to grow in semi-arid and arid environments. Previous work has shown that this genus has a diversity of alkaloid compounds with bioactive properties. Ecological theories suggest that plant chemical diversity is increased in rainforest species due to the high abundance of species interactions, promoting trait diversification to exploit different niches. However, closely related taxa are expected to contain similar secondary metabolites due to genetic control of compound biosynthesis. The wide climatic distribution (rainforest to arid), existing phylogenetic data and high alkaloid diversity in Flindersia provide a unique opportunity to test whether climate or phylogenetic distance is driving alkaloid diversity within the genus. Contrary to expectations we found that alkaloid chemical diversity in Flindersia was highly correlated with increasing climatic aridity, and that rainforest endemic species had significantly lower alkaloid diversity. We also found no relationship between Flindersia phylogenetic distance and alkaloid diversity. At the species level alkaloid diversity may be driven by environmental rather than genetic factors. The results suggest that the adaption of Flindersia species from rainforest to arid habitats has

Open session (4)

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Oral presentation

Robertson L [1,4] , **Hall C** [2] , Forster P [3] , Carroll A [1,4]

[1] Environmental Futures Research Institute, Griffith University, Gold Coast QLD, Australia

[2] Hawkesbury Institute for the Environment, Western Sydney University, Richmond NSW, Australia

[3] Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts, Brisbane Botanic Gardens, Toowong QLD, Australia

[4] Griffith Institute for Drug Discovery, Griffith University, Brisbane QLD, Australia

Alkaloid diversity increases with aridity in a genus of rainforest trees

promoted the evolution of unique alkaloid diversity.

Mark Hall

Biography

Mark Hall is a PhD candidate at La Trobe University in Melbourne. His PhD investigates the role of remnant vegetation within agricultural landscapes—often occurring along linear roadsides and streams or as scattered paddock trees—for biodiversity conservation.

EcoTAS abstract

Vast changes in land-use globally mean that the future for nature conservation in many regions depends on the capacity of species to persist among natural habitats in farming landscapes. Here, we used a landscape-level natural experiment to investigate bird community responses to the presence, or loss, of three types of landscape element typical of productive farmland: streamside tree cover, roadside tree cover, and scattered paddock trees. We selected 44 landscapes (each 1 km diameter), stratified to represent four combinations of these landscape elements: a) landscapes with all three wooded elements present (n=11), b) landscapes lacking riparian trees (n=11), c) lacking roadside trees (n=11), and d) lacking scattered trees (n=11). We systematically surveyed birds at multiple points across each landscape to calculate the impact of the loss of each type of landscape element on alpha, beta and gamma diversity. Gamma (landscape) diversity was reduced by the loss of any type of wooded vegetation, driven primarily through a reduction in alpha

Landscape Ecology (2)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #2
Speed Talk PLUS Poster
Hall M [1] , Nimmo D [2] , Bennett A [1,3]

[1] La Trobe University, Bundoora VIC, Australia
[2] Charles Sturt University, Albury NSW, Australia
[3] Arthur Rhylah Institute, Heidelberg VIC, Australia
Landscape diversity of birds is enhanced by retaining key natural components in rural environments

(site) diversity. Loss of streamside tree cover had the greatest impact, reducing gamma diversity by one-third for all landbirds and by half for woodland-dependent birds, compared with landscapes that retain all three elements. Breeding activity was halved in landscapes lacking streamside vegetation. With intensification of farming practices, these elements are under threat in many rural environments. Their loss will reduce an avifauna already in decline, potentially leading to homogenisation of communities across regions. The retention of key elements, such as streamside vegetation, is feasible and practical, with multiple benefits for landholders.

Rowena Hamer

EcoTAS abstract

Planning habitat restoration in agricultural areas often becomes the art of the possible as land access is limited by farming priorities, meaning that the most productive land is usually off limits. In this context, the biodiversity outcomes of decisions about where and what to plant can be less obvious and require a deep understanding of the ecology and habitat requirements of the focal species. Unfortunately, our perception of suitable habitat may not correspond to that of the species which we aim to conserve. Our work on mammalian carnivores (spotted-tailed quoll, feral cat, Tasmanian devil and eastern quoll) within the Tasmanian Midlands takes an animal centric approach to address this problem, using both region-wide camera surveys and fine-scale GPS telemetry. We demonstrate that even where quite a lot is known about the ecology of a species, the relative importance of habitat

2016 TNC Applied Conservation Award Winner Presentation, Animal-centric habitat restoration in Tasmania

Wednesday, November 29, 2017

9:25 AM - 9:50 AM

The Convention Centre

Oral presentation

Hamer R [1]

[1] The University of Tasmania, Hobart TAS, Australia

Animal-centric habitat restoration in Tasmania

factors such as topography, climate and vegetation cover is not always easy to predict. In addition, ‘unmappable’ factors such as disease and competitive interactions may disrupt landscape-scale ecological processes and prevent persistence even where seemingly suitable habitat is available. Our results will be implemented by our partner organisation Greening Australia and collaborators Bush Heritage, Tasmanian Land Conservancy and DPIPWE, however these findings have significance beyond the local landscape and suggest that taking an animal’s point of view can increase the effectiveness of habitat restoration.

Jayne Hanford

Biography

Jayne Hanford is a PhD student interested in how urban wetlands can be better managed to maximise their biodiversity and social benefits, and how this can be balanced against potential mosquito risks associated with these habitats.

EcoTAS abstract

Constructed wetlands are popular tools for managing urban stormwater, and can also enhance biodiversity, provide refuge for threatened flora and fauna, and opportunities for community education and interaction with nature. However, there are concerns that constructed urban wetlands may increase mosquito populations and mosquito-related public health risks. Understanding the ecological interactions between potentially problematic mosquito species and their constructed environments is critical to mitigate potential risks and balance the multiple goals and values of urban wetlands.

SYMPOSIUM: Insect Ecology
Research Chapter - insects punching above their weight (Part 2)

Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Speed Talk

Hanford J [1,2] , Hochuli D [1] , Webb C [2,3]

[1] The University of Sydney, Sydney NSW, Australia
[2] Marie Bashir Institute for Infectious Diseases and Biosecurity, Sydney NSW, Australia
[3] Medical Entomology, NSW Health Pathology, Westmead NSW, Australia

Understanding interactions between mosquitoes and invasive fish in urban

wetlands

To complement a field investigation of the effect of intensive wetland management on aquatic biodiversity and mosquito risks, we used laboratory experiments to examine how oviposition behaviour of Culex annulirostris, the most important pest mosquito species associated with freshwater habitats in Australia, is influenced by the presence of Gambusia holbrooki, a widespread invasive fish.

We collected water from urban wetlands that are intensively managed to reduce G. holbrooki populations, and adjacent unmanaged wetlands, and conducted laboratory binary choice experiments to examine oviposition behaviour of Cx. annulirostris. We found that Cx. annulirostris preferred to oviposit in water from wetlands free of G. holbrooki compared to water from an adjacent and structurally similar wetland with abundant G. holbrooki.

Understanding how invasive species affect the behaviour and spatial distribution of pest species such as Cx. annulirostris can contribute to future wetland design and management to maximise benefits of urban wetlands and minimise potential public health risks.

Nicole Hansen

Biography

Nicole Hansen is currently undertaking her PhD at the Australian National University. Her research interests have matrix ecology and conservation as a central theme, with a

SYMPOSIUM: Effectiveness monitoring (Part 1)
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Sugarloaf Room

focus on how patch-dependent species, particularly herpetofauna, respond to habitat fragmentation in agricultural landscapes.

EcoTAS abstract

Animals move through the matrix between vegetation remnants in agricultural landscapes for shelter, food resources, breeding opportunities and to avoid being predated. Mortality driving movement within the matrix may be an important process affecting populations. However, only limited empirical research has investigated the influence of matrix mortality within agricultural landscapes, particularly on reptiles. To address this knowledge gap, we used wildlife cameras to quantify rates of predation of plasticine models of a patch-dependent gecko species, Gehyra versicolor. We placed models within remnant patches, at the patch to paddock ecotone, and in four contrasting farmland types: a crop paddock, pasture paddock, restoration plantings and areas where woody mulch had been applied. We deployed models before and after crop harvest to examine temporal changes in predation rates. Our results suggest reptiles are under substantial predation pressure in farming landscapes from birds, mammals, reptiles and invertebrates. We found a reduced risk of overall predation within the matrix, and the highest risk within edge habitat. Prior to crop harvesting overall predation rates were highest at the edges of the woody debris and planting farmland types, but predation rates between predator groups varied spatially and temporally. Our findings suggest edge habitats may be reducing the effectiveness of restoration areas like plantings and threatening remaining reptile populations within the remnant patch due to high predation rates. In areas where dispersal is important management needs to consider the detrimental effects of predation on edge

Oral presentation

Hansen N [1] , Sato C [1] , Michael D [1] , Lindenmayer D [1] , Driscoll D [2]

[1] Australian National University, Evatt ACT, Australia

[2] Deakin University, Melbourne VIC, Australia

Testing predation risk on reptiles using replica models in an agricultural landscape

habitats in all farmland types (e.g. providing shelter, pest control, reducing edge size).

August Hao

Biography

Tianxiao (August) Hao is a Master of Science student at the University of Melbourne who is currently undertaking research in species distribution modelling. The author's interests include predictive performance of distribution models and development of robust modelling algorithms.

EcoTAS abstract

There are many algorithms for modelling the distribution of species, and the choice of model algorithm often has a significant impact on the predictive performance of model. Rather than choosing one algorithm to use, combining predictions from different algorithms into an ensemble has become a popular approach in species distribution modelling. However, there is limited unambiguous information on the performance of ensemble models relative to single algorithm models. Here we aim to fill this gap of knowledge by comparing a variety of ensemble and single algorithm species distribution models using a large presence-absence data set of tree species in eastern New South Wales, Australia. We test our models using different cross validation approaches, exploring how model performance changes with the testing setup. We also investigated whether the relative performance of single vs. ensemble models depends on how the single models are fitted: with default settings in popular software packages, or

Ecological Modelling (Plants)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Sugarloaf Room

Speed Talk

Hao T [1] , Lahoz-Monfort J [1] , Guillera-Arroita G [1] , Elith J [1]

[1] The University Of Melbourne, Parkville Vic, Australia

When do ensemble species distribution models perform well relative to single algorithm models?

tuned towards optimal performance. We will present results that clarify whether, or in what circumstances, ensembles outperform single model methods. Through our results we seek to provide recommendations on the optimal usage of ensemble techniques in species distribution models.

Md Mohasinul Haque

Biography

I am a doctoral candidate in the Dept. of Biological Sciences Macquarie University NSW Australia. My current research project is on assessing the quality of the digitised plant specimens of Australia.

EcoTAS abstract

Online access to specimens records held within natural history collections has opened a window to investigating biodiversity patterns across local to global scales. However, the value of these records for research depends on their spatial, temporal, and taxonomic quality. In this study, we assessed temporal patterns in records from AustralasianVirtual Herbarium (AVH), the main database for describing Australia's flora. We asked: 1) are there temporal trends in the spatial, temporal, and/or taxonomic quality of records?; 2) how temporally consistent has the pattern of collecting been across Australia?; and 3) which areas of Australia have the most reliable records (i.e. high inventory completeness and temporal sampling consistency)? To answer these questions, we undertook a multi-step filtering procedure, then estimated a) temporal consistency and b) inventory completeness, for sampling units (SUs) of 50 km × 50 km. Of > 4,500,000 records, we

Socio-ecological Interactions / Open session

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Wattagan Room

Oral presentation

Haque M [1] , Nipperess D [1] , Beaumont L [1] , Baumgartner J [1] , Gallagher R [1]

[1] Dept. of Biological Sciences Macquarie University Nsw Australia, Sydney NSW, Australia

A journey through time: temporal patterns in the collection of plant records across Australia

found that 25% had missing attribute information. There was also a strong temporal bias to collecting, with 80% of records sampled in the three decades spanning 1970-1999. South-eastern Australia, the Wet Tropics in north-east Queensland, and parts of south-western Western Australia are areas which have been the most consistently sampled over time, whereas much of central Australia has had low temporal consistency. Of the SUs, 18% have relatively complete inventories with high temporal consistency. By identifying areas with low reliability, we can limit erroneous inferences about distribution patterns and identify priority areas for future sampling effort.

Sue Hartley

Biography

Sue Hartley is Professor of Ecology at the University of York, UK and Director of the York Environmental Sustainability Institute. She is a community ecologist recognised internationally for her work on the interactions between organisms, particularly plants and their herbivores. She has studied plant-herbivore interactions from the sub-arctic to the tropical rainforest, published over 130 papers and trained over 30 PhD students. Currently, her research is focussed on using natural plant defences, particularly silicon, as a sustainable way to protect crops against pests.

Sue studied Biochemistry at the University of Oxford and has a PhD in Ecology from the University of York. She joined the University of Sussex in 2001, where she began her research on the use of silicon to increase crop

KEYNOTE PRESENTATION:
Professor Sue Hartley
Tuesday, November 28, 2017
9:45 AM - 10:30 AM
The Convention Centre
Keynote
Hartley S [1]
[1] University of York, United Kingdom
Pests, pathogens and unpredictable rainfall: using ecology to address global challenges in food security

resilience to drought, disease and insect pests. In 2010 she moved back to the University of York to become Director of the York Environmental Sustainability Institute, an innovative research partnership bringing together leading researchers from a broad range of disciplines to tackle key global challenges, such as climate change, biodiversity loss and threats to food security.

Sue is a member of the BBSRC's Strategic Advisory Panel on Agriculture and Food Security and Chair of their Sustainable Agriculture Research Innovation Club. In 2009 she delivered the Royal Institution Christmas Lectures, only the 4th woman to do since they were started in 1825. She is a fellow of the Royal Entomological Society, a trustee of the Royal Botanic Gardens, Kew, and President of the British Ecological Society.

EcoTAS abstract

Globally around a quarter of crop yield is lost to pests and diseases, even with the use of modern methods of crop protection, whilst the production of sufficient food is also increasingly threatened by unpredictable and extreme weather. Given the projected increase in global demand for food and the impacts of a warmer climate on the spread and abundance of current and emerging pest species, we urgently need new sustainable ways to protect crops, ones which are not dependant on scarce resources to produce and which do not harm the beneficial organisms in agricultural ecosystems. We also need to make crops more resilient to drought as temperatures rise and weather patterns change. The ability of crops to defend against pests and survive drought has been reduced because we have selected varieties with high yield at the expense of

other beneficial traits, but it remains in wild ancestors, offering the possibility of restoring these capabilities to our crops in future.
This talk explores the inter-disciplinary approaches which may provide new sustainable methods of crop protection and resilience to climate change. It will focus on the benefits of plant silicon, which accumulates to high levels in most food and forage grasses and provides protection against herbivore and pathogens, as well as mitigating the impacts of abiotic stresses such as drought and salinity. The talk presents recent findings on the environmental, phenotypic and genotypic determinants of silicon levels in plants: climate, levels of herbivory, plant traits such as stomatal density, and plant gene expression are key drivers, whilst crop domestication has had a relatively small impact. These advances in our understanding of the mechanisms underpinning the uptake and deposition of silicon-based defences could drive new ways of maintaining crop yields in the face of current threats.

Angie Haslem

Biography

Angie Haslem is a research fellow in the Department of Ecology, Environment and Evolution at La Trobe University; currently most of her research is in the field of fire ecology.

EcoTAS abstract

Monitoring is a key component of environmental management. It allows managers to evaluate the success of their actions, and identify future improvements. Nonetheless, despite the widespread collection of

SYMPOSIUM: Effectiveness Monitoring (Part 2)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Sugarloaf Room
Oral presentation

monitoring data, not all programs are successful in informing management. We review the degree to which large-scale monitoring programs in Victoria have informed management (policy and/or practice), such as would indicate successful adaptive management. This work was motivated by efforts to improve fire monitoring in Victoria, as guided by the state government's Bushfire Monitoring, Evaluation and Reporting Framework. The aim of this review was to distil lessons from past programs to enhance the success of future efforts. Four statewide programs were assessed, collectively representing >$10 million investment. Nine key stages associated with the adaptive management cycle were identified, and the degree to which they were completed by programs was determined from published documents and consultation with people closely involved with each. Whilst results highlighted much scope for future improvement, all programs had contributed to refinements in monitoring over time. Key indicators of success and failure were identified; many related to the stages of question definition, program design, and data management/use. Importantly, these stages are underpinned by scientific methodologies, highlighting the value of fostering synergies between monitoring and research rather than viewing them as separate entities. Recommendations for future monitoring include: assign clear responsibility, and adequate funds, for all stages of program delivery (especially program coordination, scientific oversight, and stakeholder engagement), and ensure reporting directly informs policy/practice change.

Haslem A [1] , Leonard S [1] , Bennett A [1,2] , Clarke M [1]
[1] La Trobe University, Bundoora VIC, Australia
[2] Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water & Planning, Heidelberg VIC, Australia

Lessons from large-scale monitoring programs in Victoria: how can future monitoring be improved?

Cindy Hauser

Biography

Ecological Modelling (Plants)

Cindy Hauser is a Research Fellow at the University of Melbourne. Her research addresses how to make smart environmental management decisions in the face of uncertainty, particularly for survey design and adaptive management.

EcoTAS abstract

Ecological surveys underpin threatened species management, conservation planning and biosecurity responses. Advances in ecological survey methods - such as detection dogs, unmanned aerial vehicles, and eDNA sampling - have the potential to generate better data with less effort. However, their performance is uncertain, especially in the early stages of development and application. How can we capture the benefits of investing in high-performing emerging methods while managing the risk that some technologies may perform poorly or inconsistently? In this presentation I will propose a simplified optimal investment framework for integrating new survey technologies with existing surveillance programs.

Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Sugarloaf Room
Speed Talk
Hauser C [1] , Moore J [2]
[1] University Of Melbourne, Parkville VIC, Australia
[2] Monash University, Clayton VIC, Australia
Maximising the benefit of emerging technologies for ecological survey

Alison Haynes

Biography

Alison Haynes has a degree in conservation biology with Honours in conservation genetics. Her PhD investigates the drivers of urban biodiversity, in particular microhabitat and multi-stress tolerance. She has a background in publishing and loves science as a second career.

EcoTAS abstract

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Speed Talk
Haynes A [1] , Robinson S [1] , French K [1]
[1] University Of Wollongong, Wollongong NSW, Australia

Urbanisation brings habitat loss, fragmentation, changes in microclimate, hydrology and nutrient flow, and increases in pollution. The elements of biocrusts - moss, lichen, cyanobacteria and fungi - are not immune from these processes, yet have been little studied in towns and cities. Cities worldwide support a range of biocrusts on roofs, walls and pavements, as well as vegetated urban parks, gardens and street edges. As cities can be considered stressful environments, these microhabitats provide ideal test beds for plant stress studies. This study had three main aims: 1) To identify species with differing distributions along an urbanisation gradient for future hypotheses testing with experiments in colonisation and multi-stress tolerance; 2) To quantify microhabitat characteristics that best support moss and biocrust persistence and diversity; 3) To quantify changes in species diversity, community assemblage and cover on the gradient. Moss species diversity and biocrust cover was sampled along a natural to urban gradient in suburbs of Wollongong and Sydney, NSW. Several microhabitats were investigated: pavements and concrete, grass verges, asphalt and brick (walls and footpaths) and characterised for temperature, light, moisture and microtopography. Six species were selected for future experiments to test their response to interactions between desiccation, pollutants and high light. Both cover and species diversity decreased with urbanisation while communities became dominated by xeric rather than mesic species and by cosmopolitan species including Bryum argenteum. Knowledge gained can be used in conservation of bryophytes and to develop applications of biocrusts such as urban greening projects, stormwater management and green roofs.

Microhabitats in the concrete jungle: finding patterns of persistence

Richard Haynes

Biography

Dick Haynes is Professor of Soil and Environmental Science at the University of Queensland. His main area of research is in rehabilitation of mine spoils and his other main area of interest is in Si availability in soils.

EcoTAS abstract

The most important factor that controls Si concentrations in soil solution is the solubility of primary and secondary minerals present in the soil. Soil solution Si concentrations are strongly related to the stage of soil development and the content of weatherable silicate minerals. Moderately weathered temperate soils typically maintain very much higher solution Si concentrations than highly weathered tropical soils. Like other nutrient anions, silicate is specifically adsorbed to soil colloid (mainly Fe and Al hydrous oxide) surfaces. Silicic acid is highly mobile in soils and readily leached and adsorption acts as a retention mechanism. The availability of soil Si is complicated by the presence of a biogenic pool of amorphous silica ($SiO_2 \cdot nH_2O$). This is mainly of plant origin (phytogenic Si) but also contains small amounts of silica originating from protozoa, fungi, bacteria and diatoms. Plants and other organisms take up silicic acid from soil solution and this is then accumulated and precipitated as amorphous silica. In plants, much Si is accumulated in the intracellular layer under the cuticle as sheet-like solid particles known as phytoliths. This phytogenic amorphous silica is returned to the soil in plant litter. In mature natural forest and grassland systems, cycling of Si (uptake of Si by plants, its accumulation and then return in plant litter) is the main determinant of Si availability. Diminution of the biogenic Si

SYMPOSIUM: Functional roles of plant silicon: how plants get it and what they use it for

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Brokenback Room

Oral presentation

Haynes R [1]

[1] University Of Queensland, Brisbane QLD, Australia

An overview of silicon availability in soils

pool occurs in arable agricultural systems because of the removal of phytogenic Si in harvested crop and crop residues.

Al Healy

Presentation of 2017 Jill Landsberg Trust Fund Scholarship
Wednesday, November 29, 2017
9:50 AM - 9:55 AM
The Convention Centre
Oral presentation
Healy A

Presentation of 2017 Jill Landsberg Trust Fund Scholarship

Biography

Al Healy is a PhD student with the School of Biological Science, at the University of Queensland. He's exploring the influence of water availability on vegetation dynamics in semi-arid and arid zones.

EcoTAS abstract

Surface water availability in arid and semi-arid regions has changed with the introduction of artificial water points for pastoral development. These water points have increased the area accessible to grazing, with a decline in the extent of 'water remote' areas. Where species have evolved in an environment of low and/or unreliable water availability, this increased water availability can create a mismatch between grazing and predator pressures and the resilience of species to this pressure. Detailed mapping of the changes

SYMPOSIUM: Changing Australia: emerging trends, trade-offs and synergies of landscape transformation in rural Australia
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Healy A [1] , Tulloch A [1,2] , Fensham R [1]
[1] University Of Queensland, St Lucia Qld, Australia
[2] Desert Ecology Research Group, University of Sydney, Camperdown New South Wales, Australia

in water availability has not taken place in Australia, despite the potential impacts on biodiversity. Using western Queensland, Australia, as a case study, we developed a new method to map water availability that incorporates both permanent and non-permanent waters, with weighted influence based on both permanence and distance. This dataset permits analysis of the extent and intensity of changes in water remoteness since European settlement. Two example applications of the data show its potential for modelling and management. We investigate the relationship between water remoteness and broad vegetation group, to show that declines in water remoteness are not restricted to vegetation groups of high pastoral productivity. The dataset was also used to examine patterns in observations of the greater bilby (Macrotis lagotis), a medium-sized mammal that has declined across Australia. Remaining bilby populations in Queensland are located in relatively water remote areas of their formerly suitable habitat. The method used in this study can be applied elsewhere in semi-arid and arid lands which have seen changes in water availability.

Mapping changes in water availability: a case study of Western Queensland

Geoffrey Heard

Biography

Geoff is an applied ecologist with an addiction to herpetology. He's interested in where species live and why, and what that can tell us about their conservation. Geoff's research seeks insights into key demographic processes to guide management interventions.

EcoTAS abstract

SYMPOSIUM: Novel methods for identifying and managing refuges across scales and ecosystems

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Wattagan Room

Oral presentation

Chytridiomycosis has decimated amphibian biodiversity. Management options for the disease are currently limited, but habitat manipulation holds promise due to the thermal and physicochemical sensitivities of chytrid fungi. Here, we quantify the extent to which habitat management could reduce metapopulation extinction risk for an Australian frog susceptible to chytridiomycosis. Our modelling revealed that: (1) habitat management is most effective in climates where hosts are already less susceptible to the disease; (2) creating habitat, particularly habitat with refugial properties adverse to the pathogen, may be substantially more effective than manipulating existing habitat; and (3) increasing metapopulation size and connectivity through strategic habitat creation can greatly reduce extinction risk. Controlling chytridiomycosis is a top priority for conserving amphibians. Our study provides impetus for experiments across a range of species and environments to test the capacity of habitat management to mitigate the impacts of this pervasive disease.

Heard G [1] , Scroggie M [2] , Ramsey D [2] , Clemann N [2] , Hodgson J [3] , Thomas C [4]
[1] Charles Sturt University, Albury NSW, Australia
[2] Arthur Rylah Institute for Environmental Research, Heidelberg VIC, Australia
[3] University of Liverpool, Liverpool Merseyside, United Kingdom
[4] University of York, York Yorkshire, United Kingdom

Can habitat management mitigate disease impacts on threatened amphibians?

Zac Hemmings

Biography

I'm Zac Hemmings, a doctoral candidate in the Insect Ecology Laboratory at the University of New England. I'm currently studying the physiology, ecology, and behavior of dung beetles in relation to climate change.

EcoTAS abstract

Dung beetles inhabit a unique ecological niche and drive a number of important ecosystem services, playing a particularly vital role in agriculture. The implications of

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Speed Talk PLUS Poster

Hemmings Z [1]
[1] University Of New England, Insect Ecology Laboratory, Armidale NSW, Australia

climate change for dung beetles in Australia is unclear as little is known concerning their physiology, ecology, and behavioral responses to warming, particularly their potential to mitigate the deleterious effects via plasticity. This study assessed the fecundity, thermal tolerance, metabolism, and nesting behavior of a common dung beetle in eastern Australian pastures, Onthophagus binodis, and the plasticity of these traits under simulated climate change scenarios. Custom built temperature controlled chambers and microclimate data gathered from the field were used to simulate projected temperature increases. Onthophagus binodis gathered from the field were placed in the chambers and brood ball production, burial depth, and brood ball size were measured over several weeks. Thermolimit respirometry was used to assess the maximum thermal tolerance of the population and metabolic rate measured via volume of CO2 produced measured. Young from the first generation were reared to emergence and the study repeated. Preliminary results indicate that while O. binodis displays limited physiological plasticity climate change is unlikely to pose a threat in cooler regions such as Armidale, however increasing mean temperatures and extreme weather events will approach their thermal maximum of 46°C in some areas. With limited physiological plasticity they will therefore rely on behavioral means to mitigate the effects of climate change.

The effect of temperature on a provisioner of ecosystem services, the dung beetle Onthophagus binodis

Simon Heyes

Biography

Simon Heyes is a plant ecologist at La Trobe University with an interest in recruitment and demographic processes

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017

in the savannas of Western Victoria.

EcoTAS abstract

Rural tree decline in south-eastern Australia is a well-known phenomenon in agricultural landscapes dominated by eucalypts. But what of the non-eucalypt woodlands and savannas? Are similar processes also playing out in agricultural areas where banksias, she oaks and wattles dominate the overstorey? Surprisingly, despite widespread interest in the topic, we have almost no evidence to support or refute this idea. Silver Banksia (Banksia marginata) is a foundation species in savannas of the Victorian Volcanic Plains. They provide important food resources for a range of vertebrate and invertebrate pollinators, granivorous birds and specialist invertebrates. This savanna community is now highly fragmented and is believed to be suffering further decline with anecdotal reports of widespread recruitment bottlenecks, tree mortality and the absence of seed set. With a new drive by NRM agencies to protect and restore this community, there is a need to understand stand demography and recruitment processes to better aid on-ground management. We quantified whether there was widespread recruitment bottlenecks in fragmented stands. Size class distribution data showed that recruitment bottlenecks were not widespread. Rather, three stand dynamics were seen. We suggest that widespread decline has been exaggerated in this species though further work to understand recruitment processes in savanna is required to understand why some sites are declining.

11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Heyes S [1] , Hoebee S [1] , Sinclair S [2] , Morgan J [1]
[1] Department of Ecology, Evolution & Environment, La Trobe University, Ballarat VIC, Australia
[2] Arthur Rylah Institute for Environmental Research, Heidelberg VIC, Australia

Now you see it, now you don’t – or do you? Silver Banksia Demographic Study

Andree Hickey-elliott

Biography

I am a passionate ecologist, early in my career, which currently focuses in freshwater ecology at Kessels Ecology, a small ecological consulting firm. I also have enthusiasm for avian species management and recovery, and indigenous lowland forest systems.

EcoTAS abstract

Predator presence and abundance play a major role in the success of many ecological restoration projects. In New Zealand, where predators kill an estimated 70,000 birds/day, assessing predator presence and density is important for determining management options and can predict bird survival. Globally artificial nests are popular predator indicators, in New Zealand, tracking tunnels are used almost exclusively. A study of the findings of artificial nests compared to tracking tunnels took place in forest fragments in the central North Island from 2009 to 2012. The 16 forest fragments selected varied in size, topology, exclusion from stock, predator control methods, and vegetative intactness. The data collected was then analysed using Bayesian statistics modeling (winBUGS 1.4) to assess whether the results were statistically different, and if so, what the differences were. Tracking tunnels were able to show greater variability in predator presence/abundance between forest fragments, while artificial nests showed less variability in this respect, they showed higher variation in predation within forest fragments. While artificial nests are able to provide more information on a wider range of predators, their effectiveness is based on the predator's attraction to nests. Tracking tunnels provide a limited range of predator species detection, but are more indicative regardless of season. Tracking tunnels also require less effort, however,

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Getzlaff C [2] , Sievwright K [2] , **Hickey-Elliott A** [1,2] , Armstrong D [2]

[1] Kessels Ecology, Hamilton Waikato, New Zealand

[2] Massey University, Palmerston North Manawatu, New Zealand

Predator monitoring in New Zealand: tracking tunnels versus artificial nests.

the wider range of predators detected by artificial nests should not be overlooked. As it appears the presence of rats and possums are correlated, tracking tunnels may adequately cover the needs of predator presence and abundance in New Zealand.

Ofalia Ho

Biography

Ofalia Ho is an Environmental Science Honours student at The University of Queensland. She is interested in the interface between ecology, remote sensing and spatial analysis for ecosystem monitoring, to understand implications for conserving biodiversity under environmental and climate change.

EcoTAS abstract

Cloud-dependent montane forests are often associated with high biodiversity and endemism, occurring within narrow altitudinal ranges and reliant on cloud-related microclimates. As such, this ecosystem is particularly vulnerable to environmental and climatic changes. Whilst previous studies have demonstrated the importance of clouds in Australian subtropical montane forests, there remains a gap in knowledge regarding the frequency and extent of cloud immersion. To understand its possible influence on microclimate and species distribution, there is a need for baseline data on cloud climatology. This project aimed to test and develop an approach for measuring temporal and spatial patterns of cloud immersion, at subtropical montane forests in south-east Queensland and northern New South Wales from 2001-present. This will identify areas frequently immersed in cloud, and determine

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Ho O [1] , Soderholm J [2] , Shoo L [3] , Phinn S [1]

[1] Remote Sensing Research Centre, School of Earth and Environmental Sciences, The University Of Queensland, Brisbane QLD, Australia

[2] Climate Research Group, School of Earth and Environmental Sciences, The University of Queensland, Brisbane QLD, Australia

[3] Centre of Excellence for Environmental Decisions, School of Biological Sciences, The University of Queensland, Brisbane QLD, Australia

Mapping cloud immersion patterns in Australian subtropical montane forests

seasonal and long-term trends. Daily Moderate Resolution Imaging Spectroradiometer (MODIS) satellite cloud products were used to estimate cloud-base heights (CBH) to determine the contact of cloud with canopy. Critical assessment of previous approaches were examined, conducted in other montane forests around the world. Results identified a number of challenges specific to clouds in subtropical Australia, which are more variable spatially and in their physical and radiative transfer properties. A new algorithm and automated processing methodology was therefore developed for extracting MODIS CBH in this region. This research provides the first CBH product for mapping forest cloud immersion in Australia. The methodology and data produced may be used in future studies for environmental monitoring, and to explore the ecological implications of shifting cloud immersion patterns under climate change.

Dieter Hochuli

Biography

Dieter Hochuli is head of the integrative ecology research group at the University of Sydney. His research focuses on the ecology of terrestrial invertebrates and their interactions with the environment, identifying how human impacts affect ecosystem health.

EcoTAS abstract

Everyone wants to let others know that their work means something important. One of the ways that we can do this is by talking to normal people as well as each other. We often know stuff that will make the world a better place but

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Hochuli D [1]

[1] The University Of Sydney, The University Of Sydney Nsw, Australia

Escaping ecology's echo chamber: communicating an outside science to the outside world

people don't trust us enough to act on what we know. Sad! Why?

When we talk to normal people we often tell them what we know. But they do not know what how we find out stuff and what we do at work. We should explain how we do our work. It is not just about what we found out. There are lots of ways to do this.

I will talk about what I have learned when I have done things to help normal people learn about animals and green things. I have been funny, talked in drinking places, hung around with kids, gone to schools, been on the air waves and on TV. All these things can be hard to do but are also very important for us to do. And do well.

I have learned that we are good at at talking to our friends but need to try harder to talk with people who do not usually listen to us.

I will finish by showing how we can train students to speak to normal people better, how we can make our work interesting to normal people and, have our work taken seriously to make the world a better place.

Kathryn Hodgins

Biography

Kathryn Hodgins is a Lecturer at Monash University. She studies the genetics of adaptation. She obtained her PhD at the University of Toronto, before moving to UBC to study

SYMPOSIUM: Assisted migration under climate change
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Brokenback Room

the ecological genomics of invasion and climate adaptation in conifers.

EcoTAS abstract

Local adaptation is common in widespread conifer species and current reforestation policy reflects this through local seed sourcing and breeding programs. However, as the climate changes local tree populations may become mismatched to their local environments. Our goal was to identify the genes responsible for climatic adaptation in western Canada's two most economically important conifers, lodgepole pine (Pinus contorta) and interior spruce (Picea glauca, P. engelmannnii, and their hybrids). To do this we conducted a population genomics study of local adaptation for both these species across similar climatic gradients. Using a sequence capture approach that targeted the exome, we used environment allele associations, and phenotype allele associations to identify candidate regions of the genome important for temperature adaptation. Our comparative analysis of these regions between the two species revealed that adaptation to temperature has a polygenic signature of convergence at the genomic level. This is despite the fact that these species have been diverged for more than 140 million years. This suggests that adaptation to climate is somewhat genetically constrained, with key genes, particularly transcription factors, playing non-redundant roles. Our results will be important for designing reforestation policies that consider future climates, and for understanding the genetic capacity of natural populations to adapt to new climatic conditions.

Oral presentation

Hodgins K [1] , Yeaman S [2] , Lotterhos K [3] , Aitken S [4]

[1] Monash University, Clayton Vic, Australia

[2] University of Calgary, Calgary, Canada

[3] Northeastern, Nahant, USA

[4] UBC, Vancouver, Canada

The Genomic Basis of Climate Adaptation in Lodgepole Pine and Interior Spruce

Jessica Hodgson

Biography

Jess is in her final year of her PhD with Prof John A. Endler at Deakin University. Her research interests spans animal and plant behaviour and plant ecology, particularly the study of animal and plant interactions.

EcoTAS abstract

Shrubs in semi-arid ecosystems are important drivers of vegetation dynamics as they often provide rare resources such as water and nutrients by altering the microhabitat and microclimate underneath their canopies. In these climates, seeds often rely on animals to transport them to these rare and resource-rich microsites. Previous research has demonstrated that the great bowerbird (Ptilonorhynchus nuchalis) provides directed dispersal of Burdekin Plum (Pleiogynium timorense) fruits to their bower, the sexual display site, and that the males depend upon these fruits for mating success. The Burdekin Plum is a dry rainforest canopy tree that depends on more mesic conditions than are typically available in semi-arid savannah.
Male great bowerbirds build their bower, underneath shrubs in semi-arid savannah. The bower is a tunnel shaped stick structure surrounded by various organic materials. At the end of the breeding season, the bower is abandoned and left to decompose thus providing a ‘mulching’ effect on the soil.
Preliminary results demonstrate that the abandoned, decomposing bowers directly improve the moisture content and nutrient availability of soils.
As a consequence, I predicted that; (a). Growth and survival of Burdekin Plum seedlings will be facilitated (revealing a unique mutualism) and (b) Soil fungal

Open session (2)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Bimbadeen Room
Oral presentation
Hodgson J [1]
[1] Deakin University, Waurn Ponds VIC, Australia
Great Bowerbirds as ecosystem engineers?

communities are enhanced and favour those associated with decomposition of organic matter. Thus, I predict that male great bowerbirds modulate the availability of resources to other species in semi-arid savannah through their impact on soils and therefore satisfy the definition of an ecosystem engineer. Further results of this work will be presented and discussed.

Paul Holper

Biography

Paul Holper is a Director of science communication company, Scientell. During 25 years at CSIRO, he held senior positions, including managing the Australian Climate Change Science Program. He has written over 25 science books for children and adults.

EcoTAS abstract

Children's books are driving publishing growth on a global scale. There are more than 60,000 English-language children's books in print globally. In addition to the myriad book titles for young people and magazines specifically for young readers, a number of publishers have launched younger versions of their science magazines, including National Geographic (with National Geographic Kids). Many of these publications exist both in hard copy and online, with tablets offering opportunities for a host of additional features, including animations and video.

Writing non-fiction for young people should be like writing for an older audience. Young people are more sophisticated than many of us think, so writers need to treat

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Wattagan Room

Speed Talk

Holper P [1] , Torok S [1]

[1] Scientell, Hughesdale VIC, Australia

Communicating ecology to young people – via books, magazines, apps and online

them with respect. Writing for a young audience should be viewed as writing for yourself, covering topics that interest you in a language that you find engaging. Story-telling is paramount, as engaging writing must be about more than simply imparting knowledge.

Technology is presenting exciting new opportunities for presenting environmental information to children; even letting them contribute to data collection.

This presentation will highlight good examples of communicating ecology to children – in books, magazines, apps and online.

Anna Hopkins

Biography

Dr Anna Hopkins is a lecturer in conservation biology and microbial ecology at Edith Cowan University. Her research interests include the impact of disturbance on microbial communities, invasive fungal plant pathogens and the complex interactions between fungi, plants and animals.

EcoTAS abstract

The implications of a drying climate have been investigated for aboveground vegetation, yet below-ground processes and organisms have received considerably less attention despite their central contributions to ecosystem resilience and stability. Here, we present results from two studies of the rhizosphere fungi in soils of contrasting Mediterranean Type Ecosystems. Both studies examined how projected future climate conditions may impact rhizosphere fungal

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 2)

Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Brokenback Room
Oral presentation

composition, richness and function. In the first study, we experimentally reduced rainfall over four years in a Mediterranean shrubland ecosystem. Soil samples were collected from plant-free interspaces and the rhizospheres of two common and widespread Myrtaceous subshrubs in both drought and control plots. In the second study, soil was collected from the rhizosphere of the dominant Myrtaceous tree species at two sites (and corresponding controls) in a forest ecosystem that has experienced a natural and severe drought and heatwave event 4 years previously. In both experiments, the DNA of rhizosphere fungal communities was extracted, amplified and subjected to high throughput sequencing. We found a significant effect of drought treatment on rhizosphere fungal dynamics. Fungal richness was significantly higher in drought plots in both the shrubland and forest ecosystems when compared with controls. Drought treatments also resulted in altered fungal community composition and changes in the abundance of key functional groups. Both studies demonstrate that projected future drier conditions will have an effect on the rhizosphere fungal communities. Disruptions to fungal communities have serious implications for ecosystem resilience and stability.

Hopkins A [1,3] , Birnbaum C [2,3] , Fontaine J [3] , Enright N [3] , Hardy G [3] , Ruthrof K [3,4]

[1] Centre for Ecosystem Management, Edith Cowan University, Joondalup WA, Australia

[2] Tulane University, New Orleans, United States of America

[3] Murdoch University, Murdoch WA, Australia

[4] Botanic Gardens and Parks Authority, Perth WA, Australia

Drought alters the rhizosphere fungi in two contrasting Mediterranean Type Ecosystems

Sebastian Horn

Biography

Dr Horn's research interests include molecular ecology, metagenomics, soil biodiversity and statistics. His focus lies in the exploration of rainfall pattern changes, where he seeks to provide a mechanistic insight into ecosystem

Socio-ecological Interactions / Open session

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Wattagan Room

Oral presentation

responses to climate variability and extreme climatic events.

EcoTAS abstract

Water is one of the most crucial resources on the planet, and the predicted changes in rainfall patterns could significantly shape plant and soil communities in the future. Since plants are influenced not only directly through water availability but also indirectly through belowground community responses to changes in water availability, we established an experiment aimed at linking real-world plant-soil feedbacks with changes in soil communities under a range of potential future rainfall scenarios.
We established 6 sites in Western NSW and Southern QLD within the framework of DroughtNet, which are able to provide field-site manipulation of rainfall patterns combined with real-time environmental monitoring. Part of the project is an extended greenhouse experiment aiming at linking artificial manipulation of rainfall in the lab to results obtained in the field.
For the greenhouse experiment, soil cores obtained from 2 sites, which differ in rain variability, were kept for 3 months in a climate chamber and exposed to different rainfall frequency and temperature regimes. Soils were sampled before and after treatments, and subjected to next-generation sequencing in order to obtain data on fungal and bacterial communities, as well as soil environmental and plant biomass data.
Our approach combines the benefits of a high realism field-based rainfall manipulation experiment with a highly controlled greenhouse approach to yield a more realistic picture of the water regime change mechanisms on plant and belowground communities. This will provide valuable insights into the prospects of climate change especially in

Horn S [1] , Nielsen U [1] , Singh B [1] , Eldrige D [2] , Power S [1]
[1] Western Sydney University, Richmond NSW, Australia
[2] University of New South Wales, Sydney NSW, Australia

The effect of altered rainfall pattern on soil microbial and plant communities

Australia, but also in other parts of the world.

Bryony Horton

Biography

Bryony works for NPWS managing the Reintroduction of Locally Extinct Mammals project. Her role also includes biodiversity monitoring and wildlife regulation. Bryony has a PhD in applied ecology and is interested in ecosystem function and the management of ecosystem health.

EcoTAS abstract

Increasing challenges to the management of biodiversity has seen the need for new and emerging conservation tools to be applied more widely. Government plays an important role in ensuring positive conservation outcomes through the management of protected areas and threatened species. Alongside this government regulates the application of conservation tools such as translocations and conservation fencing. Current government initiatives in NSW that apply contemporary conservation approaches include using private-public models for the delivery of land management services, large scale conservation fencing, and a range of translocations including the ‘Reintroduction of Locally Extinct Mammals’. Furthermore, the policy framework that guides the use of these tools is constantly being tested by the need for broader application. Government should respond to this need through innovation and flexibility. For example, through considering novel reasons for translocations such as for the restoration of ecosystem health rather than for traditional recovery of species. Scientific evidence underpins all governmental

SYMPOSIUM: Novel management interventions for threatened species

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Horton B [1]

[1] National Parks And Wildlife Service, Coffs Harbour NSW, Australia

Contemporary approaches to conservation in protected areas; government initiatives and the role of science

decisions around conservation including setting goals and actions, feeding into risk assessment and due diligence processes and monitoring and evaluation. Therefore, ecological research plays a crucial role in informing government. Examples of ways in which the NSW Office of Environment and Heritage is applying novel conservation tools and the risks and challenges of these approaches, as well as opportunities for ecologists to feed into the decision-making process, will be discussed.

Jessica Hoskins

Biography

I am a PhD candidate in the Chown Lab at Monash University and I am investigating the influence of thermal environments on population dynamics in springtails.

EcoTAS abstract

Springtails (Hexapoda:Collembola) are not usually thought of as wildlife. However, owing to their abundance and functional roles, they play an integral role in soil health and its influence on above-ground habitats by providing a variety of terrestrial ecosystem services. These services benefit the terrestrial habitats that are home to many different species. Global climate change has had pronounced impacts on springtail diversity, with these impacts being linked directly, in turn, to the responses shown by other terrestrial groups. Such change is predicted to continue, and in particular as a consequence of marked temperature effects on soil animals like springtails, which are typically unable to regulate their body temperature. Current understanding of springtail diversity within Australia

SYMPOSIUM: Insect Ecology
Research Chapter - insects punching above their weight (Part 2)

Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Speed Talk

Hoskins J [1] , Chown S [1]
[1] Monash University, School of Biological Sciences, Clayton VIC, Australia

The effect of environmental change on springtail diversity and functional traits

and the mechanisms underlying the demographic responses of soil organisms to thermal change is, however, far from comprehensive. Here I discuss, using an urban springtail assemblage as an exemplar, Australian springtail diversity and the functional traits linked to thermal demography to provide a foundation to better understand the responses of Australian soil systems to environmental change.

Mohitul Hossain

Biography

Mohitul Hossain is a 3rd year PhD candidate at the University of Western Australia with a specialisation in plant ecophysiology and phytopathology. His research interest increasingly concentrates on accessing ecosystem health, management and adaptation to abiotic and biotic stresses.

EcoTAS abstract

Tree mortality in many eucalypt-dominated forest ecosystems in Australia is thought to be associated with climatic extremes, and climate-driven shifts in pest and pathogen dynamics. Climatic factors may predispose marri (C. calophylla) to the stem canker disease caused by the fungal pathogen Quambalaria coyrecup, causing marri decline in Western Australia. The canker disease severity has been found to be greater at the wetter end of the marri distribution range. In two separate studies with marri saplings, we determined (1) the effects of the timing of drought and (2) provenances on disease susceptibility and development. The drought-timing experiment included pathogen inoculation treatments with drought applied either

Forest Ecology (2)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #3
Speed Talk
Hossain M [1] , Veneklaas E [1] , Hardy G [2] , Poot P [1]
[1] School Of Biological Sciences, The University Of Western Australia, Crawley, Perth WA, Australia
[2] School of Veterinary and Life Sciences, Murdoch University, Murdoch, Perth WA, Australia
Drought and provenance effects on the susceptibility of marri (Corymbia calophylla) to a stem canker

before or after inoculation, with sustained drought and a well-watered treatment as controls. Canker disease developed in all inoculated treatments but was faster in well-watered plants. However, the rate of canker growth was particularly fast in well-watered plants that had experienced drought stress before inoculation. In the provenance trial experiment, the infection rate was higher in the saplings from the drier region than the wetter region. These results suggest that the greater incidence of canker in higher-rainfall locations is probably not due to genetically defined susceptibility to the pathogen, but that seasonal drought followed by moist conditions are favourable for canker growth. Further results of the disease development rate and drought effect amongst different provenances will also be presented.

Clayson Howell

Biography

Clayson Howell is an ecologist who works mostly on the impacts and control of exotic conifers. He is current President of NZES, and has diverse skills including adventurous child-care and pizza oven construction.

EcoTAS abstract

Pinus contorta is a significant environmental weed that is often controlled in New Zealand. Many sites invaded by P.contorta previously supported mountain beech (Fuscospora solandri) but unassisted colonisation of P. contorta stands by mountain beech is rare. Dense P. contorta stands are typically controlled using aerial application of herbicide formulations. In this study,

Restoration Ecology (1)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Bimbadeen Room
Oral presentation
Howell C [1]
[1] Department Of Conservation, Wellington, Na, New Zealand
Mountain beech seedling establishment after aerial herbicide application for Pinus contorta control.

mountain beech seed was sown to treated plots one year after herbicide application and seedling survival was assessed annually for three years after sowing. Aerial boom spray application of herbicide formulations resulted in high mortality of P. contorta with associated increases in canopy openness and soil moisture. But, herbicide residues were detected in litter and soil, to a lesser extent, four years after treatment. Adding seed and caging to exclude mammalian herbivores was critical for mountain beech seedling survival, but positive responses to increased soil moisture and canopy openness appear to outweigh any negative effects of residual herbicide. Aerial application of herbicide to control P. contorta can create suitable conditions for mountain beech seedling establishment, but widespread establishment is likely to require seed addition and suppression of mammalian herbivores.

Bronwyn Hradsky

Biography

Bronwyn Hradsky is a Research Fellow with the Quantitative and Applied Ecology group at the University of Melbourne. She is developing agent-based models help support land managers with invasive predator and fire management decisions for biodiversity conservation.

EcoTAS abstract

The invasive red fox Vulpes vulpes threatens native species, harms livestock and is a key host of zoonotic diseases worldwide. Numerous models of red fox populations have been developed previously, but few are

Invasion Ecology

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Cypress #2

Oral presentation

Hradsky B [1]

[1] University of Melbourne, Parkville VIC, Australia

Foxy agents – a simulation model for invasive predator management

applicable to biodiversity conservation at a landscape scale. The aim of this study was to develop a spatially-explicit, agent-based model of red fox populations in heterogeneous landscapes, which could be readily customised to specific ecological and management scenarios. I built and ran the model using the open-source software Netlogo and R. The model depicts a cell-based landscape which can be generated within the model or imported as a spatial raster layer (in the order of 100 – 15,000 km2, at 100 m resolution), and updates at four-weekly intervals. Individual foxes disperse across the landscape, establish and update territories, find mates, and reproduce, with the timing and likelihood of these behaviours specified through a user-friendly interface. Customised baiting strategies can be specified within the model or imported as shapefiles. The model effectively reproduces key ecological patterns from diverse field sites, including Bristol, England and Carnarvon, Western Australia. These patterns include the relationship between fox home range size and density, and the age/stage structure of fox populations. Model outputs indicate that the timing, extent and intensity of baiting influence bait effectiveness, with the relative value of different baiting strategies varying with fox ranging behaviour. The model can be used to identify efficient predator management approaches, and highlights key knowledge gaps for further research and adaptive management.

Wei Huang

EcoTAS abstract

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

Plant harvesting was important factors in the regulation of wetlands, and the lack of relevant knowledge is not conducive to the scientific management of wetlands. This study attempts to investigate the mechanism of the effect of reed harvesting on the water quality purification in wetland, and to provide the theoretical basis for the healthy operation of wetland in the long term. The main conclusions are as follows:

1. Plants harvesting have a negative effect on the plant growth in initial stage of growth, vigorous growth period and the dormancy stage of the growth. The higher stress occurred when the stubble height was higher. The biomass of root and rhizome of the reed was significantly decreased with the plant harvesting. After harvest, most plant recovered through the growth and development of the lateral shoots. The annual data showed that the plant harvesting occurred in the early stage of growth and dormancy period had relatively little negative effect on the growth of reeds.

2. The effect of the water quality purification was weakened when the plant harvesting happened in in initial stage of growth and the dormancy stage of the growth. When the stubble height was lower, the water quality of effluent in wetland is worse. The main reasons may be as follows: (1) the plant harvest has inhibited plant growth; (2) the plant harvest stimulated the growth of algae; (3) the plant harvest increased the range of daily changes of water temperature and decreased the microbial activity.

3. When the litter was added to wetland system, and the easily decomposable litter released large number of nutrient into the surrounding water. Thus, the water quality of the wetland was deteriorated. After a period of sustained

5:45 PM - 7:30 PM
The Event Centre
Poster presentation

Chen K [1] , Gu [1] , **Wei H** [1]
[1] Nanjing Institute of Geography and Limnology, Chinese Academy of Science, Nanjing, China

Effect of plant harvest on the water purification of wetland

release, litter were mainly composed of refractory organics, which will provide a large surface area plant debris for microbial breeding.

Chantal Huijbers

Biography

Dr Chantal Huijbers is the Scientific Support Officer for the BCCVL. She has a research background in ecology and developed an Online Open Course in Species Distribution Modelling and other material to provide scientific support for users of the tool.

EcoTAS abstract

Models play a critical role in synthesising our understanding of the natural world and making forward projections into novel conditions. While they are central to ecological forecasting, models remain inaccessible to many ecologists, in large part due to the challenges of managing the flows of information in and out of such models. In Australia, a suite of research infrastructures has been developed to enhance access to data and analysis tools. To provide users with a holistic approach to environmental spatial data discovery and analysis, three of these infrastructures (ALA, TERN, BCCVL) have joined forces to deliver an exciting and innovative new training program. This program, called EcoEd, provides cohesive training and skill development to university lecturers and researchers enabling them to combine theoretical concepts with real-world applications. The EcoEd program builds on the tools developed by ALA, BCCVL and TERN in providing the

Ecological Modelling (3)

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Bimbadeen Room

Oral presentation

Huijbers C [1] , Holewa H [1,2] , Richmond S [1] , Belbin L [2] , Scott H [2] , Thurgate N [3]

[1] Biodiversity And Climate Change Virtual Laboratory, Gold Coast QLD, Australia

[2] Atlas of Living Australia, Canberra ACT, Australia

[3] Terrestrial Ecosystem Research Network , Adelaide SA, Australia

EcoEd: innovation in training, outreach and engagement leveraging Australia's EcoScience infrastructures

training required to further incorporate this expertise into Australia's higher education and research sector. In doing so EcoEd is increasing the capacity of Australia's research community to advance science and deliver outcomes that underpin the sustainable use of our ecosystems. Here, we will demonstrate how we developed the EcoEd program, and present the outcomes of the pilot training sessions in which the first cohort of EcoEd Champions absorbed ready-to-use lecture and workshop modules, along with tools and knowledge on how to use the platforms to explore species data and their relationships with their environment.

Jacinta Humphrey

Biography

Jacinta Humphrey is a current PhD Candidate with the Landscape and Conservation Ecology (LACE) group at La Trobe University. Her research interests include anthropogenic land-use change, urban conservation and threatened species management.

EcoTAS abstract

The term peri-urban is used to describe a transitional zone of low-density housing between urbanised centres and rural land. Worldwide, peri-urban development is one of the fastest growing forms of private land-use. As these developments occur among, or in close proximity to, natural habitats, they can impact native species distributions and community composition. Despite this, little is known of the potential ecological consequences of such development, or of the factors associated with such change, especially in an Australian context.

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Speak Talk
Humphrey J [1] , Haslem A [1] , Bennett A [1]
[1] La Trobe University, Bundoora VIC, Australia
Beyond the fringe: temporal and spatial change in peri-urban land-use and avian communities

This study aims to investigate past and present change in peri-urban land-use and avian communities. I will compare peri-urban development and avian data between urban environments with different land-use histories. By using historical mapping, modern satellite imagery, novel metrics of urbanisation and existing Australian bird Atlas data from 1977 – present day, I will examine the ecological consequences of land-use change for bird species and communities, the environmental factors associated with such change and the motivations and perspective of landowners.

This research will address both the ecological and human aspects of conservation in a contested landscape. The challenge is to find a healthy compromise where the needs of both landowners and native wildlife can be met, in the context of a growing human population. This presentation will outline my project plan with the aim of obtaining feedback from fellow students and researchers.

Sacha Jellinek

Biography

Sacha Jellinek is at Senior Ecologist at Greening Australia, and currently consults for the Arthur Rylah Institute. He is interested in monitoring and maintaining restored terrestrial and wetland habitats, and how best to prioritise restoration actions.

EcoTAS abstract

Land clearing, habitat fragmentation, and landscape degradation are major factors causing the loss of

SYMPOSIUM: Effectiveness monitoring (Part 1)

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Jellinek S [1,2]

[1] Greening Australia , Melbourne VIC, Australia

[2] Arthur Rylah Institute, Melbourne VIC, Australia

biodiversity throughout the world. To maintain biodiversity in highly fragmented landscapes such as agricultural areas, extensive habitat restoration via methods such as revegetation is necessary. Although restoration has the potential to maintain native animal and plant communities, information about how to achieve good outcomes from restoration, or how to maximise restoration survival is lacking. Here we propose a monitoring method, used on a landscape scale restoration project in south-eastern Australia, to assess restored terrestrial landscapes, and show how different biotic and abiotic factors influence plant survival. We show that there is a consistent decline in plant survival from those plants surveyed in Spring (directly after planting) to those surveyed in Autumn (after the first Summer) over a 5 year period. This may be partly due to climatic impacts (rainfall and temperature), although factors such as planting stress, weed competition and grazing pressure are likely to play a more significant role. Soil type, especially in areas that have deep sands, also substantially impacts plant survival. Overall, plant community composition substantially changes from those plants initially planted, to those that survive after the first Summer, ultimately changing the communities we are trying to restore. This study highlights the importance of a robust monitoring method to assess restoration survival, and the factors that are likely to influence plant survival directly after planting and after the first Summer, and how this may influence community composition into the future.

Monitoring restoration survival in agricultural landscapes

Scott Johnson

Biography

SYMPOSIUM: Functional roles of plant silicon: how plants get it and

Scott Johnson is an ARC Future Fellow at the Hawkesbury Institute for the Environment, Western Sydney University. He is a community ecologist working on plant-insect interactions, with a particular focus on enhancing plant protection using plant defence and multi-trophic interactions.

EcoTAS abstract

Silicon acquisition by plants is increasingly recognised as an important mechanism for alleviating biotic and abiotic stresses, including disease, water-stress, toxic metals, salt stress and attack by herbivores. Silicification of plant tissues may present physical or abrasive barriers to herbivory, reduce food digestibility and trigger synthesis of other herbivore chemical defences. Studies report wide variation in herbivore responses when feeding on silicon supplemented plants, ranging from detrimental to beneficial impacts, and it is unclear whether all major feeding guilds (chewers, fluid-feeders and borers) are affected equally. In this talk I present the first meta-analysis of how plant silicification, via silicon supplementation, affects invertebrate herbivores. All major feeding guilds were negatively affected when silicon supply to plants increased. Boring and chewing herbivores were most adversely affected whereas silicon defence was significantly less effective against fluid-feeders. Silicon supplementation caused a broad spectrum of defensive effects that adversely affected most herbivore performance traits, including abundance, feeding efficiency, growth/development, mortality/survival and reproduction. Silicon supplementation, however, caused only non-lethal effects for fluid-feeders (i.e. survival and mortality was unaffected). Moreover, fluid-feeders were not affected by silicon defence when feeding on perennial plant species and were only adversely affected when feeding on annual what they use it for

Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Brokenback Room
Oral presentation

Johnson S [1]

[1] Hawkesbury Institute for the Environment, Western Sydney University, Penrith NSW, Australia

Plants bite back unequally: plant silicon defends against herbivore feeding guilds differently

plant species. The meta-analysis established a global negative correlation between herbivore performance and silicon accumulation in the plant, confirming the importance of silicon acquisition for herbivore defence. Differences in herbivore feeding guild responses suggest these effects are not uniform, however, and different physical and chemical mechanisms are at play.

Stephanie Johnson

Biography

Steph Johnson is a PhD student interested primarily fire-structure interactions in semiarid regions. Her interests also lie in remote sensing technology and its application to the study of structural change.

EcoTAS abstract

Fire is a key determinant of vegetation structure and composition. Perennial grasses of the genus Triodia are a key structural component of arid and semi-arid regions of Australia. Triodia grasses function as fuel for fire and as a valuable habitat resource for native fauna. Understanding how fire shapes the value of Triodia as habitat is important for informing effective conservation management for fauna throughout Triodia-dominated systems. I used a space-for-time chronosequence, in addition to on-ground sampling and low altitude drone-imagery, to test the effect of time-since-fire on the most widespread Triodia species - Triodia scariosa. Structure was examined at two scales: (i) the morphology of individual plants (e.g. height and width) and (ii) the spatial characteristics of multiple plants (e.g. cover, proximity, connectivity). I collected data on the individual

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation
Johnson S [1]
[1] Latrobe University, Melbourne VIC, Australia
Watching the grass grow: effects of time-since-fire on fine-scale structure of Triodia scariosa N.T.Burb

attributes of 910 plants and spatial attribute data for 8, 377 plants, across 80 sites spanning 97 years-since-fire. Three individual plant characteristics (radius, health, volume) and five spatial characteristics (including proximity, cover, connectivity) showed a significant response to time-since-fire; the responses were complex, occurring at multiple scales and over long periods of time. A key challenge of fire management is how to manage habitat when fauna may be dependent on a structurally dynamic plant species.

Chris Jones

Biography

Following my PhD on riparian vegetation monitoring at the University of Melbourne, I've worked in research and environmental consulting across many topics and ecosystems. I'm now working for ARI on a range of long-term waterway vegetation monitoring programs.

EcoTAS abstract

Environmental flows are currently under intense scrutiny. Although these flows are considered to be valuable for supporting the natural values and improving the condition of regulated waterways, there is little conclusive evidence to link flow deliveries to environmental benefits. Criticisms of waterway management and monitoring have added pressure to this management practice that requires large water volumes and large costs. The Victorian Environmental Flows Monitoring and Assessment Program (VEFMAP) was initiated by the Victorian Government in 2005 and is tasked with the job of providing evidence for environmental flow benefits in Victoria. In 2016, the

SYMPOSIUM: Effectiveness Monitoring (Part 2)

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Sugarloaf Room

Oral presentation

Jones C [1] , Thomas F [2]

[1] Arthur Rylah Institute, Heidelberg VIC, Australia

[2] RMIT, Melbourne VIC, Australia

Demonstrating outcomes of environmental flows

program was revised to tackle new questions in new ways to provide this evidence. Riparian and in-stream vegetation and fish responses to flows are the focus of this new stage from 2016 to 2020. At the end of the first year of this stage, we can evaluate how research in this area has progressed, what is being done now, and what the future of environmental flows in Victoria may be. Results from the first year of the new vegetation monitoring approaches are presented and contrasted with previous research findings.

Decky Junaedi

Biography

PhD student at University of Melbourne and research staff at the Cibodas Botanic Gardens, Indonesia. Decky have interest on the ecological modelling of tropical invasion ecology including detection model and the use of traits for evidence based invasive species management.

Invasion Ecology (Plants)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation

EcoTAS abstract

Plant traits are a vital element in the invasive plant studies. However, the generalization of traits in relation to plant invasion is challenging, given inadequate plant invasion studies in the tropical forest ecosystems. The sufficient traits information that indicate the plant invasion processes in the tropical ecosystems are relatively rare. For the management consideration, simple and easy to measure traits are preferable. Using the naturalized exotic collections from four Indonesian botanic gardens in Java and Bali as a case study, we demonstrated that traits are useful for detection, predicting which exotic that will be naturalized and correlate with the abundance of these

naturalized exotics from tropical botanic gardens to adjacent native rain-forests. Height and leaf size affect the detectability of exotic species in this ecosystem. Specific leaf area (SLA) and height were differentiate naturalized from non-naturalized exotic collections. SLA also positively correlated with the abundance and dispersal distance reached by these naturalized exotics. Trait-based detection studies might provide additive solutions for detection optimization. Effective and efficient detection will support reliable decision making for invasive species surveillance in tropical ecosystems. This study also suggests that the reliability of traits that indicate the life history and physiological performance (e.g. SLA, height, dispersal method and residence time) are essential components for trait-based studies and its application in the invasive species management. Thus, the reliability of the trait-based invasive species management are promising.

Junaedi D [1,2] , Catford J [4,1,5] , Guillera-Arroita G [1] , McCarthy M [1] , Burgman M [1,3]
[1] CEBRA, School Of Biosciences, University Of Melbourne, Melbourne VIC, Australia
[2] Cibodas Botanic Gardens, Indonesian Institute of Sciences (LIPI), Cianjur West Java, Indonesia
[3] Centre for Environmental Policy, Faculty of Natural Sciences, Imperial College London, South Kensington Campus, London SW7 1NA, UK
[4] Biological Sciences, University of Southampton, Southampton SO17 1BJ, UK
[5] Fenner School of Environment and Society, The Australian National University, Canberra ACT, Australia

Traits-based approaches for naturalized exotics from tropical botanic gardens: detection and assessment

Hanna Kapuscinski

Biography

Hanna has recently completed her honours degree in Ecology at La Trobe University. She is interested in plant-

Barbara Rice Memorial Poster Session (Monday)
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The Event Centre

animal interactions and spatial ecology. She is now working as a database officer at the National Herbarium of Victoria.

EcoTAS abstract

Rural tree decline (RTD) is a widespread and increasing feature of the modified Australian landscape. Where agriculture predominates in temperate Australia, RTD occurs en masse at multiple spatial scales across a range of species. Symptoms typically progress from crown defoliation to bare upper branches protruding from unaffected foliage, and ultimate tree death.

River red gum (Eucalyptus camaldulensis) is long-lived and highly adaptable, its distribution covering some portion of every state. These trees provide important ecosystem services in native vegetation and within the agricultural matrix. They offer persistent habitat for native fauna and exert a positive influence on soil and hydrological processes. Although the species is not considered threatened, many populations are susceptible to the hazards of agricultural practice and a changing climate. RTD has been documented in red gums in both west-central Victoria and riparian habitat in the north of the state; however, prior estimates of RTD in pastures of the south west region are limited.

We measured paddock-scale density changes in remnant river red gum stands south of the Grampians National Park, Victoria. Historic aerial photographs were compared with contemporary satellite imagery using a manual, point-based sampling method in the GIS application Global Mapper. Paddock interiors showed significant rates of tree mortality. Pulses of recruitment were rare and largely confined to creek lines and roadsides.

Poster presentation

Kapuscinski H [1] , Morgan J [1]

[1] La Trobe University, Melbourne VIC, Australia

[2] National Herbarium of Victoria, Royal Botanic Gardens, Melbourne VIC, Australia

Rural tree decline in remnant river red gum (Eucalyptus camaldulensis) stands of south west Victoria

Given the potential negative consequences of RTD for matrix biodiversity, these findings are a potential benchmark for future conservation and monitoring of the persistence of river red gums in this landscape.

Amrit Pal Kaur

Biography

Amrit Pal Kaur is a PhD student in insect ecology laboratory, UNE. Currently, the focus of her research is to assess nutritional resources for dung beetles and to compare these resources over a period of time.

EcoTAS abstract

In terrestrial systems, insects play important ecological roles in a range of ecological processes (e.g. nutrient cycling, bioturbation, seed dispersal and pollination). Dung beetles mediate several important ecosystem processes. The mechanism of adult host preferences has been investigated in parasitoid, phyto-phagous and flower visiting insects, but the coprophagous species e.g. dung beetles have received very little attention. After finding a dung source, dung beetles quickly relocate the manure, either by burying it under the soil, or rolling it away from the dung pat for feeding and/or nest building. Few field studies and laboratory olfactometer bioassays have showed that many dung beetles are able to make choice between volatiles emitted by different types of faeces. As the resource selection process in dung beetles is assisted by olfactory cues from dung, we want to answer the following question: what kind of volatiles attracts dung beetles. We used GCMS (Gas Chromatography Mass Spectroscopy) to record volatiles emitted from the cattle dung; and use

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Poster presentation

Kaur A [1] , Drayton J [1] , Andrew N [1]

[1] Insect Ecology Lab, University Of New England, Armidale NSW, Australia

Volatile compounds from dung as olfactory cues to dung beetles

bioassays to assess the actual encounter of the dung beetles with the resource. Together this will identify the most active volatiles responsible for dung beetles attraction to the dung. This information is part of a larger project to construct artificial diets for dung beetles, as well as assist in mass rearing programs for dung beetles requiring a consistent food source throughout the year.

Rod Kavanagh

EcoTAS abstract

Do land management practices achieve the intended outcomes for conservation? Too often, monitoring is limited to assessments of whether the planned management was actually conducted (implementation or compliance monitoring), and not whether management actions resulted in any improvements to population status of threatened species (effectiveness monitoring). In the Pilliga forests, AWC has established 70 survey sites across a 2.5 km grid covering the entire project area (50,000 ha) from which it measures annual or semi-annual changes in the distribution and abundance of selected conservation-priority species and the main threats to these species (surveillance monitoring). The data from these surveys also provides a solid basis for investigating the effectiveness of management actions to control or exclude (using a large predator-exclusion fence) the numbers of introduced predators and introduced herbivores, and potentially changes resulting from alternative fire regimes and other habitat manipulations, on the population status of conservation-priority species in the project area. The extension of this survey grid across adjacent land tenures provides an opportunity to investigate the effectiveness of

SYMPOSIUM: Effectiveness monitoring (Part 1)

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Kavanagh R , Leo V [1] , Berry L [1] , Joseph L [1] , Kanowski J [1]

[1] Australian Wildlife Conservancy, Perth WA, Australia

Monitoring ecological health of the Pilliga forests in north-western NSW

alternative management regimes and subsequent conservation outcomes at the landscape scale. Long-term monitoring is essential for managers and scientists to understand the scale and frequency of environmental variation and species fluctuations over time which can obscure short-term treatment effects. The power of monitoring designs to detect changes in the population status of species of interest is of primary concern, such that species-specific research approaches may be required for rare species.

Tom Kaye

Biography

Thomas Kaye, PhD, is Executive Director and Senior Ecologist at the Institute for Applied Ecology, a nonprofit organization with a mission to conserve native habitats and species through research, restoration, and education. His interests include conservation of plants, wildlife, and pollinators through planning, research and on-the-ground restoration. Tom has a long-standing interest in reintroduction of endangered species to assist with their recovery and response to climate change. Education in schools and with prison inmate populations are key outreach tools for Tom. He is also a courtesy Associate Professor in the Department of Botany and Plant Pathology at Oregon State University.

EcoTAS abstract

Reintroduction of endangered species may be necessary to protect them from extinction, provide connectivity between populations, and reach recovery goals. But with resources

Restoration Ecology (1)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Bimbadeen Room

Oral presentation

Kaye T

[1] Institute for Applied Ecology, Oregon, United States

Using plant traits to predict reintroduction success of endangered species

scarce for large scale reintroduction, can we predict which projects will succeed? Here I propose that there are traits of endangered species that affect their reintroduction success. Reintroduction success will be highest for endangered species that share traits with non-rare native species, invasives, and species that excel in restoration projects. I synthesized the results of six review papers that evaluated traits associated with plant rarity, invasiveness, and successful restoration planting and identified traits common to more than one group to generate a short list of traits that could predict reintroduction success. From this hypothesize that the following plant characteristics may indicate the likelihood of successful reintroduction: 1) long flowering-fruiting period, 2) vegetative growth, 3) competitive ability, 4) high seed production and/or intermediate seed size, 5) long distance dispersal mechanism, 6) large geographic range and/or multiple habitats, and 7) generalist pollination and mixed mating system. To test the usefulness of these traits, I compared reintroduced plant performance (first year survival) of seven plant species from prairies of western Oregon with the number of traits hypothesized to be linked to reintroduction success using polynomial regression. First year survival of reintroduced plants was positively correlated ($R2=0.54$, $P<0.05$) with the number of predictor traits in the seven species examined. These results imply that plant species that are most likely to succeed in reintroduction programs may be predicted from their inherent traits.

Thomas Keen

Biography

Conservation Biology (1)

Tom is a PhD student in the Dynamics of Eco-Evolutionary Patterns research group at the University of Tasmania. His research focuses on the interface between biodiversity conservation and productive human land uses, particularly agriculture.

EcoTAS abstract

Discussion about conservation in agricultural landscapes in recent years has focused largely on the extent to which agriculture can be intensified to leave room for nature, and the extent to which farmland itself can be made more wildlife friendly. This discussion has created a schism between proponents of these so-called “land sparing” and “land sharing” approaches respectively, and much debate about which approach might be more appropriate and in what circumstances. An increasing number of conservationists argue that this either-or framing represents an over-simplistic false dichotomy that neglects the possibility of simultaneously employing both approaches. One proposed strategy for minimising harm to wildlife in agricultural landscapes is to limit pesticide inputs. Here, we examine the extent to which bird abundance trends in agricultural landscapes across the United States can be explained by habitat availability, crop production intensity (yields), and inputs and composition of pesticides. By doing so, we aim to identify the extent to which limiting pesticide applications is a viable avian conservation strategy, while controlling for crop production and habitat availability. Preliminary results suggest that non-cultivated habitat availability remains the primary determinant of population viability for most species, while pesticide inputs and composition provide little explanatory power once crop yields are accounted for. These results suggest that opportunities for conserving bird populations by focusing on pesticide reductions may be limited, while preserving

Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation

Keen T [1]

[1] University Of Tasmania, Hobart TAS, Australia

Avian conservation in agricultural landscapes: does reducing pesticide use represent a viable wildlife-friendly farming strategy?

habitat availability remains crucial.

David Keith

Biography

David is an ecologist with interests in ecosystem dynamics and conservation, plant population biology and vegetation science. He edited the 3rd edition of 'Australian vegetation', in a bookshop near you!

EcoTAS abstract

Classifications are fundamental tools for communication, storage and retrieval of information throughout humanity. In science, they are essential tools for ordering knowledge, testing theory, exchanging ideas, comparative analysis, and more. Ecologists, for example, classify and map landscapes and seascapes systematically for these purposes at various local, regional and continental scales, and the outputs also inform decisions by environmental and natural resource managers. The classifications are typically based on compositional, structural and/or environmental features, and are given spatial expression through remote sensing and environmental modelling. Ecological processes may be implicit through their relationships with these components, but are rarely addressed explicitly as an objective of classification. Yet understanding how ‘like’ ecosystems behave and respond to environmental change is critical to biodiversity conservation and ecosystem management. Although global ecoregional classifications that represent biogeographic and environmental patterns are well established, a systematic framework for classifying the world’s terrestrial, freshwater and marine ecosystems

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Keith D [1,2,5] , Kingsford R [1,5] , Polidoro B [3,5] , Nicholson E [4,5] , Red List of Ecosystems Thematic Group [5]

[1] Centre for Ecosystem Science, University of NSW, Kensington NSW, Australia

[2] NSW Office of Environment & Heritage, Hurstville NSW, Australia

[3] Arizona State University, Phoenix Arizona, USA

[4] Deakin University, Melbourne Victoria, Australia

[5] IUCN Commission on Ecosystem Management, Gland, Switzerland

Towards a global typological framework for ecosystems

on the basis of their ecological functions is conspicuously lacking. We present an ecosystem assembly model to support development of a global ecosystem typology. The model includes several groups of ecological processes (selection filters) that underpin ecosystem organisation, shape ecological traits and which are crucial in sustaining the biota of functionally contrasting groups of ecosystems. The typological framework comprises six nested levels that reflect functional traits and ecological drivers in the upper levels and compositional features at the lower levels. The typological framework will be useful for development of generic ecosystem models, ecosystem risk assessment, and application of management generalisations.

Dave Kelly

Biography

Dave Kelly has worked on mast seeding for 30 years, though didn't really set out to do that. He has worked mainly on Chionchloa species, but also worked on general theories of mast seeding and weather cues in other genera.

EcoTAS abstract

Plants must produce seeds to migrate in response to climate change. But climate change threatens to disrupt patterns of seed production in plants which show mast seeding (synchronous, highly variable flowering across years), because the plants typically use weather cues like warm temperatures to trigger large seed crops. Predictions on the effects of warming temperatures are hampered by uncertainty about the underlying mechanisms controlling masting. Here we describe recent discoveries in New Zealand and globally on the mechanisms for mast seeding,

Global Change
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation
Kelly D [1] , Samarth S [1] , Jamieson P [1] , Macknight R [2] , Turnbull M [1]
[1] Biological Sciences, University Of Canterbury, Christchurch, New Zealand
[2] Dept of Biochemistry, University of Otago, Dunedin, New Zealand
How will climate change affect reproduction in mast-seeding plants? The answer depends on weather/resources interactions

and consider the implications for mast seeding under a warming climate.
In Southern Hemisphere species like Chionochloa, Celmisia and Nothofagus, two alternative hypotheses make opposite predictions under climate change. The ΔT model says that masting responds to temperature differences across two summers, so would be insensitive to long term warming. Alternatively, if plants respond to warm summers plus plant resources, masting will increase with warming. Our transplant experiments and observational studies in Chionochloa are consistent with the ΔT model, but the two hypotheses are hard to separate. Ongoing genetic work may be the only way to get a conclusive answer.
In Northern Hemisphere Quercus species, recent work shows that masting is driven largely by the interaction between pollination success and internal resource dynamics. That would make masting in those species sensitive to increased spring temperatures.
Animal responses add extra complications to community responses, through seed predation and downstream effects. Two recent models from New Zealand make opposite predictions about trends in stoat numbers should Nothofagus masting become more frequent.

Isobel Kerr

Biography

Isobel Kerr - Currently studying Environmental Science (Hons) at Australian Catholic University, North Sydney. Interested in wildlife ecology.

EcoTAS abstract

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation

Ecological thinning is a relatively new conservation management tool, for native and plantation forests in Australia. In Murray Valley National Park, NSW, large-scale ecological thinning trials initiated in 2016, have selectively removed river red gums (Eucalyptus camaldulensis) in an attempt to restore historic vegetation structures and improve tree health. Three treatments were implemented at each of 22 sites, two variations of thinning intensity (moderate and heavy) and one control. Each treatment occupies a 9-ha plot, with about 400m between adjacent plots (66 plots total). I used Anabat acoustic detectors to record insectivorous bat activity within each plot for three consecutive nights. I took fisheye photos in front of each detector facing skywards, and used Gap Light Analyzer software to quantify vegetation structure within each plot. In total 30,495 calls were identified using computer software Anascheme and were proof-checked manually. Of the 11 species of insectivorous bat recorded, the little forest bat (Vespadelus vulturnus) was most common, accounting for 30% of all calls. There was a high degree of variability in bat activity and composition within each treatment. Preliminary analyses suggest there were more species on heavily thinned treatments (P = 0.036), but no effect of moderate thinning on number of species, and no effects of thinning on bat activity (P = 0.248). In this presentation I will also discuss the relationship of bat activity and species composition to vegetation structure.

Kerr I [1] , Ellis M [2] , Taylor J [1] , Monamy V [1]
[1] School of Science, Australian Catholic University, North Sydney NSW, Australia
[2] Science Division, Office of Environment and Heritage, Hurstville NSW, Australia

Ecological thinning of river red gum forest: effects on insectivorous bat activity and species composition

Lindall Kidd

Biography

Lindall is a PhD candidate at RMIT's Interdisciplinary Conservation Science Research Group investigating

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches

Wednesday, November 29, 2017

messaging for threatened species conservation. Lindall's research is supported by RMIT University and the NESP Threatened Species Recovery Hub.

EcoTAS abstract

Human actions are accelerating extinction rates worldwide and there is a growing awareness that changes in human behaviour are necessary for biodiversity protection. Despite an increased understanding of how messaging influences environmental behavior, strategies guiding conservation messaging are often not evidence-based. To clarify current understanding about the use of messaging in conservation, we conducted a systematic review of research relating to conservation messaging. We examined critical aspects of messaging, including the purpose, action, audience and evaluation. We found that, as expected, interest in this topic has increased recently within the conservation research community. Message framing and marketing were the most commonly used theories, highlighting the growing emphasis that marketing, and the careful framing of messages may play in developing strategic campaigns. However, we also identified a number of research gaps that present exciting opportunities for conservation research. For example, half of the studies investigated did not draw on an established theory or identify a target audience or evaluation strategy: key standards for communications research. We draw on multiple disciplines, including marketing, psychology and communication, with a focus on their application to environmental problems.

11:00 AM - 1:00 PM
Wattagan Room
Speed Talk PLUS Poster

Kidd L [1]
[1] RMIT University, Melbourne VIC, Australia

Messaging matters: maximizing impact in conservation campaigns

THE NEED FOR SPEED: Featured Speed Talks
Wednesday, November 29, 2017
2:45 PM - 3:20 PM

The Convention Centre
Speed Talk
Kidd L
The Need for Speed: Featured Speed Talks

Heidy Kikillus

Biography

An urban ecologist with an interest in biosecurity, specifically pets that can become pests.

EcoTAS abstract

In 2015 and 2016, over 200 pet cats in the Wellington region were tracked via Global Positioning System (GPS) units and their movements mapped on www.cattracker.nz. This large-scale Citizen Science project also collected copious amounts of information regarding cats and public attitudes towards them and their management This project aimed to help better understand the cats' home range, how much time they spend in different kinds of habitat, and how owners can manage pet cats to reduce their impact on wildlife. This talk will discuss the overall findings from the Cat Tracker project, including day / night travels and comparisons to cats in other countries.

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Kikillus H [1]
[1] Victoria University Of Wellington, Wellington New Zealand, New Zealand
Where does kitty wander? Results from the Cat Tracker New Zealand Citizen Science project

Richard Kime

EcoTAS abstract

SYMPOSIUM: Indigenous Ecological Knowledge

Even with government and Land Council support establishing and maintaining a viable Aboriginal Green Team business unit is difficult. The Worimi Green Team (WGT) was established in 2009 and for a number of years consisted of a two/three-man casual crew who were picking up small projects. The small team of staff found it impossible to network, train, quote, carryout the work and report all at the same time. This created a boom/bust situation whereby people were regularly reassigned to other Land Council duties in an attempt to preserve workloads. However, with help from an Indigenous Advancement Strategy grant and a threefold increase in staff numbers the WGT have turned their fortunes around and are on the brink of becoming financially secure. Underpinning this is an enduring partnership with National Parks and Wildlife Services and Hunter Local Land Services, which allowed the team to secure ongoing project funding for work on the Hunter Estuary Wetlands. From humble beginnings WGT now undertakes a full suite of activities in this Ramsar site including weed spraying, vegetation monitoring, feral animal control and camera surveillance. The sense of achievement and pride that comes from brining an impounded marsh back to life is only eclipsed by the knowledge that the WGT is quickly becoming a standalone business unit.

Monday, November 27, 2017
11:00 AM - 1:00 PM
Sugarloaf Room
Kime R [1] , **Chambers B** [1]
[1] Worimi Green Team, Worimi Local Aboriginal Land Council, Williamtown NSW, Australia
Obtaining a Critical Mass: How one Green Team became sustainable

Richard Kingsford

EcoTAS abstract

Tracking environmental change is fundamental to policy and management of the world's ecosystems. This demands identification of responsive indicators which can then be

SYMPOSIUM: Enabling Ecosystem Surveillance Monitoring across Australia – putting ecology to work
Thursday, November 30, 2017
11:00 AM - 1:00 PM

measured through time, ideally over long time periods, potentially separating abiotic and biotic drivers from anthropogenic impacts. The Eastern Australian Waterbird Survey began in 1986, covering almost one third of the continent and regularly estimating abundances of more than 50 waterbird species on up to 2000 wetlands each year (35 years, 1986-2017). We fly 30km wide survey bands, estimating waterbird numbers on wetlands and rivers within these survey bands. These data have contributed to policy and management, including state of environment reporting, water policy and protected area gazettal as well as public understanding. There are some important lessons which challenge all long term surveys including changing objectives, waning support, challenging budgeting, database management and accessibility to data and succession planning. Critically, commitment to long-term collection of ecological data remains a critical aspect of environmental management, underpinning biodiversity protection and management.

Sugarloaf Room
Oral presentation

Kingsford R [1] , Porter J [1] , Bino G [1] , Brandis K [1]
[1] Centre for Ecosystem Science, UNSW, Sydney NSW, Australia

Taking the pulse of our rivers and wetland – role of long term waterbird surveys

Holly Kirk

Biography

Holly recently completed her PhD on seabird movement ecology and moved to Australia in 2016. She is currently working to understand animal dispersal in urban environments, and hopes to use her experience in tracking technology to investigate terrestrial organisms

EcoTAS abstract

Behavioural decisions made by individual animals can have a critical impact on future breeding success and survival.

Marine and Freshwater Ecology
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation

This is particularly true for long-lived species, such as migratory seabirds. Analyses of multi-year behavioural datasets enable us to understand the interactions between the timing and outcome of different life-history events as a first step towards understanding decision making in these species.

Data were collected from 126 individual Manx shearwaters (Puffinus puffinus) on five breeding colonies over a seven year period. Machine-learning methods were used to identify the timing of key breeding and migratory events from geolocation and saltwater immersion loggers. Interactions between the timing of these events, migratory route and the degree to which behavioural strategies are conserved between individuals were investigated using structural equation modelling. This approach also allowed the inclusion of environmental variables (such as sea-surface temperature, wind direction and speed) in order to understand the contribution of abiotic conditions to the cycle of ecological carry-over effects.

The timing of departure from the overwintering area had a strong carry-over effect on other events. Departure date largely dictated the route taken to the breeding colony and the subsequent body condition on return to the colony. This type of information is crucial for our understanding of how behavioural ecology and the environment can influence individual movement decisions as well as understanding how populations of long-lived species will respond to environmental change.

Kirk H [1,2] , Fayet A [2] , Shoji A [2] , Freeman R [2] , Perrins C [2] , Guilford T [2]
[1] R.M.I.T. University, Melbourne Vic, Australia
[2] Oxford University, United Kingdom

Structural equation models for understanding decision making in movement ecology: A seabird case study

Alexandra Knight

Biography

Alexandra lectures in environmental planning, policy, impact assessment and community engagement. Alex’s research is interdisciplinary,incorporating ecological research focussing on frogs of the Murray-Darling Basin and social research exploring factors enabling new knowledge to be utilised in natural resource management.

EcoTAS abstract

Described in 1958, Sloane’s Froglet, Crinia sloanei, is poorly known. In 2008 it was listed as threatened in NSW in response to the decreasing number of sightings of it. We commenced fundamental research into the species’ detection, distribution and wetland scale and microhabitat requirements and concurrently advocated for its protection. We discovered a significant extant population adjacent to the Murray River in south-eastern Australia in peri-urban habitats under threat of immediate development. Sloane’s Froglet uses temporary and permanent wetlands. In breeding season (mid-winter) males call from very shallow water with emergent small-stem diameter reeds. Females lay eggs singly on submerged reeds. Sloane’s Froglets move from wetland to wetland within the breeding season and between seasons. We provided early results to community groups and state and local government and advocated for the protection of habitat. A stakeholder working group was established. Education activities commenced at local schools. In some cases councils and other landholders undertook actions to protect individual sites. Approaches to planning for new developments by state and local government have incorporated some measures to protect Sloane’s Froglet. Undertaking advocacy and engagement activities at the same time as investigating its ecology was challenging, frustrating and

Conservation Biology (1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Cypress #3

Oral presentation

Knight A [1] , Watts R [2] , Allan C [2] , Lappin N [3]

[1] Charles Sturt University, Albury NSW, Australia

[2] Institute of Land, Water and Society, Albury NSW, Australia

[3] Corowa District Landcare, Corowa NSW, Australia

Policy and practice change result from research into and advocacy for the obscure Sloane's Froglet

time consuming. Early results may be misinterpreted and application misguided, however, engaging the community whilst researching meant that new ecological knowledge about the species did not emerge alone, in peril of being unused, but into a community that is partially knowledgeable and so partially skilled to act for Sloane's Froglet.

Martyna Kotowska

Biography

Martyna Kotowska is a Postdoc at the Macquarie University with a German Research Foundation (DFG) fellowship (2017-2018) working on how soil phosphorus status affects wood anatomical traits and nutrient translocation in woody plants.

EcoTAS abstract

For plants nutrients are a valuable and often limiting resource. While the role of nutrient recycling from senescent leaves has been long recognized, the contribution of other tissues such as wood to the whole-plant budget remains unclear. We hypothesise that in woody plants the translocation of nutrients from sapwood becoming heartwood will play an increasing role particularly in nutrient poor habitats. Based on empirical data acquired from 16 tree species growing along a soil nutrient gradient in South-Eastern Australia, we (i) investigate the contribution of leaves, bark, branch and stem wood to the annual tree budget by collecting data on leaf and branch turnover, stem growth, and nutrient contents of living and senescent tissues and (ii) attempt to quantify how de-novo

Forest Ecology (1)
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Kotowska M [1] , Westoby M [1] , Wright I [1]
[1] Macquarie University , Sydney NSW, Australia
Exploring the limits of nutrient recycling: Comparing wood versus leaf tissue budgets

nutrient uptake can be economized. In addition, to understand the potential plasticity in functional traits related to nutrient cycling, the fractions of living tissue i.e. parenchyma in wood was studied in the field and in five selected species growing under controlled conditions. While the nutrient resorption from leaves can reach up to 60%, the translocation from heartwood is usually much lower. However, as woody tissue of a mature tree can contain more than 95% of its biomass, even a net increase of 8% will counterbalance the contribution of annual leaf turnover. By generalizing the framework of nutrient budgets in woody plants, we better understand the trade-off between costs and benefits of adaptive strategies and to which extent these properties can be stretched along geophysical gradients.

Aleksandra Kovacevic

Biography

Aleksandra Kovacevic is a PhD candidate at Monash University investigating the effects of climate change and extreme weather events on physiological and behavioural responses of soil arthropods using Collembola as a model organism.

EcoTAS abstract

Studies of thermal tolerance of ectotherms, which are proving key to understand both species distributions and distributional change, most often use dynamic (ramping) methods. Dynamic methods consist of heating or cooling an organism from an experimental starting temperature at a

SYMPOSIUM: Assisted migration under climate change

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Brokenback Room

Oral presentation

Kovacevic A [1] , White C [1] , Chown S [1]

[1] Monash University, Clayton VIC, Australia

Rate reveals response – a meta-analysis of the dynamics of ectotherm responses to thermal stress

constant rate of temperature change until critical thermal limits are reached. Critical thermal limits are usually characterized as the loss of righting response, onset of muscular spasms, or overall disorganized locomotion, where an animal loses its ability to escape unfavourable conditions due to heat or cold stress. While some species of ectotherms show lower thermal tolerance with slower rates of temperature change, other species of ectotherms show the opposite response. To explore the question of whether consistent variation in responses can be identified, we used phylogenetically controlled meta-analysis of studies that measure critical thermal limits of ectotherms employing more than one rate of temperature change. Many responses are species-specific. Moreover, differences in the rate effect on tolerance traits suggest that several mechanisms may underlie these responses. These outcomes have important implications for determining which species might be most vulnerable to climate change and extreme weather events, and how forecasts of impacts may be improved. This research was supported by Holsworth Wildlife Research Endowment.

Heini Kujala

Biography

Dr Heini Kujala is a Research Fellow at the University of Melbourne. Her research focuses on spatial conservation optimizations, climate change impacts, conservation decisions under uncertainty, and how to translate these complex concepts into effective conservation practices.

SYMPOSIUM: Putting ecology to work at the land development frontier
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Sugarloaf Room
Oral presentation

EcoTAS abstract

Kujala H [1] , Whitehead A [2] , Wintle B [1]
[1] The University of Melbourne, Melbourne VIC, Australia
[2] National Institute of Water and Atmospheric Research, Wellington, New Zealand

Combating ‘Death by thousand cuts’ through strategic planning

Biodiversity impact assessments typically focus on individual development proposals at a single location, often for a single or few threatened species. Such assessments of individual impacts lead to inadequate assessments of multiple impacts that accumulate over large spatial scales for multiple species. This promotes what is called “death by thousand cuts”, where biodiversity is degraded by many small impacts that individually do not appear to threaten species’ persistence. Without comprehensive understanding of the changes in the amount and configuration of habitat, marginal impacts on the ecological functions cannot be assessed. Furthermore, assessments based on single or few species are unlikely to correctly portray the impacts across the broader range of biodiversity, leading to unrecorded losses for unassessed biota. Spatial prioritization methods can improve the efficiency of decision-making by explicitly considering cumulative impacts of multiple proposed developments on multiple species over large spatial scales. We present an assessment approach and case studies in which spatial prioritization tools were used to support strategic assessment of large development plans in Western Australia and New South Wales. In Western Australia, the approach helped identify alterations to development plans that resulted in reduced biodiversity impacts and an informed expansion of the protected area network. Using these tools to assess trade-offs between conservation and development can help developers and decision-makers to resolve the complexity of multi-species impact assessments and to identify planning footprints that minimize biodiversity losses.
Our results highlight the currently underutilized opportunities for reducing costly conservation actions by diverting development into lower impact areas.

Noboru Wada Kuramoto

Biography

Studying on the floodplain of the Tama River since 1979. I have been partly successed in the restoration of Aster kantoensis in 2002, but not yet perfectly.

EcoTAS abstract

Aster kantoensis Kitam. is an endangered endemic plant species of the gravelly flood plains of a few eastern central Japanese rivers and is a flagship species of gravelly flood plains.
Reduction in seed sources and habitat might accelerate the decline of its metapopulation. To avoid extinction, we examined the effect of human-aided seed dispersal on an artificial gravelly flood plain, to conserve A. kantoensis and assess its ability to form a new metapopulation.
After 15 years, the metapopulation was still thriving as flooding created new safe sites for seed germination and seedling establishment. Furthermore, small populations of A. kantoensis were found to be thriving in the lower course of the river.
This experiment was conducted in collaboration with institutional administrations, citizens, and scientists. Since maintenance of the first developed artificial gravelly flood plain was difficult, other plants have been densely growing in the area, which has caused a reduction in 1/8 of the original area. Maintenance of a gravelly flood plain is important for retaining the seed source of A. kantoensis, in case a severe flood destroys the existing A. kantoensis

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation

Kuramoto N [1] , Okada H [1] , Ito S [1,2] , Nomura R [2]
[1] School Of Agri., Meiji Univ., Kawasaki Tokyo, Japan
[2] Nature Environment Academy, Fussa Tokyo, Japan

Restoration of a metapopulation of Aster kantoensis Kitam., an endangered floodplain endemic plant in Japan

population. Our restoration success of A. kantoensis population in the artificial gravelly flood plain led to similar restorations near other rivers in Japan. However, there are no floodplain endemic plants thriving in the restored flood plains of the Tama River.
Therefore, it is necessary to inspect all possible effects and identify more efficient ways to apply the existing restoration methods.

Aparna Lal

Biography

I work as an ecologist in population health. My interdisciplinary research program centres on the impact of human-driven environmental change on human infection patterns, with a focus on climate variability and land use practices.

EcoTAS abstract

We need environment-focused public health policies to manage disease risks associated with climate change. By focussing on disease caused by the parasite Cryptosporidium spp., - an infection easily controlled by public health interventions but also strongly linked to environmental conditions through waterborne spread, we systematically review and empirically model the effects of local weather and flooding history on childhood illness, after controlling for seasonality, publication bias, access to improved sanitation, health resources and population density at a global scale. Local rainfall and population density were related with cryptosporidiosis across latitudes as shown by mixed effects, spatio-temporal models for equatorial, sub-tropical and temperate climates. In

Socio-ecological Interactions / Open session
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Wattagan Room
Oral presentation
Lal A [1] , Wilford E [1] , Fearnley E
[1] Australian National University, Canberra Act, Australia
Natural resource managers as custodians of population health

equatorial (0-20°) latitudes, the previous month's rainfall and population density were inversely related with childhood cryptosporidiosis with a significant random effect for flooding history. In tropical-subtropical (20-35°) latitudes, rainfall in December was inversely related with cryptosporidiosis, compared to rainfall in April (the wet season). In temperate latitudes (>35°), reported disease was significantly, negatively associated with population density. We also show that the spatial scale at which natural resources are managed are better at predicting spatio-temporal patterns of cryptosporidiosis reported from 2001-2012 in the Murray-Darling Basin, Australia, compared to the scale at which human health resources are allocated. Together, these findings show that we need models that couple weather conditions with demographic factors to assess disease risks due to environmental change and that the design of prevention strategies should be based on an understanding of biologically relevant spatial scales rather than scales arbitrarily defined by humans.

Michaela Larsson

Biography

Although I primarily work with toxin producing microalgae I am more broadly interested in the distribution of species and their interactions at a community level.

EcoTAS abstract

Some species from the epibenthic marine microalgal genus Gambierdiscus produce potent neurotoxins which can accumulate in the marine food web and cause human

Marine and Freshwater Ecology
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation
Larsson M [1] , Doblin M [1]
[1] University Of Technology Sydney, Sydney NSW, Australia
Marine microalgae on the move: Assessing temperate range extension

illness. The genus usually has a tropical distribution and is known to occur in the Great Barrier Reef in north east Australia. More recently, populations have been reported from more temperate locations. In this study, we used a taxonomic, toxicological and ecological approach to assess the potential of Gambierdiscus to extend its range in eastern Australia. We identified four species of Gambierdiscus from the tropical Great Barrier Reef region and only one at a temperate location. Interestingly, there were intraspecific differences in the toxicology between sites. Fitness curves across environmental gradients of temperature, salinity and irradiance suggest the distribution of Gambierdiscus is not limited by these abiotic factors. Rafting on detached macrophyte fragments, transported south with the East Australian Current was found to be the likely natural long distance dispersal mechanism aiding extension of the distribution into more temperate locations, and successful colonisation was found to require only a single pulse of very few cells. These results suggest, Gambierdiscus has the potential to occupy a much larger range than currently recognised and will need to be managed to mitigate the risk of human exposure to harmful neurotoxins, particularly with changing climate conditions.

of the neurotoxin producing genus Gambierdiscus

Brad Law

Biography

Brad has over 25 years experience working as a Research Scientist on forest wildlife ecology with research sites scattered across NSW. He has a particular interest in bats and tree hollows, but also enjoys working with other taxa.

SYMPOSIUM: Effectiveness monitoring (Part 1)

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

EcoTAS abstract

Landscape monitoring is important for assessing change and the effectiveness of mitigation strategies and landuse. We outline annual biodiversity monitoring in the Pilliga, NSW that was initiated in 2013. The program employs a 5km grid, with multiple sub-plots sampling a 1 km2 neighbourhood at each grid point. A range of methods target different aspects of biodiversity, including diurnal birds, bats and ground fauna. We focus on bats, which are sampled on and off-flyways. Sampling effort was optimised based on pilot studies that recommended activity was a more sensitive measure of change than occupancy. Trends in total activity indicate a decline on-flyways from 2013-2016. Activity was much lower, though relatively constant, off-flyway over this period. Landscape decline in activity on-flyways could not be attributed to harvesting or fire as these were restricted to just 3 of 24 grid points. Comparison of these systematic data with previous sampling on-flyways indicates that activity in 2013 was unusually high and that lower activity in 2016 was comparable to activity recorded pre-systematic monitoring. We explore the relationship between recent rainfall and bat activity over the extended period for which bat activity data was available. We caution against setting a baseline from a single year that could be overly influenced by recent climate and support the program's aim of using the first 5 years as a baseline prior to rotating across additional grid points. Fluctuations in biodiversity span multiple years and this must be accounted for when attributing landscape change to human activities.

Law B [1] , Tap P [2] , Gonsalves L [1] , McConville A [3]

[1] Department Of Industry-Lands And Forestry, Sydney NSW, Australia

[2] NSW Forestry Corporation, Dubbo NSW, Australia

[3] EchoEcology, Crescent Head NSW, Australia

Initial trends from landscape monitoring of biodiversity in Pilliga forests

Andy Le Brocque

Biography

Andy Le Brocque has researched and published in the areas of plant-environment relationships and biodiversity in agricultural landscapes for over 20 years. He also teaches courses in ecology, conservation biology, environmental science and sustainability at the University of Southern Queensland.

EcoTAS abstract

Climate change is expected to increase the intensity of drought in many parts of the world with potentially significant consequences for grasslands. Grassland resilience will depend on its resistance to degradation during drought and ability to recover. We examined the response of grassland biomass to the millennium drought (2002-2010), with rainfall deficits comparable to the hottest and driest climate change scenarios projected for 2030. Following the drought, extreme rainfall occurred in 2010-2011. This juxtaposition between intense and protracted drought and subsequent intense rainfall phase allowed investigation of grassland resistance to drought and recovery in more favourable conditions.

We analysed 2,549 grassland sites in the Darling Downs, Queensland using remotely sensed Enhanced Vegetation Index (EVI) data. We modelled trends in a prolonged drought (resistance) and subsequent wet phase (recovery) as a function of hydro-climatic and land use drivers, using boosted regression trees (BRTs), to determine drivers of grassland resistance and recovery.

Multiple factors explained trends in EVI for both resistance (CVpred/obs. = 0.69) and recovery (CVpred/obs. = 0.61).

SYMPOSIUM: Vulnerability and resilience of grasslands in Oceania to climate change

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Le Brocque A [1] , Kath J [2] , Reardon-Smith K [2] , Apan A [1,2]

[1] Faculty of Health, Engineering & Sciences, University of Southern Queensland, Darling Heights QLD, Australia

[2] Institute for Agriculture and the Environment, University of Southern Queensland, Darling Heights QLD, Australia

Drivers of grassland resistance and recovery to long term drought

During drought, resistance decreased as the proportion of agriculture increased and woody vegetation decreased. In contrast, there was little relationship with agriculture during recovery and increased woody vegetation had a negative relationship with recovery. High levels of soil moisture corresponded to both increased resistance and recovery. The drivers we examined had differential effects for grassland resistance and recovery, which may have implications for the ongoing resilience of these systems under future climate change.

Mark Le Pla

Biography

Mark is an early-career Ecologist assisting in the delivery of the Conservation Ecology Centre's research program. Mark has undertaken ecological work throughout Australia for several organisations and is particularly interested in applied ecological projects that help inform land management planning.

EcoTAS abstract

In 2016, researchers from five different institutions worked in the Otway Ranges on a range of projects relating to threatened species. However, there was very little if any collaboration or communication between institutions and a large amount of the data being collected was not being made readily available to other researchers.
In order to address this challenge, the Conservation Ecology Centre facilitated the assembly of a network of researchers, land managers and NGO’s operating in the Otways. A key achievement of this network has been the

Conservation Biology (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #2
Speed Talk PLUS Poster
Le Pla M [1] , Pascoe J [1] , Di Stefano J [2] , Swan M [2] , Penman T [2]
[1] Conservation Ecology Centre, Cape Otway VIC, Australia
[2] University of Melbourne, Fire Ecology and Biodiversity Group, Creswick Victoria, Australia
Fine-scale species distribution models for land-management planning and research prioritisation in the Otways.

creation of a threatened species spatial database with approximately 11,000 records.
Working with our research partners, the University of Melbourne, we used the records from our new database to develop a series of species distribution models (SDMs) for all threatened ground dwelling mammals in the Otways. This presentation will compare our SDMs with more widely available state-wide models to highlight the value of comprehensive regional data sets. By distributing these outputs throughout the newly created network, these SDM's have the capacity to focus research efforts in the region and will play a vital role in land management planning into the future.

Gabrielle Lebbink

Biography

I completed my undergraduate degree in science (ecology and zoology majors) and have recently commenced my PhD at the University of Queensland. My ecological interests are varied, but I am particularly drawn to the arid zone and plant community ecology.

EcoTAS abstract

The invasion of exotic grasses into native vegetation can lead to significant declines in native species diversity, increased habitat fragmentation and loss of ecological function. In Australia, the spread of exotic grass species is being actively assisted by the establishment of exotic grasses for pasture, lawn or for the rehabilitation of degraded land. Since its introduction in the 1930s, the exotic grass Indian couch (Bothriochloa pertusa) continues

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Lebbink G [1] , Fensham R [1,2] , Dwyer J [1]

[1] University Of Queensland, St Lucia, Brisbane QLD, Australia

[2] Queensland Herbarium , Mnt Coot-tha, Brisbane QLD, Australia

Factors determining the spread and impact of the exotic grass Bothriochloa pertusa (Indian couch).

to spread widely throughout north-east Australia and is of growing concern for both pastoral production and conservation management. Despite the broad geographical range of the issue, relatively little is known about the ecology of the species, the factors driving its expansion, and its influence of native species diversity and composition. We aim to address these knowledge gaps by 1) mapping and analysing changes to the spatial extent of B. pertusa over time in relation to relevant predictors; 2) quantifying the relationships between B. pertusa cover and native species diversity and composition across space and time; 3) Experimentally assess the relative importance of land management and competition from B. pertusa on plant species composition. These findings can be used to inform management for both conservation and pastoral imperatives by helping to predict invasion success and limit the spread of B. pertusa. More broadly, findings will contribute to our understanding of community assembly and the dynamic interactions which occur between exotic and native species.

Heather Lee-Kiorgaard

Biography

Heather Lee-Kiorgaard is an honours student in the Integrative Ecology Lab at the University of Sydney. Her research interests include restoration ecology and environmental management, urban ecology and insect-plant interactions.

EcoTAS abstract

Restoration is an important management tool within a growing urban matrix, where remnant vegetation

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation
Lee-Kiorgaard H [1] , Hochuli D [1]
[1] University Of Sydney, Sydney NSW, Australia
When invasion meets restoration: ant responses to African Olive in an

communities are exposed to invasion risk due to fragmentation and disturbance. This study focused on the critically endangered Cumberland Plain Woodland, currently facing extensive invasion by African Olive, Olea europaea subsp. cuspidata. We aimed to develop a mechanistic understanding linked with a measure of invertebrate ecological function at a finer scale. We assessed the effects of African Olive invasion on the diversity of ant communities and seed dispersal by ants, identifying the mechanisms driving changes. We also determined whether passive regeneration of groundcover following mechanical removal of African Olive restored habitat traits, ant functional diversity, and seed dispersal rates, that were more similar to that of reference sites than post African Olive removal sites where dense planting of understory and shrub species had been undertaken.

Changes to the habitat structure and thermal traits of remnants as a result of African Olive invasion were expected to reduce ant diversity and ecological resilience. The standard practice of dense revegetation with characteristic tree and shrub species may not be applicable to re-establishing the extant vegetation structure of open grassy woodland remnants, with consequences for the functional diversity and seed dispersal of the ant community. This highlights the need for restoration strategies to consider the structural attributes of specific ecological communities as well as species identity.

endangered ecological community

Catherine Leigh

Biography

Open session (2)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM

Dr Leigh is a community ecologist and emerging leader in her field. Her research increases understanding of biodiversity patterns and dynamics, and processes driving functioning socio-ecological systems. She is passionate about riverine ecosystems and understanding ecological responses to environmental perturbations.

EcoTAS abstract

Intermittent rivers and ephemeral streams (IRES) stop flowing at some point in time and space, creating shifting mosaics of aquatic and terrestrial habitats. Arguably Earth's most widespread type of flowing water, IRES are increasing in prevalence where climates dries and human demands for water escalate. Many are becoming more 'terrestrial', while some more 'aquatic'. These ecosystems tend to be undervalued by society and pose challenges for management and monitoring, placing their restoration or protection from human impacts at risk, and consequently jeopardizing their provision of ecosystem services. Unfortunately, the provision of ecosystem services by IRES is poorly understood. We conceptualize how flow intermittence may govern ecosystem service provision and transfers during flowing and non-flowing (aquatic) and dry (terrestrial) phases. Services mediated by biota (e.g. filtration and sequestration) are especially altered by flow intermittence, whilst most cultural services continue to be provided across all aquatic and terrestrial phases, attesting to the cultural importance of IRES even when dry. Yet failure to fully consider trade-offs may result in exploitation of one service, often a provisioning one, to the detriment of others, typically regulating and cultural. Our framework suggests these problems may be exacerbated in IRES when temporal and spatial patterns of intermittence are altered. This work provides a platform for directing future research across the aquatic-terrestrial divide along with a

Bimbadeen Room

Oral presentation

Leigh C [1] , Boulton A [2] , Bonada N [3] , Fritz K [4] , Sauquet E [5] , Tockner K [6] , Hugueny B [7] , Dahm C [8] , Datry T [9]

[1] Australian Rivers Institute and Griffith School of Environment, Griffith University, Nathan QLD, Australia

[2] School of Environmental and Rural Science, University of new England, Armidale NSW, Australia

[3] Grup de Recerca Freshwater Ecology and Management (FEM), Facultat de Biologia, Universitat de Barcelona, Barcelona Catalonia, Spain

[4] National Exposure Research Laboratory, U.S. Environmental Protection Agency, Cincinnati Ohio, USA

[5] Irstea, UR HHLY, Centre de Lyon-Villeurbanne, Villeurbanne, France

[6] IGB, Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Freie Universität Berlin, Berlin, Germany

[7] UMR "BOREA" CNRS, Museum National d'Histoire Naturelle, Paris, France

[8] Department of Biology, University of New Mexico, Albuquerque New Mexico, USA

much needed socio-ecological perspective for assessing impacts of altered flow regimes and comparing strategies to manage IRES in the Anthropocene, along with their ecosystem services.

[9] Irstea, UR MALY, Centre de Lyon-Villeurbanne, Villeurbanne, France

Ecosystem services of 'terrestrial' rivers of the Anthropocene

Rachel Leihy

Biography

Rachel Leihy is currently a PhD student at Monash University, studying spatial and temporal trends in Antarctic and sub-Antarctic biodiversity and how this knowledge can inform conservation outcomes.

EcoTAS abstract

Understanding spatial variation in the species richness and turnover of biotic assemblages is essential to the management of alien species and for the conservation of native communities. Island systems are particularly well suited for studying species turnover, as they are discrete units from which ingress and egress pathways can be realistically monitored. In this talk, we apply a new incidence-based turnover metric, zeta-diversity (ζi), to the insect and vascular plant assemblages of the Southern Ocean Islands, including the Australian and New Zealand sub-Antarctic islands. Zeta-diversity analyses exploring the change in species similarity with sample number (zeta-decline) and geographic distance between sites (distance decay in similarity) are applied to four well-known focal assemblages: indigenous insects, alien insects, indigenous plants and alien plants. We estimate and compare the relative contributions of stochastic and niche-based processes to diversity variation. We find that while

Community Ecology

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Cypress #3

Oral presentation

Leihy R [1] , Duffy G [1] , Chown S [1]

[1] Monash University, Melbourne VIC, Australia

Differing processes structure alien and indigenous assemblages on sub-Antarctic islands

indigenous insect assemblages are driven by stochastic processes, niche-differentiation processes dominate plant structuring. Analyses of alien insect and plant assemblages indicate the dominance of niche processes on introduced assemblage structure. The influence of niche filtering processes on alien assemblages indicates that, via human-mediated transport pathways, introduced species can overcome the stochastic environmental flows associated with long distance dispersal. Combined with revised analyses of the drivers of species richness variation, these findings provide means to improve guidance for management through surveillance.

Michelle Leishman

Biography

Michelle is a plant ecologist whose research focuses on invasive species, climate change impacts and adaptation, threatened species and communities, and facilitating urban green space.

EcoTAS abstract

The impacts of climate change present a significant threat to global biodiversity and will affect a range of organisational levels, from individual species to whole ecosystems. Threatened species and ecological communities are particularly at risk because they generally possess characteristics that increase the risk of extinction due to climate change. We used the ‘red list’ of threatened species and ecological communities in New South Wales, Australia, as a case-study to assess the risk of extinction

SYMPOSIUM: Novel management interventions for threatened species
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Wattagan Room
Oral presentation
Leishman M [1] , Hancock N [1] , Laws C [1]
[1] Macquarie University, North Ryde NSW, Australia
Assessing and managing climate change threats to threatened species and ecological communities

associated with climate change. We found only 11% of listed threatened species and 22% of threatened ecological communities had climate change identified as a threat. More than half of the species that had climate change identified as a threat were plant species, but when grouped by taxa, marine mammals (40%, n=5) and amphibians (37%, n=19) had the highest percentage of species. We then developed a decision-support framework to guide the selection of management sites for threatened species that aims to maximise resilience of threatened species to climate change. The framework is a two-step process that assesses species at the range-level and site-level, and prioritises site selection for conservation management.

Emrys Leitch

Biography

Emrys studied at the University of Adelaide. He has worked extensively in the arid and semi-arid zone across Australia. Emrys is interested in understanding how landscape processes including fire, grazing and invasive species affect vegetation communities

EcoTAS abstract

TERN's AusPlots program now has over 530 plots spread through all of Australia's major rangeland biomes and spanning major temperature and rainfall gradients that reach into more temperate areas. The methods used provide comprehensive data on soil physico-chemical attributes, vegetation composition and structure as well as plant leaf tissue, soil metabarcoding and pressed plant samples. All of the data and samples from these sites has

Ecological Modelling (1)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Sugarloaf Room
Oral presentation
Leitch E [1] , Sparrow B [1] , Macdonald C [1] , O'Neill S [1] , Tokmakoff A [1] , Guerin G [1]
[1] TERN AusPlots, University of Adelaide, Adelaide SA, Australia
Putting AusPlots data and samples to work

now been published and all of the samples are accessible to researchers. In this presentation we detail some of the work that is being undertaken using this data and the associated physical samples and outline what the possibilities are in regards to future work. Building the temporal depth of the data through a program of revisits to existing sites will also become a key focus of the program going forward and we will discuss the possibilities that this data will present.

Pia Lentini

Biography

Pia is a Research Fellow with the Quantitative and Applied Ecology Group at The University of Melbourne.

EcoTAS abstract

Many threatened species persist only as relict populations occupying a fraction of their former distribution, in habitats which may not be optimal. Following population growth of one such species, the kakapo (Strigops habroptilus), conservation managers are faced with the challenge of identifying suitable locations for reintroduction. Areas which support habitat conditions typical of those occupied by kakapo in the past have the greatest potential to support future populations. We collated occurrences of kakapo from recent fossil records, then used MaxEnt to model the past distribution of kakapo across New Zealand, and contemporary areas suitable for reintroductions based on extant habitat and present-day climate. We validated our models against three independent data sets of the most recent relict populations. Our models suggest that kakapo

Conservation Biology (3)

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Cypress #2

Oral presentation

Lentini P [1] , Stirnemann I [2] , Stojanovic D [2] , Worthy T [3] , Stein J [2]

[1] School of BioSciences, The University of Melbourne, Parkville Vic, Australia

[2] Fenner School of Environment and Society, The Australian National University, Canberra ACT, Australia

[3] School of Biological Sciences, Flinders University, Adelaide SA, Australia

Using historic distributions to inform management of the kakapo as a refugee species

once occurred in mountain beech and Hall's totara or broadleaf forests with moderate to high precipitation and milder winters. Areas predicted to be environmentally suitable for kakapo in contemporary New Zealand include the west coast of the South Island, the west and north-east of the North Island and the southern side of Lake Taupo. Assuming that known threats of introduced predators can be managed, our study suggests that suitable kakapo habitat persists in New Zealand, and here we offer insight into locations for future population establishment. Given the finite carrying capacity of offshore islands, this is an important first step which will enable kakapo managers to prioritise focal areas and also highlights the benefits and potential pitfalls of using these modelling approaches for refugee species.

Ryan Leonard

Biography

Ryan Leonard is currently a PhD student in the Integrative Ecology Lab at The University of Sydney, looking at the effects of air pollution on honeybee behaviour and memory.

EcoTAS abstract

Roads lie at the heart of social and economic development; however, their presence also has significant ecological impact – degrading habitat, changing wildlife behaviour and increasing wildlife fatality. Our understanding of how roads affect ecological processes and the mitigation efforts needed to offset these impacts continues to grow. Despite this, very little research to date has focused on the impact of one critical factor – air pollution from vehicle and road use. Here, we highlight the extent of this bias, using a

Urban Ecology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Bimbadeen Room
Oral presentation
Leonard R [1] , Hochuli D [1]
[1] The University of Sydney, Sydney NSW, Australia
Exhausting all avenues: why impacts of air pollution should be part of road ecology

systematic review of 161 road ecology articles spanning years 2000-2016. We show that, despite a clear mechanistic understanding of how air pollutants affect individuals, we are yet to fully appreciate the role vehicle and road borne air pollution has in affecting the myriad biota encountering roads, and the spatial extent of these effects. We provide a new conceptual framework for future studies and emphasize the dynamic perspective air pollution will bring to road ecology. Ultimately, failing to include air pollution will result in an incomplete representation of the impact that roads have, and likely diminish the effectiveness of mitigation strategies.

Andrew Letten

Biography

My research aims to bridge outstanding gaps between theory and empiricism in understanding the role of environmental variability in maintaining biodiversity. Plant communities have been a pre-occupation in the past but I currently spend more time with their floral microbes.

EcoTAS abstract

Mechanisms affecting species coexistence in fluctuating environments can be classified into two groups: the temporal storage effect and relative non-linearity of competition. Most empirical studies have focused on identifying these mechanisms in isolation, even though they likely operate in unison. We studied the two mechanisms together using nectar-colonizing yeasts as a model system. In floral nectar, yeasts inhabit a dynamic environment where they experience large variability in osmotic stress

Community Ecology

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Cypress #3

Oral presentation

Letten A [1,2] , Dhami M [1,3] , Ke P [1] , Fukami T [1]

[1] Stanford University, Stanford California, United States

[2] University of Canterbury, Christchurch Canterbury, New Zealand

[3] Landcare, Lincoln Canterbury, New Zealand

Environmental variability and non-linear responses to competition interact to affect species coexistence in nectar yeasts

and resource availability as they disperse from flower to flower. Given trade-offs in tolerance of osmotic pressure, and saturating responses to resource availability, the two mechanisms are both expected to affect coexistence. To test this hypothesis, we quantified the growth responses of the four most ubiquitous yeast species isolated from a hummingbird-pollinated shrub to different combinations of sucrose and amino-acids in nectar. We then fitted response curves to parameterise and simulate models of resource competition under sucrose and amino acid variability. We used the simulation results to make predictions on competitive outcomes and to quantify the combined influence of the temporal storage effect and nonlinearity on coexistence. We found that the four species varied in their responses surfaces, but also had a strong competitive hierarchy. Despite the competitive hierarchy, simulation results indicated that variability in sucrose and amino-acid concentrations across flowers would allow several pairs of species to coexist via the combined influence of temporal storage effect and relative non-linearity. Competition experiments are currently underway to test this prediction. Our results illustrate the importance of studying multiple coexistence-affecting mechanisms in concert.

Shaun Levick

Biography

Shaun Levick is a landscape ecologist who integrates 3D remote sensing and geospatial modelling to address environmental challenges. His research programme focuses on the structure and dynamics of savanna landscapes in Australia, South Africa and Brazil.

Global Change
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation

EcoTAS abstract

Fire regimes across the globe have been altered through changes in land-use, land management and climate conditions. Understanding how these changes impact vegetation structure and dynamics is essential for informed biodiversity and carbon management in frequently burnt savanna ecosystems. We used a long-term fire experiment at the Territory Wildlife Park (TWP), northern Australia, to investigate the consequences of altered fire regimes for habitat structure and aboveground carbon storage. We mapped vegetation three-dimensional (3-D) structure in high spatial resolution with airborne LiDAR, across replicated 1 ha plots of varying fire frequency and season. We used LiDAR-derived canopy height and cover metrics to extrapolate field-based measures of woody biomass to the full extent of the experimental site (R^2 = 0.78, RMSE = 8.33 t C/ha). Woody canopy cover and biomass were highest in the absence of fire (76 % and 39.8 t C/ha) and lowest in plots burnt late in the dry season on a biennial basis (42 % and 18.2 t C/ha). Woody canopy vertical profiles differed among all six fire treatments, with greatest divergence in the lower height classes (<5m). Our results provide insight into the extent to which fire management can shape 3-D structural integrity in savanna landscapes, which has important implications for faunal habitat conservation and aboveground carbon storage.

Levick S [1,2] , Richards A [1] , Cook G [1] , Schatz J [1] , Subedi P [2] , Guderle M [3] , Trumbore S [3] , Andersen A [2]

[1] CSIRO Land and Water, Winnellie NT 0822, Australia

[2] Research Institute for the Environment and Livelihoods, Charles Darwin University NT 0909, Australia

[3] Max Planck Institute for Biogeochemistry, Jena 07745, Germany

Rapid response of habitat structure and woody biomass to altered fire regimes in tropical savanna

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Ximeng Li

Biography

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Ximeng Li is a PhD candidate at Western Sydney University. His work mainly focus on identifying traits underlying drought related tree mortality across NSW.

EcoTAS abstract

Hydraulic traits involved in plant drought tolerance have been identified as key factors that determine the growth, distribution and survival of plants. However, detailed information is still lacking on the interplay of various traits, as well as their relationship to climate, which represent one of the major knowledge gaps hampering the projection of forest fate in the context of climate change. We investigated variation in hydraulic traits of twelve species native to five vegetation types across NSW. Leaf turgor loss point (TLP), stomatal closure threshold (Pgs), xylem vulnerability to cavitation (Px) as well as whole branch capacitance (Cbranch) were measured. The coordination among multiple traits as well as the relationship between hydraulic traits and climate were examined. The potential for trade-offs between carbon economic traits and hydraulic traits were also explored. Traits conferring plant drought tolerance were highly coordinated across species. Trade-offs were found among hydraulic traits denoting safety, efficiency, storage and support, and between hydraulic and carbon economy traits. Sensitivity of stomata and xylem cavitation to drought were strongly related to climatic variables characterizing rainfall in the native distributional range. Results of this study highlight the critical role of climate in determining plant hydraulic coordination in native tree species. Furthermore, trade-offs between plant carbon economy and hydraulics are important aspects that shape the overall growth strategy.

Monday, November 27, 2017
11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Li X [1] , Blackman C [1] , Choat B [1] , Duursma R [1] , Medlyn B [1] , Tissue D [1]

[1] Western sydney university, Sydney NSW, Australia

Plant hydraulic traits are co-ordinated and strongly linked to climate of origin

Samantha Lloyd

Biography

Dr Sam Lloyd has 18 years experience in fire, ecology, entomology, community engagement and natural resource management, graduating from Wollongong University with a PhD in 2006. Sam has Managed the South East Queensland Fire and Biodiversity Consortium since 2010.

EcoTAS abstract

Hosted and coordinated by the South East Queensland Fire and Biodiversity Consortium, Bushfire 2016: Connecting Science, People and Practice was a national conference held on 28 - 30th September, at the University of Queensland. Bushfire 2016 aimed to connect fire scientists, ecologists and students with onground fire operators, land managers and other fire professionals whilst showcasing applied fire ecology, management and collaborative fire projects. Bushfire 2016 featured three keynote speakers, panel discussion and 74 presentations across ten themed symposia, over two days of concurrent sessions, with a poster session Wednesday evening, dinner Thursday night and field trips on the Friday. Bushfire 2016 received impressive support with ten official sponsors and eight trade/promotional partners. In particular, Gold Sponsors Fireland Consulting, Healthy Land and Water and the University of Queensland are gratefully acknowledged. Bushfire 2016 was a tremendous success, attracting over 330 people from every Australian state and territory. The conference had a strong indigenous focus with twelve indigenous presentations and travel grants for presenters. Attendee response was overwhelmingly positive, with 75% of surveyed attendees reporting their experience as “extremely positive”. Respondents nominated networking opportunities 40% (45/112); presentation content 19%

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Speed Talk PLUS Poster

Lloyd S [1] , Welden C [1]

[1] South East Queensland Fire & Biodiversity Consortium, Brisbane QLD, Australia

Bushfire 2016: Connecting Science, People and Practice

(29/112); presentation and presenter diversity 16% (21/112) and the indigenous session 12.5% (14/112) as highlights. The conference success can be summed up in the following two comments “I liked your approach of reaching out to the grassroots while engaging scientists and academics at the same time” and “I learnt something at every session I attended”. Preparations are currently underway for Bushfire 2019.

Michael Lohr

Biography

Michael Lohr is a PhD candidate at Edith Cowan University studying the effects of urban and agricultural habitat fragmentation on Southern Boobooks focusing on anticoagulant rodenticides, genetic diversity, nest hollow availability, and prevalence of the parasite Toxoplasma gondii.

EcoTAS abstract

Secondary poisoning of non-target wildlife species by anticoagulant rodenticides has been widely documented in North America, Europe, and New Zealand but its prevalence and impacts have not been measured and assessed in Australia. The APVMA has currently scheduled a review of some rodenticides due to concerns over human health and safety. Testing of Southern Boobooks (Ninox boobook) for eight rodenticides across a variety of habitat types and locations in Western Australia has revealed substantial exposure in urban and semi-urban environments with up to five different rodenticides detected in some individuals. More persistent second-generation products were most commonly detected and were directly

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Lohr M [1]
[1] Edith Cowan University, Joondalup WA, Australia
Silent Night: Prevalence and Implications of Anticoagulant Rodenticide Exposure in Southern Boobooks

implicated in the deaths of some boobooks. Pindone – which is widely used for rabbit control in Western Australia – was not detected in any boobooks suggesting that government rabbit control programs are not having a substantial impact on boobook populations in urban areas. The rodenticides flocoumafen and difethialone are not currently available for retail sale but were detected in boobook samples indicating that at least some proportion of rodenticide exposure occurred as a result of professional pest control activities. Boobooks are dietary generalists and as such are less likely to be impacted by secondary rodenticide poisoning than scavengers and species with a higher proportion of rodents in their diet. These findings have important implications for the persistence and re-introduction of many omnivores and carnivores in urban and semi-urban environments across Australia and the ecosystems which depend on their continued presence.

Richard Loyn

Biography

Richard worked as an ecologist for the Victorian Government to 2013, then La Trobe University and established Eco Insights. His main interests are in fauna conservation and the ecology of forests, fire, wetlands and threatened species.

EcoTAS abstract

The Western Treatment Plant treats wastewater for half of Melbourne (~5 million residents). The site covers 10,500 ha of coastal habitats, listed under the Ramsar Convention and protected under Australian legislation. It attracts

SYMPOSIUM: Effectiveness Monitoring (Part 2)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Sugarloaf Room
Oral presentation

thousands of waterfowl, shorebirds, cormorants and ibis, and provides habitat for the Critically Endangered Orange-bellied Parrot. Waterbirds have been monitored systematically since 2000 to determine the impact of a major treatment upgrade aimed at reducing nutrient input to the adjacent sea. The plant attracts over 100,000 waterfowl (up to 70% of ducks counted in Victoria), with numbers fluctuating inversely to water availability inland. Modelling showed that waterfowl and shorebirds benefit from nutrient enhancement of the treatment ponds and adjacent tidal mudflats. Waterbirds remained numerous after the upgrade but one important section of the plant (Lake Borrie) supported fewer birds. Consequently three major engineering projects were undertaken to enhance habitat quality, along with a broader conservation program. A new pipeline was built to deliver partly treated sewage to Lake Borrie. Multiple outlets were built to distribute treated sewage from Lake Borrie more effectively on tidal mudflats. An old lagoon was opened to the sea to restore saltmarsh habitat for the parrot and other saltmarsh birds. Preliminary results show benefits for waterbirds, while meeting water quality standards. Active collaborations between managers, scientists, engineers and the community have been the key to success. Sensitively managed treatment plants can play important roles in waterbird conservation, especially when actions are taken to address opportunities revealed by effectiveness monitoring.

Loyn R [1] , Rogers D [2] , Menkhorst P [2] , Swindley R [2] , Stamation K [2] , Haynes S [3] , Steele W [3]
[1] Eco Insights, Viewbank VIC, Australia
[2] Arthur Rylah Institute for Environmental Research, Heidelberg VIC, Australia
[3] Melbourne Water, Melbourne VIC, Australia

Management solutions responding to effectiveness monitoring at a Ramsar-listed wastewater treatment plant.

Sarah Luxton

Biography

Community Ecology
Tuesday, November 28, 2017
1:30 PM - 3:30 PM

Sarah Luxton is a PhD student at Curtin University, Western Australia. She is interested in how prepared databases can be used to understand vegetation dynamics and inform conservation planning under climate change.

EcoTAS abstract

Refuges have become an important ecological concept under climate change. To identify refuges conceptual and technical limitations must be overcome. Conceptually, a refuge is relative to the system of interest. In the Mediterranean jarrah forest of south-western Australia rainfall has decreased 15-20% and temperate increased 0.4% since mid-1970, resulting in decreased surface runoff, a falling water-table and shifts from perennial to ephemeral streams. It is predicted that riparian vegetation will contract into refuges under continued drying, but to what degree and where is yet to be quantified. A large floristic dataset collected by Alcoa of Australia (30000 plots, 432 km²) enables community-level vegetation modelling at the within-landscape scale. Twelve site-vegetation types (SVT's) have been mapped, ranging in abundance from a major upland type (S – 13000 plots: heavy gravels on slopes, ridges and plateaus, Eucalyptus marginata) to less abundant but floristically important moisture-related types (i.e. W – 1400 plots: moist sandy loams, lower slopes and valley floors, E. megacarpa and E. patens). Fine-scale topographic data (30 m) enables modelling of SVT's relative to wetness indicators. Initial tests have found modelled types to have robust accuracy (76%) and separate vegetation into distinct upland (dry) and lowland (riparian) types. Topographic wetness, longitude, slope and aspect are key significant drivers of SVT differentiation. Testable hypotheses regarding the location, thresholds and taxa indicating refuges can be generated based on automated types. Ultimately, the spatial location of potential

Cypress #3

Oral presentation

Luxton S [1] , Wardell-Johnson G [1] , Robinson T [1] , Trotter L [1] , Sparrow A [2] , Grigg A [3]

[1] Curtin University, Perth WA, Australia

[2] CSIRO, Floreat WA , Australia

[3] Alcoa of Australia Ltd, Huntly WA, Australia

Automating vegetation types: a step towards identifying refuge's in the Mediterranean forests of south-western Australia

refuges can be mapped - providing essential information for conservation planning and management in the forest.

Pete Lyon

Biography

Pete Lyon, from the Environmental Resources Information Network, works on spatial information and analytics for the Department's biodiversity conservation activities. Fiona Dickson works in the Biodiversity Conservation Division managing several research activities including the collaborative CSIRO-DoEE Biodiversity Knowledge Projects.

EcoTAS abstract

This presentation will outline current & emerging policy/program priorities relating to the Department of Environment and Energy's biodiversity conservation and data management objectives and discuss what ‘ecosystem surveillance monitoring’ means to the organisation. Improving our national environmental monitoring capability is critical for a range of activities such as environmental accounting, State of the Environment reporting, better targeting our interventions and reporting on investment effectiveness. We face some significant challenges. For example, in building a national approach to environmental accounting, key challenges exist both in defining the roles of a wide range of stakeholders, as well as in presenting the data inputs and the relative values of data types within an accounting frame.

To overcome such challenges, it is essential to build

SYMPOSIUM: Enabling Ecosystem Surveillance Monitoring across Australia – putting ecology to work

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Lyon P [1] , **Dickson F** [1]

[1] Australian Government, Department of the Environment and Energy, Canberra ACT, Australia

What does Ecosystem Surveillance Monitoring mean within the Commonwealth Department of the Environment and Energy?

environmental information architectures which clearly describe data sources and flows, identify knowledge gaps and drive collaborative information development within a unified conceptual framework. The Australian Ecosystem Models Framework, being co-developed with the ecosystem science community, CSIRO and the Department is designed to provide this missing architecture. This framework will collate, synthesise and summarise scientific knowledge about ecosystem dynamics within a national set of dynamic ecosystem models. The models will describe the dynamic characteristics and drivers of Australian ecosystems in their natural and non-natural states, and will underpin an integrated, network-style knowledge management system that can incorporate additional understanding of ecosystem dynamics over time, including ecosystem responses to climate change.

Mitchell Lyons

Biography

Mitchell is a statistical ecologist interested in developing and testing new and modern methods in a range of environmental modelling, monitoring and mapping applications.

EcoTAS abstract

Recent development of model-based approaches in multivariate ecology have spurred application to traditional vegetation classification and mapping problems. This talk presents two applications where model-based approaches have been particularly valuable, both readily implemented via R packages. Firstly, assessing and choosing among

Ecological Modelling (Plants)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Sugarloaf Room

Oral presentation

Lyons M [1] , Foster S [2] , Keith D [1] , Kingsford R [1] , Warton D [1]

[1] UNSW Australia, Sydney NSW, Australia

[2] CSIRO, Hobart TAS, Australia

Model based approaches for vegetation classification and mapping

competing clustering solutions. A ‘good’ vegetation classification should provide information about the composition and abundance of species within clusters. Predictive models are a natural way of formalising this idea. We use a simple generalised linear model framework with cluster membership as the predictor and multivariate species data as the response. Predictive performance allows us to: i) choose the optimal partitioning of sites; ii) identify the species that contribute most to compositional differences (i.e. characteristic species); and iii) guide classification refinement based on floristic ‘distinctiveness’. We demonstrate this procedure on various clustering solutions for an example data set with ~500 sites and ~700 species, as well as simulated data sets. The second application is classification and mapping at large spatial scales. Multivariate mixture models offer a streamlined approach to a traditionally two-stage process (i.e. ‘cluster-then-predict’), potentially tightening the link between description of biodiversity patterns and their depiction in space. We use a mixture modelling framework that incorporates latent variables to simultaneously model both species and environmental data. The model probabilistically classifies observations into groups, and then those groups are predicted out into the unsampled (i.e. without species observations) environmental and geographic space. We demonstrate this model on a data set of ~50,000 sites and ~500 species across New South Wales.

Le Ma

Biography

Marine and Freshwater Ecology
Tuesday, November 28, 2017

I'm a PhD student in the area of aquatic science. My PhD program is about the conservation of Carter's Freshwater Mussel, Westralunio carteri, the only freshwater mussels in the south-western Australia.

EcoTAS abstract

Freshwater mussels (Unionoidae) are crucial ecological “generalists” in freshwater systems. Carter’s Freshwater Mussel, Westralunio carteri, is the only species of Unionoidae in the south-west of Australia, where it is endemic. This species has been listed as Vulnerable (A2c) under the IUCN Red List and local environmental legislation. The population demographic characteristics of W. carteri were examined in 17 river systems. The mean density of W. carteri over all sampling sites was 28.20±3.722 mussels/m2. All populations had roughly similar age distributions, with more than half of the population below middle age and evidence of juvenile recruitment. Mussels were significantly aggregated with a very high Lloyd’s Patchiness Index of 3.65 (m*/m >> 1), and this appeared to be in response to a number of microhabitat variables, including substrate grain size, water depth, debris size and current velocity. Furthermore, aggregation was greater in larger mussels than in smaller mussels.

4:00 PM - 6:00 PM
Cypress #2
Oral presentation
Ma L [1] , Lymbery A [1] , Morgan D [1] , Beatty S [1]
[1] Murdoch University, Murdoch Wa, Australia
The demography of the freshwater mussel, Westralunio carteri, in south-western Australia

Ying Ma

Biography

My research interest is quantifiying water and nitrate fluxes between interfaces of Soil-Plant-Atmosphere continumn (SPAC) using field experiments, isotope tracing and

Agro Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #2

modeling methods. I have published over 30 papers and make presentations or posters in AGU, EGU, and GSA meetings.

EcoTAS abstract

Irrigation and fertilization jointly affect evapotranspiration (ET) and root water uptake in the water cycle of the Soil-Plant-Atmosphere Continuum (SPAC). Accurately partitioning ET into transpiration through crop (T) and evaporation from the soil (E), coupled with quantifying water uptake sources are challenging but critical to improve water use efficiency (WUE). In this study, isotopic and hydrometric measurements were combined to determine seasonal variation in ET partitioning of winter wheat under different irrigation and fertilization treatments in Beijing, China during 2014 and 2015. The contribution of soil water at different depth to water uptake was quantified using dual stable isotopes (D and 18O) and the MixSIAR Bayesian mixing model. The fraction of T in ET (FT) in the total season was in average of 81.8%. However, it varied little among different treatments and seasons ($p > 0.05$). The total T in jointing-heading and heading-filling periods (Tjh) rather than the FT performed significant quadratic correlation with both crop yield and the WUE ($p < 0.01$). When Tjh reached 136 mm, the irrigation and fertilization schedule was optimal in experimental seasons. The designed wetting layer should be controlled in 0-70 cm in accordance with the primary water uptake depth to avoid deep percolation. 140 mm of irrigation and 105 kg ha-1 N of fertilization could be saved using the optimal schedule with respect to the referencing schedule during winter wheat growing season. The present study presented scientific insights into improving agricultural water and fertilization management practices.

Oral presentation

Ma Y [1]

[1] Institute Of Geographic Sciences And Natural Resources Research, Chinese Academy Of Sciences, Beijing Beijing, China

Evapotranspiration partitioning and water use efficiency of winter wheat under different irrigation and fertilization treatments

Cate Macinnis-Ng

Biography

Cate Macinis-Ng is senior lecturer and Rutherford Discovery Fellow in the School of Biological Sciences at the University of Auckland. She is interested in the impacts of climatic conditions on ecosystem function of native forests.

EcoTAS abstract

The forest ecosystems of Aotearoa-New Zealand are globally significant for their high proportion of endemic species and their symbolic place in our cultural heritage. Increasing threats to forests include pathogen attack (such as Phytophthora agathidicida causing kauri dieback and new arrival myrtle rust) and climatic extremes such as fire weather, floods and drought. The information available on the severity and distribution of these different threats is very limited. However, as the most severe and widespread drought in 70 years, the 2013 dry spell acts as a perfect natural experiment of drought vulnerability for native forests. We are using remote sensing and interpolated soil moisture data to define the impact of drought on forest ecosystems across the country. We have selected eight forest sites representing a range of forest ecosystems. Selection was based on reported sightings of dead trees and other indicators such as water catchment areas. Normalised difference vegetation index (NDVI) derived from archived MODIS and Landsat datasets will be used to quantify decline in vegetation vigour during the 2013 drought in comparison to wetter and average years. Where an impact is detected, we will also look at recovery of the forest. This research will help us identify which forest types might be more or less vulnerable to drought-induced

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? – part 2

Monday, November 27, 2017

3:45 PM - 5:45 PM

Wattagan Room

Oral presentation

Macinnis-Ng C [1] , Awasthi K [1] , Gao J [1]

[1] University Of Auckland, Auckland, New Zealand

Scoping forest response to drought in Aotearoa-New Zealand using remote sensing

mortality.

Martine Maron

Biography

Martine is an ARC Future Fellow at The University of Queensland and Deputy Director of the NESP Threatened Species Recovery Hub. She works on the ecology of threatened species and communities, conservation policy, and the links between the two.

EcoTAS abstract

‘No net loss’ of biodiversity is a buzz phrase in conservation policy, but it is often used without a frame of reference, rendering it meaningless. Different frames of reference result in three broad types of counterfactual scenario against which no net loss might be evaluated, and each of these can lead to significantly different outcomes for biodiversity: A) no net loss compared to some fixed state of biodiversity, such as the present state or a desired future state; B) no net loss compared to a dynamic counterfactual, such as ‘what would have occurred through time without the impacts targeted by the policy’; and C) no net loss compared to a future in which the no net loss policy did not exist, but the impacts occur. We further categorise no net loss policies in two types: those relating to overarching policy goals (“overarching”), and those relating to responses to particular impacts (“impact-specific”). This distinction is important, because different types of reference frames are implied by (and arguably, appropriate for) each. Nevertheless, overarching and impact-specific NNL policies interact if they apply within the

SYMPOSIUM: Putting ecology to work at the land development frontier

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Sugarloaf Room

Oral presentation

Maron M [1] , Gordon A [2] , Quetier F [5] , von Hase A [4] , Evans M [1] , Watson J [1,3] , Brownlie S [6] , Bull J [7]

[1] The University Of Queensland, Brisbane QLD, Australia
[2] RMIT University
[3] Wildlife Conservation Society
[4] Forest Trends
[5] Biotope
[6] deVilliers Brownlie Associates
[7] University of Copenhagen

What does no net loss mean?

same jurisdiction. Counterfactuals used in impact-specific NNL policies (in order to calculate losses and gains through offset exchanges) must be consistent with the frame of reference for overarching NNL policies, but often they are not. We provide a practical guide to the appropriate specification of counterfactuals for impact-specific NNL policies.

Erica Marshall

Biography

I am a PhD candidate at the University of Melbourne in the Quantitative and Applied Ecology Group. I am interested in incorporating multiple aspects of ecology into conservation planning and management objectives.

EcoTAS abstract

Biodiversity around the globe is being lost at an alarming pace due to development. Policy makers and corporations have, as a result, become more engaged in methods to avoid, mitigate and minimise the environmental impacts due to development. Biodiversity offsetting has been increasingly employed to compensate for the residual adverse impacts of development around the world. However, there is still considerable scepticism about offset effectiveness for achieving no net loss. Offsets receive major criticism for having no consistent metric to measure biodiversity losses and gains. My PhD aims to determine which biodiversity metrics developers and offset planners should be considering in addition to traditional measures such as the habitat hectare. I have assessed the metrics

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Marshall E [1] , Wintle B [1] , Kujala H [1]

[1] University Of Melbourne, Melbourne VIC, Australia

Putting biodiversity metrics to the test: Improving offset design and increasing species persistence

currently being used to quantify biodiversity in both offsetting and the broader ecology literature. The results from this assessment will be used to pick key metrics that are specific to offsetting and those being employed elsewhere in various fields of ecology. The second aspect of this project will test the use of these metrics in a simulation study for the Lower Hunter Valley, NSW. A combination of species distribution modelling (SDM) and population viability analyses (PVA) will be used to determine how the inclusion of various metrics in offset designs will impact species persistence. Addressing pitfalls in offsetting procedures is essential going forward as development pressure increases, placing biodiversity at risk of further loss globally.

Trace Martyn

Biography

I explore plant species interactions within highly diverse annual plant communities of Western Australia. My research focuses on understanding the importance of the spatial and identity context of higher-order and direct interactions which increases biological realism within coexistence modelling.

EcoTAS abstract

Individual plant fitness models are often used to understand species interactions and dynamics of coexistence. Most models within the literature contain only direct , pairwise interactions which are often limited to negative or competitive interactions. Including higher-order interactions within these fitness models allows for facilitative as well as competitive interactions between focal

Ecological Modelling (Plants)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Sugarloaf Room
Oral presentation
Martyn T [1] , Mayfield M [1] , Stouffer D [2]
[1] University of Queensland, Brisbane QLD, Australia
[2] University of Canterbury, Christchurch, New Zealand
The importance of neighbour identity in modelling higher-order interactions in annual plant communities

plants and plants within a local surrounding neighbourhood. Within these models, plant species is most commonly used to identify the types of interactions in the models (i.e. conspecific or heterospecifc interactions). Here, we test how important are levels of identity in modelling individual plant fitness, from species-level identity to functional groupings to no identity. Specifically we ask: How important is the identity of neighbourhood members to effectively model higher-order plant interactions? We used a dataset of 773 focal individuals of 6 species with paired local neighbourhoods from an diverse herbaceous annual plant community in Western Australia to explore these questions. Preliminary results show including species-level identity to model the effects of the surrounding neighbourhood fit best when compared to other models using maximum likelihood. Groupings of neighbourhood plants into broader categories of identity (i.e. exotic/native or total number of neighbourhood species) had poorer fitting models than species-level data.

The results of this analysis will increase biological realism in coexistence modelling and improve predictions of species coexistence and biodiversity across multiple scales.

Leanda Mason

Biography

Leanda, a Perthian, always had a strong interest in creepy-crawlies that was further developed during her undergraduate studies at University of Western Australia.

Conservation Biology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Cypress #2
Oral presentation

Here she was mentored by the truly inspiring Prof. Barbara York Main, an expert on mygalomorph spiders.

EcoTAS abstract

Ecological traps attract biota to low-quality habitats. Landscape traps are zones caught in vortex of spiralling degradation. We describe the ‘specialist trap hypothesis’: the particular vulnerability of habitat specialised taxa to ecological and landscape traps.
Three short-range endemic mygalomorph spider species were chosen as models to test this hypothesis. Mygalomorphs can be long-lived (> 40 years) and select sites for permanent burrows in their early dispersal phase. Spiderlings from two species showed preferences for microhabitats that correspond to where adults typically occur. An invasive veldt grass microhabitat was selected almost exclusively by spiderlings of the third species. Habitat dominated by veldt grass acts as an ecological trap for this species due to lower prey diversity and abundance than undisturbed habitats. Further, as a homogenising force, veldt grass spreads to form a landscape trap in naturally heterogeneous ecosystems.
Specialist traps may explain high extinction rates in old, stable landscapes undergoing change.

Mason L [1] , Wardell-Johnson G [1] , Bateman P [1]
[1] Curtin University, Perth WA, Australia

The specialist trap hypothesis: microhabitat requirements make taxa more vulnerable to ecological and landscape traps

Tanya Mason

Biography

Tanya Mason is a Research Fellow within the Centre for Ecosystem Science at UNSW. She is a community plant ecologist with particular interest in long term vegetation dynamics, disturbance ecology and invasion ecology.

Community Ecology
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #3
Oral presentation

EcoTAS abstract

Upland Swamps are groundwater-dependent ecosystems. Component species have evolved to reproduce with sustained and predictable water resources. The likelihood of swamp community persistence may decline in response to disruption of surface and groundwater flows following underground mining, which shatters bedrock beneath swamps and warps and cracks the surface. A dearth of ecological data has hampered our ability to predict risk associated with mine subsidence on upland swamp plant communities. This project is monitoring swamp hydrology with deployment of a series of soil moisture probes at undisturbed and undermined sites. Monitoring indicates that undermined swamps are both drier and more responsive to rainfall events (with more rapid recession rates) than undisturbed swamps. In addition, we collected intact soil sods (150mm diameter and 250 mm depth) from the wettest sub-communities (ti-tree thicket and cyperoid heath) of four undisturbed swamp sites. We transferred the sods to the glasshouse and established three different soil moisture treatments to simulate undermined, intermediate and undisturbed (low, intermediate, high) water resources. We are monitoring species composition and biomass over a two-year period. Early results indicate that sods in the low water resource treatment have lower biomass and different species composition compared with intermediate and high water resource treatments. The study will directly inform biodiversity policy on mine design and offset requirements, and identify potential alternative states for undermined swamp communities. The research will also inform parameters for modelling of future vegetation in response to hydrological change, under a range of mining and climate scenarios.

Mason T [1] , Keith D [1,2]
[1] UNSW, Sydney NSW, Australia
[2] New South Wales Office of Environment and Heritage, Hurstville New South Wales, Australia

Predicting persistence of upland swamp plant communities after underground mining

Luis Mata

Biography

Luis Mata is a Research Fellow with RMIT's Interdisciplinary Conservation Science Research Group, working as part of the NESP – CAUL Hub. He is an ecologist with an interest in plant-insect interactions, conservation science in urban environments and quantitative methods.

EcoTAS abstract

Nature in cities provides a remarkable range of benefits to humans and other species. The experience of nature in cities has positive effects on people's physiological and psychological health, and the health and wellbeing of urban residents has been correlated with the amount, proximity and access to urban nature. Importantly, nature is fundamental to engage people with local Indigenous knowledge, and plays a key role in supporting biodiversity in urban landscapes, including threatened species. For these reasons, there is growing global enthusiasm for bringing nature back into cities and associated interest from planning, landscape and health practitioners seeking to incorporate nature into the design of cities.

Here we provide a perspective on recent developments revolving around the idea of bringing nature back into cities, highlighting the need to move beyond rewilding and reintroduction strategies that do not consider crucial cultural dimensions such as Indigenous ontologies and the challenges and opportunities of brokering local Indigenous knowledge. We introduce a decision-making framework to assess the ecological, social, cultural and economic

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Mata L [1] , Miller M [2] , Garrard G [1] , Bekessy S [1]
[1] Rmit University, Melbourne VIC, Australia
[2] Department of Environment, Land, Water and Planning, Melbourne VIC, Australia
Bringing nature back into cities

suitability of species to be brought back into cities, and present examples that demonstrate how key variables (e.g. species charisma, dispersal potential, cultural significance) can be parameterised. We conclude by discussing the types of actions available to decision-makers who wish to ‘bring back nature’, including nature-based solutions, metanetworks, biodiverse-greening, biodiversity sensitive urban design and safeguarding ‘Iconic’ species in schools, as well as the theoretical and methodological advances needed to move forward the ‘bringing nature back into cities’ research and practitioner agenda.

Laura McCallion

Biography

Laura has industry experience as an environmental advisor and has recently completed honours at Griffith University, with the Australian Rivers Institute. Her focus is on the ecology of riparian zones, and unravelling the complex relationships within these habitats.

EcoTAS abstract

Riparian habitats represent important areas for environmental management and conservation. They provide crucial habitat for terrestrial vertebrates, particularly in degraded landscapes, often containing important resources that may be scarce in upland habitats. Knowledge of the drivers and use of riparian habitats is critical to understand how they support terrestrial vertebrates, both locally and in the broader landscape, and the influence of human disturbances and catchment changes.

Conservation Biology (1)
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #3
Speed Talk PLUS Poster
Mccallion L [1]
[1] Griffith Univeristy, Nathan Qld, Australia
[2] Australian Rivers Institute, Nathan Queensland, Australia
Value of riparian habitats for terrestrial vertebrates in a semi-arid agricultural landscape

Here we examine differences in riparian and non-riparian habitat use by terrestrial vertebrates in a semi-arid agricultural landscape in eastern Australia, as well as changes in habitat connectivity. A broad range of faunal groups were surveyed at twelve sites across the Gwydir river catchment in northern New South Wales. Presence/absence data and Poisson regression showed significantly higher bird species richness in riparian habitats in this semi-arid landscape, being on average double that of non-riparian habitats. This was also true of echolocating bat species, which exhibited significantly higher species diversity in riparian habitats, as well as a response to connectivity.

Effects of habitat type (i.e. riparian vs. non-riparian) were stronger than effects of habitat connectivity (i.e. connected vs. non-connected), but the importance of the latter differed between habitat types. Indeed, the results suggest that disconnected riparian sites are likely to support higher species diversity than connected non-riparian sites. Riparian habitats, with intact linkages to non-riparian areas, may therefore represent the most critical habitat for many terrestrial vertebrates in this landscape and should therefore be prioritised for conservation and restoration interventions.

Samantha McCann

2016 Jill Landsberg Trust Fund
Scholarship Presentation
Wednesday, November 29, 2017

9:55 AM - 10:10 AM
The Convention Centre
Award Presentation
McCann S
2016 Jill Landsberg Trust Fund Scholarship Presentation

James McCarthy

Biography

My previous research was focused on pests and diseases of pine plantations in New Zealand. I am now completing a PhD at UQ and CSIRO working on modelling plant abundances, from both functional and classical community perspectives, under climate change.

EcoTAS abstract

The field of ecology has very few general models and theories, and an enduring goal of ecology has been to discover mechanistic processes that describe ecological patterns. Applications of metabolic theory of ecology (MTE) to forests links plant size distributions to ecosystem productivity and is one of the most high-profile models of ecology. MTE is based on an average, idealised forest in its climax stage with a steady state of resource availability however there is a growing body of literature suggesting that these assumptions are over-simplistic for many forests, with most proof-of-concept studies applied to low-disturbance systems such as rainforests. MTE is yet to be tested in disturbance-prone systems, questioning its generality. Here, we compare calculations of productivity based on MTE with remote sensed levels of gross primary productivity (GPP) in south east Queensland, Australia; a

Forest Ecology (1)
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
McCarthy J [1,2] , Dwyer J [1,3] , Mokany K [2]
[1] The University of Queensland, St Lucia QLD, Australia
[2] CSIRO Land and Water, Black Mountain ACT, Australia
[3] CSIRO Land and Water, Dutton Park QLD, Australia
Community composition, primary productivity and metabolic theory of ecology in Australia

region dominated by both fire-prone ecosystems and pyrophobic rainforest. We show that MTE-derived productivity calculations are a poor predictor of GPP with over-estimations of productivity in areas with low precipitation and high fire frequency (disturbance-prone vegetation) and that under-estimates occur in areas dominated by rainforest. It is possible that these forests may naturally shift toward MTE predictions over time, however this is questionable in frequently-disturbed systems. We join others in calling for MTE to be further refined, but question whether this can be achieved while maintaining its generality.

Emily McColl-Gausden

Biography

I am a Masters student in the Quantitative and Applied Ecology group at The University of Melbourne. I am interested in the management outcomes of research and modelling the effectiveness of novel technologies.

EcoTAS abstract

To prevent biodiversity loss, we need to adequately understand the current state of biotic communities. Traditional sampling methods for monitoring species and communities in aquatic environments (such as trapping or electrofishing), can be expensive and labour intensive, especially over large spatial scales. A more cost-efficient alternative is to detect a species' environmental DNA (eDNA)—extra-organismal DNA shed in the environment. However, relatively few studies have compared traditional sampling methods and multispecies eDNA metabarcoding.

SYMPOSIUM: Enabling Ecosystem Surveillance Monitoring across Australia – putting ecology to work

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

McColl-Gausden E [1] , Tingley R [1] , Weeks A [1,2]

[1] School of BioSciences, The University of Melbourne, Parkville Victoria, Australia

[2] cesar, Parkville Victoria, Australia

Improving the accuracy of freshwater biodiversity surveys: a comparison between environmental DNA metabarcoding and electrofishing

We conducted a direct comparison of detection probabilities between electrofishing and eDNA metabarcoding at 23 sites in three of Melbourne's catchments. Fish eDNA was identified using universal vertebrate primers as well as a taxonomically-specific primer. Both primers were validated using an extensive reference library of fish species in the study region. Electrofishing identified thirteen native fish species—including the EPBC listed Prototroctes maraena—and eight exotic species. eDNA metabarcoding is nearing completion. In my presentation, I will discuss how I have used multi-species site occupancy models to directly compare the detection probabilities of the two sampling methods.

Sarah McColl-Gausden

Biography

Sarah McColl-Gausden: I joined the Bushfire Behaviour and Management group at the University of Melbourne in 2016 as a Master of Science student. My research interests lie broadly in the areas of fire ecology and ecological modelling.

EcoTAS abstract

The flammability of forests depends on the three-dimensional structure and plant identity. However, most fire behaviour models don't incorporate these components. Improving the quantification of flammability will allow for more informed decision making around fuel treatments, and therefore the ability to alter risk across sites and landscapes. Here we consider how the three-dimensional

Forest Ecology (1)

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Bimbadeen Room

Oral presentation

McColl-Gausden S [1] , Penman T [1]

[1] School of Ecosystem and Forest Sciences, University of Melbourne, Creswick Vic, Australia

To burn or not to burn: How does forest type and age influence flammability?

structure of vegetation and species composition changes over time since fire in 115 sites across a range of woodland and forest ecosystems in the Otway Ranges, Victoria. We use three published fire behaviour models to explore site based changes in flammability over time. Flammability varied widely between forest types and changed with time since fire. These changes were most evident in the fire behaviour models that account for both species identity and vegetation structure. Results of the study suggest that in some vegetation types fuel treatments may reduce flammability, but in others, this outcome is not possible. These results can be incorporated into a landscape analysis to better understand the risk reduction achieved through fuel treatment approaches.

Christiana McDonald-Spicer

Biography

Christiana McDonald-Spicer is a PhD candidate at ANU. She conducts research into methods of identifying refugia and her work focuses on squamates in the Australian Monsoonal Tropics.

EcoTAS abstract

Refuges are important for the persistence of many species and communities. Landscape level refuges, or refugia, are often identified using species distribution models (SDMs). This works well for identifying regions that are important for a single species. However, conservation managers often need to protect assemblages, and community level

Community Ecology

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Cypress #3

Oral presentation

McDonald-Spicer C [1] , Moritz C [1] , Rosauer D [1] , Ferrier S [2]

[1] The Australian National University, Acton Act, Australia

[2] CSIRO, Acton ACT, Australia

Identifying refugia: community and species level approaches

modelling approaches may be more effective for this. There are few comparisons of the results of between species and community modelling. To try and address this, we compared two methods of identifying regions of stability – a community level approach using generalised dissimilarity modelling and a species level approach using stacked SDMs. The models were fitted across the Australian monsoonal tropics using squamate distribution data and paleoclimate models for the last 120kya. Preliminary analysis indicated similar patterns across the two methods, with some key differences. We will discuss these alternative methods for identifying refuges.

Rylea McGlusky

2017 Applied Forest Ecology
Presentation
Wednesday, November 29, 2017
10:25 AM - 10:40 AM
Award Presentation
McGlusky R
Applied Forestry Award Winner
Presentation

Margarita Medina

Biography

Margarita Medina is a PhD candidate at the University of Canberra, her ongoing project is on the evolution of marsupials. Margarita research interest is in the

Open session (1)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Sugarloaf Room
Oral presentation

biogeographical and evolutionary patterns that affect the distribution of biodiversity, mainly mammals and reptiles.

EcoTAS abstract

Marsupials are a suitable group for phylogenetic and spatial analysis, because of their current distribution and evolution. In this analysis we used phylodiversity measures such as phylogenetic diversity (PD), phylogenetic endemism (PE) and Categorical Analysis for Palaeo and Neo Endemism (CANAPE) to identify significant hotspots of neo and palaeo endemism in the Americas and Australasia across different biomes. Our results showed that there are hotspots of neo-endemism in Central, north portion of South America and the south-east coast in Australia which coincide with species with short branches in the phylogeny, and hotspots of palaeo-endemism scattered through Australia and Chile corresponding to areas where there are taxa correspond to long branches such as Dromiciops gliorides. We concluded that phylodiversity measures provided results for consistent patterns to explain the evolution of marsupials because most of the refugia are distributed in the tropics and that the incorporation of dated phylogenies can provide valuable information on the study taxa. These type of analyses provide further evidence for the utility of phylogenetic measures in testing hypotheses about phylogenetic and biogeographical processes with the inclusion of phylogenetic trees.

Medina M [1] , González-Orozco C [2] , Knerr N [3] , Gruber B [4]
[1] University Of Canberra / Institute For Applied Ecology, Bruce Act, Australia
[2] Centro De Investigación La Libertad. Villavicencio, Meta, Villavicencio Meta, Colombia
[3] Centre for Australian National Biodiversity Research, Commonwealth Scientific and Industrial Research Organisation, Plant Industry, Canberra, Australian Capital Territory, Australia, Canberra ACT, Australia
[4] Institute for Applied Ecology and Collaborative Research Network for Murray-Darling Basin Futures, University of Canberra, Australia., Canberra ACT, Australia

Identification of marsupial hotspots in the Americas and Australasia

Belinda Medlyn

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? – part

Biography

I describe myself as an ecosystem modeller, but other modellers often call me a physiologist. My work interfaces between experiments and models, as I aim to use experimental data to develop evidence-based models of ecosystem function.

EcoTAS abstract

The Prairie Heating and CO2 Experiment was a long-term multi-factor ecosystem-scale experiment carried out on a semi-arid grassland (mean annual precipitation 384 mm) in Wyoming, USA. We applied ten terrestrial biosphere models to data from this experiment in order to evaluate how well alternative models could predict key ecosystem functions and identify a road map for model improvement.

We found that models performed poorly in current ambient conditions. Although the models were generally able to capture interannual variability in above-ground net primary productivity (ANPP) with rainfall, there was a wide spread in the predicted mean values, and models failed to capture within-season variations in soil moisture and greenness. There were also large differences among models in sensitivity to soil moisture stress and representations of phenology. Models also performed poorly in predicting

2

Monday, November 27, 2017

3:45 PM - 5:45 PM

Wattagan Room

Oral presentation

Medlyn B

Facilitated discussion

SYMPOSIUM: Vulnerability and resilience of grasslands in Oceania to climate change

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Medlyn B [1] , De Kauwe M [2] , Pendall E [1]

[1] Hawkesbury Institute for the Environment, Western Sydney University, Penrith NSW, Australia

[2] ARC Centre of Excellence for Climate System Science, UNSW, Kensington NSW, Australia

Modelling the Prairie Heating and CO2 Experiment (PHACE): Lessons for Australian Grasslands

responses to elevated CO2 and heating. Observed interactive (CO2 x warming) treatment effects were subtle and contingent on water stress, phenology and species composition. Since the models did not correctly represent these processes under ambient and single-factor conditions, little extra information was gained by comparing model predictions against interactive responses.

Important lessons can be learnt from this model-data intercomparison for Australian grassland eosystems. We highlight key areas of uncertainty in model predictions and the measurements that would be needed to help constrain these uncertainties. Improved understanding of these processes is crucial to develop informed predictions of grassland responses to global change.

Graciela Metternicht

Biography

Graciela is Professor of Environmental Geography at the University of New South Wales, where she teaches and supervises research on geospatial technologies and their application in environmental management and sustainability. She advises on science-policy interface to UN Conventions and Programmes.

EcoTAS abstract

The Australian government and the private sector concur on the significant role of fundamental geographic information in building more resilient communities, better responding to natural hazards, improving decisions on natural resource management, and sustainable land use

SYMPOSIUM: Enabling Ecosystem Surveillance Monitoring across Australia – putting ecology to work

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Metternicht G [1]

[1] University Of New South Wales,School of Biological, Earth and Environmental Sciences, Sydney NSW, Australia

Enabling ecosystem surveillance and monitoring: good practice to bridge

planning that support a more sustainable pathway of development. More to the point, the “Australia State of the Environment 2016 (SoE 2016)” report argues that Australia’s environmental outlook depends on our ability to effectively address the complex mix of socio-economic and environmental drivers and pressures on the environment. Continued improvement in data and understanding is identified as one of the several ‘options for action’ to address that mix. In this presentation I will discuss:
• why geographic information continues to be essential for addressing ongoing challenges identified in the SoE report;
• examples of good international practice for integrated environmental monitoring
• the potential of multi-stakeholder, multi-source, open data access facilities such as TERN AusCover to address critical monitoring gaps and contribute to enhanced ecosystem surveillance

In concluding I will reflect on the significance and need for operational, open access information systems for ecosystem surveillance and monitoring in relation to the SoE 2016 mention “Providing access to data that are comparable, comprehensive, reliable, re-usable, aggregated and timely has the potential to lead to better decisions, more cost-effective management, and better implementation and integration of policies”.

critical gaps in current monitoring efforts

Deborah Metters

Biography

Deborah Metters has led the Land for Wildlife program in south-east Queensland for over a decade. She has

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches
Wednesday, November 29, 2017

ensured that the program translates ecological science into practical conservation, while also delivering social and human well-being outcomes.

EcoTAS abstract

Active and informed landholders who undertake conservation on private land are essential for the protection and management of native species and ecosystems. The Land for Wildlife program offers a framework for meaningful engagement with landholders resulting in on-ground conservation outcomes, as well as social networking, physical health benefits and improved relations with governments.

Results from a survey completed by 1,124 Land for Wildlife members (37% response rate) showed positive correlations between numerous points of contact with the program and their confidence in land management, improved land management skills and their adoption of conservation land management. Other results pointed towards the physical health benefits of the program and an improved sense of social networks. Landholders who are more engaged with the program also demonstrated a greater appreciation of their local government.

Survey results indicate that diverse, regular and multiple methods of communication are effective in translating ecological science into practice and delivering on-ground conservation outcomes. The Land for Wildlife program employs several communication methods including personalised face-to-face visits, field days, workshops, newsletters, social media and celebratory events.

In addition to regular and diverse communication channels, the survey showed that tangible incentives such as grants,

11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Metters D [1]
[1] Healthy Land & Water, George Street QLD, Australia

Membership survey results correlate environmental, social and health benefits of the Land for Wildlife program.

labour support and loans of equipment (e.g. spray-packs, tree poppers, fauna monitoring cameras) motivate tangible investment into conservation by private landholders.

The survey tested and demonstrated that the Land for Wildlife program, as delivered in south-east Queensland, delivers greater social connectivity, improved physical activity and increased on-ground environmental outcomes.

Charlotte Mills

Biography

Charlotte is completing her PhD at UNSW on vegetation change driven by the loss of small mammals from Australia's arid zone. Charlotte is particularly interested in trophic cascades and community ecology with a bit of granivory on the side.

EcoTAS abstract

The extirpation of apex predators worldwide has revealed their role as trophic regulators, with changes observed at almost every trophic level. There are, however, few opportunities where ecosystems with and without large predators can be compared in order to isolate the effects of predators at a broad spatial scale. We take advantage of a long-term manipulation of dingo abundance (the Dingo Barrier Fence) to investigate large scale effects of dingo removal on vegetation cover in the Strzelecki Desert. Using cover indices obtained from satellite imagery and on-ground vegetation surveys within herbivore exclosures, we calculate vegetation cover fluctuations in response to rainfall where dingoes are rare and where dingoes are

Landscape Ecology (1)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Cypress #2
Oral presentation
Letnic M [1] , Fisher A [1] , **Mills C** [1] , Lyons M [1]
[1] UNSW, Sydney NSW, Australia
Remote sensing reveals that extirpation of a top predator dampens vegetation response to rainfall.

common. We also surveyed predator and herbivore abundances over a nine-year period.
We found vegetation differences between areas with and without predators scaled up from experimental exclosures to be observable from satellite imagery. In addition, the differing responses of vegetation to rainfall align with trophic cascade theory, where vegetation responses to rainfall were dampened by herbivores in the absence of a top predator. We suggest that trophic cascades such as this may be pervasive with the decline of large predators, but remain undetected due to the absence of clear demarcated areas where the differences in apex predators can be readily observed.

Kirsty Milner

Biography

Kirsty is a PhD candidate at UTS. Her research is concerned with Australian desert plants and their ability to cope with heat stress. She is particularly interested in addressing questions surrounding the cost of heat stress and thermal tolerance.

EcoTAS abstract

Understanding species thermal thresholds will be pivotal in understanding their persistence with higher temperatures under climate change. For plants, many studies base critical thermal thresholds on the health of photosynthetic tissue (photosystem II: PSII) but we know other systems, such as membranes are susceptible to heat. Early research suggests that membrane damage occurs 10^{0}C above damage to PSII, but this has not been formally tested. Further, it is not known how thresholds for membrane

Open session (2)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Bimbadeen Room
Oral presentation
Milner K [1] , Valenzuela S [1] , French K [2] , Leigh A [1]
[1] Universtiy Of Technology Sydney, Ultimo NSW, Australia
[2] University of Wollongong, Wollongong NSW, Australia
What do thermal thresholds look like for desert plants?

stability and photosynthetic function relate to mechanisms plants use to protect against and repair protein damage, such as upregulation of heat shock proteins (HSPs). Does HSP expression more closely relate to protection of PSII or membranes? We conducted field research in southern arid Australia to compare between two congenerics with differing microhabitat preferences. Solanum orbiculatum grows in drier habitats, while S. oligacanthum prefers higher water availability. We measured PSII function, membrane stability and HSP expression. Despite the two species having similar thermal thresholds, there were differences in the damage incurred. Solanum orbiculatum experienced less damage to PSII and membranes than S. orbiculatum. This is likely to be explained by their corresponding expression of HSPs. Considering the two species had similar thermal thresholds it is conceivable that HSPs do not confer greater thermal tolerance, as previously thought, but work to limit damage during heat stress events. This research suggests that plants from more mesic environments may be more vulnerable to climate change.

Angela Moles

Biography

Angela leads the Big Ecology Lab in the Evolution & Ecology Research Centre at UNSW. She is a plant ecologist who studies large scale patterns in the way plants grow and reproduce, and rapid evolution in introduced species.

EcoTAS abstract

Forest Ecology (2)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation

We used a dataset spanning 37 011 species-site combinations worldwide to quantify the shape of latitudinal gradients in plant height, seed mass, leaf area, specific leaf area, leaf Nmass, and leaf Pmass. Latitudinal gradients in all six plant traits displayed significant step changes at the edge of the tropics. Many of these steps were substantial, especially at the southern edge of the tropics where there was a 30-fold drop in leaf area, a 10-fold drop in seed mass, and a 7-fold drop in plant height. The step at the edge of the tropics remained significant in all six plant traits after accounting for mean annual temperature, minimum temperature, mean annual precipitation, within year temperature variability, and within year precipitation variability. We discuss the possibility that this major discontinuity in plant traits at the edge of the tropics might reflect the existence of alternative stable states.

Moles A [1] , Tamme R [1,2] , 41 other authors
[1] UNSW Sydney, Sydney NSW, Australia
[2] University of Tartu, Estonia

Evidence of a substantial step in plant traits at the edge of the tropics

Ben Moore

Biography

Ben studies many aspects of the interactions between plants and herbivores, from plant defence strategies and effects of environmental drivers including climate change on plant quality, to animal foraging strategies and nutritional and chemical ecology and the gastrointestinal microbiome.

EcoTAS abstract

As an obligate dietary specialist feeding almost exclusively on the foliage of a single plant genus, Eucalyptus, the koala (Phascolarctos cinereus) is a rarity amongst mammals. The koala has a particularly large hindgut and slow gut passage rate, accommodating a gastrointestinal microbiome that

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 1)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Brokenback Room
Oral presentation

assists in digestion of this diet, which is physically tough, nutritionally poor, high in fibre and defended by digestibility-reducing tannins and numerous toxins. Using 16S amplicon sequencing and gene-centric analysis of whole-community shotgun sequencing data, we have compared the faecal microbiomes of koalas living in a single habitat but feeding on different eucalypt species, and in geographically-separated populations with diets differing in composition and diversity. We will highlight associations between microbial community composition and gene functional potential, particularly of glucoside hydrolases, and measures of diet nutritional quality, including structural polysaccharide composition, tannin activity and foliar digestibility. A strong pattern emerges of dominance of the faecal microbiome by bacteria from the phylum Bacteroidetes when koalas feed on high-quality diets (e.g. Eucalyptus viminalis) but dominance by the phylum Firmicutes when koalas feed from poor-quality diets such as E. obliqua. These differences highlight the close association between the koala, its diet and its symbiotic gut microbes and raise the question, can specialized microbial communities further narrow the nutritional niche of their dietary specialist hosts? We discuss this particularly in the context of historical patterns of koala decline and recovery, and of overabundance in parts of its range.

Moore B [1] , Brice K [1] , Blyton M [1] , Foley W [2] , Soo R [3] , Hugenholtz P [3]

[1] Western Sydney University, Penrith NSW, Australia

[2] Australian National University, Canberra ACT, Australia

[3] University of Queensland, St Lucia Queensland, Australia

How does the gastrointestinal microbiome benefit and constrain the feeding ecology of the koala?

Sean Moore

Biography

Current Zoology PhD Student at the Insect Ecology laboratory in the University of New England. Completed Bachelor of Science (Hon) at Flinders University in 2016.

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

EcoTAS abstract

Contemporary ecological studies in Australia include assessment of the responses that species have to climatic fluctuations and differential resource limitation. Testing the predicted responses for ecologically important species across the Australian landscape to both current and future modeled conditions will be paramount in understanding the challenges for our unique biota as well as for future research and conservation endeavors. Ants represent an ideal subject for ecological studies as they are keystone species in a majority of terrestrial ecosystems. They are also time and cost effective to sample in large-scale research. The Future Keepers project aims to establish a national survey of ant responses employing the aid of citizen scientists. The project uses ITEX perspex warming chambers designed to mimic the predicted climate conditions of the near future. The sites of these chambers will be set up along naturally occurring Australian aridity and temperature gradients, with a focus on Northern Territory and Southern Australia. This will allow us to test whether responses are uniform for species exposed to varying conditions, particularly comparing areas where conditions are at the ants thermal maximums and minimums. With the establishment of this network of research sites we can answer ecological questions, particularly within the context of ant community dynamics, interactions across trophic levels and changes to ecosystem processes. Predictions can be made concerning the impact of climate change on the functioning of Australian ecosystems, both for local contexts as well as for species across the continent.

Poster presentation

Moore S [1]

[1] University Of New England, Armidale NSW, Australia

The Future Keepers: Assessing effects of thermal stress and resource limitation on ants

John Morgan

Biography

John Morgan is a plant ecologist at La Trobe University with a passion for understanding how plant communities are put together, the ways they respond to disturbance, and how they change over time.

EcoTAS abstract

Species' phenotypic traits are widely thought to predict their abundances. The most abundant species at a given site should be those with traits that make them well-adapted to the biotic and abiotic conditions at that site. Species with traits poorly matched to the local biotic and abiotic environment should be rare or absent. Much research takes this argument for granted. We test this idea in semi-arid grasslands recovering from cultivation and fertilizer addition where we predicted that successful colonisation of recently cultivated old-fields would be associated with traits linked to dispersal and competitive ability, whilst composition of historical and never cultivated sites would be associated with traits linked more to efficiency of resource use. Plant traits (RGR, SLA, height, diaspore mass) were measured for 13 annual species and related to the abundance of species in areas of different cultivation history. We found that traits promoting early colonization of old fields are not evenly distributed across species. Two exotic grasses, and the native daisy Rhodanthe corymbiflora, consistently showed characteristics associated with higher competitive ability, as well as long-distance dispersal. This is consistent with their distribution in the field; these species are most common in the competitive environment of recently cultivated sites. Most other native species had trait values associated with resource-use efficiency and, as hypothesised, were most

Community Ecology

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Cypress #3

Oral presentation

Morgan J [1] , Flaim D [1]

[1] La Trobe University, Bundoora VIC, Australia

Do phenotypic traits of grassland annuals predict their abundance in old-fields recovering from cultivation?

common in the less productive, less recently cultivated sites. Hence, phenotypic traits did predict vegetation response to disturbance and viewing species by their traits enabled us to understand why this may be.

Steve Morton

Biography

Steve is an Honorary Professorial Fellow with Charles Darwin University in Alice Springs. He studied at the Universities of Melbourne, California at Irvine, and Sydney. He joined CSIRO in Alice Springs to work in the desert environment that has long been his focus. Subsequently, from 2000 until 2011, he helped lead CSIRO as Chief of Division and Executive Team member. In 2011 he returned to live in Alice Springs, from where he serves on a variety of boards and committees relating to environmental science and natural resource management.

EcoTAS abstract

The honour of receiving ESA's Gold Medal prompts reflection, condensing into three topics. Firstly, of course, I want to talk about the challenge of doing ecology in the Outback, and its stuttering progress with few people and vast landscapes. This is not a complaint, for the situation is explicable; and yet sometimes I wish it were otherwise. Second, ecology is very much a human activity, although our disciplinary culture seems to highlight only occasionally the importance of colleagues, collaborators, mentors and role modellers. I might mention some people important to me. Finally, ecology is in an interesting space as our continent and the globe continue experiencing the great

KEYNOTE PRESENTATION: ESA Gold Medal Winner
Monday, November 27, 2017
2:45 PM - 3:15 PM
The Convention Centre
Morton S
ESA Gold Medal Presentation: Reflections on long involvement in Australian ecology

human acceleration. Our discipline is at its core a science, a dispassionate search for facts unaffected by sentiment – and yet simultaneously it is an expression of a value system favouring greater weighting for the environment in human decision-making. I fear that we are struggling to straddle this contrast. Resolution of the dilemmas lies in future, as the next scientific generations think more deeply about the intersection of ecology and values, and about how the discipline might best contribute to societal need. I leave you with my thanks.

Sarah Munks

EcoTAS abstract

Forest management agencies increasingly recognise the need to monitor and report on the effectiveness of forest management strategies to conserve natural and cultural values. Many different approaches have been tried around the world but there are few published examples of successful monitoring programs with effective links to management. We visited and reviewed five monitoring programs related to conservation of forest biodiversity in western North America.
The main drivers for effectiveness monitoring were reporting for wood certification and national or international agreements and to maintain the social licence to operate. The monitoring programs differed in many respects, including scale, budget, links to management and their capacity to inform forest managers and the general public. They ranged from large-scale, multi-agency, well-funded programs to smaller enterprises targeting specific questions of current management plans. Differences in the

SYMPOSIUM: Effectiveness monitoring (Part 1)
Wednesday, November 29, 2017
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Sugarloaf Room
Oral presentation

forestry context in each jurisdiction, including ownership, land management, governance, and regulatory systems influenced the selection and complexity of monitoring approaches. All five projects were tailored for local conditions, with little communication between agencies. Important design considerations included governance, fluctuations in funding, clarity and scale of objectives, inherent complexity, the variety of biodiversity management practices to be evaluated, temporal and spatial dimensions, separation of values and science, species as indicators and habitat surrogates, complementary research needs, a process linking monitoring to management decisions, data transparency and communication with all stakeholders. Additionally, we recommend better communication between agencies in designing future projects, and a pragmatic mix of flexibility and rigour to ensure longevity and value for money.

Munks S [1,2] , Kavanagh R [3,4] , Loyn R [5,6]
[1] Forest Practices Authority, Hobart TAS, Australia
[2] School of Biological Science, University of Tasmania, Hobart TAS, Australia
[3] Forest Science Centre, NSW Department of Primary Industries, Beecroft NSW, Australia
[4] Australian Wildlife Conservancy, Sydney NSW, Australia
[5] Arthur Rylah Institute, Heidelberg VIC, Australia
[6] Eco Insights, Viewbank VIC, Australia

Monitoring the effectiveness of forest practices to conserve biodiversity in western North America: lessons for Australian forest management

Miriam Munoz-Rojas

Biography

I am a Research Fellow at the University of Western Australia and Kings Park and Botanic Gardens. My research focuses on understanding the functioning and dynamics of natural and disturbed dryland ecosystems, with a particular interest on belowground processes.

Restoration Ecology (1)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Bimbadeen Room
Oral presentation

EcoTAS abstract

Global environmental changes and other anthropogenic impacts are rapidly transforming the structure and

functioning of ecosystems worldwide. These changes are leading to land degradation with an estimated 25 % of the global land surface being affected. In the resource-rich biodiverse semi-arid Pilbara region of Western Australia hundreds of thousands of hectares are disturbed due to established and emerging iron-ore mine operations. The need to develop cost-effective large-scale solutions to restore these landscapes becomes imperative to preserve biodiversity and achieve functionality and sustainability of these ecosystems. The Restoration Seedbank Initiative (RSB) is a five-year multidisciplinary research project that aims to build knowledge and design strategies to restore mine-impacted landscapes in the Pilbara and other arid and semi-arid landscapes worldwide. Within the soil program of the RSB, a series of glasshouse studies and field trials have been conducted in the last three years to advance our knowledge on soil limitations and to provide solutions to effectively overcome these challenges in arid ecosystem restoration. These studies include (i) the analysis of the influence of climate and edaphic factors in the recruitment of arid zone seedlings and (ii) the evaluation of soil physicochemical and microbiological indicators to assess functionality of restored soils in degraded semiarid ecosystems and (ii) the development of nature-based strategies based on bio-tools to enhance soil functionality. Here, we summarize our latest results in the soil program of the RSB, and propose recommendations for integrating soil science in cost-effective landscape-scale restoration practices in ecosystems worldwide.

Muñoz-Rojas M [1] , Erickson T [1,2] , Bateman A [1,2] , Merritt D [1,2]
[1] University Of Western Australia, WA, Australia
[2] Kings Park and Botanic Garden, WA, Australia
[3] University of New South Wales, NSW, Australia

The Soil Program of the Restoration Seedbank Initiative project: addressing knowledge gaps in dryland restoration

Nicholas Murray

Biography

I am a research fellow at the UNSW Centre for Ecosystem Science . My research focuses on ecosystem risk assessment, remote sensing and conservation biology.

EcoTAS abstract

Recent assessments of progress towards global conservation targets have revealed a paucity of indicators suitable for assessing the changing state of ecosystems. This deficiency is partly due to a lack of suitable data on ecosystem change, driven mostly by the considerable technical expertise needed to make ecosystem maps from remote sensing data. We have developed a free and open-access online remote sensing application that enables volunteers, managers, and scientists with little or no experience in remote sensing to develop high-resolution classified maps of land cover for a given focal region. The REMAP application, which builds upon the geospatial data storage and analysis capacity of the Google Earth Engine, requires only spatially resolved training data that define map classes of interest. The training data, which can be uploaded or annotated interactively, is used in a random forest classification of up to 16 publicly available biophysical (slope, elevation), spectral (Landsat Archive imagery) and climatic (precipitation, temperature) datasets to classify all pixels in the focal region into map classes. In this talk we introduce REMAP through a series of case studies that highlight it's utility in ecosystem risk assessment. The ability of REMAP to develop and export high-quality classified maps in a very short (sub-10 minute) time frame represents a considerable advance in satellite remote sensing, and we expect remap to enable local-scale actions that support environmental conservation, including developing inventories of biodiversity, identifying hotspots of ecosystem diversity, enhancing spatial conservation

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Murray N [1,2] , Keith D [1] , Simpson D [1] , Wilshire J [1] , Lucas R [1]

[1] Centre for Ecosystem Science, University Of New South Wales, Sydney Nsw, Australia

[2] School of Biological Sciences, University of Queensland, Brisbane Queensland, NSW

Introducing REMAP: a free, online remote sensing application for generalized ecosystem mapping

planning, mapping ecosystem loss, and supporting environmental education initiatives.

Heather Neilly

Biography

I currently work in tropical savanna studying the impact of grazing strategies on vertebrate fauna. Previously, I have looked at the mechanisms driving plant community composition in semi-arid rangelands and studied cat, fox and dingo interactions in the arid zone.

EcoTAS abstract

The impact of domestic livestock grazing is implicated in the decline of vertebrate fauna species globally. How fauna respond to grazing depends on how much they rely on the niches affected by grazing. Additionally, grazing response can change depending on the vegetation community in which it occurs. We examined the response of two mammals that use different habitat strata, to four cattle grazing strategies and two vegetation types: the arboreal Common Brushtail Possum and terrestrial Rufous Bettong. We conducted a three year mark-recapture survey at a long term experimental grazing trial in northern Australia. We modelled abundance in response to grazing treatment and vegetation type and calculated Manly selection ratios to elucidate microhabitat preference. Home-range calculations were performed on the most frequently recaptured individuals.We found that both species had a vegetation type preference, in which Possums were resistant to the impact of heavy grazing but Bettongs were negatively impacted by heavy grazing. Possums preferred complex arboreal habitat and low ground cover on average,

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Oral presentation

Neilly H [1] , Schwarzkopf L [1]

[1] James Cook University, Townsville QLD, Australia

Habitat selection reveals the grazing response of two medium-sized mammals in a tropical savanna rangeland

and Bettongs preferred tall grass and avoided bare ground. Possum individuals exclusively used one vegetation type or the other, with very few using both, suggesting the presence of a movement barrier. Our results indicate that microhabitat selection is driving the response of two mammal species to different grazing strategies in two different vegetation types. The grazing/vegetation interaction is important to consider when managing rangelands for conservation. Vegetation type should provide a context for determining the benefits of adopting a certain management strategy.

Rachel Nepia

Biography

Rachel Nepia is a PhD student at the University of Waikato. Her research funded by the Biolgical Heritage National Science Challenge and is focused on understanding the role and impact of introduced honeybees in native New Zealand forest ecosystems.

EcoTAS abstract

Since the early nineties the number of beehives registered in New Zealand has nearly doubled and on conservation land growth in beekeeping has exceeded the national trend with numbers of hives increasing by 70% in the past 5 years. The demand for apiary sites on conservation lands necessitates increased understanding of the role and impact of honey bees in native ecosystems. Research on flower visitor network assemblages and interactions between flower visitors and native trees is being undertaken in submontane Kaimai-Mamaku Range forests to determine interactions between honey bees and native

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Nepia R [1]

[1] University Of Waikato, Hamilton Waikato, New Zealand

Understanding the role and impact of introduced honey bees in native New Zealand submontane forest

flora and fauna. At sites of varying hive density invertebrate flower-visitor assemblages were collected by sweep netting and identified. External pollen and internal pollen from each flower visitor was collected, acetolysed, and identified to demonstrate interactions between flower visitors and native trees. Ordination and 3D network mapping were then used to visualise the pollination networks. From 564 flower visitors over 50 different pollen species were identified with 50% of pollen species unique to the external surface of the invertebrate, 20% unique to the internal tissues, and 30% present externally and internally. There was a pronounced overlap in pollen preference between flies, bees and beetles, but generalist strategies may reduce the potential for competitive effects. Networks showed low levels of nestedness and low linkage density. These results contribute an essential part of a larger study that will help guide decisions around apiary management on conservation land.

Thomas Newsome

Biography

I have broad research interests in the ecology, conservation and management of mammals. My research addresses how species respond to human-induced changes to the landscape.

EcoTAS abstract

Understanding the key patterns and drivers of extinction risk has been a key pursuit of conservation biology, but detailed insights on the factors controlling such risks are lacking for many vertebrate taxa. For instance, some

Conservation Biology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Cypress #2
Oral presentation
Newsome T [1] , Ripple W [2]
[1] Deakin University / University of Sydney, Sydney NSW, Australia
[2] Oregon State University, Corvallis Oregon, USA
Using body size and range size to predict vertebrate extinction risk

studies examining specific subsets of vertebrates (e.g., mammals and birds) have suggested that species with larger bodies are more vulnerable to decline and extinction than smaller species, but fewer than half of all comparative studies found a positive correlation between slow life history or large body size and extinction risk. Furthermore, verification of the relationship has been equivocal, with studies reporting negative, positive, and bimodal relationships or no relationship at all for the subsets of taxonomic assemblages that have been examined. In this talk, I will present a systematic analysis of vertebrate extinction risk based on a newly constructed database containing the body masses for 27,647 vertebrate species out of the 44,694 that have been assessed by the International Union for Conservation of Nature (IUCN) Red List. I will then examine whether the relationship between body size and geographic range size can be used to complement existing approaches by the IUCN to classify extinction risk. The results offer new insights into the vulnerability of different sized taxa to extinction risk and provide a complementary way to assess whether a species is trending towards extinction.

Katherina Ng

Biography

Katherina Ng is a third year PhD candidate at the ANU. She is studying the distribution and dispersal of beetle communities across fragmented woodlands in mixed-cropping areas of the NSW Lachlan Catchment.

EcoTAS abstract

SYMPOSIUM: Insect Ecology
Research Chapter - insects punching above their weight (Part 2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Oral presentation

Trait-based approaches may help generalise predictions of community responses to landscape fragmentation. However, they are still underutilised for arthropods, with most studies limited to body size or qualitative traits, and sampling within single land-uses. We examined variation in morphological traits of ground beetles sampled on both sides of edges between woodland patches and adjoining farmlands in an agricultural landscape. We asked three research questions: (1) Are beetle responses to habitat changes manifested by trait differences? (2) Do traits vary across a distance from edges between woodlands and four farmland types (crop, fallow, planting, woody debris applied over crop)? (3) How do traits vary with vegetation structure? There were four key findings. First, we found that ground beetle species varied in their body size, and body shape-related traits associated with diet (head width), robustness (elytra width) and visual ability (eye protrusion) across the landscape. Second, body size increased across a distance from edges between woodlands and farmland, where there were strong mediating effects of farmland type on this association. Third, vegetation structure was associated with body size and body shape traits, and helped explain some of the effects of habitat type and distance from edges on body size. Finally, we found greater occurrence of wingless species in the interior of woodlands and with increased vegetation height. Our work provides evidence of fragmentation-driven environmental filtering on morphological traits as an important factor shaping ground beetle community assembly and associated ecological functions, in both managed and unmanaged parts of farming landscapes.

Ng K [1] , Barton P [1] , Blanchard W [1] , Evans M [1] , Lindenmayer D [1] , Macfadyen S [2] , McIntyre S [2] , Driscoll D [3]

[1] Australian National University, Canberra ACT, Australia

[2] CSIRO, Canberra ACT, Australia

[3] Deakin University , Burwood VIC, Australia

Morphological trait responses of Carabidae to land-use, edges and vegetation structure in an agricultural landscape

Sam Nicol

Biography

Sam Nicol is a research scientist at CSIRO Land and Water. He loves all things mathematical, decision-theoretic and conservation and is fascinated by trade-offs, optimal decision-making, and Australia's incredible natural history and biodiversity.

EcoTAS abstract

The 'implementation gap' that divides on-ground local or regional conservation practitioners from strategic planners at the state and national scale is well recognised as one of the big communication challenges in conservation. Different incentives and challenges at every level of implementation of a plan mean that it's often difficult to communicate and coordinate activities to achieve conservation outcomes. In this talk I will outline our experiences as we tried to tackle this problem through CSIRO's ONPrime innovation acceleration program. The program takes a unique approach to solving scientific challenges, requiring participants to engage with users of their proposed idea before developing the solution. This approach enabled us to identify the necessary features of a solution (and whether it is a problem worth solving) based on the needs of our users. By designing projects that are built around our users' needs, we are more likely to see our science used to solve real problems. Our team conducted over 60 interviews with conservation practitioners at all levels of the implementation hierarchy, trying to better understand the problems with implementing strategic conservation plans. I will describe what we learned from the program, and how the techniques could be used more broadly to help us select the 'right' problem and ensure our science is used to have impact in the real world.

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Wattagan Room

Speed Talk

Nicol S [1] , Chades I [1] , Carwardine J [1]

[1] Csiro, Dutton Park QLD, Australia

Making conservation connections: experiences from applying innovation thinking to a conservation challenge

Adrienne Nicotra

Biography

Adrienne Nicotra is a plant evolutionary ecologist based at the Research School of Biology at ANU. She'll present on behalf of an NCCARF supported expert elicitation working group.

EcoTAS abstract

Increasingly conservation and management practitioners are required to make decisions about allocation of resources based on vulnerability assessments that incorporate exposure risk and adaptive capacity of species. But there is little agreement on how to quantify that capacity efficiently or rigourously. Further, resource allocation decisions cannot be based on adaptive capacity alone; the relative importance of the organism to ecosystem function must also be considered for conservation resources to be effectively allocated. A species with high functional importance and low adaptive

THE NEED FOR SPEED: Featured Speed Talks
Wednesday, November 29, 2017
2:45 PM - 3:20 PM
The Convention Centre
Speed Talk
Nicotra A
The Need for Speed: Featured Speed Talks

SYMPOSIUM: Assessing risks to ecosystems - research and applications
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Brokenback Room
Oral presentation
Nicotra A [1]
[1] Australian National University, Acton Act, Australia
Expert elicitation: Predicting adaptive capacity in Australian mountain plant communities

capacity requires urgent management attention, whereas one with both low adaptive capacity and functional importance most likely not. But where is the science to enable to such decisions to be made objectively? Expert opinion is emerging as a way to augment empirical resources in a time of rapid change. We explored the potential for expert elicitation techniques to reveal areas of consensus and uncertainty about adaptive capacity and functional importance of species with Australia's critically threatened alpine and mountain biomes as a test case. We will report on the outcomes of this working group involving botanists, ecologists and land managers with extensive experience of mountain flora that aimed to infer performance of mountain plant species over the next 25 – 50 years.

Uffe N. Nielsen

Biography

Dr Uffe N. Nielsen is a Senior Lecturer at the Hawkesbury Institute for the Environment. His is broadly interested in soil biodiversity and ecosystem functioning, particularly in the light of global changes with a focus on dryland ecosystems

SYMPOSIUM: Vulnerability and resilience of grasslands in Oceania to climate change

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

EcoTAS abstract

Australia is dominated by dryland ecosystems where water is the main limiting factor. The predicted changes in rainfall regime, i.e. greater variability in rainfall and an increased frequency of extreme events, could have wide ranging implications. However, historical rainfall regime is likely to

moderate the impact. Ecosystems experiencing high rainfall variability are for example likely to respond differently to those experiencing a more predictable rainfall. Natural differences in inter-annual rainfall regime across Australian drylands provide an excellent opportunity for investigating how rainfall variability structures ecosystems, but also how legacy effects of historical rainfall regimes moderate the impacts of climate change. Hence, we designed an experiment that combine the use of natural differences in inter-annual rainfall variability with imposed rainfall manipulations as a framework to investigate how historical rainfall regime structures dryland ecosystems, and how this in turn moderates their responses to altered rainfall patterns. In spring 2016 we established rainfall manipulation facilities at six sites across a rainfall gradient (250-450 mm year-1) with sites paired to have similar long-term mean annual precipitation but high versus low inter-annual rainfall variability. Reduced rainfall (-65%) was achieved using passive displacement and the water removed was gravity fed to nearby plots to simulate increased rainfall (+65%). Three plots of each treatment as well as plots with ambient rainfall were established at each site. We present an overview of the experimental framework and design, key site characteristics and rainfall manipulation performance to date.

Nielsen U [1] , Horn S [1] , Chieppa J [1] , Singh B [1] , Eldridge D [2]
[1] Hawkesbury Institute For The Environment, Western Sydney University, Penrith NSW, Australia
[2] Office of Environment & Heritage, Department of Premier & Cabinet & School of Biological, Earth and Environmental Sciences, University of New South Wales

The legacy of rainfall regime in Australian dryland ecosystems

Craig Nitschke

Biography

Craig is a Senior Research Fellow in the School of Ecosystem and Forest Sciences at the University of Melbourne. He is a forest and landscape ecologist and

SYMPOSIUM: Effectiveness monitoring (Part 1)
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Sugarloaf Room

focuses on understanding the interactions between forest ecosystems and climate, disturbance and management.

EcoTAS abstract

Astelia australiana (Tall Astelia) is a threatened forb endemic to temperate rainforests of Victoria. In 1993 a monitoring program was established to meet the legislative requirements of its listing under the EPBC (1999) and FFG Act (1988). The monitoring program incorporated two survey methods. The monitoring was repeated on 100% of sites in 1993 and 1995; however, only a sub-set of sites have been measured repeatedly. Multiple factors have been hypothesised as potential threats to Tall Astelia including logging, drought, wildfire, disease and herbivory; however, none of these factors have been tested against the monitoring framework. In 2013, 20 years after its establishment, we repeated the monitoring program at all sites and tested the framework's potential for assessing the causality of listed factors. Monitoring revealed the species is in serious decline highlighting that conservation approaches have been ineffective. We found that the factors hypothesised i are not capturing the determinism of the decline suggesting that the monitoring program is not addressing causality and is overlooking structural uncertainty. Twenty years on we evaluate the effectiveness of the monitoring program, highlight its limitations, and propose improvements to reduce structural and statistical uncertainty. We discuss how we can incorporate measures of important processes that influence the demography of the species in a constantly changing environment to better inform models of future population viability and allow for the transition from monitoring to effectiveness monitoring.

Oral presentation

Nitschke C [1] , Kasel S [1] , Aponte C [1] , Parker L [1]

[1] University of Melbourne, Richmond Victoria, Australia

Monitoring does not guarantee effective conservation: lessons from 20 years of monitoring a threatened forb

Daniel Nugent

Biography

I am a PhD candidate at La Trove University studying the ecology and behaviour of the Plains-wanderer and effects of disturbance on grassland food webs and bird habitat. My primary area of interest is applied grassland and avian conservation research.

EcoTAS abstract

Since European settlement, approximately 95% of the Victorian Northern Plains Grasslands have been lost and degraded through past and ongoing cultivation and inappropriate grazing. These grasslands are one of the last remaining strongholds for the genetically unique and critically endangered Plains-wanderer (Pedionomus torquatus) — a species recently ranked first among Australian birds, and fourth in the world, for conservation importance. Over the past two decades there have been concerted efforts to protect and manage the remaining high-quality, Plains-wanderer habitat on public and private land to save this species.
The Plains-wanderer is highly responsive to vegetation structure and prefers grasslands that are not too sparse or too dense. Land managers utilise livestock and planned burns to reduce biomass and promote a more suitable structure. These types of management practices have been shown to significantly impact grassland food webs and, in particular, bird communities within other grassland systems, however on the Northern Plains their impacts in this regard remain unstudied.
My study aims to assist conservation efforts by providing further insight into the habitat requirements and movement ecology of the Plains-wanderer. It also seeks to identify the effects of cultivation legacies and current management

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Nugent D [1] , Leonard S [1] , Morgan J [1] , Baker-Gabb D
[1] La Trobe University

Food Webs & Disturbance: Implications for the Plains-wanderer (Pedionomus torquatus) and other grassland birds

practices on Plains-wanderer habitat and grassland food webs. I will employ experimental livestock grazing and burning regimes to assess the impacts of different management practices on grassland birds. I will compare bird communities and food resources between sites with different cultivation histories. Miniature GPS trackers will be fitted to Plains-wanderers to understand their movement ecology and habitat use.

Corey O'Brien

Biography

Corey O'Brien is a 3rd year undergraduate student currently undertaking a Bachelor of Advanced Science with a major in General Biology. Areas of interest include Ecology, Conservation, and Environmental Studies.

EcoTAS abstract

Climate change is predicted to impact on biodiversity, ecosystem function and primary productivity. Correlative models of species distributions provide estimates of climate suitability that can be projected to future climate scenarios highlighting species and areas that may be at risk of extinction. This study tests the ability of Acacia species with restricted and widespread elevation ranges to establish from seed within their local climate to their natural climatic limits and beyond. Seed collected from low, mid and high elevations of four Acacia species were propagated at low and high elevation sites with and without irrigation to determine the seedling establishment. The key outcomes of this study are, (i) Seed establishment at high altitudes was significantly lower and less responsive to water additions compared with low altitude sites, (ii) Species were

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

O'Brien C [1] , Rolls K [1] , Rymer P [1,2]

[1] Western Sydney University, Richmond NSW, Australia

[2] Hawkesbury Institute for the Environment, Richmond NSW, Australia

Is Seed Establishment Determined by Climate Suitability?

able to establish from seed outside of their natural distribution, (iii) At low altitudes, seed establishment decreased with the increase of altitudinal change from source population to planting site, and (iv) low and mid elevation seed had equal or better establishment in high elevation planting sites compared with local (high) seed collections. These results provide a better understanding of the climatic tolerance of Acacia species, along with the role that temperature in local adaptation and species distribution limit, informing policy makers and land managers better plan for climate change.

Joanne Ocock

Biography

Joanne is an environmental scientist working in the Water and Wetlands Team in the NSW Office of Environment and Heritage, assisting with the monitoring and evaluation of wetland fauna responses to natural and managed flows.

EcoTAS abstract

Native Australian frogs in semi-arid regions of the Murray Darling Basin (MDB) are threatened by river and land management activities that divert water for irrigated agriculture. These altered flow regimes modify the distribution, extent and frequency of wetland habitat. To address this threatening process (NSW TSC Act 1995), many regulated river valleys in the NSW section of the MDB have an allocation of water managed to improve the health of rivers and their floodplains, and provide positive outcomes for wetland-dependant biota, including frogs.

We present work from multi-year monitoring of frog

SYMPOSIUM: Novel management interventions for threatened species
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Wattagan Room
Oral presentation
Ocock J [1,2,3] , Wassens S [2] , Spencer J [1,2,3]
[1] NSW Office Of Environment And Heritage, Sydney NSW, Australia
[2] Institute of Land, Water and Society, Charles Sturt University, Albury NSW, Australia
[3] Centre for Ecosystem Science, School of Biological, Earth & Environmental Sciences, UNSW, Sydney NSW, Australia
Going with the flow: optimising water management in regulated wetlands for native frogs

communities in the northern and southern MDB. We identified three ecohydrological groups for wetland frogs relevant to flow management, broadly reflecting morphological and physiological characteristics. Monitoring data identified relationships between different species and wetland-filling, and was used to assess the importance of key flood pulse components, i.e. timing and duration, for flow-responsive species, including the nationally vulnerable southern bell frog (Litoria raniformis).

We found where managed flow events coincided with spring or were used to maintain wetland duration into summer, this maximised breeding opportunities for the flow-responsive species. This information guides site watering priorities for southern bell frogs, which had become restricted to a small number of wetlands following prolonged drought but could recolonise following large flood events. Management of spatial and temporal components of flow regime over short and long-term are key to ensuring persistence of frog communities in regulated sections of MDB. Long-term monitoring is critical to informing and evaluating management actions in these large variable systems.

Erica Odell

EcoTAS abstract

The presence of woody climbers is one of the main features that characterise and identifies rainforests. In some forest systems lianas contribute up to 40% of the above ground green leafy biomass. Such ubiquity and

Open session (4)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Oral presentation

abundance in rainforests suggests a likely functional importance, particularly for herbivory – the fundamental way in which the products of primary production enter the wider foodweb. Much of our current understanding of insect herbivory in rainforests comes from the study of large canopy trees and saplings. However, inferences and conclusions about herbivory gathered from data on trees cannot simply be extended to lianas due to distinct contrasts in leaf traits between the two groups; most notably, structural, chemical, and phenological properties. Information is needed to quantify the contribution of each functional group, and the roles they play in supporting herbivory. As climatic conditions continue to favour the growth of lianas, understanding their role in ecosystem functioning is increasingly necessary and urgent.

During two consecutive years (May 2016 and 2017) leaves were collected from 36 lianas and 57 trees (29 of which hosted the sampled lianas) in a subtropical rainforest in Queensland, Australia. Herbivory was quantified from 14,746 leaves using the software package ImageJ, and leaf traits such as leaf toughness, total phenols, and elemental concentrations, were determined.

Our results to date suggest variation in leaf chemistry, leaf structure and herbivory between trees and lianas; and between trees with lianas compared to trees without. Trees hosting lianas had lower levels of herbivory, as well as higher concentrations of leaf nitrogen than those without lianas. Analyses also indicated a lack of consistency among the variables influencing herbivory for each of the plant types. In trees, leaf toughness, phenol concentrations and phosphorus were correlated with herbivory, whereas in lianas no such correlations were evident.

Odell E [2] , Kitching R [1]
[1] Environmental Futures Center and Griffith School of Environment, Griffith University, Nathan QLD, Australia

A comparison between lianas and trees in supporting rainforest insect herbivory

The presentation will discuss these results and their implications within rainforest dynamics.

James O'Hanlon

Biography

Postdoctoral research fellow in the Insect Ecology Lab at the University of New England. I research the behaviour of invertebrates and what ecological impacts behaviour has.

EcoTAS abstract

Many plant seeds contain a fleshy ‘elaiosome’ that acts as a food reward for ants that carry the seed into their nests. This interaction, termed ‘myrmecochory’, is a major driving force in the evolution of plants and may be responsible for increasing diversity of angiosperms worldwide. A lesser-known fact is that certain stick and leaf insects (Phasmatodea) use a convergent dispersal strategy for their eggs. Ants collect stick insect eggs and feed on the lipid rich egg capitulum. The egg capitulum is known to be present in up to 40% of all known stick insect species, yet despite its recurrence little is known about the function and evolution of this mutualism. Using GIS to analyse spatial patterns in occurrence records of Australian Phasmatodea, this project asks two main questions 1) whether the foraging behavior of ants has had an effect on the large-scale distribution of stick-insects, and 2) how has the Australian landscape influenced the evolution of stick-insect dispersal strategies.

SYMPOSIUM: Insect Ecology
Research Chapter - insects punching above their weight (Part 2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room
Speed Talk PLUS Poster
O'Hanlon J [1] , Andrew N [1]
[1] University Of New England, Armidale NSW, Australia
How do ants influence the distribution of stick and leaf insects?

Luke O'Loughlin

Biography

Luke is an invasion biologist and community ecologist, currently undertaking postdoctoral research on ecological surrogacy. His main research interest is in developing a more holistic approach for quantifying invasive species impacts.

EcoTAS abstract

Invasive species management is frequently undertaken on the assumption that abundant invaders are having a serious impact, and that removing that species will have an overall positive effect. The precautionary principle drives much of this approach as the ecological impacts of most invasive species are not determined, and when measured, impacts are typically based on only few response variables. One approach to remove speculation and biases in how we quantify and conclude ecological impact is to integrate any number of measured responses into a single indicator – a proposed objective assessment of 'overall' impact. In our study, we used a 9-year quasi-experiment to determine the overall impact of an invasive shrub. Bitou Bush Chrysanthemoides monilifera ssp. rotunda is a serious weed within forest of Booderee National Park and subject to ongoing management. Previous studies have found a variety of impacts of differing magnitude and direction on many components of the native community, yet the impact Bitou Bush itself remains somewhat unclear, in part, due to the difficulty in making broad conclusions from many independent impact metrics. By considering observed responses of multiple plant, mammal, reptile and bird community measures as (1) proportional change from the uninvaded state and (2) a function of Bitou Bush cover, we were able to compare and integrate metrics of varying units

Invasion Ecology (Plants)

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Cypress #2

Oral presentation

O'Loughlin L [1] , Gooden B [2] , Foster C [1] , MacGregor C [1] , Catford J [3] , Lindenmayer D [1]

[1] The Australian National University, Canberra ACT, Australia

[2] University of Wollongong, Wollongong NSW, Australia

[3] University of Southampton, Southampton, England

Integrating cross-taxonomic metrics to determine the overall impact of an invasive species and its management

and identify thresholds in the relationship between invasion extent and impact. This approach demonstrates a more informative integration of empirical data into the decision making process through a more holistic assessment of ecological impact.

Mark Ooi

Biography

Mark is a Senior Research Fellow at UNSW, Sydney. His research encompasses plant (particularly seed) ecology, fire and global change biology. This work is often applied to understanding key ecological issues, including maintaining biodiversity and the impacts of climate change.

EcoTAS abstract

Australia is highly fire-prone and while plant species have evolved to persist with fire, the term “inappropriate fire regime” is often invoked as a threatening process. However, identifying which aspect of the fire regime is responsible for threat is rarely made clear. For threatened species, comparative studies help isolate limiting factors, leading to better conservation management. I studied the threatened species Leucopogon exolasius and two common congeners to identify potential limiting traits. Species were monitored over 16 years, with seedling survival, growth and primary juvenile period assessed. For L. exolasius and the common L. esquamatus, comparisons of survival, growth and maturation were also made after winter and summer fires, to assess the effects of season of burn. A key difference was found in primary juvenile period, which was exceptionally long for L. exolasius (>11 years for

Conservation Biology (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation
Ooi M [1]
[1] University Of New South Wales, Sydney NSW, Australia
Comparison of a rare Leucopogon and two common congeners: impacts of fire season and frequency

80% of the population to flower) compared to the common congeners (3.2-7.57 years). This may limit L. exolasius population persistence, because plants are more likely to be killed by subsequent fire before maturation. Higher fire frequency may therefore have historically caused contraction of this obligate-seeding species. Winter fires delayed emergence, leading to increased primary juvenile period for both species, a trait that would exacerbate the effects of interval squeeze. In fire-prone systems, fire frequency is often assumed to drive persistence, however, interactions with fire season can influence recruitment success. There are scant data on recruitment variation in response to fire season, a factor that may impact rare and common species with seasonal germination requirements.

Soraya Outim

Biography

Soraya Outim is a Master of Research student from the Hawkesbury Institute for the Environment, Western Sydney University. She has a strong interest in entomology and her research is focused on the interactions between plants and pollinators.

EcoTAS abstract

Climate change is threatening biodiversity and ecosystem processes. Whilst the impacts on populations and species have been documented, the response of communities and plant-animal interactions is largely unknown. An altitudinal gradient can be used as a model for climate change, as temperature increases with increasing altitude. This study explores the diversity and abundance of insect pollinators, flowering native plants, along with the species-level

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Outim S [1] , Rymer P [1] , Cook J [1]

[1] Hawkesbury Institute for the Environment, Western Sydney University , Richmond NSW, Australia

Plant-pollinator interactions across an altitudinal gradient in the Blue Mountains

specificity and phenology across 12 sites in the Blue Mountains. DNA barcoding is used to assist with species identification and revealing seasonal and altitudinal variation. Insect abundance and diversity has been shown to vary with altitude, with mid-altitudes having a lower abundance of pollinators. By monitoring plant-pollinator interactions across an altitudinal gradient, we can improve our understanding of how terrestrial ecosystems may be more or less adapted to warming.

Esti Palma

Biography

Esti is currently a PhD student and her research interests include questions regarding community assembly and functional ecology. Her thesis will contribute a better understanding of the role of functional traits in plant invasion, with a special focus in Australia.

EcoTAS abstract

Identifying traits that enable plants to become invasive is key to increase the efficiency of Australian biosecurity and save millions of dollars allocated to weed management. Despite decades of research, general rules about invasive plant traits have been hard to prove. A common approach in trait-based invasiveness studies is the binary classification of plants as invasive or non-invasive, assuming all invasive species behave equally. However, recent advances in invasion science suggest that invasion ability can be explained through different demographic mechanisms. Our aim was to determine whether the correlation between traits and invasion varies depending on how we define invasion (i.e. which mechanism we focus

Invasion Ecology
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation
Palma E [1] , Catford J [2] , White M [3] , Baumgartner J [4] , Vesk P [1]
[1] University Of Melbourne, Parkville VIC, Australia
[2] University of Southampton, Southampton, UK
[3] Arthur Rylah Institute for Environmental Research, Heidelberg VIC, Australia
[4] Macquarie University, North Ryde NSW, Australia
Functional traits of invasive plants relate to multiple dimensions of invasiveness

on).

Using Victoria as a case study, we quantified the relationship between plant traits and four types of invasive species: locally abundant plants, rapidly spreading plants, plants occurring in many different environmental conditions (e.g. habitat types), and plants widely distributed across the state. In all cases, continuous metrics were used to determine invasiveness level of plants.

We found that the same plant traits relate to the invasion mechanisms in varying ways: different traits promoted each form of invasion, and single traits can promote one form of invasion while hampering another one. We concluded that the way we define invasive plants is not trivial for trait-based invasiveness studies, and being explicit about the mechanisms of invasion can improve our understanding of how traits promote invasion. When possible, we recommend that trait-based studies include continuous metrics of invasiveness that directly link to specific invasion mechanisms.

Gary Palmer

Biography

I am a plant ecologist with an interest in plant-animal interactions, particularly how these interactions are affected by human disturbance. I also have general interests in conservation ecology and how science is communicated to the wider public.

Conservation Biology (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Cypress #2
Speed Talk

EcoTAS abstract

Species composition of vertebrate assemblages can be substantially altered by rainforest fragmentation, which may in turn lead to changes in patterns of post-dispersal seed predation. This study investigated the effects of fragmentation on vertebrate post-dispersal seed predators, their feeding behaviour and patterns of seed predation across a community of rainforest tree species in subtropical eastern Australia.
Across continuous and fragmented rainforest, levels of seed predation were measured by establishing experimental seed stations using the seeds of 20 coexisting tree species. Simultaneously, vertebrate seed predators were recorded by deploying automated infra-red video cameras focused on seed stations.
Across all sites, seven vertebrate species were identified as “common” seed predators, occurring in six or more sites. The abundance and observed feeding behaviour of six species was significantly affected by fragmentation, however the direction of response varied among species: four suffered reduced abundance in fragments, while two increased in fragments. For each species, levels of destructive interest shown in seeds increased in the habitat of increased abundance. As with seed predators, fragmentation effects on seed predation were highly variable among species, varying in both the direction and extent of change. Five species experienced significantly greater predation in fragments, and five species significantly less than in continuous forest.
Fragmentation led to species-specific changes in patterns of seed predation across a community of tree species, which may be related to the vertebrate predator species turnover observed between habitat types. Consequently,

Palmer G [1] , Catterall C [1] , Zalucki J [1]
[1] Griffith University, Nathan QLD, Australia

Forest fragmentation effects on vertebrate seed predators and rates of post-dispersal seed predation

long-term changes in community-wide patterns of plant recruitment in rainforest fragments are expected.

Nicola Palmer

Biography

Nicola Palmer is a Field Ecologist with the Australian Wildlife Conservancy. Her work is focused on the planning, implementation and monitoring of mammal reintroductions to a feral predator free fenced exclosure at Mount Gibson Sanctuary in Western Australia.

EcoTAS abstract

Australian Wildlife Conservancy's Mammal Restoration Project aims to re-establish ten regionally extinct species of mammals to a 7,800 ha feral predator free fenced area at Mount Gibson Sanctuary in the southwest of Western Australia. Numbats (Myrmecobius fasciatus) were translocated to Mount Gibson as part of this project in January and December 2016. Individuals were sourced from two locations – a wild population at AWC's Scotia Wildlife Sanctuary in southern New South Wales, and Perth Zoo's captive breeding facility. All captive bred, and a subset of wild sourced, Numbats were fitted with VHF radio collars. Wild sourced Numbats were radio tracked for several weeks before, and all Numbats were radio tracked for several months after translocation to both their overnight refuges and day time bolt retreats. This has provided us with an opportunity to compare the translocation outcomes of Numbats from different sources in in terms of their survival, habitat use, behaviour and breeding success. The information gained from these comparisons can be used to help guide future

SYMPOSIUM: Novel management interventions for threatened species

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Palmer N [1] , Smith M [1] , Ruykys L [1] , Riessen N [1]

[1] Australian Wildlife Conservancy, Subiaco WA, Australia

A comparison of wild-to-wild and zoo-to-wild Numbat reintroductions into a predator-free exclosure in Western Australia

translocations of this species.

Phil Papas

Biography

Phil is an aquatic ecologist with the Victorian Department of Environment, Land, Water and Planning. He has over 20 years experience working in rivers and wetlands and is presently leading the on-ground implementation of Victoria's Wetland Monitoring and Assessment Program.

EcoTAS abstract

Tensions between the community and natural resource managers on the allocation and delivery of environmental water to rivers and wetlands have precipitated the need for a robust state-wide monitoring program to demonstrate beneficial environmental outcomes. Supported by wetland specialists and naturalists, consultants and regional natural resource management agencies, the Victorian Government has implemented a program to monitor the response of wetland biota – vegetation, frogs, waterbirds and fish – to the supply of environmental water to Victorian wetlands. As well as demonstrating outcomes, the program is also addressing knowledge gaps about wetland environmental watering that will inform management decisions – such as the magnitude and timing of water delivery. Key evaluation questions and indicators are addressing responses at individual wetlands and broader scales, and the methods – including quantitative in-situ assessments, sensors such as acoustic recorders and imagery capture and analysis – are tailored to these scales. The program's design has accounted for the high level of variability among wetlands.

SYMPOSIUM: Effectiveness Monitoring (Part 2)

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Sugarloaf Room

Oral presentation

Papas P [1] , Brooks J [2]

[1] Arthur Rylah Institute for Environmental Research - Department of Environment, Land, Water and Planning, Heidelberg VIC, Australia

[2] Integrated Water and Catchments - Department of Environment, Land, Water and Planning, East Melbourne VIC, Australia

Relieving the pressure – demonstrating the effectiveness of environment water in Victoria's wetlands

A Before-After-Control-Impact (BACI) design has been adopted where suitable control sites exist and a Single Site Multiple Impact (SSMI) design adopted at other sites. The Wetland Monitoring and Assessment Program (WetMAP), as it is known, integrates with, and augments, regional environmental water monitoring programs to maximise data and new knowledge.

Linda Parker

Biography

Linda's PhD thesis examined aspects of the ecology of Astelia australiana (Tall Astelia), including changes in its abundance over 20 years; its reproductive ecology and habitat niche; its response to drought and light availability; and the viability of its populations.

EcoTAS abstract

Astelia australiana is a threatened perennial forb, endemic to cool temperate rainforest in Victoria. Monitoring of A. australiana over 20 years (1993-2013) has revealed the species is in decline, with a loss of 57% of individuals. Few flowering or juvenile individuals were observed during the 20 year time frame suggesting that a low reproductive rate may be contributing to decline. We examined whether light availability affects reproduction of A. australiana by modifying stand structure to manipulate light in the understorey above individuals. In addition, we conducted a trial translocation of adult A. australiana to microsites characterised by either full canopy or canopy gaps within

SYMPOSIUM: Novel management interventions for threatened species

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Parker L [1] , Kasel S [1] , Regan T [1,2] , Aponte C [1] , Nitschke C [1]

[1] University Of Melbourne, Burnley VIC, Australia

[2] Arthur Rylah Institute, Heidelberg VIC, Australia

Conservation of Astelia australiana through manipulation of the understory light environment in cool temperate rainforest

an existing site and at two additional rainforest sites where the species does not occur. Survival of translocated individuals was high and translocation is an easy and practical method to increase the species range into new rainforest sites. Reproduction of A. australiana was successful under canopy gaps but was absent under full canopy controls. The population viability model RAMAS was used to explore how the frequency of canopy gap creation may affect the viability of populations through increased reproductive output.

Kate Parkins

Biography

Kate is a PhD candidate at the University of Melbourne and part of the Fire Ecology and Biodiversity Group. Her current research focuses on how fire influences movement patterns and resource selection of various arboreal and ground dwelling mammals.

EcoTAS abstract

Over the last decade tools for quantifying animal movement have developed at a rapid rate and GPS technology has become standard, with vast improvements being made in terms of fix accuracy, storage capacity and remote download capabilities. However, many commercially available tracking products with these capabilities are very expensive. We have developed a tracking device that is reasonably priced and can also record altitude, facilitating movement and resource selection studies for species that move in three dimensions. The device features a global positioning system (GPS) module and external antenna for

Forest Ecology (1)

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Bimbadeen Room

Oral presentation

Parkins K [1] , Di Stefano J [1] , Maizels K [2] , York A [1]

[1] University Of Melbourne, Creswick VIC, Australia

[2] Kean Electronics, Sydney NSW, Australia

How high do they go? A low-cost tracking device for measuring animal movement in three-dimensions.

recording horizontal movements, a high-resolution barometer for altitude calculations (vertical movement), a three-axis accelerometer to measure activity patterns and energy use, a rechargeable battery, and a microSD card for increased data storage.

In order to test the capabilities and accuracy of these devices, we conducted a static test to quantify the error associated with data collected both horizontally (x, y) and vertically (z). We further tested these devices by deploying them on Mountain Brushtail Possums (Trichosurus cunninghami) in the Central Highlands of Victoria, to quantify movement patterns in forest regenerating from the 2009 Black Saturday bushfires. Results from both the static test and the animal study will be presented.

Kirsten Parris

Biography

Kirsten Parris is an Associate Professor of Urban Ecology at the University of Melbourne. She likes small, green and brown animals with wet skin.

EcoTAS abstract

I study small, green and brown animals with wet skin; they call at night when they are looking for friends. These animals live near wet places but many of them need dry places too. In cities, houses and roads are often built on top of the places where these animals like to spend their time. Roads with lots of cars make it hard for small animals to move from one place to another without being killed. This means that over time, there can be fewer small, green

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Parris K [1]

[1] The University of Melbourne, Parkville VIC, Australia

Small, green and brown animals with wet skin - in the city!

and brown animals with wet skin at wet places with many roads around them. Also, things change at the wet places, making them less nice for the animals. There are not so many green things growing in and around the wet places; there are animals with teeth that eat the baby green and brown animals with wet skin; there are walls around the wet places that stop the animals from getting in and out; and there is bad stuff in the water that hurts the animals. What the wet places are like and the chance to move from one wet place to another are both important for groups of small, green and brown animals with wet skin that live in cities. So to keep them living in cities for many years to come, we need to keep the wet places nice AND allow these animals to move between different wet places without being run over.

Jack Pascoe

Biography

Jack Pascoe is the Conservation and Research Manager at the Conservation Ecology Centre. Jack's interests are in ecological restoration and native food plants, and his research themes include threatened species and predator ecology.

EcoTAS abstract

The coastal woodlands of Cape Otway have undergone catastrophic decline and tree dieback over the past decade due to intense browsing by an overabundant koala population. Changes to land management and an interruption to the area’s fire regime broke the cycle of

Restoration Ecology (2)
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Bimbadeen Room
Oral presentation
Pascoe J [1]
[1] Conservation Ecology Centre, Cape Otway VIC, Australia
Cape Otway Ecological Burns Program

seedling recruitment and led to an intensification of the shrubby mid-storey. Working with partner organisations, including the Country Fire Authority, the Conservation Ecology Centre has led a five year program to re-establish a fire regime on the Cape. The project has now treated over 50ha of woodland with fire.
Results from the first years of a monitoring program, established in 2013 to record changes to species richness, fuel hazard and vegetation structure post fire, are mostly positive. No net loss of species richness, a reduction in elevated fuels and bark fuels, and importantly an opening of the mid-strata, allowing the diverse herb and forb flora of the region to compete. Weeds also often take advantage of the disturbance in the early years post fire and require management.
This presentation will also discuss the practical aspects of applying fire in a woodland habitat in Temperate Australia. The challenges and opportunities moving forward, and how we envisage the program into the future, especially how it can transition from an ecological and fuel hazard reduction project into a cultural burns program with traditional owner groups.

Adrian Paterson

Biography

Adrian Paterson is head of the Department of Pest-management and Conservation at Lincoln University. His research interests and postgrads run from wildlife behaviour to diversity and systematics.

Conservation Biology (1)
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation

EcoTAS abstract

Black-fronted terns (Chlidonias albostriatus) are an endemic bird species that rely on New Zealand's braided river ecosystems for breeding. Black-fronted terns have a small, declining population and are globally endangered, primarily due to predation. Effective black-fronted tern management is challenging, due to the dynamic and unpredictable nature of the braided river environment as well as the behaviour of the terns themselves. Black-fronted terns frequently change their breeding colony locations both within and between years. The ability to attract prospecting terns to a particular breeding site would allow for increased planned protection for colonies. Social attractants, decoys and audio playback, were deployed at ten sites within nine Canterbury braided rivers in the 2016 breeding season. We found that the terns interacted significantly more ($P < 0.001$) with the social attractants compared to the control plots (social attractants absent). Nearest tern breeding sites were recorded for eight of the ten sites, with five of these nesting records occurring within 300 m of the experimental plots. These results suggest that social attraction, particularly audio, has potential for use in black-fronted tern conservation.

Paterson A [1] , Hamblin C [1] , Ross J , Maloney R [2]
[1] Lincoln University, Lincoln Canterbury, New Zealand
[2] NZ Department of Conservation , Christchurch Canterbury, New Zealand

Will they tern up? Socially attracting black-fronted terns to braided river colonies sites

Hilary Pearl

Biography

Hilary Pearl is a PhD student at the USC, with a fascination for Sunshine Coast heathlands. After teaching in high schools for many years, Hilary completed a Graduate

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation

Diploma in Science (Botany) at UNE before moving into post-grad studies.

EcoTAS abstract

Sunshine Coast Heathlands are spectacular in spring, and considerable areas of heathland have been protected on the Sunshine Coast. But what is the significance of the areas we have protected? Are there gaps in the types of heathland protected, and are there some types that need further protection, particularly in planning for climate change?

This research project is using field and molecular methods to examine heathlands on the Sunshine Coast from Cooloola to Bribie Island. It is collecting environmental data and analysing species richness using Queensland Herbarium CorVeg plot data techniques within selected Sunshine Coast heathlands. This data will be used test hypotheses of environmental variables including type of substrate, elevation, age of substrate and moisture variables which may affect community composition, as well as contributing to the use of “Regional Ecosystems” as a surrogate for biodiversity in Queensland.

However, the project is also generating a quality, vouchered DNA barcode dataset (to be uploaded to BOLD and GenBank) for approximately 400 heathland species. The barcodes of individual species will be used to generate a phylogeny for the Sunshine Coast heathland flora, to calculate phylogenetic metrics for individual communities and different types of heathland, and use this information to identify areas of conservation concern. Testing for evidence of phylogenetic clustering or over-dispersion may inform on our understanding of the evolutionary and biogeographic history of the Sunshine Coast heathlands. The barcode

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[1] University Of The Sunshine Coast, Sippy Downs QLD, Australia
[2] Queensland Herbarium, Brisbane QLD, Australia

DNA barcoding of Sunshine Coast heath to enhance conservation

library will contribute to concurrent studies at USC into animal and plant interactions including predation studies and pollination networks using metabarcoding.

Sandra Penman

Biography

Sandra has a keen interest in landscape processes and community ecology. She previously worked in the Centre for Environmental Risk Management of Bushfires at the University of Wollongong, and is currently completing her PhD examining how fire affects microbat communities.

EcoTAS abstract

Fire is a major driver of vegetation patterns in Australia. It is an overriding ecological disturbance that affects almost all flora and fauna at some stage, although our understanding of this is limited for many taxa. Australia has a diverse microbat fauna yet we have very little understanding of how fire affects these bat communities. Bats are highly sensitive to changes in vegetation structure and other fire-affected habitat features, such as the availability of tree hollows, as well as the abundance and composition of invertebrate prey. Previous work indicates that the response of bats to fire will differ between bat functional groups with some advantaged and others disadvantaged. We have developed a conceptual model identifying the direct and indirect mechanisms by which fire affects bats. Research gaps and opportunities have been identified, as well as scenarios which are highest risk to bat communities at the site and landscape scale.

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Penman S [1] , Law B [2] , York A [1]

[1] University Of Melbourne, Creswick VIC, Australia

[2] NSW Department of Primary Industries, Parramatta NSW, Australia

Bats and fire: known unknowns

Cara Penton

Biography

Early career researcher interested in conservation biology of Australian small mammals. Began a PhD in early March 2017 investigating how fire regimes influence tree hollow availability and whether this is threatening the viability of arboreal mammals in Australian tropical savannas.

EcoTAS abstract

There has been much research into how the fire regimes of northern Australian savannas directly affect biodiversity. However, the ecology of tree hollows, and the extent to which they support hollow-dependent fauna, has been severely neglected. Hollows in standing trees and fallen logs are an important ecological resource for around 40% of vertebrates in the Top End, including mammals (many of which are threatened), reptiles and birds. This study aimed to determine the effectiveness of ground-based surveys of tree hollows in eucalypt savanna. Counts of tree hollows have been conducted across Melville Island, using two approaches, ground-based and climbing surveys (double sampling), for four tree species. We show that a high percentage of hollow-bearing trees and trees without hollows can be correctly classified by ground-based surveys due to the open nature of the savanna canopy. However, we also see significant overestimation of hollow abundance using ground-based surveys. These overestimates tend be associated with multiple entrances allowing access to the same hollow, and termite nests blocking hollows. Earlier reports of very high densities of tree-hollows in the northern savannas, from ground-based surveys, may need to be re-evaluated.

Conservation Biology (1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Cypress #3

Speed Talk PLUS Poster

Penton C [1] , Radford I [2] , Woolley L [1] , Murphy B [1]

[1] Charles Darwin University, Darwin NT, Australia

[2] Department of Parks and Wildlife, Kununurra WA, Australia

Double sampling to assess the effectiveness of ground-based surveys of tree hollows in northern Australia

Guadalupe Peralta

Biography

Guadalupe Peralta is a post-doctoral fellow at Landcare Research, Lincoln, New Zealand. Her research is focused on understanding why species interaction patterns change across space and time, and how does this affect ecosystem functioning and services.

EcoTAS abstract

The structure of species interaction networks is usually associated with community stability. In mutualistic communities, network modularity (i.e. the extent to which subsets of species interact more frequently among themselves) has been reported to diminish species persistence. If this were the case, however, we would not expect empirical mutualistic networks to be modular, and yet this pattern is pervasive in nature. One possible explanation for this difference could be that mutualistic interactions are usually modelled as mutually beneficial for the interacting partners, even though there are both positive and negative effects associated with the consumption and supply of resources (e.g. damage to floral structures made by visitors). As such, the incorporation of the cost of mutualistic interactions into dynamic models could have a strong influence on the dynamics of the populations that interact within a community. Furthermore, these changes in the dynamics could alter the relationship between interaction network modularity and species persistence, as modularity should make it take longer for changes in species abundance to spread across the entire community, favouring species persistence. Here, we compared species persistence of mutualistic communities with different levels of modularity, using population dynamic models that included the cost of these interactions. We

Ecological Modelling (3)

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Bimbadeen Room

Oral presentation

Peralta G [1,2] , Stouffer D [2] , Bringa E [1,3] , Vázquez D [1,3]

[1] CONICET, Mendoza, Argentina

[2] University of Canterbury, Christchurch, New Zealand

[3] Universidad Nacional de Cuyo, Mendoza, Argentina

Revisiting the link between network structure and stability of mutualistic communities

found that the negative effect modularity has on species persistence decreases as the cost of the mutualistic interaction increases (providing the cost never exceeds the benefit). Using more realistic models for mutualistic communities, including the cost of interactions, allow us to better understand the relationship between network structure and community stability.

George Perry

Biography

George Perry is interested in the dynamics of forest ecosystems at spatial scales from the population to the landscape and at temporal scales from decades to milennia. His research involves a strong field-based component supported by simulation and/or statistical modelling.

EcoTAS abstract

In fragmented landscapes metapopulation dynamics are driven by the arrangement of habitat patches and the connections between them. Non-spatial models suggest that the inter-patch frequency-distribution of connectivity is crucial to metapopulation persistence. However, such models do not consider the spatial arrangement of patches and so they ignore the distance those connections span. Failing to consider space is important because long distance connections may be more tenuous than shorter ones (i.e., risk in moving between connections increases with distance). We ask whether, in terms of metapopulation persistence, a system with a few highly connected but many poorly connected patches (as in a 'small-world

Landscape Ecology (2)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #2
Oral presentation
Perry G [1] , Lee F [1]
[1] School of Environment, University of Auckland, Auckland Auckland, New Zealand
Metapopulation dynamics in a disconnected world

network') better than one where all patches are equally connected but all have fewer connections (as in a regular lattice). And how would metapopulations in such networks fare when connectivity varies through time? To explore these questions we used a spatially explicit simulation model. We compare population persistence in different network topologies under both static and dynamic conditions, where connectivity is represented by noise of different colours. Understanding how temporal variability interacts with spatial structure to influence population dynamics is important if metapopulation theory is to be translated to conservation applications.

Jennifer Peters

Biography

Jen Peters is a PhD candidate in the plant hydraulics and water relations lab of Dr. Brendan Choat. She is investigating drought resistance in native Australian tree species growing across a broad environmental gradient.

EcoTAS abstract

The physiological thresholds set by plant hydraulic traits are thought to constrain the environmental conditions under which a plant can survive. Water stress associated with severe drought can result in hydraulic failure of trees and has the potential to cause large scale forest dieback, impacting species distribution, community structure, hydrology, and associated ecosystem services.
We aim to address the questions: How do hydraulic thresholds compare for tree species from different climatic regions? Is there coordination of hydraulic traits? And how

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? – part 2

Monday, November 27, 2017

3:45 PM - 5:45 PM

Wattagan Room

Oral presentation

Peters J [1] , Choat B [1] , Nolf M [1] , Lopez R [2,1]

[1] Hawkesbury Institute for the Environment, Western Sydney University, Richmond NSW, Australia

[2] INRA, Clermon, France

Physiological Thresholds of Hydraulic Failure in Australian Forests

vulnerable are different forests types to hydraulic failure from severe drought events?
In this research, we characterize evergreen forest and woodland communities from across Australia by the hydraulic traits and thresholds of the dominant tree species. We measure xylem and leaf vulnerability to drought induced embolism at seven sites, representative of major Australian biomes. Measurements of current water status are used to assess risk of drought-induced hydraulic failure.
Our results show a strong relationship between climate and hydraulic traits. We found coordination between stem hydraulic vulnerability and water stress experienced for different species across sites. This finding indicates that climate imposes limitations on species distribution and that species are finely tuned and adapted to their environment. Hydraulic safety margins, defined as the difference between hydraulic vulnerability and maximum water stress, were smaller among tropical rainforest species (average 1.6MPa); species located at more arid sites maintained larger safety margins (2.7MPa). This suggests rainforest species are operating closer to their hydraulic threshold and could be more vulnerable to future climate change.

Chuyen Phung

Biography

• Lecturer, researcher and leader of Department of Resource and Environment management – College of Education – Danang University – Vietnam.
• Area of research interests: Ecotoxicology; Sustainable

Open session (2)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Bimbadeen Room
Oral presentation

Development; Limnology research; Relationships between ecological changes and climate change.

EcoTAS abstract

Antibiotics are designed to inhibit bacterial growth and function. Antibiotics enter the environment from aquaculture treatments, animal manures, domestic sewage application as a fertilizer or from wastewater effluents. The occurrence of antibiotics in aquatic environment has been reported with concentrations often in the low ng/L range (Larsson 2014). However, knowledge of potential effects by these highly biologically active compounds on aquatic ecosystems and microbes has been limited. Moreover, previous studies have focused on acute effects at high concentrations of antibiotics, which have not represented realistic conditions. Since antibiotics are released constantly into surface waters and exist in aquatic environment at trace levels, examining long – term impacts of antibiotics at these low concentrations is essential. Aquatic bacteria involve in various important ecological processes: nutrients cycling, metabolism and self-purification, which help remain aquatic ecosystems' health. The study aimed to determine the influence of the fluoroquinolone antibiotic – ciprofloxacin on growth and ecologically relevant function of bacteria isolated from a lake in Danang city, Vietnam. The results showed that chronic exposures of Pseudomonas sp. and E. Coli to ciprofloxacin at environmental concentrations (0.03µg/L-30µg/L) significantly affected the CFU counts and microcolony sizes. The suppression in enzyme production (cellulase and protease) was also detected. Moreover, the reduced sensitivity of E. Coli and resistance in Pseudomonas. sp was observed after treated with low concentrations of ciprofloxacin in long time. These results suggest that the appearance of ciprofloxacin in the aquatic

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[1] Department of Resource and Environment management - College of Education -Danang University , Danang Danang , Viet Nam

How could the antibiotic ciprofloxacin affect aquatic bacteria even at environmentally relevant concentrations?

ecosystems could pose a risk to both the environment and human health.

Rodrigo Pires

Biography

Mr Rodrigo Neto Pires, PhD candidate. Rodrigo is interested in plant ecophysiology, especially in water relations and plant hydraulic architecture. Rodrigo is particularly interested in how current and future climate change will shape plant communities around the globe.

EcoTAS abstract

Catastrophic and widespread tree mortality events around the globe have been linked with increased temperatures and more frequent/severe droughts events. Sudden large-scale Banksia woodlands mortality in the south-west of Western Australia (SWWA) is being reported, particularly after extreme dry and hot summer seasons. Environmental stresses (e.g. drought, heatwaves) can induce a decline in leaf water potential (Ψleaf), putting plant water systems under tension, promoting embolism formation and ultimately plant death. We investigated the seasonal relationship between Ψleaf (ΨPD and ΨMD), stomatal conductance (gs) and tree mortality during a record dry and hot summer in SWWA. Four co-occurring tree species (Allocasuarina fraseriana, Banksia menziesii, Corymbia calophylla, Eucalyptus marginata) were selected in two sites within a woodland. The sites differing in groundwater depth and plant density allowed the evaluation of seasonal effects of drought and elevated temperatures between species/sites. There were strong contrasts in hydraulic

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017
11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Pires R [1] , Drake P [1] , Poot P [1] , Veneklaas E [1]
[1] The University Of Western Australia, Crawley WA, Australia

The costs of isohydry: mortality and hydraulic control strategies in woodlands under severe drought stress

strategies to cope with reduced soil water availability and increased atmospheric evaporative demand. E. marginata and A. fraseriana showed anisohydric control of ΨPD and ΨMD allowing more negative Ψleaf with declining soil moisture. C. calophylla showed strong Ψleaf control, leaning towards an isohydric strategy, however allowing further Ψleaf decline than B. menziesii. B. menziesii exhibited the strictest Ψleaf control along the season, maintaining the highest ΨPD and ΨMD between species and sites, a markedly isohydric response. This strategy, although seemingly advantageous during seasonaly dry conditions, may lead to physiological failure during severe drought/temperature stress, which may partly explain the widespread mortality of B. menziesii in the region.

Christopher Pocknee

Biography

Chris is a MSc student from the Quantitative and Applied Ecology (QAECO) group at the University of Melbourne. He is researching novel uses for technology in detecting Lumholtz's tree-kangaroo and has a keen interest in wildlife conservation and management.

EcoTAS abstract

Effective measures to detect species of conservation interest are vital to wildlife management. When a species is particularly cryptic, researchers are increasingly looking to technology to enhance survey techniques. Thermal imaging has been used to improve detection rates of a range of endothermic species, while the use of drones, or unmanned aerial vehicles, has been investigated as a

Conservation Biology (1)
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation
Pocknee C [1] , Lahoz-Monfort J [1] , Wintle B [1] , Martin R [2]
[1] University Of Melbourne, Parkville VIC, Australia
[2] James Cook University, Cairns QLD, Australia
Assessment of novel survey techniques for detection of a cryptic arboreal mammal

survey method in recent years. The appeal of drones in conservation stem from their potential to survey larger and more remote areas than possible by researchers on-foot, although their high cost may present a hurdle to their use. Lumholtz's tree-kangaroo (Dendrolagus lumholtzi) is an arboreal mammal endemic to the wet tropics of northern Queensland. Population estimates of D. lumholtzi are highly uncertain due to low detection rates with the typical survey method of spotlighting. In this study, detectability of D. lumholtzi is compared under various survey methods – daytime surveys, spotlighting, thermal imaging surveys and drone surveys. The use of thermal imaging greatly increased survey success compared to both spotlighting and day surveys, detecting tree-kangaroos in a higher proportion of surveys and in greater numbers. The effectiveness of thermal imaging will encourage its use in surveys of arboreal mammals at sites that are readily accessible. Drone surveys are currently in progress, with results to be presented at EcoTAS 2017. If effective, drones will enable surveys of rainforest fragments to obtain more accurate population estimates for D. lumholtzi than have been possible to date, with applications for other cryptic arboreal mammals.

Min Raj Pokhrel

Biography

Min Pokhrel, PhD research scholar at the University of New England. Research and knowledge interest is in the areas of ecological functions, biodiversity, climate change,

Agro Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #2
Speed Talk PLUS Poster

sustainable agriculture production and environment management

EcoTAS abstract

Dung beetles are well known in Australia for controlling bush flies and livestock parasites along with their ecological services. After nearly 45 years of exotic dung beetle introduction into Australia, a seasonal dung beetle monitoring was conducted in native and improved grasslands at eight different locations along elevation gradients from 385 to 1357 masl during summer and autumn of 2017. The major objective of the survey was to assess the native and introduced dung beetle assemblage among altitudes, seasons and grasslands in the northern tablelands of NSW. Three different dung types (cow, sheep and kangaroo) were used as the baits in the standard pitfall traps. A total of 1924 dung beetles and 18 different dung beetle species were recorded in the pitfall traps. The average number of dung beetles trapped to sheep dung baits was highest (126.75±56.70 SE) followed by cattle (97±39.03 SE) and kangaroo dungs (16.75±6.73 SE). There was no significant differences in the number of beetles trapped in native (51.7%) and improved (48.3%) grasslands, and 75% of the specimens were introduced species. Euoniticellus fulvus Goeze, Onthophagus binodis Thunberg and Aphodius lividus (Olivier) were three most dominant introduced species and Onthophagus dandalu Matthews, Onthophagus granulatus Boheman and Onthophagus australis (Guerin) were the most dominant native species. Community composition among seasons shows in detail how the introduced and native dung beetle species are structured. Future research will start to assess the thermal physiological tolerances of species, and the role this plays in structuring the communities along the

Pokhrel M , Andrew N , Cairns S
[1] The University of New England, Armidale NSW, Australia

Native and introduced dung beetles assemblage along the environmental gradients of NSW northern tablelands

elevational gradient.

Alison Popay

Biography

Alison Popay is a senior scientist who for the last 20 years has been working with fungal endophytes of grasses and their interactions with plants and insects. She is also leads the Biocontrol and Biosecurity Team at AgResearch.

EcoTAS abstract

Outbreaks of root-feeding scarab insects cause severe disruption to pasture ecosystems particularly under drought conditions. One such scarab, the endemic New Zealand grass grub (Costelytra givenii), has largely abandoned its original tussock habitats in favour of wreaking havoc in improved pastures. Despite extensive research to find ways to combat this pest, control methods remains elusive. Tall fescue and meadow fescue are naturally infected by Epichloë endophytes that produce loline alkaloids known to deter this insect. To determine if deterrent effects of endophyte on root consumption by grass grub larvae are influenced by drought, plants of both species were grown in moist or very dry conditions. Root consumption and weight change of third instar larvae was determined in a bioassay over 7 days. Relative root consumption was higher on droughted plants than those grown in moist conditions, and reduced by endophyte in meadow fescue but not in tall fescue. Following a similar pattern, relative weight gain (RWG) was also greater on droughted than on non-droughted plants but, in a significant three-way interaction, this difference was only significant for endophyte-free tall

Agro Ecology
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Cypress #2
Oral presentation
Popay A [1] , Jensen J [1] , Mace W [1]
[1] AgResearch Ltd, Hamilton Waikato, New Zealand
Herbivory down under: grass species, endophyte and moisture status make a difference

fescue. RWG of larvae was reduced by endophyte in meadow fescue grown under moist and dry conditions, but the effect was significantly greater for plants grown in high moisture which also had the higher loline alkaloid concentration in roots. This experiment has indicated that increased root consumption may partially account for increased damage from root herbivory under drought conditions but that such effects may also be species specific.

Tamara Potter

Biography

Tamara has recently completed her Bachelor of Science (Advanced) degree at the University of Sydney with first class honours and a university medal. She's an avid adventurer with a passion for ecology.

EcoTAS abstract

Successful foraging is important for animals to fulfil their specific energy and nutrient requirements. However, as these resources are generally limited, competition often arises. Intraguild predation (IGP) is a distinctive form of interference competition where a dominant predator selectively kills subordinate species and thereby gains increased access to resources. This asymmetrical interaction has been documented primarily among carnivores, with few examples from different taxonomic levels. We present such an example here. The lesser hairy-footed dunnart (Sminthopsis youngsoni) is a common generalist insectivore in arid Australia that has been shown to consume wolf spiders (Family Lycosidae)

Open session (4)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Oral presentation
Potter T [1] , Greenville A [1] , Dickman C [1]
[1] University Of Sydney, Sydney NSW, Australia
Who killed the wolf spider? Intraguild predation among taxonomically disparate micro-carnivores

disproportionately often relative to their availability. In this study, we tested three hypotheses to uncover the underlying mechanisms driving this selective predation. Lycosids were not found to contain more energy, water or nutrients than other available arthropod prey, discrediting the hypothesis that S. youngsoni forages to optimise nutritional or caloric intake. However, we found a high degree of spatial and temporal overlap in resources (diet and microhabitat), providing support for the hypothesis of competition. This latter hypothesis, and the operation of IGP, was further supported by the results of cafeteria-style trials showing that S. youngsoni selectively targets lycosids when alternative prey types are equally available. This study is the first to uncover IGP between such taxonomically disparate groups, and its consequences extend beyond simple predator-prey relationships to suggest that IGP can have substantial impacts on community structure and dynamics.

Jeff Powell

Biography

Jeff Powell is a microbial ecologist and has a particular interest in interactions between microbes and plants. He hopes to use ecological approaches to better manage and exploit microbes in environmental applications.

EcoTAS abstract

Mycorrhizal fungi form symbioses with the vast majority of terrestrial plant species. These fungi are important drivers of ecosystem productivity, yet we lack an understanding of

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 1)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Brokenback Room

Oral presentation

what drives their distributions beyond broad generalisations of their roles in particular biomes. High-throughput sequencing has attempted to shed light on this, but in a way that is arguably independent of existing autecological understanding. Using information obtained from the Biomes of Australian Soil Environments (BASE) database (https://downloads.bioplatforms.com/base/), we mapped the distributions of arbuscular mycorrhizal (AM) and ectomycorrhizal (EM) fungi in Australia. Then, to determine whether environmental filtering might be acting on specific traits associated with these fungi, we integrated spore trait data (namely colour and size) with species of AM fungi identified and observed in BASE. We found that the relative abundances of DNA sequence reads and the richness of operational taxonomic units (OTUs) belonging to AM and EM fungi were responsive to environmental conditions (e.g., vegetation type and soil fertility) in ways that were expected based on current knowledge. However, for both AM and EM fungi, turnover in OTU composition among samples was extremely high suggesting a largely stochastic community assembly process. Despite this, we found evidence for climate, land use, and edaphic properties influencing AM fungal community composition via selection on spore traits. This study emphasises how integrating data generated from DNA-based environmental surveys with trait data obtained at the species level is a promising approach to identify fungal adaptations to different environments, improving our understanding of their ecological roles.

Powell J [1] , Aguilar-Trigueros C [2] , Deveautour C [1] , Bissett A [3]
[1] Western Sydney University, Penrith NSW, Australia
[2] Freie Universitaet Berlin, Berlin, Germany
[3] CSIRO, Hobart TAS, Australia

A trait-based understanding of mycorrhizal fungal dynamics in Australian environments

Sally Power

Biography

Sally Power is an ecosystem ecologist researching the impacts of global change on plant communities, plant-soil interactions and ecosystem functioning.

EcoTAS abstract

Climate models predict large changes in the overall amount, frequency and seasonality of rainfall, with ecosystems expected to experience climatic conditions in the future that will be far beyond historical norms. Indeed, the record-breaking droughts, floods and heat waves of recent years are abundant evidence of climate extremes, the impacts of which are being felt across the globe.
This talk presents results from two field experiments – DRI-Grass and DroughtNet – in Richmond, NSW, investigating impacts of altered rainfall regimes on the structure and functioning of grassland ecosystems. We show that aboveground productivity and community composition are largely resistant to reductions in the frequency of rainfall inputs, but that ecosystem carbon fluxes are sensitive to changes in the timing of rainfall events. Reducing the overall amount of rainfall has a large, negative impact on aboveground productivity and the composition of plant and microbial communities, although there is high functional resilience (i.e. rapid recovery when rainfall inputs return to normal).

SYMPOSIUM: Vulnerability and resilience of grasslands in Oceania to climate change
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Brokenback Room
Oral presentation
Power S [1]
[1] Hawkesbury Institute for the Environment, Western Sydney University, Penrith NSW, Australia
Too much, too little or too late? Understanding grassland responses to altered rainfall regimes

Noel Preece

Biography

Noel is a conservation ecologist working in northern Australian ecosystems, fauna, vegetation, fire ecology,

Open session (4)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM

restoration, environmental impact assessment and carbon sequestration. He is a Director of Biome5 Environmental Consultants, and an Adjunct Principal Research Fellow (JCU), and University Fellow (CDU).

EcoTAS abstract

Australia's northern savannas cover 1.9 million km2, a quarter of Australia's land area. Half lies within Queensland, 1/3 in the Northern Territory, 1/6 in Western Australia. Across northern Australia, it has been assumed that native mammals have experienced dramatic declines. Over 220 long-term monitoring sites have been established in the NT in just three national parks, and showed 'alarming' downward trends in mammal fauna over the last 20 years. But these studies are confined to the Top End of the NT.

Contrast this with studies undertaken on Cape York Peninsula. Half of all Australian bird species, 1/3 of frog, 1/3 of mammal and 1/4 of reptile species are known from the Peninsula. But the status of biodiversity of Cape York is poorly known. The few recent studies have shown disturbing patterns, with mammal captures at levels that caused alarm in the NT and WA.

Have declines been occurring across the Cape or Gulf of Carpentaria regions? We don't know. Across the Cape only 230 systematic sites have been established between 1979 and 2012. Only one has been re-surveyed. No long-term studies of most mammals have been done for the Cape or Gulf regions, despite known declines of some of the more iconic species.

There is no reason to think that these declines have not occurred on Cape York, given its similar climate, soils,

Oral presentation

Preece N [3]

[1] Biome5 Pty Ltd, Atherton QLD, Australia

[2] Centre for Tropical Environmental & Sustainability Science (TESS), College of Science and Engineering, James Cook University, Cairns Qld, Australia

[3] Research Institute for the Environment and Livelihoods, Charles Darwin University, Darwin NT, Australia

Northern Australia's faunal extinction modelling based on too few monitoring sites

pastoral history, and original fauna. So what is being done about this lack of knowledge? Not much. A complete re-assessment is required.

Aiden Price

Biography

Peter is managing Director of Anditi Pty Ltd and has been working in natural resource management for 30 years. In recent years peter has been focussing on the use of high resolution remote sensing techniques to undertake landscape analysi

EcoTAS abstract

Large scale vegetation mapping has been undertaken using remote sensing techniques such as analysis of satellite imagery for several decades with varying degrees of success due largely to resolution of the imagery which were measured in metres, types and coverage of data available and availability of tailored algorithms for analysis. More recently targeted capture programs, specifically designed for vegetation and habitat mapping using high resolution imagery (now measured in centimetres) combined with high resolution LiDAR are providing dense coloured 3 Dimensional point clouds are being commissioned. These data sets, while not yet providing absolute certainty about the plant species within the surveyed area do provide data rich in information that can be used to derive landform characteristics, vegetation height and structure, lifeform, coverage and in some instances species.
This presentation explores the findings of a vegetation

Landscape Ecology (1)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Cypress #2
Oral presentation
Jamieson P [1]
[1] Anditi Pty Ltd, Teralba NSW, Australia
Learnings in Using LiDAR, Imagery and Machine Learning in Mapping and Characterising Vegetation Characteristics

mapping over approximately a 50,000 ha area using a combination of remote sensed data (high resolution LiDAR and imagery), targeted field surveys and data analytics including machine learning. This information was used to define landform characteristics, vegetation structure, lifeform categories and percentage vegetation cover on rehabilitated areas. The same techniques and data were then used to describe and compare vegetation characteristics of large undisturbed areas surrounding the rehabilitation sites.
The presentation also investigates the impact of capture resolution of the remote sensed data and sample size on accuracy of results and methods for comparing results obtained using different resolution data.

Jodi Price

Biography

Jodi is a plant community ecologist broadly interested in community assembly, disturbance, restoration and grassy ecosystems. Jodi lectures in disturbance ecology and vegetation management.

EcoTAS abstract

Species richness in local communities is influenced by the size of the regional species pool (i.e. the number of species that can potentially inhabit a site) and local abiotic and biotic factors. It is expected that the species pool is of greater importance in species-rich communities as communities are relatively open to colonisation. We used a macroecological approach to determine the relative

Community Ecology
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #3
Oral presentation
Price J [1] , Gazol A [2] , Tamme R [3] , Morgan J [4] , Leonard S [4] , Pärtel M [3]
[1] Charles Sturt University, Albury NSW, Australia
[2] Instituto Pirenaico de Ecología , Spain
[3] University of Tartu, Tartu, Estonia
[4] Latrobe University, Melbourne Victoria, Australia

importance of species pool size and local factors governing species richness in temperate grasslands around the world. We sampled vegetation in 5000 quadrats (10 x 10 cm, arranged contiguously along a 10 m long transect) in seven regions—Argentina, Spain & Morocco, south eastern Australia, Western Australia, Estonia, Mongolia, and Canada. We used a series of tests to determine the relative importance of different factors driving species richness (including log-ratio of species pool size to local richness, species-area curves, and assembly tests). Small-scale richness was high, with an average of 7 species (10 x 10 cm) in all regions, and highest richness was 23 species recorded in Spain. We found a curvilinear relationship between local richness and species pool size indicating that communities are saturated at higher levels of small-scale richness, and that local factors place some limits on species coexistence. We detected similar local assembly patterns across the globe, but they were relatively weak and only detected at small spatial-scales. Consistent patterns were found in ecologically similar but evolutionary distant grasslands suggesting generality in the importance of species pool size in driving species richness patterns in temperate grasslands.

Species richness of temperate grasslands around the world is primarily driven by species pool size

Stephanie Pulsford

Biography

Stephanie Pulsford's research focuses on human modified landscapes and how human land use can influence biodiversity conservation. She has been examining how reptiles and frogs are influenced by land management on private grazing properties in NSW.

SYMPOSIUM: Changing Australia: emerging trends, trade-offs and synergies of landscape transformation in rural Australia

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Wattagan Room

EcoTAS abstract

Habitat modification and fragmentation due to grazing has led to changes to biodiversity, including altered movements of species. My aim was to examine the effect of different land use types on reptile and frog movement in a grazing landscape. I used pitfall and funnel trapping to survey reptiles and frogs in five land use types: 1) woodland remnants, 2) grazed pastures, 3) coarse woody debris added to grazed pastures, 4) fences in grazed pastures, 5) linear plantings within grazed pastures. I used Visible Implant Elastomer to individually mark the animals. Reptiles and frogs displayed contrasting movement behaviour. Reptiles moved both within and out of paddocks more than remnant patches and also moved longer distances in paddocks. In contrast, frogs appeared to use the fence lines as movement corridors and the two most common frog species displayed differing movement patterns. Interestingly I recorded no recaptures of the most common frog species (Limnodynastes tasmaniensis) in the linear plantings, suggesting it does not perceived it to be habitat. Most recaptured reptiles and frogs did not move trapping arrays though some individual frogs moved up to 720m and individual reptiles up to 1326m. My study showed that the land use type in the grazing landscape did influence reptile and frog movement. Most animals appear to perceive all land use types as habitat, though of varying quality, with moderate recapture rates in all land cover types, generally short movement distances and low occurrences of movement out of land cover types.

Oral presentation

Pulsford S [1]

[1] Australian National University, Acton ACT, Australia

The effect of land use on reptile and frog movement in a grazing landscape

Desi Quintans

Biography

Desi is a pastry chef-turned-PhD candidate at Western Sydney University. He is fascinated by insects and excited about the possibilities of using DIY technology to make community-level observations at lower costs.

EcoTAS abstract

Legumes (family Fabaceae) are key nitrogen-fixing plants and post-fire pioneers. Their seeds are eaten by the larvae of some beetles, and those larvae are in turn eaten by the larvae of parasitoid wasps. Within Australia, the beetles that are involved in this tri-trophic food web show more host-specificity than legume-feeding beetles that have been observed in other parts of the world.

We are studying this legume-beetle-wasp food web along an altitudinal gradient in the Blue Mountains, NSW. An altitudinal gradient features rapid changes in temperature and rainfall within a compact area, without the confounding effects of population structure and landscape changes over a larger area. We are observing how the insect and plant community changes across the gradient in terms of assemblage, fecundity, predation, and genetic diversity. We are particularly interested in how climate change is creating mismatches between predators/herbivores and their hosts, by pushing species out of their climatic niches or changing the timing of plant fruiting and insect maturation. This study will add to our understanding of community dynamics and abiotic effects in the legume system, and provide hints at future food web adaptation.

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Quintans D [1] , Rymer P [1] , Cook J [1] , Auld T [2]

[1] Hawkesbury Institute For The Environment, Richmond NSW, Australia

[2] NSW Office of Environment and Heritage, Sydney NSW, Australia

How do legume-insect interactions change along an altitudinal gradient?

James Radford

Biography

Jim is the Principal Research Fellow - Future Landscapes Initiative in the Department of Ecology, Environment and Evolution at La Trobe University. This program examines the drivers and consequences of landscape transformation and seeks solutions for sustainable and liveable landscapes.

EcoTAS abstract

Transformation of land and water, and its consequences for people and nature, pose a critical challenge for human society in the 21st Century. Societal expectations are that land will continue to be used to meet human needs – producing more food, materials and fuel – while maintaining natural values, biodiversity and ecosystem services. Agriculture has long been the dominant driver of landscape transformation in rural and regional areas, and now occupies 58% of Australia. However, the ways in which humans are transforming landscapes are changing as a result of demographic change, technological advances, new markets, climate change and emerging economies. In this presentation, I examine changes in land-use from 1992/93 to 2010/11, and identify ten current and emerging trends relevant to land-use in Australia. These include the rise of post-agricultural landscapes, shifts in agricultural production systems and climate-induced changes in native vegetation structure and composition. Business-as-usual is not an option if we are to halt the ongoing decline in biodiversity, ecosystem services and natural capital. Solutions to increasing sustainability ultimately lie in how people value and interact with nature, and how we use and allocate land. I present a suite of plausible interventions and options for re-designing landscapes and changing attitudes and behaviour to alter the trajectory of rural landscapes in Australia. These include market-based interventions, technological and

SYMPOSIUM: Changing Australia: emerging trends, trade-offs and synergies of landscape transformation in rural Australia

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Radford J [1]

[1] La Trobe University, Bundoora VIC, Australia

Landscape transformation in rural Australia: emerging trends and interventions to increase ecological and social sustainability.

biotechnological fixes, social strategies, policy settings, agricultural practice changes, and some “left-field” possibilities. These options have been developed in response to the current and emerging drivers underpinning landscape transformation in rural Australia.

Nirosha Ranawaka

Biography

Nirosha is currently conducting her PhD research on meat ants' aggression behaviour, thermal tolerance and population genetics. She did her masters study in the United States and her BSc in Zoology in Sri Lanka.

EcoTAS abstract

Aggression behaviours among ants are primarily observed within field enclosures due to difficulty in observing their behaviours in open spaces. Over the past decades nearly 90% of studies have undertaken ant behavior assessments, primarily using enclosed space trials. Here, I investigated how the methodology used to assess aggression behavior in meat ants (Iridomyrmex purpureus) influences the outcome of meat ant interactions. Intruder ants were introduced on to resident ant nests using either using within an enclosure or no enclosure. Within enclosure observations were also taken using blind and non-blind scores. Aggression behaviour was recorded as ‘non-aggression’, ‘ritualized display’ and ‘fight’ over a 5 minute period post first contact between the resident ant and the intruder ant. Aggression percentages were calculated in each method and observation type, in order to determine the amount scored of each behaviour type against method or observation type. In no-enclosure treatments the most

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 2)

Monday, November 27, 2017

3:45 PM - 5:45 PM

Brokenback Room

Speed Talk PLUS Poster

Ranawaka N [1] , Andrew N [1]

[1] University of New England, Armidale NSW, Australia

Meat ants’ true aggression behaviours are masked by human interference when recorded in enclosures

prevalent type of aggression shown by the ants was ‘fight’. However within enclosures, the most prevalent was ‘ritualized display’. There was no differences between blind and non-blind scoring. These results suggest that, the true outcome of behavioural assays are impacted by the human interference due to stress caused by marking and ants kept inside enclosures.

Krystal Randall

Biography

Krystal Randall
PhD Candidate
School of Biological Sciences - University of Wollongong
Research interests include:
Responses of vegetation to environmental change
Plant ecophysiology
Remote sensing to monitor plant health status

EcoTAS abstract

Bryophytes are predicted to undergo shifts in community structures, as well as changes to their abundance, distribution and biomass as a result of climate change, however little is being done to monitor and predict their responses to change. Predicting the response of bryophyte communities to climate change is hampered by a scale mismatch between regional scale climate models and scales biologically relevant for bryophyte communities. Microclimate pockets, or microrefugia, are arguably the most important determinants of bryophyte distribution, abundance and community structure. Slight changes to microclimate parameters over scales of centimetres can

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation
Randall K [1] , Robinson S [1] , Ashcroft M [1] , Bennie J [2] , Maclean I [2]
[1] University Of Wollongong, Wollongong NSW, Australia
[2] University of Exeter Penryn Campus, Penryn Cornwall, UK
Modelling and Monitoring Mossy Microclimates

provoke rapid changes in community structure or even rapid, irreversible die-off. Mosses inhabit a range of contrasting habitats, and thus represent an opportunity to develop monitoring techniques that can be standardised and employed across wide geographic ranges. Achieving this would greatly improve our ability to monitor various species and communities. Using East Antarctic and arid Australian moss-beds as model communities, the present research aims to develop a protocol for the establishment of a powerful microclimate model capable of real-time monitoring at calibrated sites. Incorporating the influence of micro-topography, the model will be calibrated using comprehensive site-specific microclimate indices calculated from empirical data, mechanistic indices of other physical processes that can influence microclimate, including diurnal light and shade exposure, as well as regional scale climate data obtained from satellite observations and automatic weather stations. Model outputs will be able to monitor and predict moss microclimate at a finer scale and with higher accuracy than has previously been achieved.

Julia Rayment

Biography

Julia Rayment is currently studying a Bachelor of Conservation Biology at UOW. Her honours project is investigating how mycorrhizae can be incorporated into green roof designs to improve species survival.

EcoTAS abstract

Urban habitats are characterised by factors which can increase the risk to human health and ecosystem

Urban Ecology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Bimbadeen Room
Oral presentation
Rayment J [1] , French K
[1] University Of Wollongong, Wollongong NSW, Australia
Incorporating below-ground mycorrhizal associations to increase

functioning. Green urbanism such as green roofs has the ability to mitigate these negative effects, however green roofs face high stress from wind, shallow soils and high sun exposure affecting survival and growth. In natural environments plants adapt to stressful habitats through mutualistic associations with mycorrhizal fungi. This study therefore aims to investigate the role that naturally-occurring and commercial mycorrhizae play in regulating plant growth and plant-plant interactions between native species. Using pot experiments 3 native species were planted either alone, with all species present or with three of the same species present and were watered with a native mycorrhizal, commercial mycorrhizal, or mycorrhizal free solution for 10 weeks. We identified changes to growth, mycorrhizal colonisation and survival amongst species associated with intraspecific and interspecific competition, that were mediated by mycorrhizal associations. The results confirm the importance of mycorrhizae in polyculture plantings and show that mycorrhizae is important to seedling growth. Incorporating mycorrhizae in green roof designs could drastically improve a bleak urban ecosystem.

the survival of seedlings suitable for green roof applications

Maia Raymundo

Biography

Maia Raymundo is a PhD candidate in the School of Biological Sciences at the University of Queensland. Her research interests lie in conservation, community ecology, and the mechanisms underlying species coexistence.

Invasion Ecology (Plants)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation

EcoTAS abstract

Community assembly theory posits that local communities are products of dispersal and abiotic and biotic mechanisms which acts as ‘filters’ through which species from a regional pool pass. Understanding the extent to which these ‘filters’ interact to drive community assembly is especially important for invaded plant communities. Few studies, however, have manipulated more than a single filter to examine invasion dynamics. For invaded systems, identifying the mechanisms that promote or constrain the dominance of exotic species is important to mitigate or prevent the effects of invasive species on native plant communities. This study examined the role of multiple filters in shaping semi-arid annual plant communities in York gum woodlands in Western Australia by experimentally impeding natural dispersal and manipulating the intensity of rainfall in experimental plots over the course of three years. Three exclusion treatments (open, partially close, and completely close) and two rainfall treatments (control, enhanced) were applied in different combinations to six 1 m x 1 m plots and repeated across 10 blocks in Bendering Nature Reserve, WA. Preliminary analyses using linear mixed models showed that enhanced rainfall had no significant effect on diversity and evenness between treatments. However, diversity in treatments where dispersal was partially or completely impeded, was significantly different from open plots. Multivariate analysis also showed the influence of dispersal constraints on community assemblage. Further analyses will focus on the factors which promote the dominance of native and non-native species in the experimental plots.

Raymundo M [1] , Hille Ris Lambers J [2] , Mayfield M [1]
[1] School of Biological Sciences, University Of Queensland, Brisbane QLD, Australia
[2] Department of Biology, University of Washington, Seattle Washington, USA

The effects of experimental water addition and dispersal exclusion on invaded annual plant community assembly

Kate Reardon-Smith

Biography

Kate Reardon-Smith, Senior Research Officer

EcoTAS abstract

Climate change is expected to increase the intensity of drought in many parts of the world with potentially significant consequences for grasslands. In this regard, changes in the proportions of C3 and C4 grasses associated with increasing aridity may have significant consequences for grazing systems.
We examined the response of grassland biomass with different proportions of C3 and C4 grasses to the millennium drought (2002-2010), and subsequent period of extreme rainfall (2010-2011). This juxtaposition between protracted drought (rainfall deficits comparable to climate change projections) and subsequent intense rainfall phase allowed investigation of the role C3 and C4 grasses in grassland drought resistance and recovery. We analysed 2,549 grassland sites in the Darling Downs, Queensland using remotely sensed Enhanced Vegetation Index (EVI) data. We modelled trends in a prolonged drought (resistance) and subsequent wet phase (recovery) as a function of the ratio of C3 to C4 grasses alongside hydro-climatic and land use drivers, using boosted regression trees (BRTs).
Multiple factors explained EVI trends for resistance (CVpred/obs. = 0.69) and recovery (CVpred/obs = 0.61). The ratio of C3 to C4 grasses was an important determinant of how grasslands responded to, and recovered from drought. Not surprisingly, sites with lower C3 to C4 ratios (i.e. higher proportion of C4 grasses) were more resistant to drought. However, sites with high C3 to

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Reardon-Smith K [2] , **Le Brocque A** [1] , Kath J [2] , Apan A [1,2]

[1] Faculty of Health, Engineering & Sciences, University Of Southern Queensland, Darling Heights QLD, Australia

[2] Institute for Agriculture and the Environment, University of Southern Queensland, Toowoomba Queensland, Australia

Enhanced Vegetation Index (EVI) as measure of drought resistance and recovery: role of C3/C4 grasses

C4 ratios showed significant recovery during the wetter period. This suggests C3 dominated grasslands, while sensitive to long term drought, have high recovery ability and may be resilient to extreme climate variability.

Sean Reilly

Biography

Sean Reilly graduated summa cum laude from Santa Clara University in 2016 with a B.S. in Environmental Science and Biology. He is currently conducting invasive species management research in Australia as a Fulbright Postgraduate Student.

EcoTAS abstract

Stakeholder engagement in invasive species management has been shown to increase the success of control efforts. This is particularly important for Aboriginal ranger groups charged with managing the traditional of their community. The pond apple (Annona glabra) poses a significant problem for the rangers of the Djunbunji Land and Sea Program since this Weed of National Significance produces edible fruit. Consequently, the traditional owners of the land administered by Djunbunji value this Americas native for its resource production. This research project sought to develop a management plan that balanced the potential ecological harm of the pond apple with the needs of the community. We accomplished this task in three phases. First, we mapped the location of pond apple trees within East Trinity Reserve to understand the scope of the threat and the pattern of distribution. Second, we conducted a

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Reilly S [1,2] , Bulmer V [1] , Bulmer M [1] , Tsey K [2]

[1] Djunbunji Land and Sea Program, East Trinity QLD, Australia

[2] The Cairns Institute at James Cook University, Cairns QLD, Australia

Invaders in a cultural landscape: Managing Annona glabra within the Mandingalbay Yidinji Indigenous Protected Area.

systematic scoping of the literature to explore what had previously been done to manage invasive species with resource potentials. Lastly, we interviewed key community members to understand their perceptions of the pond apple, identify key harvest areas and establish the minimum pond apple population size needed to support the community harvest. This information was synthesized into management guidelines for the rangers.

Michael Renton

Biography

Michael moved from mathematics to biology via virtual apple and frangipani trees in Montpellier and Brisbane. Now at UWA, he applies his skills in ecological modelling and analysis to address problems in agriculture, conservation biology and theoretical ecology.

EcoTAS abstract

Through the processes of evolution, plants develop effective and efficient strategies to acquire the limited resources they need, such as light, water and nutrients. These strategies can be more or less plastic, that is, able to respond to changes and variability in environment within the lifetime of an individual. Computer simulation integrating both ecological and evolutionary processes is a powerful tool with the potential to help us understand the relative advantages of different structural growth strategies with varying levels of plasticity, in different environments. We developed a new functional-structural plant model (FSPM) to represent root development and water uptake within a single growing season. The model can represent a range of structural rooting strategies with varying levels of

Ecological Modelling (Plants)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Sugarloaf Room
Oral presentation
Renton M [1] , Poot P [1]
[1] University of Western Australia, Perth WA, Australia
Exploring the evolutionary dynamics of phenotypic plasticity with a functional-structural plant root model

structural plasticity. We then linked the FSPM with a computational evolutionary algorithm, and successfully simulated evolution of structural rooting strategies in different soil types and rainfall frequencies. Different traits and strategies evolved in different conditions, in ways that made sense, but were not necessarily predictable.
The results highlight how this eco-evolutionary modelling approach lets us explore how ecological root growth strategies and levels of root structural plasticity evolve to enable plants to most efficiently exploit available water resources in a water limited environment. We also discuss how this approach can be used to explore fundamental ecological questions, such as the evolutionary advantages and disadvantages of phenotypic plasticity and its relationships with environmental variability; the repeatability or uniqueness of evolutionary trajectories; the coevolution of traits within plant communities; and the processes of speciation.

April Reside

Biography

April Reside is a postdoc working on threatened species and landscape conservation. She is part of the NESP Threatened Species Recovery Hub project 4.4 Identifying and managing refuges from threats. She spends far too much time worrying about endangered finches.

EcoTAS abstract

Rocky environments are important habitat and refuges for a diverse range of animal and plant species. Rocks afford multiple advantages, particularly for a hot, dry and fire-

SYMPOSIUM: Novel methods for identifying and managing refuges across scales and ecosystems
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Wattagan Room
Oral presentation

prone landscape: protection from fire, predators or herbivores, reduced radiation and evaporation, and water accumulation. Australia has 158 vertebrates (10 amphibians, 10 birds, 60 mammals and 78 reptiles; 39 of which are threatened) endemic to rocky habitats (rock obligate species), and many more that seek refuge in rocks in the presence of a stressor such as fire or high predation (rock facultative species). Many of the rock obligate species have restricted distributions so are vulnerable to disturbance of their rock sites. We mapped the extent of rocky habitats across Australia based on the distribution of basalt, sandstone and granite, using a Topographic Roughness Index (TRI) raster derived from a 1 arc-second Digital Elevation Model of Australia and surface geology data from Geosciences Australia. We measured the range of TRI values within 50 m of each species record to estimate the bounds of rock-dependent species. We intersected the distributions of both rock obligate and rock facultative species with the distribution of rocky habitats to identify important and irreplaceable rock sites. We looked at the degree of protection and threat of each of the rock sites to identify which are most in need of conservation action attention. The important rocky habitats on leasehold and freehold land, particularly granites, require greater protection in order to maintain the threatened species relying on these areas.

Reside A [1,2,3] , Michael D [4] , Atkinson S [1,3] , Kearney S [1,3] , Fisher D [1,3]
[1] University of Queensland, Brisbane Qld, Australia
[2] NESP Threatened Species Recovery Hub
[3] Centre for Conservation and Biodiversity Science, University of Queensland
[4] Fenner School of Environment and Society, Biology Place, Australian National University, Canberra ACT, Australia

On the rocks: mapping rocky habitats, their threats and conservation status

Olivia Reynolds

Biography

PROFESSOR OF APPLIED ECOLOGY AT CHARLES STUYRT UNIVERSITY AND VISITING PROFESSOR AT

SYMPOSIUM: Functional roles of plant silicon: how plants get it and what they use it for

Tuesday, November 28, 2017

FUJIAN AG & FORESTRY UNIV IN CHINA.

EcoTAS abstract

There is mounting awareness of the positive effects of plant-available silicon on plant defences against biotic threats. Most of this work has focused on plant pathology while work on arthropod pests has been largely confined to constitutive (‘always-on’) defence and mechanisms that operate directly on pests. This paper will present result from very recent work on the effects of silicon on indirect, induced plant defence that operates via herbivore-attacked plants releasing volatiles to attract natural enemies to serve as ‘bodyguards’. Work in rice demonstrated for two herbivore-parasitoid systems that the identity and ratios of volatiles produced by rice plants is altered soon after herbivore damage commences and that parasitoids are more attracted to the blend from infested plants than undamaged plants. Moreover, damaged plants with prior silicon treatment produce an odour blend that was more attractive than that from damaged plants grown under silicon deficient conditions. Consistent findings were evident in studies with radish and cucumber together with their herbivores and parasitoids. In cucumber, a time series study revealed that silicon treatment led infested plants to be more attractive to parasitoids than were uninfested plants after just one hour of herbivory. For silicon deficient plants, parasitoids did not discriminate between infested and uninfested plants until herbiory had extended for three hours. Transcriptomics showed that silicon affected the expression of genes linked with the jasmonic acid (but not the salicylic acid) pathway as well as the synthesis of volatiles, terpene synthase, lipoxygenase and indole synthesis.

11:00 AM - 12:30 PM
Brokenback Room
Oral presentation

Reynolds O , Gurr G [1] , LIU J [1,2] , ZHU Z [2]

[1] Charles Sturt University, Orange NSW, Australia

[2] Fujian Agriculture and Forestry University, Fuzhou Fujian, China

Using silicon to manipulate plant defence: chemical and molecular ecology

Anna Richards

Biography

Anna is a savanna ecologist in the CSIRO Land and Water Darwin laboratory. She has a broad interest in vegetation and soil dynamics in tropical savannas and the influence of land management practices, particularly fire, on these processes.

EcoTAS abstract

Fire management is used across northern Australian savannas to reduce greenhouse gas emissions and sequester carbon. These managed fires are less intense and frequent than recent historical baselines (one fire every two years) and may help to reverse declines in vertebrate biodiversity. Here we test whether reduced fire frequency and intensity and lower greenhouse gas emissions also correlate with increased diversity of the grass layer or if there is a trade-off between these ecosystem processes. We measured grass species diversity and abundance at a long-term fire experiment at the Territory Wildlife Park near Darwin. Fire treatments consisted of plots remaining unburnt, burnt every one, two, three and five years in the early dry season and every two years in the late dry season. At the start of the fire experiment, after more than 20 years without fire, total grass richness was low across all treatments and dominated by perennial species (S = 5.7, P(%) = 56). After 10 years of fire treatment grass species richness had diverged with the early two year treatments showing highest species diversity (S = 18.3). Plots remaining unburnt had the lowest diversity (S = 13.3), while plots burnt every year had the highest proportion of annual grasses (A(%) = 72). If landscape scale savanna fires were solely managed for low greenhouse gas emissions there may be a decline in grass diversity (especially annual

SYMPOSIUM: Changing Australia: emerging trends, trade-offs and synergies of landscape transformation in rural Australia

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Richards A [1] , Andersen A [2] , Liedloff A [1] , Schatz J [1] , Tardy F [1] , Walker S [3] , Setterfield S [4]

[1] CSIRO Land and Water, Winnellie NT, Australia

[2] Charles Darwin University, Darwin NT, Australia

[3] Environmental Research Institute of the Supervising Scientist, Eaton NT, Australia

[4] The University of Western Australia, Perth WA, Australia

Trade-offs between grass diversity and greenhouse gas emissions under different fire regimes in tropical savannas

species), suggesting a trade-off between biodiversity and carbon benefits.

Markus Riegler

Biography

A/Prof. Markus Riegler is HDR Director of the Hawkesbury Institute for the Environment. Research in his team encompasses ecology, evolution and function of Australian native insects in agricultural and forest ecosystems with a particular focus on insect-plant and insect-microbe interactions.

EcoTAS abstract

Eucalypts are associated with diverse native psyllids, small plant-sap feeding insects. Many psyllid species are rare; some, however, experience rapid population build-up and cause significant area-wide eucalypt defoliation and dieback.
Over the last decade we have documented unprecedented area-wide defoliation and dieback of two dominant Eucalyptus species over several thousand hectares of the critically endangered Cumberland Plain Woodlands in Sydney. This was caused by two outbreak waves of a potentially new psyllid species, Grey Box Cardiaspina sp. that specifically feeds on Grey Box (Eucalyptus moluccana), and another outbreak by Cardiaspina fiscella on Eucalyptus tereticornis. Our data demonstrate that the psyllid populations experienced boom and bust cycles that were impacted by resource availability and climatic factors, in particular summer heat waves that crashed psyllid populations. During the outbreak control of psyllids by

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Riegler M [1] , Flores-Renteria L [1,2] , Morrow J [1] , Hall A [1,3] , Esveld J [1] , Rymer P [1] , Gherlenda A [1]

[1] Hawkesbury Institute For The Environment, Western Sydney University, Penrith NSW, Australia

[2] Department of Biology, San Diego State University, San Diego California, USA

[3] Department of Agriculture and Water Resources, Rosebery NSW, Australia

Could psyllid-induced defoliation and dieback of eucalypts become more common and widespread?

natural enemies was limited. Given this new emergence of a Cardiaspina sp. on E. moluccana, the genetic identity of the psyllid and its host association became a major point of inquiry. Population genomic analyses of the psyllid demonstrated that it is genetically distinct from its relatives that are specific to other Eucalyptus species in other parts of Australia. In a common garden experiment with different Eucalyptus species we found that it is highly host specific to E. moluccana provenances from Sydney and beyond, from NSW and QLD. This highlights the potential risk for GB Cardiaspina to become far more widespread, similar to the notorious Eucalyptus defoliator C. fiscella that is widespread and invasive in New Zealand.

Rohan Riley

Biography

Rohan Riley completed is MSc at the University of Ottawa studying the evolutionary genomics of arbuscular mycorrhiza (AM) fungi. He now is now studying the resource allocation trade-offs between AM fungi and plants across nutrient and stress gradients.

EcoTAS abstract

The arbuscular mycorrhizal (AM) symbiosis is a widespread and ancient association, but observations that plant growth responses to AM fungi can range from positive to negative call into question its mutualistic basis. This variation has been linked to the relationship between plant nitrogen (N) or phosphorus (P) limitation and fungal-plant carbon (C) balance, but we still lack a mechanistic insight to exploit the association in managed systems and to

Agro Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation
Riley R [1]
[1] Western Sydney University, Richmond NSW, Australia
Growth strategy trade-offs drive mycorrhizal responses in Brachypodium distachyon

understand how natural selection can act on mycorrhizal growth responses (MGRs). Using two genotypes of the grain model Brachypodium distachyon, grown in the presence and absence of AM fungi on a high-throughput plant phenotyping platform, we demonstrate that the coupling of tissue N:P content to growth-rate determines the coordination of functional traits linked to plant growth strategies and determines MGRs. Our results reveal a novel mechanism in plants by which growth strategy drives growth outcomes during the AM symbiosis.

Euan Ritchie

Biography

I apply ecological theory with good doses of field work to seek solutions to the challenges of conserving biodiversity. My key research interests include predator-prey interactions, pest and wildlife management, and mammalian ecology and conservation. I'm passionate about science communication.

EcoTAS abstract

Predation exerts a strong influence on the distribution and abundance of organisms, and hence the composition and functioning of ecosystems. Prey can reduce their risk of predation through use of ecological refuges, which may be structural (e.g. vegetation cover or topographic complexity), or spatio-temporal (e.g. mesopredator suppression by apex predators). With reference to ecological theory and recent research I will synthesise our current understanding of the importance of refuges in mediating predation, and hence conserving biodiversity. Key factors affecting refuge quality

SYMPOSIUM: Novel methods for identifying and managing refuges across scales and ecosystems

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Wattagan Room

Oral presentation

Ritchie E [1]

[1] Deakin University, Burwood VIC, Australia

Ecological safe houses: refuge from predation

and availability include: disturbance regimes—particularly fire in an Australian context; herbivore populations and total grazing pressure; and the diversity of predator guilds and their interactions. Where environments have a reduced availability of refuges, supplementation and enhancement of habitat through the creation of artificial refuges (e.g. rock piles, concrete tubing) may facilitate the persistence of natural or reintroduced animal populations. Further, such refuges could provide immediate and vital protection for prey following severe disturbance events such as wildfire, and particularly in systems that may take decades to naturally accumulate refuges again.

Fiamma Riviera

Biography

Fiamma was a senior botanist for a botanical consultancy for several years, leading vegetation mapping, threatened flora and restoration monitoring projects throughout WA. Fiamma began her PhD in April 2014 where her research interests are restoration ecology and vegetation modelling.

EcoTAS abstract

We used long-term restoration monitoring data to identify the vegetation-dynamic trends for two mining areas in species-rich mediterranean-type shrublands (kwongan) in southwest Western Australia, a biodiversity hotspot. These data sets consist of vegetation plot data collected over 15 years in permanent transects and plots aged four to 37 years old, subject to different restoration practices and fire regimes, as well as corresponding data for reference sites in undisturbed vegetation. The description of floristic

Restoration Ecology (1)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Bimbadeen Room

Oral presentation

Riviera F [1] , Renton M [1] , Dobrowolski M [1,2] , Veneklaas E [1] , Mucina L [1,3]

[1] The University Of Western Australia, Perth WA, Australia

[2] Iluka Resources Ltd, Perth WA, Australia

[3] Stellenbosch University, Stellenbosch Western Cape, South Africa

Comparison of floristic and functional patterns and drivers in post-mining restoration of kwongan shrublands

vegetation-dynamic trajectories for these areas has been the first step in understanding current restoration outcomes. Large variability was observed in vegetation composition, cover, density and richness between restored areas. This floristic variability could be partially, but not fully, explained by analyses of restoration practices and environmental variables as potential drivers in recovery. We therefore decided to broaden methodologies, complementing floristic analyses with those based on functional traits and syndromes. These latter analyses are in progress and we anticipate that this approach will clarify drivers of post-restoration vegetation changes and aid interpretation of vegetation recovery patterns. Our approach will inform not only post-mining vegetation recovery, but will also contribute to the theory of vegetation dynamics in ecologically stressed ecosystems characterized by an extremely low nutrient status and intrinsic long periods of drought.

This research is supported by ARC grant LP150100339.

Bridget Roberts

Biography

Bridget Roberts is a recent graduate with a Bachelor of Science, Honours, majoring in Biological Sciences. Her project focussed on fire ecology, disturbance regimes and herpetology. Similarly, her interests lie in herpetology, fire ecology and conservation.

EcoTAS abstract

Forest Ecology (1)
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Roberts B [1] , Price O [1]
[1] University of Wollongong, Wollongong NSW, Australia
The effect of fire frequency and logging on forest reptiles in south-

In Australian forests, prescribed burning and logging are two of the most common management practices. Prescribed burns often occur at shorter intervals than in natural systems, as it used as a form of asset protection and to consume debris post-logging. Studies have investigated how each of these management practices effect forest fauna, however there seems to be little insight into the impacts on reptiles in areas where these practices co-occur. This study addresses this knowledge gap, using camera traps and active searches to survey reptiles in a long-term logged and burned forest in south-eastern New South Wales. Multiple habitat requirements of reptiles which may represent causal links between fire frequency and logging and reptiles were also surveyed. We found that reptiles were unaffected by logging, but positively affected by increased fire frequency. However, when fire was implemented in logged areas, the reptile population was unaffected. Canopy cover and temperature variability were identified as possible causal links between treatment and the response of reptiles, which could be explained by species-specific ecological requirements. This study provides some of the first insights into how reptiles may be affected by current forest management practices, and may be important if the aim is to restore previously logged areas. We suggest that implementing multiple fires after a timber harvest may not offer any benefit to a reptile population in forests, but that frequent burns in unlogged forest could increase biodiversity in otherwise poor areas.

eastern Australia

Katie Rolls

Biography

SYMPOSIUM: Assisted migration under climate change

I'm a Masters student exploring fundamental and applied questions in ecology. Are species distribution limits determined by bioclimatic factors or dispersal limitation? Can local adaptation to climate develop with gene flow? Should seed be sourced locally or match future climates?

EcoTAS abstract

Understanding how species cope under changing climatic conditions contributes to natural resource management strategies, the conservation of biodiversity, and enhanced primary production. As the climate warms, species current ranges are expected to shift, forcing species to persist through these changes or risk local extinction. Plants that exhibit higher phenotypic plasticity will be better equipped to cope in a changing climate, while those more locally adapted may require translocations to more suitable climates. The altitudinal gradient in the Blue Mountains provides the opportunity to use space for time in climate studies as temperatures are expected to shift up the mountain as temperatures warm. A reciprocal transplant was conducted using seeds sourced from low, mid and high populations of Acacia species restricted to lower (warmer) or higher (cooler) altitudes, as well as, those widespread across the gradient. These were planted into high and low altitude common garden sites to capture environments within and beyond their current temperature ranges. Seed showed significantly greater establishment in well-watered, low altitude sites with local populations showing greater performance than foreign provenances. The establishment of seeds beyond their current ranges indicates dispersal limitations as a greater inhibitor of seed dispersal than climate. Plant fitness (seed emergence, growth and survival) was impacted by climate shifts as well as extreme weather events that filtered maladapted genotypes. These findings provide a scientific basis for

Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Brokenback Room
Speed Talk

Rolls K [1] , O'Brien C [1] , Rymer P [1]
[1] Western Sydney University - Hie, St Clair NSW, Australia

What determines species distribution limits and local adaptation in Acacia along an altitudinal gradient?

adaptive management strategies for climate change.

Erika Roper

Biography

Erika Roper is a PhD student at UWA. Her research interests include animal behaviour, urban ecology, conservation, and birds, especially parrots.

EcoTAS abstract

The traditional habitat of the threatened forest subspecies of the red-tailed black-cockatoo (Calyptorhynchus banksii naso) is in the Jarrah forest of south-western Australia. Since 2000, red- tailed black- cockatoos have occurred increasing frequency in the heavily urbanised Perth Metropolitan Area on the Swan Coastal Plain, adjacent to the Jarrah forest. While it is believed many urban red-tailed black-cockatoos commute to the Metropolitan Area, there are several urban populations that are resident year round. Urbanisation alters the landscape, causing changes to the availability of food, water, and breeding resources. This in turn can lead to behavioural adaptations in animals that reside in urban areas.
The traditional food of the forest red-tail black-cockatoo is the fruit of Jarrah (Eucalyptus marginata) and Marri (Corymbia calophylla), which are the dominant tree species in the Jarrah forest, and are also found in Perth in patches of remnant bushland. The recent range expansion of the red-tailed black-cockatoo is believed to be due to their discovery and exploitation of a novel food source, the exotic ornamental tree Cape Lilac (Melia azedarach), which

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Roper E [1] , Craig M [1] , Hobbs R [1]
[1] The University Of Western Australia, Crawley WA, Australia
Foraging behaviour of the forest red-tailed black-cockatoo on native and exotic foods in urban habitat.

is commonly planted on streets and in gardens around Perth.
This talk will present findings of the diet and foraging behaviour of urban and forest cockatoos. Processing times of traditional and novel foods (such as Cape Lilac) will be discussed. The findings of this study provide detailed information on behavioural modification caused by urbanisation, and will increase our understanding of the effect of urbanisation on the forest red-tailed black-cockatoo.

Michael Rostas

Biography

Michael is a Senior Lecturer in Entomology and Chemical Ecology at Lincoln University, New Zealand. His research focus is on plant-insect-fungus interactions and the chemical molecules that mediate such relationships. He is also interested in Biological Control.

EcoTAS abstract

The number of plants known to be pollinated by ants is surprisingly low given that ants can be common visitors of angiosperm flowers. In most cases ants are considered as nectar robbers but several plant species show adaptations to ant pollination. We studied the pollination system of the dry grassland forb Euphorbia seguieriana (Euphorbiaceae) and found two ant species, Formica cunicularia and Tapinoma spp. to be the most frequent visitors of its flowers. Workers of F. cunicularia carried five times more pollen than the smaller Tapinoma individuals, but significantly more viable pollen was recovered from the

SYMPOSIUM: Invertebrate ecology of managed grasslands - addressing the new challenges
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Wattagan Room
Oral presentation
Rostas M [1]
[1] Bio-protection Research Centre, Lincoln Canterbury, New Zealand
Ants contribute to pollination but not reproduction in the calcareous grassland herb Euphorbia seguieriana

latter. Generally, however, the viability of pollen on ant cuticles was low and presumably an effect of the metapleural gland secretion's biocidal activity. A marking experiment suggested that ants were unlikely to facilitate outcrossing as workers repeatedly returned to the same individual plant for foraging. When pollinated by ants only, 36 ± 5% of flowers set seed compared to 2 ± 1% when all insects were excluded. However, no difference in seed set was found when only flying insects (98 ± 1%) or all pollinators (97 ± 1), including ants, were admitted. The germination rate of seeds from flowers pollinated by flying insects was 31 ± 7% in contrast to 1 ± 1% resulting from ant pollination. We conclude i) that ants play a negligible role in the pollination of E. seguieriana and speculate ii) that geitanogamy and inbreeding depression may have caused the very low germination rate in seeds from ant pollinated flowers.

Rhiannon Rowe

Biography

Rhiannon Rowe is a Master of Research student at Hawkesbury Institute for the Environment. Her research interests include integrated pest management, crop science and agricultural entomology.

EcoTAS abstract

Global human populations are rising and this increases the global demand for food. Crop pests destroy enough food to feed 1 billion people across the globe each year. Aphids represent a serious threat to crop productivity and generally benefit from factors such as environmental change. Grasses, including cereals, are hyper accumulators of

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Rowe R [1] , Johnson S [1]

[1] Hawkesbury Institute for the Environment, Western Sydney University, NSW, Australia

Does silicon supplementation enhance plant growth and limit aphid performance?

silicon and silicon deposition in plant tissue is a key driver of a plant's natural defences against herbivorous arthropods. This pilot study investigated the effect of silicon supplementation on plant growth and aphid development, with the longer term aim of protecting crop yield and reducing pesticide applications. Wheat seedlings were raised with and without silicon supplementation and two species of aphid were introduced. Plant biomass increased with silicon supplementation, but plant height was unaffected. Development time (time to adulthood) was significantly delayed for one aphid species (Rhopalosiphum padi) and there was a trend (P = 0.08) for similar development delays in the other aphid species tested (Diruraphis noxia). These findings suggest that silicon could assist plant resistance to two aphid species that have become of concern in Australia and warrants further investigation.

Jessica Rowland

Biography

Jessica Rowland is completing her PhD at Deakin University. Her current research focuses on improving the guidelines for selecting and using indicators for assessing functional decline for ecosystem risk assessment, including the IUCN's Red List of Ecosystems.

EcoTAS abstract

Reducing ecosystem degradation is among the most important biodiversity conservation challenges. Protocols assessing the risk of ecosystem collapse (e.g. IUCN Red List of Ecosystems) typically measure change using

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

quantitative indicators of important ecological processes. Yet little guidance is available on selecting and implementing indicators for robust and consistent risk assessment. In this study, we conducted a systematic quantitative review of indicator use in studies of collapse across two major biomes. We evaluated studies to determine: i) were explicit selection protocols outlined to justify indicators; ii) were conceptual models of ecosystems presented; iii) types of indicators (geographic distribution, abiotic, biotic) used to quantify symptoms of decline; iv) indicator measurability (including time-series availability and data sources); and v) approaches for evaluating multiple indicators. To identify gaps between current ecological theory and conservation practice, we compared indicator use in current literature and RLE assessments. We found that frameworks for selecting indicators were rarely used in studies of collapse. We found that few studies or RLE assessments quantified change across three symptoms of decline, but most examined change across two symptoms. Most studies used reasonably long time-series and multiple indicators, which were typically evaluated independently or as indices. The poor uptake of indicator selection protocols, and infrequent assessment of all three symptoms of decline, limits the ability to assess multiple pathways towards collapse with the most relevant and sensitive indicators, increasing the chance of misestimating risk. We provide recommendations for indicator selection and use, and identify opportunities for translating available data to risk assessment.

Rowland J [1] , Nicholson E [1] , Keith D [2] , Murray N [2] , Lester R [1] , Bland L [1]
[1] Deakin University , Burwood VIC, Australia
[2] University of New South Wales, Kensington NSW, Australia

Selecting and applying indicators of ecosystem collapse for risk assessments

Anindita Roy

Biography

Landscape Ecology (2)

Tuesday, November 28, 2017

Anindita Roy is a PhD candidate in the Department of Biological Sciences at Macquarie University. Her research interests are Global Climate Change and its impacts on the habitat suitability of migratory birds.

EcoTAS abstract

Future climate change may impact habitat suitability, but assessments of this impact using species distribution models (SDMs) are rare for migratory bird species. During migration, migratory birds utilize flight paths, or flyways, that may span continents and often oceans. For example, the Central Asian Flyway (CAF) is used by > 180 waterbird species. It extends from breeding grounds in Siberia, across much of Eurasia, to non-breeding grounds in West Asia, India and islands in the Indian Ocean. To date, little is known about how birds that utilize the CAF may respond to future climate change. In this study, we assess how future climate change may impact habitat suitability for six bird species whose breeding and non-breeding distributions are restricted to the CAF. We do so by: (i) applying SDM techniques to species occurrence and climatic data to delineate and compare the climatic niches of breeding and non-breeding habitats, (ii) assessing the sensitivity of climatic-niche delineation to alternative methods of classifying occurrences as breeding, non-breeding, or passage records, (iii) assessing the impact of alternate, yet equally plausible future climate scenarios on habitat suitability. We obtained occurrence records from a variety of sources including Global Biodiversity Information Facility (GBIF), published literature and unpublished Chinese sources. Ensemble SDMs were developed using the e-Research platform and the Biodiversity and Climate Change Virtual Laboratory (bccvl.org.au). Our study provides the first assessment of climate-change impacts on birds utilizing the CAF, and guidance on how alternate

1:30 PM - 3:30 PM

Cypress #2

Oral presentation

Roy A [1] , Huijbers C [2] , Allen A [1] , Beaumont L [1]

[1] Macquarie University, North Ryde NSW, Australia

[2] Griffith University, Gold Coast QLD, Australia

Assessing climate change impacts on habitat suitability for migratory birds in the Central Asian Flyway

approaches to calibrating SDMs can influence projections of climate impacts.

Lorena Ruiz Talonia

Biography

Lorena has recently concluded her Ph.D. in 'Ecology of seed germination for broad-acre restoration of native vegetation on cracking clay vertosols'. She is currently extending research on seed ecology and pursuing the integration of that knowledge into practice.

EcoTAS abstract

Seed attributes—viability, germination under three different seasonal temperatures and the requirement for seed pre-treatment to promote germination—were assessed for 50 native plant species from north-western New South Wales, most of which are poorly understood with regard to seed ecology. Seedlot viability, optimum season for germination and germination constraints such as seed dormancy were determined in order to assist with the propagation of these species from seed. Percentage seed viability varied widely among the species. It was >75% in 38 of the species, and <50% in seedlots of only seven species, which were discarded prior to conducting further germination tests. Seasonal temperature affected germination success in 27 species, while various seed pre-germination treatments were effective in increasing germination in 22 species. The most frequent seed treatment required was rupturing the seed coat. This resulted in approximately a two-to-three-fold increase in germination percentage. Seed stratification, seed coat removal and seed leaching increased

Restoration Ecology (2)
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Bimbadeen Room
Oral presentation
Ruiz Talonia L [1] , Reid N [1] , Whalley R [1]
[1] University of New England, Armidale NSW, Australia
Seed germination constraints of species native to north-western NSW and their implications for direct seeding

germination in some species. The results will contribute to determining seed pre-treatments for germination prior to direct seeding in both the nursery and field, and contribute to the understanding of the ecology of the germination of a range of native species in the study region.

Rogini Runghen

Biography

I am Rogini Runghen, a current PhD student from the School of Biological Sciences at the University of Canterbury. I am mainly interested in ecological networks and invasion ecology.

EcoTAS abstract

Humans have long been associated to the unintended dispersal of weeds, seeds and pathogens between ecological communities. In New Zealand, new trails, tracks, roads and facilities are constructed within public conservation areas every year, thereby increasing their access to natural areas. Consequently, risk of unintended dispersal of alien species in natural areas increases. Here, we assess the potential contribution of visitors (i.e. both international visitors and domestic travellers) to the spread of alien species within the natural areas of New Zealand. To understand this visitor-mediated dispersal, we consider places as hosts of the alien species and visitors as carriers. We use national-scale survey data to construct a visitation network - where nodes represent places and links represent trips travelled between two places by a given visitor. Using a Mixed Membership Stochastic Block Model, we identify characteristic groups of visitors based on the

Invasion Ecology (Plants)

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Cypress #2

Oral presentation

Runghen R [1] , Stouffer D [1]

[1] School of Biological Sciences, University Of Canterbury, Christchurch, New Zealand

Exploring how different types of visitors contribute to the spread of alien species

similarities of their visitation patterns across places. We identify characteristic groups of places in a similar manner. Our results also highlight the way that observed visitation patterns can help us to better predict the potential behaviour of future visitors. We will conclude by demonstrating how these patterns enable us to identify the extent to which different types of visitors are expected to contribute to the dispersal of alien species.

Susan Rutherford

Biography

Susan's research interests centre on evolutionary biology, focusing on the evolution of Eucalyptus. She is using new genetic techniques in combination with functional trait and environmental data to address questions concerning speciation, phenotypic plasticity and species boundaries.

EcoTAS abstract

Eucalyptus is an iconic Australian genus that comprises commercially important trees and many rare and restricted species. We investigated ecological specialisation and evolutionary history of Eucalyptus species from south-eastern Australia. Our study focused on the green ashes, a diverse group that includes common and widespread species (e.g. the trees, Eucalyptus obliqua and E. fastigata), as well as others that have narrow distributions (including the mallees, E. cunninghamii and E. langleyi). We used genome-wide scans, trait measurements from a common garden experiment and environmental niche modelling to examine the predicted environmental range and phylogenetic niche conservatism of twelve species from across this group. Two tall trees (E. obliqua and E.

Conservation Biology (3)

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Cypress #2

Oral presentation

Rutherford S [1] , Bonser S [1] , Wilson P [2] , Wilson P [2] , Rossetto M [2]

[1] University Of New South Wales, Sydney NSW, Australia

[2] Royal Botanic Garden Sydney, Sydney NSW, Australia

From environmental niche modelling to phylogenetics and functional traits: understanding ecological specialisation in Eucalyptus

fastigata) had the highest predicted environmental ranges. In contrast, the mallees, medium trees, and a tall tree (E. regnans) had narrower predicted environmental ranges. Species from tall open forests and low open shrublands had juvenile leaves with higher specific leaf area (SLA) and lower thickness, whereas species from woodlands and open woodlands had juvenile leaves with lower SLA, and higher thickness. A strong phylogenetic signal was found in some traits (e.g. seedling height). However, other traits had a relatively low phylogenetic signal (e.g. leaf width). Since species presence data in combination with genomic and functional trait data can allow us to test hypotheses linking environmental parameters, species ecology and clade evolution, our results have implications for predicting the response of these species to changing climates. Linking knowledge of functional traits and niche preferences is also important for informing regeneration practices.

Katinka Ruthrof

Biography

Katinka is a research scientist at the Botanic Gardens and Parks Authority, and Murdoch University, in Perth, Western Australia. Her fields of interest include restoration of degraded systems, climate change impacts on forest and woodland communities, and fire ecology.

EcoTAS abstract

There is a growing realisation that the use of degraded habitats for agricultural production is becoming an increasingly practical and economically viable alternative target or state to clearing pristine environments, which are optimally managed and conserved for the protection of

Agro Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation

biodiversity and ecosystem services. Given their synergies in terms of availability of labour, machinery, and the need for food and animal feed, the two major industries of mining and agriculture should collaborate. Although there are many advantages for agricultural production following mining, substrates often have abiotic and biotic challenges for plant growth, including poor fertility, heavy metals, and a lack of beneficial soil microbes. A nutrient trial was established to investigate methods of increasing plant biomass and health in a post-phosphate mining environment using a well-known legume as a model species, Lablab purpureus L. Sweet. We found that the addition of potassium (K) significantly increased plant biomass, enhanced root growth, and enhanced mycorrhizal fungal colonisation rates. Potassium amendment was also associated with significantly lower heavy metal levels in plant material. We hypothesise that heavy metals were either diluted in larger biomass or healthy, non K-limited plants can select against heavy metal uptake. Clearly, K is the critical nutrient for legumes in post-phosphate mine sites for enhancing biomass and health. These results have global ramifications for successful transitioning from mining to agriculture (in terms of food security, food safety and sustainable employment for stakeholders, and information for land-use policy makers), but also for restoration of native vegetation in ex-mined sites.

Biography

Katinka is a research scientist at the Botanic Gardens and Parks Authority in Perth, Western Australia. Her fields of interest include climate change impacts on forest and woodland communities, fire ecology and restoration of degraded systems

Ruthrof K [1,2] , Fontaine J [2] , Hopkins A [3] , McHenry M [2] , Howieson J [2] , O'Hara G [2] , Hardy G [2]

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[2] Murdoch University, Perth Western Australia, Australia

[3] Edith Cowan University, Perth Western Australia, Australia

Overcoming challenges in the transition from mining to agriculture

Global Change

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Cypress #2

Oral presentation

EcoTAS abstract

Heat waves have profoundly impacted biota globally over the past decade, especially where their ecological impacts are rapid, diverse, and broad-scale. Currently unfolding ecological events of widespread tree die-off and coral bleaching are among the most dramatic examples of climate change, providing clear warnings about ecological vulnerabilities to warming in general, and to heat waves in particular. Although usually considered in isolation for either terrestrial or marine ecosystems, heat waves can straddle ecosystems of both types at subcontinental scales, potentially impacting much larger areas and taxonomic breadth than previously envisioned. Using climatic and multi-species demographic data, we show that a massive heat wave event triggered abrupt, synchronous, and multi-trophic ecological disruptions, including mortality, demographic shifts and altered species distributions. Tree die-off and coral bleaching occurred concurrently in response to the heat wave, and were accompanied by terrestrial plant mortality, kelp dieback, population crash of an endangered terrestrial bird species, plummeting breeding success in marine penguins, and outbreaks of terrestrial wood-boring insects and marine invasive mussels. These multiple taxa and trophic-level impacts spanned >300,000 km2, encompassing one terrestrial Global Biodiversity Hotspot and two marine World Heritage Areas. The rapid, broad-scale shifts that we document from a single heat wave are alarming given projected increases in heat wave frequency and extent. The subcontinental multi-taxa context documented here reveals that terrestrial and marine biotic responses to heat waves do not occur in isolation, implying that the full extent of ecological vulnerability to projected increases in heat waves is grossly underestimated.

Ruthrof K [1,2] , Breshears D [3] , Fontaine J [2] , Froend R [4] , Matusick G [5] , Kala J [2] , Miller B [1] , Mitchell P [7] , Wilson S [8] , van Keulen M [2] , Enright N [2] , Law D [3] , Wernberg T [6] , Hardy G [2]

[1] Botanic Gardens And Parks Authority, Perth WA, Australia

[2] Murdoch University, Perth Western Australia, Australia

[3] University of Arizona, Tucson Arizona, USA

[4] Edith Cowan University, Perth Western Australia, Australia

[5] Auburn University, Auburn Alabama, USA

[6] University of Western Australia, Perth Western Australia, Australia

[7] CSIRO, Sandy Bay Tasmania, Australia

[8] Department of Biodiversity, Conservation and Attractions, Perth Western Australia, Australia

Tree die-off meets coral bleaching in massive terrestrial-marine multi-taxa heat wave jolt

Paul Rymer

Biography

Research focuses on the ecology and evolution of organisms in natural populations, applied to understanding the origin of biodiversity hotspots, the evolution of invasiveness, and adaptation to climate change.

EcoTAS abstract

Understanding the capacity of trees to respond to environmental change is essential for the maintenance of biodiversity, forest health and productivity. In south-west Australia, altered environments have resulted in tree death associated with droughts, pest, and disease. Adaptive land management is urgently needed in order to mitigate the risk of large-scale mortality. Heritability and genetic variation are the essential ingredients for adaptation to a rapidly changing world. The phenotypic traits expressed by a plant are determined by its genetic make-up, as well as, the environment. Quantitative genetics partitions the phenotypic variation to estimate genetic heritability. This research took advantage of large quantitative genetic trials established for Corymbia calophylla (Marri), an economically and ecologically important forest tree of south-west Australia. The trials have 18 provenances with approximately 170 families; each with 24 seedlings planted in a randomised blocking design at two sites with contrasting rainfall patterns. We estimated tree growth (height, basal diameter) and disease resistance (shoot blight) in Margaret River and Mt Baker trials during 2015 and 2016. Growth and disease resistance both show moderate levels of genetic heritability (0.2 to 0.3).

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Oral presentation

Rymer P [1] , Ahrens C [1] , Mazanec R [2] , Byrne M [2] , Tissue D [1] , Hardy G [3]

[1] Hawkesbury Institute for the Environment, Western Sydney University, Richmond New South Wales, Australia

[2] Department of Biodiversity, Conservation and Attractions, Perth WA, Australia

[3] Murdoch University, Perth WA, Australia

Rapid growth and disease resistance are adaptations to cool and wet climates in southwest forests

Heritability was greatest in warm and cool regions with admixture found in the intermediate region potentially increasing epistatic effects. There was strong associations with the climate of origin (temperature, rainfall) showing high growth and disease resistance in southern coastal populations experiencing cool and wet climatic conditions. This study highlights provenances that could be selected for assisted migration to enhance competition and disease resistance in southwest WA forests.

SYMPOSIUM: Assisted migration under climate change
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Brokenback Room
Rymer P
Fitness consequences of assisted migration: Insights from historic provenance trials of Australian woody species

Sarah Sapsford

Biography

Sarah completed her Masters degree at James Cook University where she studied the effect of the amphibian chytrid fungus on a frog species endemic to Queensland. She then decided to move to Perth to study canker disease in marri trees.

EcoTAS abstract

A canker disease caused by the fungus Quambalaria coyrecup is devastating Corymbia calophylla trees

Forest Ecology (1)
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation

throughout much of their native range in the southwest of Western Australia. Disease incidence is higher in remnant stands that border cleared land such as road edges where there is greater anthropogenic disturbance. It is likely that a combination of factors are predisposing C. calophylla to canker disease. The aim of this project was to determine potential predisposing factors and how they may interact with marri along a disease gradient. Seventeen sites were surveyed. Each site consisted of a disturbance gradient of 3 transects: remnant stand bordering cleared land and a road, a forest edge, and the middle of an intact forest. Soil was collected from ten trees along each transect, used in a glasshouse experiment to bait for mycorrhizae, and tested for nutrient composition.
Results demonstrated differences in soil nutrition between the disturbed and intact forest transects. Quantities of both macro- and micro-nutrients were higher along the disturbed edge than the other transects. The mycorrhizal communities were significantly different among the three transects with the community along the disturbed edge having a unique community assemblage. Soil temperature was lower along disturbed edges than within intact forest and leaf litter depth was significantly higher along disturbed edges than intact forest.
It is possible that in addition to the differences in microclimate along this disturbance gradient, marri is more susceptible to canker disease due to the joint effects of temperature, nutrients and mycorrhizal fungi.

Sapsford S [1] , Paap T [2] , Hopkins A [3] , Hardy G [1] , Burgess T [1]
[1] Murdoch University, Perth Western Australia, Australia
[2] University of Pretoria, Pretoria, South Africa
[3] Edith Cowan University, Perth Western Australia, Australia

Biotic and abiotic factors predisposing Corymbia calophylla trees to canker disease

Manu Saunders

Biography

Agro Ecology
Monday, November 27, 2017

Dr Saunders is a community ecologist with research interests in insect communities, ecosystem services and interaction networks.

EcoTAS abstract

Understanding how to manage multifunctional landscapes to protect biodiversity and ecosystem function, while supporting human well-being, is a research imperative. The ecosystem services concept provides a critical foundation for building understanding of how humans can use landscapes sustainably to produce food and fibre while limiting environmental impacts. Building a holistic model of ecosystem services flows and dynamics that integrates ecological knowledge of land and water ecosystem functions, as well as social and ecological components, is essential to provide a foundation for conservation management initiatives. However, there is currently no consensus on the best approach to modelling ecosystem services. A broad range of disparate approaches have been published in the literature, many of which may suffer from errors or have limited application across other systems. Here, we identify six key properties of a holistic systems model for ecosystem services in multifunctional landscapes and show how established ecological analysis techniques can address these properties.

11:00 AM - 1:00 PM
Cypress #2
Oral presentation
Saunders M [1] , Rader R [1] , Ryder D [1] , Cacho O [1]
[1] University of New England, Armidale NSW, Australia
Towards a holistic model of ecosystem services in multifunctional landscapes

Ben Scheele

Biography

Ben Scheele is a postdoctoral research ecologist with a particular interest in amphibians. His research focuses on understanding mechanisms that underpin patterns of

SYMPOSIUM: Novel methods for identifying and managing refuges across scales and ecosystems
Tuesday, November 28, 2017

species decline across the landscape. My work aims to inform the development of innovative management strategies.

EcoTAS abstract

Understanding mechanisms leading to spatial variation in species declines is crucial for conservation. We argue that species declines are generally non-uniform across species niche space because variation in environmental conditions and biotic processes either reduce or amplify threats, or affect a species' capacity to tolerate the impact of threats. This heterogeneity in threat impact and tolerance can lead to reductions in the niche breadth of declining species. This focus on understanding how threats reshape the realized niche of declining species can provide insights into why habitats can act as refugia in some locations but not others. Using examples of emerging disease in Australian frogs, we demonstrate mechanisms underpinning variation in threat tolerance and threat impact that can lead to species contracting to refugia outside their optimal habitat. First, we show how extremely low adult survival in disease-challenged alpine tree frog (Litoria verreauxii alpina) populations results in major demographic shifts. The loss of long-lived adults capable of reproducing across multiple years reduces the species capacity to tolerate periodic recruitment failure, driving a contraction to perennial wetlands. Second, disease impact in northern corroboree frog (Pseudophryne pengilleyi) populations is amplified in areas where the co-occurring common eastern froglet (Crinia signifera) – a species that acts as a reservoir host – is abundant. As a result, the species has contracted to areas with few reservoir hosts. In each case, contraction to refugia is underpinned by reductions in niche breadth. By identifying how threats reshape declining species' niches

1:30 PM - 3:30 PM
Wattagan Room
Oral presentation

Scheele B [1]

[1] The Australian National University, Canberra ACT, Australia

Niche contractions in declining species: mechanisms underpinning refugia

we can identify where to prioritise management.

Nick Schultz

Biography

Nick Schultz is a vegetation ecologist interested in ecological restoration and patterns of plant diversity.

EcoTAS abstract

Plant traits can offer insight into the processes that determine the outcomes of ecological restoration. In the arid zone of southwest New South Wales, Australia, rehabilitation after mineral sands mining has been attempted, primarily by broadcasting native seed mixes on prepared ground. In this study, detailed vegetation monitoring was conducted in rehabilitation areas and in adjacent remnant vegetation. We analysed floristic data to test if particular plant traits help to explain restoration outcomes. Plants using the C4 photosynthetic pathway had significantly greater cover and diversity in the rehabilitation areas compared to the remnant vegetation. This was primarily driven by Atriplex spp. (Chenopodiaceae), though Tetragonia moorei (Aizoaceae) and some C4 grasses also had higher cover in the rehabilitation. The composition of the seed mix used was insufficient to explain this result. These C4 plants possess traits to cope with high temperature and salinity, and low water availability, suggesting the rehabilitation environment is more stressful for plants than in the remnant vegetation. The findings may also relate to longer-term changes in arid systems—for instance, the dominant tree genera in the region have persisted since the Tertiary, though chenopods are a more

Restoration Ecology (1)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Bimbadeen Room
Oral presentation
Schultz N [1] , Sluiter I [2] , Sluiter K [2] , Sluiter H [2]
[1] Federation University Australia, Ballarat VIC, Australia
[2] Ogyris Ecological Research, Birdwoodton VIC, Australia
Plant traits help explain species' success in arid woodland restoration after mining

recent addition to the flora, and may be better adapted to current conditions than other native trees and shrubs. The results encourage investment in C4 seed in the early stages of arid zone rehabilitation, though they also prompt us to consider how environmental change in the arid zone may influence community composition.

Katherine Selwood

Biography

Katherine is a postdoctoral research fellow in the Quantitative and Applied Ecology group at the University of Melbourne. Her research centres around identifying and characterizing landscapes that are important for conserving biodiversity in the face of environmental change.

EcoTAS abstract

Christmas Island is a site of international conservation significance, home to many threatened and endemic species, two Ramsar wetlands, several species of migratory birds and the infamous ecosystem engineer, the red crab. Despite a large portion of the island being protected as national park, Christmas Island faces many conservation challenges, including multiple invasive species and severe ecosystem disturbance caused by phosphate mining. We outline the challenges faced by this small island, and demonstrate the potential of habitat modelling and spatial prioritisation to estimate the impacts of future land-use proposals and identify opportunities for maximising conservation outcomes for the island.

SYMPOSIUM: Putting ecology to work at the land development frontier
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Sugarloaf Room
Oral presentation
Selwood K [1]
[1] University of Melbourne, Parkville VIC, Australia
Identifying development impacts and conservation opportunities on a remote oceanic island

Lucie Semenec

Biography

Lucie Semenec is a PhD candidate at Dr Ashley Franks laboratory in the Department of Physiology, Anatomy and Microbiology at La Trobe University. She focuses on community dynamics of electrogenic biofilms and the underlying mechanisms of syntrophic and competitive interactions.

EcoTAS abstract

Electrogenic bacteria are unique in their ability to respire through metallic surfaces such as an electrode, where they can be harnessed in microbial electrochemical systems (MES). These systems can be utilized for energy production, bioremediation of natural ecosystems or monitoring environmental health. Electric bacteria which interact with insoluble electron acceptors and donors live in complex communities of microbial biofilms where both syntrophic and competitive interactions dictate their ability to thrive and in turn drive MES function. However, the interactions that occur within these communities are poorly understood. Two well characterized electrogenic bacteria, Geobacter sulfurreducens and Pseudomonas aeruginosa co-habit many of the same environments such as ocean sediments and anaerobic soils, however their ability to interact has not yet been determined. By placement of these two bacteria in cocultures in a strict environment, we have found a syntrophic interaction exists, where one microbe, Pseudomonas, essentially feeds the other, Geobacter, via electron transfer. This interaction underwent adaptive evolution over many generations and the resulting cocultures were sequenced to determine adaptations on the genetic level. By observing the protein and genetic changes throughout evolution, we see an initial

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 1)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Brokenback Room

Oral presentation

Semenec L [1] , Vergara I [2] , Bond P [3] , Franks A [1]

[1] Department of Physiology, Anatomy and Microbiology, La Trobe University, Melbourne VIC, Australia

[2] Bioinformatics and Cancer Genomics, Research Division, Peter MacCallum Cancer Centre, Melbourne VIC, Australia

[3] The University of Queensland, Advanced Water Management Centre, Brisbane Queensland, Australia

Adaptive evolution of electrogenic syntrophy between Geobacter sulfurreducens and Pseudomonas aeruginosa: from friend to foe?

dependency that is then replaced with a competitive interaction as they adapt over time. We will be testing for potential antimicrobial activity being elicited by either organism to confirm whether this initially harmonious interaction has evolved into a competitive one. Gaining deeper understanding of the ecological interactions that take place in electrogenic biofilms will contribute to our ability to harness their interaction in the environment.

Carla Sgro

Biography

Carla Sgro is an evolutionary biologist, interested in understanding the genetic basis of adaptation to environmental change. She is also interested in exploring how evolutionary processes can be explicitly incorporated into biodiversity conservation and management.

EcoTAS abstract

Climate change threatens biodiversity, with many animals thought to be at risk of extinction. Global change will also alter the distribution and abundance of species of direct concern to human health and food security, such as disease vectors and agricultural pests. The extent to which evolution and phenotypic plasticity might mediate specie responses to climate change remains largely unknown. We have used a combination of experimental evolution and environmental manipulations to address this gap in our understanding. In particular, I will discuss how we have used intra- and inter-specific studies to understand the

SYMPOSIUM: Assisted migration under climate change

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Brokenback Room

Oral presentation

Sgro C [1]

[1] Monash University, Melbourne VIC, Australia

Responding to environmental change: plasticity or evolution?

physiological and evolutionary processes that limit, and enable, adaptive responses to rapid environmental change.

Michael Sievers

Biography

Michael Sievers is a third year PhD candidate at the University of Melbourne with research interests in conservation biology, aquatic ecology and ecological trap theory.

EcoTAS abstract

Wetlands harbour diverse biological communities and provide extensive ecosystem services, but are being altered, degraded and destroyed worldwide. Understanding these effects, and how we can best manage wetlands for ecological purposes, requires information about how they perform as habitats for animals. Despite wealth of research on how animals respond to anthropogenic changes to wetlands, we lack a broad synthesis of these data. To address this gap, we conducted a global meta-analysis to characterise how animals respond to four key drivers of wetland alteration: agriculture, mining, restoration and urbanisation, extracting data from 271 studies across 29 countries. Our overarching goal was to evaluate the ecological impacts of human alterations to wetlands, as well as identify current knowledge gaps that limit both the current understanding of these responses and effective wetland management. Community- and population-level measures (e.g. richness and density) within altered wetlands were largely comparable to those within reference wetlands. By contrast, individual fitness measures –

Conservation Biology (1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Cypress #3

Oral presentation

Sievers M [1,2] , Hale R [1] , Parris K [2] , Swearer S [1]

[1] School of BioSciences, The University Of Melbourne, Melbourne VIC, Australia

[2] School of Ecosystem and Forest Sciences, The University of Melbourne, Melbourne VIC, Australia

Impacts of human-induced environmental change in wetlands on aquatic animals

particularly survival and reproduction – were often lower. Our findings highlight that relying solely on community- and population-level measures as a proxy for habitat quality is inadequate. Wetlands created for and impacted by humans will need to be an integral part of future natural resource management plans and conservation practices and policies. We emphasise that the role of wetlands in human-altered ecosystems can be complex, as they may represent important habitat but also pose potential risks to animals.

Jen Silcock

Biography

Jen Silcock is an arid zone ecologist and Postdoctoral Research Fellow with the Threatened Species Recovery Hub at the University of Queensland.

EcoTAS abstract

Translocation of species deemed valuable by societies is not a new phenomenon, with numerous contemporary plant distributions attributed to human nurture and transport over millennia. This includes staple food plants and those with medicinal, culinary or narcotic properties and/or cultural and ceremonial meaning. In recent decades, the intentional movement of plant material with the aim of increasing a species' geographic range and/or population size, including both augmentation of existing populations and establishment of new ones, has emerged as a rapidly expanding field of conservation biology. The prevalence and imperative for conservation translocations will continue to grow in response to the increasing number of species threatened by habitat loss, weeds, disease and projected

SYMPOSIUM: Novel management interventions for threatened species

Wednesday, November 29, 2017

4:00 PM - 6:00 PM

Wattagan Room

Oral presentation

Silcock J [1] , Simmons L [1] , Monks L [1,2] , Dillon R [1,2] , Reiter N [3] , Jusaitis M [4] , Coates D [1,2]

[1] National Environmental Science Program – Threatened Species Recovery Hub, Brisbane/Perth QLD/WA, Australia

[2] Department of Biodiversity, Conservation and Attractions, Perth WA, Australia

[3] Royal Botanic Gardens, Melbourne VIC, Australia

[4] Botanic Gardens of South Australia, Adelaide SA, Australia

climate change.

Translocation is a relatively high-risk, high-cost and challenging exercise, and must be informed by past experience. In Australia, more than 600 translocations targeting threatened species have been undertaken since the late 1970s, with many more planned. Data on these translocations typically remain in practitioner's heads or unpublished reports, while the available literature is scant and biased towards successful projects. We compiled a national plant translocation database incorporating available data on all translocations that have occurred in Australia, including location, number and type of propagules, treatments applied and short and long-term success. This will provide the first overview of the practice of plant translocation in Australia, examine factors that influence success and evaluate its contribution to plant conservation. Results will feed into the Australian Network for Plant Conservation's updated Guidelines for Threatened Plant Translocations, currently in preparation.

A review of plant translocations for species conservation in Australia

Flávia Siqueira

Biography

I am a Forest Engineer PhD student at University Federal of Lavras - Brazil. Currently, I am an exchange student at the University of Queensland in School of Earth and Environmental Sciences.

EcoTAS abstract

Tropical forests are habitually cleared to establish crops and pastures. In the pastures, scattered trees from the

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
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The Event Centre
Poster presentation

original forest are often retained. We evaluated the relevance of these trees for ecological processes and services in area in Southeastern Brazil of 659 ha comprises 11 patches of active pastures (489 ha) and eight patches of Semideciduous Forest partially connected among them (170 ha). In order to identify the ecosystem services and the history of scattered trees we interviewed the landowners. We assessed regeneration, distance of propagules source, cover of exotic grasses, microclimate, seed rain and soil compaction under scattered tree crowns and in samples in the pasture without scattered trees. We found the scattered tree community retaining high species diversity, and that, during the clearing process the landowners show little preference for species, choosing the trees mainly by their size (shade). The scattered trees improving microclimate and affecting strongly seed rain and sapling, although this last effect was strongly dependent on the forest proximity. We showed that protection and, possibly, active restoration of scattered trees can be an important tool for conservation in pasture without compromising their economic use. Moreover, we also showed that, besides ceasing the land management, the proximity to forest fragments and the presence of scattered trees are key factors to any attempt of forest restoration in pastures, as well as an important biodiversity pool per si in highly fragmented landscapes.

Siqueira F [1] , Calasans L [1] , Furtado R [1] , Carneiro V [2] , van den Berg E [1]
[1] Universidade Federal De Lavras, Lavras Minas Gerais, Brazil
[2] Secretaria de Estado da Educação do Amazonas, Manaus Amazonas, Brazil

Scattered trees in active pastures matter for biodiversity conservation

Laura Skates

Biography

Laura completed her B.Sc (Botany & Conservation Biology) with Honours at UWA. Her current PhD research focuses on the ecology and nutrition of Australian carnivorous

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre

plants. Laura is interested in botany, ecology, and science communication. Find her @floraskates on Twitter.

EcoTAS abstract

Carnivorous plants were considered by Charles Darwin to be some of “the most wonderful plants in the world”, as they are capable of capturing and digesting prey with specialised leaf traps. Globally, there are more than 600 species of carnivorous plants, employing a range of trapping mechanisms including adhesive, suction, pitcher, corkscrew, and snap traps. Western Australia is a global centre of carnivorous plant diversity, hosting several species of Drosera (Droseraceae, Sundews), Byblis (Byblidaceae, Rainbow Plants), and Utricularia (Lentibulariaceae, Bladderworts), as well as the endemic Cephalotus follicularis (Cephalotaceae, Albany Pitcher Plant) and the aquatic Aldrovanda vesiculosa (Droseraceae, Waterwheel Plant). Despite this incredible diversity, there have been relatively few studies of the carnivorous plants of Western Australia, particularly of those occurring in the remote Kimberley region. This national biodiversity hotspot is home to a range of Drosera and Byblis species, which use adhesive traps, and Utricularia species, which use suction traps. While the biology and taxonomy of these genera have been well described, there have been no or few in situ studies to quantify the degree to which these plants rely on heterotrophy for nutrient gain. We address this significant knowledge gap, by applying modern isotopic methodology to some of the pioneering concepts developed by Charles Darwin over a century ago. This study provides empirical evidence for the different reliance on heterotrophy of carnivorous plants of the Kimberley. By understanding the ecological role and requirements of Australian carnivorous

Oral presentation

Skates L [1,2] , Cross A [2,3] , Stevens J [2] , Gebauer G [4] , Dixon K [3]

[1] University Of Western Australia, Perth WA, Australia

[2] Kings Park Botanic Gardens, Perth WA, Australia

[3] Curtin University, Perth WA, Australia

[4] BayCEER Laboratory, University of Bayreuth, Bayreuth Bavaria, Germany

Investigating Dependence on Heterotrophic Nutrition for Carnivorous Plants of the Kimberley Region, Western Australia

plants, we will be better able to conserve them in their natural habitats.

Darren Southwell

Biography

Darren Southwell is a postdoctoral research fellow at the University of Melbourne. His research interests include optimal monitoring and adaptive management. He previously held positions at the Department of Agriculture, Fisheries and Forestry and the Australian Antarctic Division.

EcoTAS abstract

The recent decline of biodiversity in northern Australia, particularly small-to-medium sized mammals, is one of the most pressing conservation problems of this decade. It is crucial that current and future monitoring programs have sufficient resources, and are adequately designed, to maximise the chance of detecting further population declines should they occur. In this study, we developed a simulation tool to inform the re-design and expansion of a faunal monitoring program that has operated in Kakadu, Litchfield and Nitmiluk National Parks in northern Australia over the last 20 years. Using occupancy and detectability maps for more than 150 species recorded in these parks, we simulated declines in species' occupancy over the next 15 years while modelling the incidence and spread of fire throughout the landscape. By developing a cost model, considering the location of new monitoring sites, and using estimates of detectability for four different survey methods (live trapping, camera trapping, active searches, and spotlighting), we optimised the trade-off between survey

Ecological Modelling (1)

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Sugarloaf Room

Oral presentation

Southwell D [1] , Einoder L [2] , Lahoz-Monfort J [1] , Gillespie G [2] , Wintle B [1]

[1] University Of Melbourne, Melbourne Victoria, Australia

[2] Flora and Fauna Division, Department of Environment and Natural Resources, Berrimah Northern Territory, Australia

Optimising a monitoring program in northern Australia to detect declines in vertebrate populations

frequency, duration of visits and the number of sites, to maximise statistical power to detect occupancy trends. Given current levels of funding, we found that statistical power was maximised across and within six conservation reserves by surveying sites every 5 years for 4 nights. With this design, our simulations suggest we are likely to detect moderate-to-large changes in populations of the most ubiquitous/detectable species over the next 15 years, but are unlikely to detect trends in the rarest/most cryptic species, even if population declines are severe.

Ben Sparrow

Biography

Ben works for TERN at the University of Adelaide where he directs the Ausplots and Eco-informatics facilities. Previously Ben has held numerous positions for the South Australian and Northern Territory Governments including various roles that include ecosystem surveillance.

EcoTAS abstract

Increasingly the need for a widespread national ecosystem surveillance monitoring program for Australia is identified to inform on biodiversity and the magnitude and direction of change in our unique environments. Often this recognition is framed negatively – That we don't know enough about our biodiversity, that we are not collecting biodiversity data and do not have monitoring programs in place to effectively inform on these issues. Whilst this is indeed true it is important to acknowledge that we are not embarking on this task from a base of nothing. A great deal of excellent work has occurred in Australia over several decades to

SYMPOSIUM: Enabling Ecosystem Surveillance Monitoring across Australia – putting ecology to work

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Sparrow B [1]

[1] Tern / The University Of Adelaide, Adelaide SA, Australia

Ecosystem Surveillance Monitoring in Australia – Why the Glass is half full!

inform on these issues. The success of ACRIS and TERN Ausplots are two relevant examples, but there are many more. None of these programs get close to realising our ideal Surveillance monitoring network, but they have achieved parts of that vision well and form a basis from which we can incrementally improve our coverage both spatially and in the variables that are measured to get closer to the ideal that we seek. This presentation will briefly outline where we have come from, where we should be headed, and reasons that we should be optimistic about that journey.

Sivagowre (Meena) Sritharan

Biography

Meena Sritharan is a student who has completed a Bachelor of Advanced Science (Honours), majoring in ecology and microbiology. Her fascination with nature has drawn her to work and volunteer for various ecology research projects at UNSW Sydney.

EcoTAS abstract

Australia’s alpine flora has been identified as being particularly at risk from global climate change. We know that there is limited scope for Australian alpine plants to migrate uphill, but we do not know whether these plants are adapting to keep pace with the changing climate. I used herbarium specimens to quantify changes in plant size, leaf thickness, leaf mass per unit area, leaf shape, and size across the last 126 years for 21 species native to Kosciuszko National Park. Only two out of 21 species (9 %) showed significant changes in any of the measured traits.

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Sritharan M [1]

[1] UNSW Sydney, Sydney NSW, Australia

Few changes in native Australian alpine plants, despite substantial local climate change

This lack of change is not attributable to methodology – an earlier study using the same methods found significant changes in 70% of introduced species. My findings suggest that the future may be bleak for many native Australian alpine plants facing future climate warming.

Rachel J. Standish

Biography

Rachel is a Senior Lecturer in Ecology at Murdoch University. Her research interests are broad, driven in equal measures by curiosity, a keen interest in experiments and fieldwork, and a desire to contribute to science-based biodiversity conservation and ecological restoration.

EcoTAS abstract

The role of root symbionts in biotic resistance to plant invasion remains elusive despite implications for ecological theory and for restoration practice. Here we tested whether the presence of arbuscular mycorrhizal fungi (AMF) and rhizobia influence the resistance of an assemblage of native woody plant species to plant invasion. We planted the assemblages in microcosms of field-conditioned soil with and without addition of AMF and rhizobia in a fully factorial experimental design. After seedling establishment, we seeded half the microcosms with an invasive grass. We measured shoot and root biomass of native plants and the grass, percentage colonization by AMF, number of root nodules and number of root clusters. We used these data to assess native plant biotic resistance to plant invasion. We found the two native legumes had increased shoot and root biomass with access to AMF compared with their shoot and root biomass in microcosms without access to

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 1)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Brokenback Room

Oral presentation

Standish R [1]

[1] Murdoch University, Perth WA, Australia

Roots 'n' all response to plant invasion in an experimental microcosm

AMF. Biotic resistance was not evident in the invader biomass data, which was similar among soil treatments. However, with access to AMF and rhizobia, one native legume produced significantly more root nodules in the invaded microcosms than any other treatment combination, which may contribute to its biotic resistance. Our study has demonstrated the importance of measuring belowground effects because the aboveground effects gave limited indication of the effects occurring belowground.

Timothy Staples

Biography

I am a community ecologist interested in functional traits, macroecology and plants. My PhD uses inventory data collected in revegetated forests to answer fundamental ecological questions, with the aim of improving the success and productivity of restored forests and woodlands.

EcoTAS abstract

A common goal of ecological restoration is to recover degraded systems to be self-sustaining and resilient communities, with specific species and functional profiles. Despite this goal, many restoration projects diverge into alternate and often undesirable states. For woody systems that take decades to mature, failure may not be detectable until long after monitoring ceases. Understanding how the growth of individual plants is affected by local conditions and biotic interactions will inform planting designs and likely improve success rates. Using data from 186 mixed-species tree plantings across Australia, I will discuss how local environmental conditions, focal plant functional traits,

Restoration Ecology (1)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Bimbadeen Room
Oral presentation
Staples T [1,2] , Dwyer J [1,2] , England J [3] , Mayfield M [1]
[1] University Of Queensland, St Lucia QLD, Australia
[2] CSIRO Land and Water, Dutton Park QLD, Australia
[3] CSIRO Land and Water, Clayton South VIC, Australia
Acacia and Eucalyptus interactions and growth in diverse planted forests

neighbour density and neighbourhood diversity affected the growth rate of 80 Eucalyptus and 43 Acacia species (23 530 plants in total). We found that these factors consistently affected Eucalyptus and Acacia growth rates differently. Specifically, Acacia growth was positively correlated with moisture availability and neighbourhood diversity, and negatively with the density of conspecific neighbours. In contrast, the growth of Eucalyptus species was not strongly related to abiotic conditions and was higher in neighbourhoods with more conspecifics and lower diversity. Our study indicates that the factors affecting individual growth often differ between commonly coexisting genera, which has important implications for the design and monitoring of ecological restoration.

Mitchell Stares

Biography

Mitchell Stares is a PhD candidate at the University of Wollongong. His PhD focuses on the creation and loss dynamics of coarse woody debris in response to fire and climate, expanding on previous work conducted during his honours year.

EcoTAS abstract

Future climate scenarios predict a changing climate with increased temperatures, heatwaves, prolonged droughts and changes to fire regimes. Such changes to climate will have significant effects on the fire-prone forest ecosystems of south-eastern Australia, causing widespread forest dieback and modification to faunal food and habitat resources. Our study investigated the effect of fire

Socio-ecological Interactions / Open session

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Wattagan Room

Oral presentation

Stares M [1] , French K [1] , Bradstock R [1] , Collins L [2]

[1] University Of Wollongong, Wollongong NSW, Australia

[2] La Trobe University, Melbourne VIC, Australia

Dead, Downed and Decayed – Coarse woody debris and hollow modification by fire and climate

frequency, mean annual temperature and rainfall on coarse woody debris availability and log-hollow modification in the Sydney Basin/Blue Mountains region of NSW. Sites were selected across 8 climatic regions; combinations of temperature and rainfall between 12°C – 16°C and 800mm – 1200mm respectively. Sites were also stratified by fire frequency (0-3 fires) between 1972-2003, the most recent of which occurred in either 2001/2002 or 2002/2003 as a wildfire. Increasing temperatures from 12°C to 16°C saw a reduction in coarse woody debris biomass. Log-hollow abundance was dependant on mean annual rainfall, with higher rainfall reducing overall abundance of hollows at the site scale. At the individual log scale however, hollow presence was linked to increasing diameter, surface log char and decomposition state. These findings provide important insight into the potential ramifications of climate change on these habitat resources. Increasing temperatures and changes to rainfall and burning patterns could significantly impact total coarse woody debris biomass and hollow abundance, resources important to threatened forest fauna.

Jamie Stavert

Biography

Jamie is a PhD candidate at the University of Auckland. Jamie’s research focuses on how global change impacts pollination systems. He is particularly interested in understanding the link between pollinator functional roles and how they respond to landuse change.

EcoTAS abstract

SYMPOSIUM: Insect Ecology
Research Chapter - insects punching above their weight (Part 1)
Monday, November 27, 2017
11:00 AM - 1:00 PM
Brokenback Room
Oral presentation

Globally, agricultural intensification is a primary driver of declines in critical ecosystem services, such as pollination. However, exotic species are often well-adapted to human-modified environments and could compensate for ecosystem services lost from native species. We measured pollination services provided by wild insects to a mass flowering crop, pak choi (Brassica rapa) on 12 farms, across an agricultural intensification gradient. We found that pollination provided by exotic fly species exceeded the loss of pollination from native species as agricultural land-use intensified, resulting in an overall increase in pollination services. Thus, exotic pollinators can play a key role in stabilising pollination services in highly modified agricultural systems. We suggest the potential positive impacts of exotic species on ecosystem services should be considered, particularly in systems subject to strong landuse change. Nevertheless, conservation of natural habitat for diverse native communities is essential to maintain ecosystem services that are robust to future environmental change.

Stavert J [1] , Pattemore D [2] , Bartomeus I [3] , Gaskett A [4] , Beggs J [1]

[1] Centre for Biodiversity and Biosecurity, School of Biological Sciences, The University of Auckland, Auckland, New Zealand

[2] The New Zealand Institute for Plant & Food Research Limited, Hamilton, New Zealand

[3] Estación Biológica de Doñana (EBD-CSIC), Integrative Ecology Department, Sevilla, Spain

[4] School of Biological Sciences, The University of Auckland, Auckland, New Zealand

Exotic flies maintain pollination services as native pollinators decline with agricultural intensification

Simone Stevenson

Biography

Simone is a PhD student at Deakin University whose project aims to develop and apply new theory for testing biodiversity indicators. Her research interests include environmental decision-making, ecosystem modelling, marine management and conservation and international policy.

EcoTAS abstract

Marine and Freshwater Ecology
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Cypress #2
Speed Talk PLUS Poster

Existing research indicates that marine protected areas (MPAs) are not being established in areas valuable to human use, and where biodiversity is most at risk. Instead, they are concentrated in areas least likely to create conflict with users. The relative influence of different types of human-induced pressures on this pattern has not yet been explored. The question remains, do human-induced pressures influence the likelihood of a marine area receiving protection? Here we tested whether the distribution of different human induced pressures were correlated (positively or negatively) with global MPA locations.

We calculated the intensity of 17 different pressures within protected and unprotected areas of national waters (exclusive economic zones) for all coastal states. Binomial generalised linear models were used to determine whether the intensity of each pressure would predict the likelihood of that area being protected, and the level of protection it was likely to receive.

Our results indicated that the likelihood of protection varies according to the pressure type. Marine protected areas were negatively correlated with some pressures, such as pelagic fisheries and shipping. Conversely, MPAs were positively correlated with other pressures, including human population and demersal fisheries.

Our results demonstrated that pressure from pelagic fisheries and shippings, and subsequent biodiversity loss, are unlikely to be mitigated by the existing distribution of MPAs. This suggests that some human-induced pressures present a consistent obstacle to the effectiveness of area-based protection, whereas other pressures are amenable to it.

Stevenson S [1,2] , Woolley S [3,4,5] , Barnett J [2] , Dunstan P [3]

[1] Centre for Integrative Ecology, Deakin University, Melbourne Victoria, Australia

[2] School of Geography, The University of Melbourne, Melbourne Victoria, Australia

[3] CSIRO Oceans & Atmosphere, Hobart Tasmania, Australia

[4] Museum Victoria, Melbourne Victoria, Australia

[5] School of Biosciences, The University of Melbourne, Melbourne Victoria, Australia

Do marine protected areas safeguard human interest at the cost of biodiversity?

Erinne Stirling

Biography

Erinne Stirling is a University of Adelaide PhD candidate at The Waite Research Institute. She is currently working in the Soil Ecology Research Group investigating soil nutrient cycling and microbiomes in soils, litters, and charcoal sourced from the Adelaide Hills.

EcoTAS abstract

Shrub and forest wildfires currently burn more than a quarter of a million square kilometres per year, and are expected to increase in frequency in the future. Organic inputs to the soil are changed after a fire, in particular after moderately severe fires (complete combustion of the understory but not the canopy) there may be the formation of a scorched litter layer. This litter lacks the complexity of layers formed under normal conditions, and may interact differently with the soil microbial community. In this study, soils and litters from two vegetation types and burn statuses were characterised and incubated in a fully factorial laboratory based experiment. Litters were mixed with soils at a rate of 10gC/kgSoil and incubated to determine cumulative respiration, microbial biomass, and available N and P response. The results of this study show that litter origin was more influential on decomposition dynamics than soil origin, however there were some instances of an interactive response. Cumulative respiration at day 6 was slightly higher in the scorched relative to unscorched native litter, and was significantly higher (>3x) in the scorched relative to unscorched pine litter. There was also evidence of distinct changes in soil N cycling, however this was not observed in the microbial biomass. In conclusion, decomposition of a scorched litter layer is fundamentally different to normal litter, and fire

SYMPOSIUM: Microscopic interactions with macroscopic effects - the role of micro-organisms in maintaining and monitoring the health of macro-communities and organisms (Part 2)

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Brokenback Room

Oral presentation

Stirling E [1] , Cavagnaro T [1]

[1] The University Of Adelaide, Glen Osmond SA, Australia

Post fire soil and litter decomposition dynamics under native and pine forest reserves

induced changes can be expected to have complex interactive microscopic effects on the soil microbial communities which leads to complex macroscopic effects on forest communities.

Zoe Stone

Biography

Zoë Stone is a PhD Candidate with the University of Queensland studying habitat requirements for the persistence of the northern Eastern Bristlebird. Her interests are threatened species ecology and reintroduction biology focusing on habitat requirements needed for successful conservation

EcoTAS abstract

Threatened species often have highly fragmented and isolated populations. These populations can often be locally adapted to different environmental conditions, habitats and disturbance regimes. Conservation of small isolated peripheral populations is important for maintaining genetic diversity and resilience to future environmental conditions. In disturbance-prone ecosystems, conservation of small populations is often highly state-dependent, so population-specific information is crucial for effective management. The Eastern Bristlebird (Dasyornis brachypterus) provides a good example of the risks of generalising ecological information from a well-researched population to a smaller ‘marginal’ population. We created threat assessments and developed corresponding management strategies for the three Eastern Bristlebird populations (central, northern, southern). Conservation

Conservation Biology (2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Cypress #2
Oral presentation
Stone Z [1] , Tasker E [2] , Tulloch A [1] , Maron M [1]
[1] The University of Queensland, Brisbane QLD, Australia
[2] NSW Office of Environment and Heritage, Hurstville NSW, Australia
One size doesn’t fit all: small populations provide important information for threatened species management

actions to manage threats for southern populations do not mitigate threats acting on the northern population. Fire exclusion and genetic bottleneck threats are more pronounced in the northern population. Low fire frequencies suitable for managing southern Eastern Bristlebird habitat are too infrequent for northern Eastern Bristlebird habitat, and lead to the degradation of necessary thick grassy structure. The small population size of the northern population also means reintroduction and captive breeding management actions have increased importance, compare with the stable, larger southern populations. A management action common across populations is feral animal control, which while having a lower threat risk, has high consequences if not done particularly for the smaller northern population. We show how research within small populations benefits management of a threatened species and should not be ignored. Integrating this information produces robust management strategies for populations adapted to various disturbance regimes.

Daniel Stouffer

Biography

Daniel B. Stouffer works on a range of problems in community ecology, but is particularly interested in the role of species-species interactions in driving emergent ecological and evolutionary phenomena.

Ecological Modelling (Plants)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Sugarloaf Room
Oral presentation

EcoTAS abstract

Interactions are a defining characteristic of every species' "milieu" since no organism exists without participating in

some sort of ecologically relevant interaction during its lifetime. In addition, interactions between species are regarded as a key driving force that determines species ability to thrive in different environments. They have even been described as "the architecture of biodiversity". In competitive communities, it is widely accepted that species must exploit a unique combination of resources and/or exhibit a unique set of functional traits if they are to minimise competition and thereby maximise their chances of coexisting. These ideas imply that competition is inherently a high-dimensional problem that needs high-dimensional solutions; that is, the majority of theories of competitive communities require that there are as many potential resources to exploit as species that successfully co-occur. In this talk, I will discuss new analyses of the competitive effects between plant species found in multiple locations around the world. In particular, I will show how the competitive interactions between these co-occurring plants give strong indications that competition is a decidedly "low-dimensional" phenomenon. Using data from some of the locations where the plants were subjected to experimental disturbance, I will demonstrate explain why these low-dimensional systems can often and easily give the false impression that they are high dimensional. Finally, I will highlight the implications of these results for our understanding of coexistence in diverse communities and for competition theory in general.

Stouffer D [1] , Godoy O [2] , Dalla Riva G [3] , Mayfield M [4]
[1] University Of Canterbury, Christchurch, New Zealand
[2] Instituto de Recursos Naturales y Agrobiologia de Sevilla (IRNAS-CSIC), Seville, Spain
[3] University of British Columbia, Vancouver, Canada
[4] University of Queensland, Brisbane, Australia

The dimensionality of competition in plant communities

Emma Sumner

Biography

Conservation Biology (3)
Thursday, November 30, 2017
11:00 AM - 1:00 PM

Emma Sumner has recently graduated from La Trobe University with honours in BSc (Wildlife and Conservation Biology). Her research interests lie in plant ecology and restoration ecology.

EcoTAS abstract

As the climate warms, plant species are predicted to move upward and poleward in order to remain within their climatic envelopes. These predictions are made by extrapolating current distributions to future climate scenarios under the assumption that plant boundaries are controlled by climate alone. However, species-specific responses to climate change are likely more complex than can be forecast with simple climate modelling. Understanding controls on species geographical range limits, and how these may respond to rapid environmental change has prompted calls for greater ‘brute force’ experimentation. Here, I investigate controls on the distribution of a model alpine species Podolepis robusta (Asteraceae) by conducting a beyond-range transplant experiment. Seedlings were planted along a temperature and moisture gradient in gaps and amongst existing vegetation. Here, close neighbors significantly increased survival of planted seedlings, compared to seedlings planted in gaps. This pattern was consistent, even below the current distribution, contrary to expectations of stronger competitive interactions. Results also indicate that Podolepis is able to occupy a far greater niche than can be observed currently. These results highlight the importance of facilitative interactions at the seedling stage in the alpine zone, demonstrating that biotic factors act to constrain or widen the theoretical niche. Biotic interactions, dispersal limitation, and recruitment processes may enforce stronger limits to geographic distribution than climatic tolerances per se. Predictions on how plant

Cypress #2

Speed Talk PLUS Poster

Sumner E [1]

[1] La Trobe University, Melbourne VIC, Australia

Current plant distribution is not a useful predictor of niche requirements of an alpine daisy

species may respond to climate change will benefit from incorporating these factors.

Pongthep Suwanwaree

Biography

My research interests are in the fields of environmental science and ecology. I investigate water quality, solid waste, carbon footprint, water footprint and greenhouse gases. I also study ecology of various organisms including insects, reptiles, amphibians and plants.

EcoTAS abstract

Soil respiration in tropical forest is an important source of carbon dioxide in atmosphere. Termite is one of the soil decomposer in the tropic contributing a major portion of CO2 into atmosphere each year. The aim of this study was to compare soil respiration from thin-wall termite mounds in dry evergreen forest of Thailand. We measured CO2 efflux directly above mounds of five termite species (n=5) by using a portable infrared gas analyzer connected with PVC pipes two times in wet season (October 2015) and dry season (January 2016). The results showed that CO2 efflux is significantly different among termite species. Globitermes sulphureus had the highest soil respiration (37.7 ± 14.7 µmol m-2 s-1), followed by Microcerotermes crassus, Termes comis, Termes propinguus and Dicuspiditermes makhamensis, respectively. CO2 effluxes in wet season were significantly higher than dry season in both termite mounds and soil surrounding. Globitermes sulphureus and M. crassus mounds significantly produced more CO2 than surrounding soils but T. propinguus and D. makhamensis significantly produced less CO2 than

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Suwanwaree P [1] , Boonriam W [1] , Yamada A [2]

[1] Suranaree University Of Technology, Nakhon Ratchasima -, Thailand

[2] Nagasaki University, Nagasaki City -, Japan

Soil respiration from thin-wall termite mounds in dry evergreen forest of Northeastern Thailand

surrounding soils. Therefore, G. sulphureus and M. crassus can be major CO2 producers among thin-wall termites in tropical forest.

Lauren Svejcar

Biography

Lauren Svejcar worked in various fields of ecology including weed science and restoration ecology, and is currently pursuing a PhD at Murdoch University and Kings Park Botanic Garden with Drs. Rachel Standish, Ben Miller, Jason Stevens and Joe Fontaine.

EcoTAS abstract

Plant-plant interactions drive plant community structure and dynamics. In the last 20 years, a renewed interest in facilitation, rather than competition, has driven a change in perspective from one of all species being independent to a more integrated community perspective. Facilitation is likely to play a large role in environments where abiotic factors limit establishment. For example, in post-mine restoration sites in the Swan Coastal Plain seedlings are exposed to high surface soil temperatures, frequent wind and low nutrient soils. The goal of our research is to test the intraspecific interactions of a N-fixing and non N-fixing species in a post-mine restoration site, and to determine whether a comparison of spatial patterns at emergence and after the summer drought suggest N-fixers help one another more than non-N-fixers to establish. We planted 640 seeds of Acacia pulchella (N-fixing) and Regelia inops (non N-fixing) in random spatial patterns within two separate plots (each 2 m × 4 m) to obtain a range of different distances between seedlings. Seedling

Restoration Ecology (2)
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Bimbadeen Room
Speed Talk PLUS Poster
Svejcar L [1,2] , Standish R [1] , Fontaine J [1] , Miller B [2] , Stevens J [2]

[1] Murdoch University, Murdoch WA, Australia
[2] Kings Park and Botanic Garden, Kings Park WA, Australia
Can facilitation between plants help ecological restoration after sand mining?

emergence and height will be measured periodically from spring 2016 to autumn 2018, and above-ground biomass will be collected in autumn 2018. Preliminary results suggest timing in addition to spatial patterns of emergence play a critical role in seedling persistence.

Samiya Tabassum

Biography

Samiya has broad interests in the ecology and evolution of invasive species. She completed a Bachelor of Advanced Science (Hons I) at UNSW and is currently a PhD student at Macquarie University, investigating selection for traits that promote range expansion.

EcoTAS abstract

The process of range expansion often selects for traits that maximise invasion success at range edges. For example, during range expansion, individuals with greater dispersal and colonisation ability will be selected for towards range edges. For wind dispersed plants, however, there exists a fundamental trade-off between dispersal and colonisation ability (germination success and growth) that is mediated by seed size; smaller seeds often have greater dispersal ability but poorer colonisation ability. We investigated the nature of the dispersal/colonisation trade-off by comparing dispersal ability (wing loading ratio: seed mass/wing area), germination success and growth related traits across multiple populations of a coastal exotic invasive plant species (Gladiolus gueinzii Kunze) along its entire introduced distribution in eastern Australia. We found that G. gueinzii had significantly greater dispersal ability

Invasion Ecology (Plants)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation
Tabassum S [1] , Leishman M [1]
[1] Macquarie University, Sydney NSW, Australia
Greater dispersal ability and faster germination towards range edges of an invasive plant species

towards its range edges which was mediated by a decrease in seed mass. However, this was not associated with a decrease in germination success or growth. In fact, seeds from range edge populations had significantly faster germination times. Our results suggest that shifts towards greater dispersal ability does not have an associated negative effect on the colonisation ability of G. gueinzii and may be a key factor in promoting further range expansion of this exotic invasive species.

Leah Talbot

Biography

Leah Talbot is currently employed by CSIRO as an Indigenous Researcher. She is a descendant of the Kuku Yalanji People, Indigenous people from Far North Queensland, Australia. Leah has recently completed her PhD, exploring the integration of conservation management and Indigenous knowledge and governance systems. In particular she investigated the conditions that enable Indigenous knowledge to be recognised and supported by Indigenous governance in Protected Areas and undertook a comparative study between the Wet Tropics World Heritage Area in Australia and the Laponia World Area in Sweden. Leah has many years of experience in conservation and environmental management, high level Indigenous negotiations and developing collaborative Indigenous research methodologies and participative planning with Indigenous communities. She also has experience in International forums particularly in environment policy, community engagement and Indigenous involvement. Generally, her interests have

KEYNOTE PRESENTATION: Leah Talbot

Monday, November 27, 2017

9:30 AM - 10:00 AM

The Convention Centre

Keynote

Talbot L

How can … Indigenous governance and the application of Indigenous knowledge – support ecology being put to work …

always included social justice issues, Indigenous peoples rights and responsibilities, environmental issues, protection of cultural and natural resources, and finding ways and methods to develop a better future for our planet and people. Leah is also a current Board Director with the Wet Tropics World Heritage Area and member of the Indigenous Advisory Committee to the Minister for Department of Environment and Energy. Leah has a Masters of Science (with a Thesis: Indigenous Land Management Techniques) and a Bachelor of Science in Environmental Studies.

Jennifer Taylor

Biography

Murray Ellis is Senior Scientist at the Office of Environment and Heritage, NSW. His research focuses on key threatening process. He is talking about data from a 10-year collaboration with Laura Rayner and Jennifer Taylor researching woodland ecology.

EcoTAS abstract

Tree hollows are essential to the survival of many Australian animal species. Characteristics of the hollow and source tree govern its use and occupant, yet there are limited data on hollow diversity among tree species and across landscapes. We compared characteristics of tree hollows among ten Eucalyptus species in semi-arid woodland in central-western NSW. On 105 1-ha sites, mostly in Travelling Stock Routes and Reserves and spread across 10,000 km2, we assessed hollows in 5,199 live and 530 dead stems. Most (~75%) stems were from

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Oral presentation

Ellis M [1] , Rayner L [2] , Taylor J [3]

[1] Science Division, Office of Environment and Heritage NSW, Hurstville NSW, Australia

[2] Fenner School of the Environment, Australian National University, Canberra ACT, Australia

[3] School of Science, Australian Catholic University, North Sydney NSW, Australia

Patterns of tree hollow type, size and position in semi-arid woodland

Eucalyptus populnea or E. microcarpa, but E. camaldulensis, E. conica and E. melliodora each contributed > 300 trees. Most stems (4,912) were small in diameter (< 60 cm), but 123 larger stems (> 100 cm) were surveyed. We classified 10, 259 visible hollow entrances into eight hollow types and three size categories. Irrespective of species, the vast majority of hollow entrances were in broken ends of branches (54%) or broken tops of stems (19%). The next most-common entrance type occurred in the main trunk (17%), while lateral entrances into branches were least common. There were significantly more north-facing hollows (21%) than other orientations. Despite these general similarities, we found evidence of differences among tree species in relative abundance of hollow types and sizes. In this presentation we will explore the potential for using tree species, site characteristics and landscape position as predictors of hollow diversity.

Biography

Jennifer Taylor is an ecologist in the School of Science, Australia Catholic University. For the past 10 years she has collaborated with Murray Ellis and Laura Rayner to research ecology of woodland trees in central-western NSW.

EcoTAS abstract

Biomass estimates form the basis of carbon storage calculations. Important to interpreting these estimates is an understanding of uncertainty. We examined the variability in biomass estimates of naturally-occurring woodland eucalypt trees obtained using 17 published equations. We applied these equations to our data for stem diameter at breast height (DBH; n = 3844 trees) and tree height (n = 1772) for ten Eucalyptus species at 109 1-ha sites in

eucalypts

Forest Ecology (1)

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Bimbadeen Room

Oral presentation

Taylor J [1] , Ellis M [2] , Rayner L [3]

[1] School of Science, Australian Catholic University, North Sydney NSW, Australia

[2] Science Division, Office of Environment and Heritage NSW, Hurstville NSW, Australia

[3] Fenner School of the Environment, Australian National University, Canberra ACT, Australia

central-western NSW. Trees ranged from 2 to 230 cm DBH, with 405 stems > 80 cm DBH. Estimates of biomass varied markedly among these equations as trunk diameter increased. The ratio of largest estimate to smallest estimate of biomass of individual stems varied from 2 at 26-cm DBH, to 5.8 at 230-cm DBH. Number of trees per hectare in our study area is extremely variable (1 to 277). We examined stand effects by comparing total biomass on each of our 109 1-ha sites to number of trees on site. For sites with > 40 trees.ha-1, estimates were extremely variable, with upper biomass estimates being up to 10 times the lowest biomass estimates for a site. In addition, height was variable across most of the DBH range in our study and variability increased with DBH. Consideration of height, number of stems in trees and hollow trees added another layer of uncertainty to biomass estimates of naturally-occurring trees in these semi-arid woodlands; areas increasingly managed for carbon sequestration.

Eucalypt biomass in relictual woodlands: the problems of using current equations

Riki Taylor

EcoTAS abstract

The supportive role of fire in many of the world's ecosystems is being increasingly contrasted against its destructive role in others. Many areas in the Southern hemisphere feature ecosystems particularly sensitive to fire and are vulnerable to invasion following burning. This study aimed to investigate the interactions between fire and communities comprised of both native (predominantly vulnerable to fire) and exotic (predominantly promoted by fire) vegetation on Great Barrier Island, New Zealand, following wildfire in 2013. Repeat vegetation surveys of 36

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Taylor R [1]

[1] University of Auckland, New Zealand

Post-fire community dynamics in a disturbed landscape, Great Barrier Island

plots both inside and outside the burned area were undertaken two years apart, recording species' frequency, height, and reproductive status, as well as associated environmental variables. These data were analysed to determine community composition using clustering based on dissimilarity analysis, which identified five distinct vegetation communities across the study site. These communities represented a gradient of invasion, from wholly indigenous communities to communities dominated by invasive fire-adapted woody vegetation. Correlative analysis of the vegetation and environmental conditions suggested that soil moisture and nutrients (C and N) acted as the strongest controls on community type. The trends in community composition seen over the study period were of the spread of exotic fire-promoted species, with Pinus spp. and Paraserianthes lophantha identified as key invaders. Their increased dominance has resulted in an increase in the quantity and connectivity of fuel, representing greater fire risk. Prospects for succession to mature indigenous forest of lower fire risk are minimal due to mammal invasion, low-nutrient soils, and a lack of regional seed dispersal.

Patrick Tegart

Biography

Erin is a Senior Scientist working in the NSW Office and Environment and Heritage (OEH). Erin is also the Chair of the Australian Citizen Science Association. Previously, Erin worked in climate change adaptation and has a PhD in terrestrial ecology.

SYMPOSIUM: Communicating ecology to a broad audience - novel ideas and approaches

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Wattagan Room

Speed Talk

EcoTAS abstract

Citizen science is public participation and collaboration in research to increase scientific knowledge. Citizen science is growing rapidly in Australia and globally, and presents valuable opportunities to engage with the community and amplify scientific research. Despite the potential, there is a lack of information for practitioners in understanding peoples' motivations and barriers in participation in citizen science. Indeed, few studies have examined community awareness of the term citizen science and what factors influence participation (including ongoing participation) in projects. Here, we describe a social research method to examine motivation in participation and include our findings from focus group research, an online survey and choice modelling. We found that the term citizen science is not widely understood, but once explained the concept is broadly appealing. Key barriers in participating in citizen science were identified such as science itself as well as a lack of awareness of what institutions undertake scientific research. Based on the research, we provide common elements required to build and sustain successful citizen science projects, and the results can equally help inform more effective science communication. When key elements of an appropriately designed citizen science project are met, citizen science can represent a mechanism to collect scientifically robust data and maintain ongoing community interest and participation.

Roger E [1]

[1] Nsw Office Of Environment And Heritage, Sydney NSW, Australia

Understanding motivations of citizen science participants

Joshua Thia

2016 Wiley Fundamental Ecology Award Winner Presentation

Wednesday, November 29, 2017
10:10 AM - 10:25 AM
The Convention Centre
Oral presentation
Thia J
2016 Wiley Fundamental Ecology Award Winner Presentation

Freya Thomas

Biography

Freya is a PhD student in The Quantitative and Applied Ecology Group at The University of Melbourne; and also works at RMIT University in the Interdisciplinary Conservation Research Group.

EcoTAS abstract

Ecologists commonly collect field data. How can we know if we are collecting enough? Pilot studies and power analysis help us figure this out. Unfortunately, in practice this can be challenging. Ecologists increasingly use datasets collected over complicated ecological gradients that require complex analyses. Traditional power analyses are often poorly suited to these problems. For example, questions such as ‘what’s a good sample size?’ are often really ‘what’s a good design for a multi-level model?’. I will demonstrate a flexible simulation approach designed to have field realism. I will explain a case study which aimed to use a multi-species non-linear growth model to predict heights of plant species in the Victorian Mallee.

The Mallee is vast and heterogeneous - not all species are in the same place, and some species are harder to find

SYMPOSIUM: Effectiveness Monitoring (Part 2)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Sugarloaf Room
Oral presentation
Thomas F [1,2] , Vesk P [1] , Hauser C [1]
[1] The University Of Melbourne, Melbourne VIC, Australia
[2] RMIT University, Melbourne Victoria, Australia
A field ecologist’s adventures in the virtual world: using simulations to design data collection

than others. Our simulation revealed that multi-species growth models require relatively intensive data collection for adequate sample sizes - and when practical field constraints (travel time, measuring time, species detection) are not taken into account, the field time needed is underestimated. I hope to provide a convincing argument that using simulations to design field based research or monitoring not only gives insight analogous to that of traditional power analysis but can also be incredibly valuable for estimating field costs and making research decisions. This approach is relevant to researchers but also individuals or organisations responsible for designing field programs with limited and/or transparent budgets.

Caragh Threlfall

Biography

I am a post-doc in the Clean Air and Urban Landscapes Hub supported by the National Environment Science Programme. My research interests combine urban ecology, animal behaviour and ecosystem ecology to address questions of human impacts to the urban environment.

EcoTAS abstract

Urbanization is a severe threat to global biodiversity, often leading to taxonomic and functional homogenization. However, current urban ecology research has focused mostly on urban birds and plants, limiting our ability to make generalisations about the drivers of urban biodiversity globally. To address this gap, we conducted a global meta-analysis of 87 studies, including 117 bat species (Chiroptera) from 45 cities in Asia, Australia,

Urban Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Threlfall C [1] , Jung K [2]
[1] Clean Air and Urban Landscapes Hub, The University Of Melbourne, Melbourne NSW, Australia
[2] Institute of Evolutionary Ecology and Conservation Genomics, University of Ulm, Ulm, Germany
The loss of functional and phylogenetic diversity of bats in urban areas

Europe, North & South America. We aimed to 1) understand the importance of functional traits and phylogeny in driving changes in urban bat assemblages, and to 2) assess the capacity of traits for predicting which types of species are most sensitive to urbanization. Our results indicate species-specific functional traits explain differences in the intensity of urban habitat use. However, the predictive potential of specific traits varied by bat family. Effect sizes revealed that species with traits that allow for food acquisition in open habitats in addition to traits that favour fast flight over medium distances allow species to persist in urban environments. Our analysis demonstrates that the local extinction of bat species in urban areas is non-random, trait-based and predictable, allowing urban landscape managers to tailor local conservation actions to particular types of species.

Federico Tomasetto

Biography

Federico Tomasetto is a Scientist in AgResearch. He has a sound technical background and experience in the fields of Ecology and Invasion Ecology, with recent focus on the stability of alien biocontrol dynamics in New Zealand pastoral ecosystems.

SYMPOSIUM: Invertebrate ecology of managed grasslands - addressing the new challenges
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Wattagan Room
Speed Talk PLUS Poster

EcoTAS abstract

This contribution advances the hypothesis that alien species' trophic niches can affect intra-and inter-specific coexistence, with implications for biodiversity and invasiveness in New Zealand pastoral ecosystems.

Difficulties in measuring species' interactions in New Zealand ryegrass pastures limit our comprehension of functional biodiversity in those ecosystems. We use isotopic analysis of Listronotus bonariensis and several other sympatric herbivore species to quantify the trophic niche of this abundant invertebrate pest, and its intra- and inter-specific isotopic similarity across 8 different altitudinal and latitudinal locations in the North and South Islands in New Zealand. Bayesian mixing models were also applied to quantify the feeding of L. bonariensis on different plant sources.
Density, body size and isotopic distribution of adult L. bonariensis all varied between locations. The observed trophic-functional variability was explained by the inclusion of different plant organs (i.e. stem, leaf and roots) of Lolium perenne and L. multiflorum and, to a lesser extent, by other plant species in the diet. As a consequence, niche overlap with other distinct populations varied between locations with implications for intra-specific limitation and coexistence with other species in the community.
Results emphasized the value of isotopic analysis as a promising tool for understanding coevolved functional biodiversity in simplified pastoral ecosystems, clarifying mechanisms of intra-specific niche segregation in the ryegrass pest L. bonariensis. This may represent a key ecological aspect promoting the success of the pest, and should be taken into account for effective integrated pest management strategies.

Tomasetto F [1] , Calizza E [2] , Goldson S [1,3] , Olaniyan O [3] , Careddu G [2] , Fedele A [2] , Marro A [2] , Costantini L [2] , Rossi L [2]
[1] Agresearch Ltd., Lincoln Canterbury, New Zealand
[2] Department of Environmental Biology, Sapienza University of Rome, Rome, Italy
[3] Bio-Protection Research Centre, Lincoln University, Lincoln, New Zealand

Functional biodiversity in New Zealand pasture: studying a ryegrass pest via stable isotopes analysis

Simon Torok

Biography

SYMPOSIUM: Communicating ecology to a broad audience - novel

Simon (https://www.linkedin.com/in/simon-torok-5570782) is Director of Scientell, which provides a range of communication services, including to ESA. He's worked in communication for over 20 years, including at CSIRO, as a climate communicator in England, and as editor of two science magazines.

EcoTAS abstract

There are challenges associated with effectively communicating the science and impacts of environmental research, such as ecology and climate change. These subjects are complex, controversial and often hotly debated.

The communication of information to support decision-makers has the added difficulty associated with using and translating research into appropriate responses or action.

Rapidly changing media platforms have created new opportunities and challenges for communicating science. Traditional science communication assumed a deficit model and bestowed privilege on the expert knowledge of the scientist. More recently, science communication has attempted to address the needs of stakeholders through strategic planning and formal processes that enable more inclusion and dialogue between scientists and the community. The changing approach is driven in large part by legitimate demands from society for increased accountability and transparency.

By incorporating communication theory into practical communication activities, drawing on techniques that work well, and monitoring and evaluating science communication activities we have a better chance of communicating our ideas and approaches

Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Wattagan Room
Oral presentation

Torok S [1] , Holper P [1]
[1] Scientell Pty Ltd, Hughesdale VIC, Australia

Communicating contested science

science in ways that achieve change.

Samantha Travers

Biography

Samantha is a post-doc at the University of New South Wales, but undertook this work as an independent ecological consultant for OEH. She has an interest in processe that impact ecosystem function across a diverse range of ecosystems.

EcoTAS abstract

Standard protocols for assessing habitat quality often include counts of trees with hollows. Although hollows are utilized by a range of fauna, the rate at which hollows develop in trees varies greatly with tree species and environmental variables. As such, the presence of hollows may not necessarily indicate large mature trees. Observing hollows in the field can also be costly or destructive and is fraught with observer biases. Rather than relying on hollow occurrence data alone to define habitat quality, our aim was to determine at what size a tree is large enough to support the potential to develop hollows (i.e. a 50 % chance of developing any size hollow) to assist with revising protocols for assessing habitat quality in NSW. We used a meta-analysis to synthesize how the probability of hollows occurring increases with tree diameter at breast height (DBH), our measure of tree size. We collected data from 18 published sources for 69 tree species found in NSW. We developed a hierarchical Linear Mixed Model (LMM) that used the probability of hollows occurring for given hollow diameters, to model DBH for all species simultaneously.

Open session (2)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Bimbadeen Room
Speed Talk
Travers S [1] , Dorrough J [2] , Somerville M [2] , Oliver I [2] , Watson C [2] , McNellie M [2]
[1] University of New South Wales, Sydney NSW, Australia
[2] Office of Environment and Heritage, NSW, Australia
An alternate approach to defining large trees: using tree size and probability of hollow occurrence

From this model we predicted the DBH for all species at the same hollow size and probability of hollow occurrence and plotted these data to assist with selecting benchmarks for large tree DBH at a vegetation formation and class scale. This work ultimately lends itself to providing more efficient, cost effective field-based methods for defining large trees for biodiversity assessment, habitat quality and conservation.

Elizabeth Trevenen

Biography

I am interested in macroecology, resilience, community ecology and plant physiology and anatomy.

EcoTAS abstract

Plant Soil Feedbacks (PSFs) are plant-induced changes to the abiotic/biotic conditions of the soil that positively or negatively impact plant growth. The magnitude and direction (positive or negative) of this impact on plant growth is likely to depend on the species involved. In plant communities, such feedbacks create complex interaction networks that have been shown to play a key role in promoting and maintaining high levels of diversity within plant communities.
There is mounting evidence that diversity loss leads to reduced resilience, which can be defined as an ecosystem's ability to recover following disturbance, or its ability to resist its effects completely. As they can promote diversity, PSFs may also positively influence the resilience of a community, but to our knowledge this relationship has never directly been empirically or theoretically explored.

Ecological Modelling (Plants)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Sugarloaf Room
Oral presentation
Trevenen E [1] , Renton M [1] , Mucina L [1,2]
[1] School of Biological Sciences, University of Western Australia , Crawley WA, Australia
[2] Department of Geography & Environmental Studies, Stellenbosch University, Stellenbosch, South Africa
Simulating the effect of plant soil feedbacks on the resilience of plant communities

Therefore, we explored the effects of different PSF interaction networks on community resilience across several disturbance regimes, using a spatially-explicit stochastic cellular automata simulation model. The PSF interaction networks were hypothetical model systems, each consisting of 100 species, but designed to highlight different feedback types – including different combinations of positive and negative conspecific and heterospecific interactions, as well as equivalent systems with no interactions. We found that plant-soil feedback scenarios could influence the resilience of a community undergoing disturbance, and that particular interaction networks prove more resilient than others.

This research is supported by ARC grant LP150100339

Raphael Trouve

Biography

I am a research fellow at Melbourne University interested in forest dynamics, how it is affected by environmental drivers and how forest management can help adapt our forests to current and future challenges

EcoTAS abstract

Increased temperature and drought intensity have affected forest mortality rates worldwide. We hypothesized that a reduction in the level of water resources available will reduce the maximum stocking that forests can sustain, with major consequences on carbon stock and forest management.

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Trouve R [1] , Nitschke C [1] , Robinson A [2] , Baker P [1]

[1] School of Ecosystem and Forest Sciences, University of Melbourne, Richmond VIC, Australia

[2] CEBRA & School of Mathematics and Statistics, University of Melbourne, Parkville VIC, Australia

We developed a simple method linking mortality rates to maximum carrying capacity and used it to quantify how climatic drivers of mortality integrate to change the dynamic equilibrium between stand growth and mortality that defines the self-thinning line. The method was applied to data from a large network of permanent sample plots of Eucalyptus regnans during the 1960-2000 period.

The late 20th Century saw an increase in temperature and drought conditions in southeastern Australia. This has led to increased mortality rates—particularly for well-stocked stands—as the lower levels of available water have reduced the maximum stocking a stand can support. We discuss our results in the context of climate change and potential impacts on future carrying capacity of forests.

Quantifying climate-induced changes to maximum carrying capacity during last century: the role of mortality

Mirela G. Tulbure

Biography

Mirela is a geospatial scientist, working at the interface of landscape ecology and water dynamics. She is a senior lecturer with the University of New South Wales, where in 2012 she built the Geospatial Analysis for Environmental Change Lab (www.mirela-tulbure.com).

EcoTAS abstract

Land use (LU) change and hydroclimatic variability affect spatiotemporal landscape connectivity dynamics, important for species movement and dispersal. Despite the fact that LU change can strongly influence dispersal potential over time, prior research has only focused on the impacts of dynamic changes in the distribution of potential habitats.

SYMPOSIUM: Putting ecology to work at the land development frontier

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Sugarloaf Room

Oral presentation

Tulbure M [1] , Bishop-Taylor R [1] , Broich M [1]

[1] University of New South Wales, Sydney NSW, Australia

The impact of land use change and hydroclimatic variability on landscape connectivity dynamics

We used 8 time-steps of historical LU together with a Landsat–derived time-series of surface water habitat dynamics (1986-2011) over the Murray-Darling Basin (MDB), a region with extreme hydroclimatic variability, impacted by LU changes.

To assess how changing LU and hydroclimatic variability affect landscape connectivity across time, we compared 4 scenarios, namely one where both climate and LU are dynamic over time, one where climate is kept steady (i.e. a median surface water extent layer), and two scenarios where LU is kept steady (i.e. resistance values associated with the most recent or the first LU layer). We used circuit theory to assign landscape features with ‘resistance’ costs and graph theory network analysis, with surface water habitats as ‘nodes’ connected by dispersal paths or ‘edges’.

Findings comparing a dry and an average season show high differences in number of nodes (14581 vs 21544) and resistance distances. The combined effect of LU change and landscape wetness was lower than expected, likely a function of the large, MDB-wide, aggregation scale. Spatially explicit analyses are expected to identify areas where the synergistic effect of LU change and landscape wetness greatly reduce or increase landscape connectivity, as well as areas where the two effects cancel each other out.

Ayesha Tulloch

Biography

SYMPOSIUM: Communicating ecology to a broad audience - novel

Ayesha is a conservation ecologist who focuses on improving monitoring and evaluation of threatened communities and ecosystems. She works with conservation agencies including the Wildlife Conservation Society and Bush Heritage Australia to ensure conservation management is informed by good ecology.

EcoTAS abstract

We have lost many animals from our push to change the world, and could lose many more if we do not better manage land. For one in six animals, we do not understand enough about where they live and how many are left to decide whether they will disappear or are safe. This understanding is needed so people know which animals and where to manage, and to decide how much we need to spend on saving them. We pulled together all approaches that people have used to search for the 493 small and large animals that have live young from around the world. We worked out the best approaches to search for each animal, and how much money we would need to find each animal and learn more about where it lives. Understanding how much space animals have left will help us tell people how safe animals are from disappearing. We found that we need to pay $7,220,000 to $18,630,000 to find all 493 animals, but could search for 144 for $1,000,000.
In a “scientific” nutshell: We collated the first database of different methodologies to survey mammals, along with costs and likely effectiveness. We used it to estimate the cost of the most effective survey methods for detecting each IUCN Red-Listed Data Deficient mammal. To strategically allocate funds to data collection and IUCN assessments of threat status, we ranked mammals by survey costs and determined the number and identity of species that could be surveyed and reassessed for different budgets.

ideas and approaches

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Tulloch A [1] , Stewart C [1] , Bland L [2,3] , Watson J [1]

[1] Centre for Biodiversity and Conservation Science, University of Queensland, Brisbane Queensland, Australia

[2] Centre for Excellence in Environmental Decisions, University of Melbourne, Melbourne Victoria, Australia

[3] Deakin University, Melbourne Victoria, Australia

How much must we spend on finding 493 disappearing (Data Deficient) animals to save them?

EcoTAS abstract

Mitigating the impacts of global anthropogenic change on species is conservation's greatest challenge. We need to make good predictions of the likely outcomes of alternative management actions to avoid possible perverse outcomes of threat management due to variable impacts of threats on species and interactions between threats and species. However, forecasting the effects of actions to mitigate threats is hampered by incomplete information on species responses; most attempts to predict management outcomes lack data on expected responses for the whole community. We developed an approach to predict community restructuring and recovery under threat management, which combines models of responses to threats with network analyses of species co-occurrence. We discovered that contributions by bird species to network co-occurrence in the threatened Grassy Box Woodlands predicted their recovery under reduction of independent or combined threatening processes (livestock grazing, tree cover loss and competitive exclusion by the noisy miner). Importantly, we showed that information from a few species on co-occurrence and expected responses to alternative threat management actions can be used to train a response model for an entire community. After 5 years of management, we used monitoring data on changes in site occupancy by different species to validate our predictions and, in doing so, demonstrated positive feedbacks in occurrence and co-occurrence resulting from shared threat management responses during ecosystem recovery

Biography

Ayesha is a conservation ecologist who focuses on improving monitoring and evaluation of threatened communities and ecosystems. She works with conservation agencies including the Wildlife Conservation Society and

THE NEED FOR SPEED: Featured Speed Talks

Wednesday, November 29, 2017

2:45 PM - 3:20 PM

The Convention Centre

Speed Talk

Tulloch A [1]

[1] Centre for Biodiversity and Conservation Science, University of QLD

Featured Speed Talk: How to avoid perverse outcomes of threat management when restoring communities

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Bush Heritage Australia to ensure conservation management is informed by good ecology.

EcoTAS abstract

Changed fire regimes lead to declines of fire-regime-adapted communities, biotic homogenisation, and ecosystem degradation. Accurately measuring ecosystem degradation in disturbed landscapes is challenging because an ecosystem could be in multiple states that might worsen or improve depending on disturbances. We demonstrate two methods of assessing ecosystem degradation by measuring divergence from benchmark conditions resulting from fire disturbance. Our case study is the south-western Australian proteaceous mallee-heathland, which does not warrant threatened status under IUCN Red List criterion A due to <50% loss of extent since 1750. Our first assessment method uses matrix population models to predict population growth of ecosystem-provisioning species (obligate-seeding Banksia) under 100 years of alternative fire regimes and growing conditions. Under current regimes and poor rainfall, 85% of Banksias are predicted to be lost from poorly-connected patches (20% of remnant vegetation), and 70% could be lost from highly-connected patches that make up the remaining 80% of vegetation. The combination of >80% extent with >50% severity of degradation (loss of species with key roles for ecosystem funtion) suggests classification as Endangered (criterion D2). Our second method quantifies the summed shortfall of vegetation age-class frequencies relative to a reference age-class distribution of time-since-last-disturbance, and indicates that 37-61% of remaining extent diverges from ideal baseline conditions. This suggests classification as Vulnerable (criterion D1), although lack of historical data on fire intensity makes it difficult to accurately assess degradation severity. Improved

Brokenback Room

Oral presentation

Tulloch A [1,2] , McDonald J [1] , Sanders A [3] , Chadès I [4] , Gosper C [5] , Possingham H [6]

[1] Centre for Biodiversity and Conservation Science, University Of Queensland, Brisbane Qld, Australia

[2] Desert Ecology Research Group, University of Sydney, Camperdown New South Wales, Australia

[3] Bush Heritage Australia, Albany Western Australia, 6330

[4] CSIRO, Ecoscience Precinct, Dutton Park Queensland, Australia

[5] Science & Conservation Division, Department of Parks & Wildlife, and CSIRO Land and Water, Bentley Western Australia, 6983

[6] The Nature Conservancy, Brisbane Queensland, Australia

Accurately measuring degradation due to change fire regimes to inform IUCN Red-Listing and ecosystem recovery

assessment of ecosystem degradation resulting from disturbances is crucial to accurately evaluate change, assess ecosystem risks, and direct recovery actions.

Perpetua Turner

Biography

Perpetua is a terrestrial ecologist with 20 years experience, with strong interests in conservation and biodiversity of forested ecosystems. She is also a bryologist and has a keen interest in quantitative techniques for ecological data. @perpetuaturner peptalkecology.wordpress.com

EcoTAS abstract

The Tasmanian Threatened Species Protection Act 1995 Rare listed keeled snail (Tasmaphena lamproides) occurs only in far north-western Tasmania and southern Victoria. Initial surveys for the species and information on species biology contributed to a management plan for keeled snail in Tasmania's public production forests, where it predominantly resides. The management plan identified four key management strategies aimed at limiting the conversion of potential habitat for the species (wet forest and rainforest) and managing the age structure and distribution of habitat. This study examines the degree to which the management strategies have been implemented (using GIS spatial analyses), and have been effective in maintaining viable breeding populations of the species across its range. Management effectiveness was assessed by surveying 28 sites for keeled snails in 1992 and 2013, with an additional 31 new sites surveyed in 2016. The data suggests that there has been an overall decrease in the abundance of keeled snails across their range. However,

SYMPOSIUM: Effectiveness monitoring (Part 1)

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Turner P [1] , Bonham K [3] , Yee M [2] , Koch A [1]

[1] Forest Practices Authority , Cambridge TAS, Australia

[2] Sustainable Timber Tasmania, Hobart Tasmania, Australia

[3] University of Tasmania, Hobart Tasmania, Australia

How effective are management strategies for the rare Keeled snail?

this decrease is less than predicted by previous population viability analysis modelling investigating impacts of logging. Effective management was evident where keeled snails were confidently and consistently found in older logging regeneration and mature forest. Unexpectedly, in similar numbers to mature forest keeled snail were also present in young plantation and 20-39-year-old logging regeneration, albeit with larger variance than that of mature forest. Modelling of species data will be presented and the conclusion that management to date has been effective will be discussed.

Gerry Turpin

SYMPOSIUM: Indigenous Ecological Knowledge
Monday, November 27, 2017
11:00 AM - 1:00 PM
Sugarloaf Room
Convene a Symposium
Turpin G
ESA Indigenous Symposium

Melissa Van De Wetering

Biography

Melissa Van De Wetering, second year PhD student, Insect Ecology lab at La Trobe University. Studying ants in Australia's seasonal tropics, quantifying their roles in ecological functions, including ant-mediated plant defence,

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 2)
Monday, November 27, 2017
3:45 PM - 5:45 PM
Brokenback Room

carrion decomposition, food resource usage and seed predation.

EcoTAS abstract

Ant-mediated plant defence is a common and widespread phenomenon, wherein plants offer rewards to attract ant defenders in exchange for protection against natural enemies. Facultative mutualisms between ants and plants bearing extrafloral nectaries (EFN's) can structure invertebrate communities and moderate processes such as herbivory. These mutualistic interactions are highly variable, with outcomes depending on the identity and characteristics of the species involved. Australian ant assemblages commonly contain ecologically dominant species that, through their numerical and behavioural dominance, contribute disproportionately to functions such as plant defence. However, the influences of dominant ants on facultative plant mutualisms are poorly understood. We used paired plots to investigate the effect of large-scale dominant ant suppression on ant-mediated plant defence. We tested herbivory and invertebrate community composition on Acacia umbellata seedlings at two sites with varying ant diversity and abundance. We predicted that ant suppression would increase leaf area loss and alter the structure of the invertebrate community. Dominant ant suppression varied in its effect between sites. Subsequently, herbivory was influenced by differences in ant assemblages and by leaf age, with younger leaves most likely to have a higher area of leaf loss when dominant ants were absent. Ant suppression also had variable effects on the composition of predatory and herbivorous invertebrates and is subject to further investigation. Our results highlight the complexity of facultative ant-plant mutualisms and the potential for ecological consequences in response to changes in

Oral presentation

Van De Wetering M [1]

[1] La Trobe University, Melbourne VIC, Australia

Variable effects of dominant ant suppression on an EFN-mediated, facultative ant-plant mutualism.

community composition.

Eddie Van Etten

Biography

Eddie is a plant community ecologist working in various ecosystems of Western Australia, including eucalypt forests, arid shrublands and Banksia woodlands. His interests span fire ecology, invasive species and restoration ecology.

EcoTAS abstract

The spread and proliferation of exotic species in native ecosystems depends on the emergence of new interactions with existing local species, both mutualistic (e.g. with mycorrhiza or pollinators) and antagonistic (e.g. with herbivores or pathogens). Taxonomic relatedness between the new species and the native community is known to be increase the likelihood of successful invasion, and here we compare invasion patterns of three widely planted species from plantations into adjacent bushland across several sites of southwest Australia: Pinus pinaster (native to Mediterranean Europe); Pinus radiata (native to California); and Eucalyptus globulus (native to Tasmania/Victoria, and the most closely related to the dominant species of much of the bushland). Contrary to expectations, Pinus spp. were much more likely to invade into adjacent areas of bushland than E. globulus, with all species showing typical ‘edge’ recruitment curves of higher plant density with distance from edge of plantation. Degree of invasiveness was also related to vegetation type, with jarrah-marri forest

Invasion Ecology

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Cypress #2

Speed Talk

Van Etten E [1] , Calviño Cancela M [2]

[1] Edith Cowan University, Joondalup WA, Australia

[2] University of Vigo, Vigo, Spain

Patterns of invasion of pines and bluegums into forests and woodlands of southwest Australia

experiencing far greater invasion of P. radiata than karri forest, and damplands (Melaleuca spp.) having much higher P. pinaster densities compared to Banksia woodlands and Eucalyptus-Banksia woodland/forest. Reasons for these differences will be explored, particularly in the context of the differential integration of these exotic species into native ecosystems across the globe.

Rebecca Vandegeer

Biography

Rebecca Vandegeer has recently joined the Hawkesbury Institute for the Environment at Western Sydney University as a postdoctoral research fellow in plant-herbivore interactions. Her role will investigate how grasses supplemented with silicon respond chemically and physiologically to herbivore attack and drought.

EcoTAS abstract

The antioxidants ascorbate and glutathione play an important role in regulating potentially harmful reactive oxygen species produced during plant-virus interactions, although their role during infection of plants with variable susceptibility is not well understood. In addition, environmental conditions such as elevated atmospheric CO2 (eCO2) under climate change may influence antioxidant responses during infection. Barley yellow dwarf virus (BYDV) is a widespread pathogen of cereal crops that is transmitted by phloem-feeding aphids and significantly reduces yields and quality. Symptom expression and the role of ascorbate and glutathione were investigated after infection of wheat cultivars (Triticum aestivum L.) with

Agro Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #2
Oral presentation

Vandegeer R [1,2,3] , Powell K [1] , Tausz M [2,4]

[1] Agriculture Victoria, Department of Economic Development, Jobs, Transport and Resources, AgriBio, Bundoora VIC, Australia
[2] Faculty of Veterinary and Agricultural Sciences, The University of Melbourne, Creswick VIC, Australia
[3] Hawkesbury Institute for the Environment, Western Sydney University, Richmond NSW, Australia
[4] School of Ecosystem and Forest Sciences, Faculty of Science, The University of Melbourne, Crewsick VIC, Australia

BYDV, and in response to eCO2. A resistant cultivar, containing the Bdv2 gene that suppresses virus replication, was compared to a susceptible cultivar. The susceptible cultivar expressed greater disease severity (yellowing leaf symptoms), decreased leaf chlorophyll content, and decreased root to shoot ratio, which did not occur after infection of the resistant cultivar. The response of these parameters are likely to depend on putative differences in virus titre between cultivars. In contrast, both cultivars had decreased biomass, total ascorbate and an increase in the oxidised fraction of ascorbate after infection, suggesting that such parameters indicate infection, regardless of virus titre and yellowing symptoms. eCO2 was associated with an increase in disease severity of the susceptible cultivar, but left it unchanged in the resistant cultivar, and had few effects on antioxidants. Knowledge about the response of antioxidants to biotic stress and environmental change may assist with the selection of varieties with greater stress tolerance.

Virus infection alters the antioxidant defence capacity of wheat, independent of resistance and visual symptoms

Susanna Venn

Biography

I’m a plant ecologist with a keen interest in the processes that shape vegetation patterns in alpine areas. Right now, I'm working on alpine shrub encroachment dynamics, long-term vegetation change, alpine treeline dynamics and freezing resistance of alpine plants.

EcoTAS abstract

In Australian alpine areas dominated by grasses and forbs, woody shrubs are increasing in abundance and

SYMPOSIUM: Vulnerability and resilience of grasslands in Oceania to climate change

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Brokenback Room

Speed Talk

Venn S [1]

[1] Australian National University, Northcote VIC, Australia

Is facilitation the underlying mechanism of shrub encroachment in

encroaching into previously shrub-free areas. These increases match a trend spanning four decades of rising temperatures and declining snowpack. While adult shrubs produce loads of leaf litter, potentially preventing seedling establishment within their canopy, they also create a snowdrift in their lee, which insulates soils from extreme temperatures and can lead to increases in soil nutrient availability on the leeward side of a shrub.

Could the snowdrift zone be the place where shrub seedlings establish and thrive, thereby promoting further shrub expansion?

To answer this question, I undertook a simple experiment. I transplanted local Grevillea australis seedlings into the leeside snowdrift zone and into the windward side of three different adult shrub species, and I investigated the relationships between adult shrub size, leaf area index and several snow parameters (depth at peak season, snow density and snow-lie duration), on growth and survival of the transplanted Grevillea seedlings. Overall, most Grevillea seedlings grew new leaves in their first year, regardless of position around the adult shrubs. Also, Grevillea seedlings on the leeward side produced proportionally more leaves than those on the windward side. The adult characteristics of the adult shrubs and the snow variables all had marginal effects on Grevillea seedling growth and survival. If shrub seedlings can benefit from the favourable conditions on the leeside of alpine shrubs, facilitative effects such as these may be the underlying mechanisms for future shrub expansions.

alpine areas?

Simon Verdon

Biography

Simon is a PhD student at La Trobe University, researching the effects of fire on the endangered mallee emu-wren

EcoTAS abstract

In fire dominated systems, fire is the main tool for land managers who aim to promote biodiversity. The theory goes that by maintaining a mix of fire age classes, more species will have their preferred fire age available as habitat. Recently, managers have adopted the geometric mean of relative abundance (GMA) to determine the mix of fire ages which most effectively promotes biodiversity. This metric assumes that the effect of fire is uniform within a vegetation type and a region. However, we have found that Triodia scariosa exhibits multiple, contrasting post-fire succession pathways. These different succession pathways are based on small-scale changes in elevation. Many fauna are dependent on Triodia scariosa for habitat in mallee systems. As a result, failing to incorporate multiple succession pathways for Triodia scariosa will undermine the GMA results for the suite of species. In this study, we focussed on the mallee emu-wren which is an endangered, Triodia dependent bird species. We found evidence that the mallee emu-wren also has multiple fire-responses based on elevation, as it tracks the Triodia vegetation on which it depends. The accuracy of GMA outputs may be increased by developing separate fire response curves at different elevations for the mallee emu-wren and other Triodia dependent species. This study highlights the need to understand the mechanisms underlying the fire responses of fauna. GMA will be a more effective management tool if we can avoid lumping multiple fire responses in to a single fire response curve with

Landscape Ecology (1)

Tuesday, November 28, 2017

11:00 AM - 12:30 PM

Cypress #2

Oral presentation

Verdon S [1] , Watson S [1]

[1] La Trobe University, Melbourne VIC, Australia

Saving the mallee emu-wren: What role should burning play?

decreased accuracy.

Sofie Voerman

Biography

PhD student at the ecosystem security group at UTS in Sydney. Her research interest ranges from climate change impacts on marine communities to invasive species ecology.

EcoTAS abstract

Changing environmental conditions are altering the composition of many ecosystems around the world, including those in the marine environment. Species are disappearing following a wide range of disturbances. On the other hand, certain species are increasing in their abundance within their native ranges, and become to dominate communities. Those species are sometimes referred to as native invaders.
Co-occurring with important habitat formers of the Great Southern Reef is the native green macroalga Caulerpa filiformis. This species has spread both within and outside its known historical distribution and is now the dominant macroalga on many rocky reefs in New South Wales. Here we questioned what mechanisms may aid in the current success of this species.
Firstly, we investigated habitat associations of adult populations at multiple spatial scales and found indications for the positive role of sand in its distribution. Surprisingly a low association with turf habitat was found, which is opposite to that observed for several other vegetatively spreading Caulerpa species. We hypothesized that this

Marine and Freshwater Ecology
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation
Voerman S [1,2] , Gladstone W [1] , Glasby T [3] , Gribben P [2]
[1] Uts, SoE, Ultimo NSW, Australia
[2] UNSW, Sydney NSW, Australia
[3] DPI, Port Stephens NSW, Australia
Mechanisms behind the spread of a native macroalga

observation may indicate an end state of succession and that different processes may alter the performance of the recruitment stage. Recruits were observed in high abundance on turf habitat aided by increased structural complexity of the turf algae. A model is presented where sediment disturbance allows for dominance over turf algae.

Sean Walsh

Biography

Sean is a PhD student at the University of Melbourne, researching the interaction of climate, fire and seed banks in natural ecosystems. His background includes mathematical modelling, environmental science, fire behaviour and scientific software development.

EcoTAS abstract

Plant species relying entirely on seed-based reproduction after fire events can persist under suitable fire regimes, which land managers typically describe using acceptable inter-fire intervals. However, this approach fails to account for the number of seeds stored in canopy or soil seed banks, which may become depleted under repeated short-interval fires. It also assumes that seed-based reproductive processes are unaffected by changes in climate.

In this research, a mechanistic stand-level model is presented for estimating local extinction risk for obligate seeder populations, accounting for interactions between fire, climate, seed banks and plant demographics. A key objective is to provide improved decision support tools for managing extinction risks in fire-adapted landscapes under

SYMPOSIUM: Assessing risks to ecosystems - research and applications

Thursday, November 30, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Walsh S [1] , Vesk P [2] , Nitschke C [1]

[1] School of Ecosystem and Forest Sciences, University Of Melbourne, Richmond VIC, Australia

[2] School of Biosciences, University of Melbourne, Parkville VIC, Australia

Seeding under pressure: Modelling the interaction between fire and seed banks in a changing climate.

future climates.

The model includes techniques for estimating annual seed production and loss rates based on a minimum number of parameters. A Weibull distribution is used to generate fires stochastically within each simulation, with convergence typically achieved after 2000 replicate runs. A size-based (rather than age-based) threshold is used for plant reproductive maturity, and competitive mortality is accounted for using a self-thinning rule.

Simulations were conducted for a number of Australian species to determine the likely patterns of local extinction under increasing pressure from altered fire regimes and climate change. Preliminary results indicate that mean and variability in the inter-fire interval are both important in determining extinction risk, and that seed loss processes (including seed predation and progressive loss of viability) generate key constraints on population survival under a variable fire regime.

Justin SH Wan

Biography

Justin is a researcher with interests in the evolutionary consequences and the costs of adaptation to stress (e.g. pesticides and stressful habitats).

EcoTAS abstract

Adaption to extreme environments is predicted to incur fitness costs which limit the ability of stress-tolerant individuals to spread outside of the stressful environment.

Landscape Ecology (2)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #2
Speed Talk
Wan J [1] , Fazlioglu F [2] , Bonser S [1]

[1] University of New South Wales, Sydney Nsw, Australia
[2] University of Ordu, Ordu, Turkey

However, comparison of stress-tolerant and neighbouring non-stress tolerant plants for performance costs often finds low costs. A lower performance under competition may explain why most stress-tolerant genotypes are constrained inside the stressful environments despite having modest costs. In a glasshouse experiment, we compared the performance of stress and non-stress plants of six herbaceous species under competition. Plants from a mine site and from a neighbouring non-mine area were raised from seeds, and grown with a grass competitor species that is present in the area. In addition, plants were grown under intraspecific competition. Stress-tolerant plants had similar performance to non-mine plants when grown alone or under competition. In two of six species, the performance of mine plants was higher than that of non-mine plants across competition treatments. Intraspecific competition had overall inconsistent effects across species. Taken together with the results from a companion study, these findings suggest that costs are very low or absent, and that stress-tolerant genes may have spread outside of the mine site. Adaptation to extreme stress does not necessarily reduce competitive ability or performance, nor is stress-tolerance necessarily limited to the area of extreme stress.

Is loss of competitive ability a cost of adaptation to extreme and stressful environments?

Grant Wardell-Johnson

Biography

Grant Wardell Johnson leads the Environment program in the Deptartment of Environment and Agriculture, Curtin University and is a forest ecologist with interest in refugia.

Landscape Ecology (1)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Cypress #2
Oral presentation

He is Director of ACEDD and Deputy Director of the ARC Centre for Mine Site Restoration

EcoTAS abstract

The South West Australian Floristic Region (SWAFR) includes Earth's oldest and most stable surfaces, and harbours a rich and endemic flora. From its western boundary, a series of banded ironstone formation ranges (BIFs) extend inland for over 750 km. These small, ancient ranges are floristically distinct from the surroundings. Many, including the Helena-Aurora (HAR) BIF Range harbour unique floristic assemblages and numerous rare and endemic plant taxa. Digital elevation models, interpolated from very high resolution (c. 1 m) airborne LiDAR acquisitions, have enabled fine-scale modelling of this environment. How has micro-topographic complexity contributed to refugial capacity, and what is the nature of refuges for plants of this region? We derived a spatially explicit distribution of plant species richness and endemism, and 18 rare species in relation to micro-topographic variation across the 1736 km2 region. Micro-topographic heterogeneity had stronger influence on richness and endemism than solar radiation intensity or topographic wetness. However, this influence was spatially variable at metre scales across HAR hillslopes, suggesting effects of warming will not manifest uniformly across the region. Elevation, slope and solar radiation were the main contributors in the 18 derived species distribution models. Very rare species were restricted to ridgelines and summits - the rarest habitat in the BIF ranges. Species of lower conservation significance were more widespread across mid and low-elevation hillslopes and plains. These findings demonstrate the extraordinary evolutionary significance and conservation importance of micro-topographic variation in ancient landscapes. They also suggest the importance of

Wardell-johnson G [1,4] , Robinson T [2,4] , di Virgilio G [3] , Nevil P [1,4]
[1] Department of Environment and Agriculture, Curtin University, Perth WA, Australia
[2] Department of Spatial Sciences, Curtin University, Perth WA, Australia
[3] Climate Change Research Centre, School of Biological Earth and Environmental Sciences, University of New South Wales, Sydney, Australia
[4] ARC Centre for Mine Site Restoration, Curtin University, Perth WA, Australia

Topographic refuges and patterns of rarity in the subdued landscapes of south-western Australia's Helena-Aurora Range

re-integration of topographic complexity in mine-site restoration.

Glenda Wardle

Biography

Glenda Wardle is a Professor of Ecology and Evolution at the University of Sydney and Chair of the Ecosystem Science Council. Glenda studies the dynamics of populations, species and ecological interactions to improve conservation and management of ecosystems, particularly deserts.

EcoTAS abstract

Necessity is the mother of invention. The current necessity is to understand ecosystem change, to forecast possible futures, and to plan management interventions. Biodiversity is organised into ecosystems that are the basis of the natural capital that provides clean air, water, food, and raw materials to sustain all life on earth. Here we outline five steps to create the next generation ecosystem monitoring and forecasting capability for Australia.

1. Awareness of importance of natural capital to wellbeing.
2. Trusted ecosystem monitoring data
3. Good governance, enduring capability
4. Appropriate resourcing
5. Support for research that underpins ecosystem forecasting

The invention needed is a cohesive and enduring body with a ‘paddock-to-plate’ oversight of environmental

SYMPOSIUM: Enabling Ecosystem Surveillance Monitoring across Australia – putting ecology to work
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Sugarloaf Room
Oral presentation

Wardle G [1]

[1] The University Of Sydney, Sydney NSW, Australia
[2] Ecosystem Science Council

EMMA: Next generation ecosystem monitoring and forecasting for Australia

management. We propose an Ecosystem Monitoring and Management Agency (EMMA), similar to the Bureau of Meteorology is formed with legislation that ensures that data collection and analysis is coordinated, and secured into the future. Moving beyond the short-term churn of programs and policies to a mature ecosystem forecasting capability would create secure and highly desirable environmental jobs to undertake monitoring, analysis and management actions. Achieving this goal would address industry, government and social requirements for sustainable use of natural capital. A reasonable estimate for maintaining any asset would be around 1% of its value, which for natural capital is around $60 Billion per annum).

Finally, to build the future we want, improve risk analysis, and meet its international obligations, Australia needs to embed the science of ecosystem forecasting in a social and economic framework.

Kate Watermeyer

Biography

Lucie holds a BA(Hons) in Biological Sciences from the University of Oxford and a PhD from Imperial College London. She focuses on assessing risks to biodiversity with the IUCN Red List of Threatened Species and IUCN Red List of Ecosystems.

EcoTAS abstract

Assessing risks to marine ecosystems is critical due to their biological and economic importance, and many have recently undergone regime shifts due to overfishing and environmental forcing. Yet defining collapsed ecosystem

SYMPOSIUM: Assessing risks to ecosystems - research and applications
Thursday, November 30, 2017
11:00 AM - 1:00 PM
Brokenback Room
Oral presentation

states, selecting informative indicators and reconstructing long-term marine ecosystem changes remains challenging. We applied the IUCN Red List of Ecosystems criteria to quantify the risk of collapse of the southern Benguela, a productive and dynamic upwelling ecosystem located off the coast of South Africa. We used an analogous but collapsed ecosystem – the northern Benguela – to inform a general definition of collapse for the southern Benguela, and derived collapse thresholds in indicators with 4-point expert elicitation. We used survey- and catch-based indicators, environmental indicators and ecosystem models to capture complex ecosystem dynamics and reconstruct historical ecosystem states. We used three model parametrizations to account for uncertainties in historical ecosystem models. We hind-casted the status of the ecosystem in 1960 to Endangered (Endangered-Critically Endangered), and assessed the ecosystem in 2015 as Vulnerable (Vulnerable-Endangered), with assessment outcomes robust to different ecosystem model parametrizations. The ecosystem suffered from large declines in seabird populations since the 1900s, but many indicators exhibited recovery trends over the last 50 years. We show that risk assessments can effectively synthesize information from indicators, ecosystem models and experts to inform the management of marine ecosystems. Our case study provides a template for assessing risks to marine ecosystems and for further application of ecosystem models in Red Listing around the world.

Bland L [1,2] , Watermeyer K [1,3] , Keith D [4] , Nicholson E [1] , Regan T [5] , Shannon L [3]
[1] Deakin University, Burwood Victoria, Australia
[2] University of Melbourne, Parkville Victoria, Australia
[3] University of Cape Town, Cape Town, South Africa
[4] University of New South Wales, Kensington New South Wales, Australia
[5] The Arthur Rylah Institute for Environmental Research, Heidelberg Victoria, Australia

Assessing risks to marine ecosystems with indicators, ecosystem models and experts

David Watson

Biography

SYMPOSIUM: Enabling Ecosystem Surveillance Monitoring across Australia – putting ecology to work

Dave Watson's current research interests fall into four broad areas: the biological consequences of habitat fragmentation, ecological interactions between plants and animals with an emphasis on parasitic plants, biodiversity conservation in agricultural landscapes, and biodiversity survey methods.

EcoTAS abstract

Ecoacoustics is an emerging discipline combining community ecology with bioacoustics, generating high resolution recordings of entire ecosystems that can be readily shared, analyzed and archived for future comparisons. Here, we introduce the Australian Acoustic Observatory (A2O)—a continental scale array of 400 permanent acoustic sensors generating petabytes of data. As well as showcasing the hardware and deployment rationale, we discuss data properties and analytical approaches, and explore some of the potential applications and emergent visualizations. Emulating observatories used in astronomy, all data collected via this sensor network are open access, stored on cloud-based servers and available to anyone with access to the internet. In addition to generating a complementary stream of data for large-scale ecological comparisons and long-term monitoring and reporting across Australian terrestrial ecosystems, this world-first infrastructure affords new opportunities to engage the wider community with science. Three case studies (from woodlands in inland Australia, wetlands in Northern Australia and subtropical forest remnants) will illustrate the variety of questions that are being addressed with ecoacoustic data, including species-specific call recognition, before-after comparisons to quantify community change, and whole-of-ecosystem visualization using false-colour spectrograms.

Thursday, November 30, 2017
11:00 AM - 1:00 PM
Sugarloaf Room
Oral presentation

Watson D [1] , Schwarzkopf L [2] , Fuller R [3] , McDonald P [4] , Roe P [5]
[1] Charles Sturt University, Albury NSW, Australia
[2] James Cook University, Townsville QLD, Australia
[3] University of Queensland, Brisbane QLD, Australia
[4] University of New England, Armidale NSW, Australia
[5] Queensland University of Technology, Brisbane QLD, Australia

Establishing a national acoustic observatory—listening in to Nature at the continental scale

Georgia Watson

Biography

Georgia Watson has recently completed her Bachelor of Science, Honours, with a major in biological science. Her research career has begun with projects focused on disturbance ecology, forest demography and threatened species conservation.

EcoTAS abstract

Prescribed burning is used to protect industrial timber stocks, meaning logging and burning are frequent, concurrently applied management strategies. This disturbance regime can push plant populations beyond what they are adapted to, resulting in unnatural demographics. This study examined the effect of low intensity prescribed burning frequency and one logging event on the recruitment, growth and mortality of eucalypts within forests of South-Eastern Australia. The Eden Burning Study is a long-term forestry experiment established in 1985 and spanning 31 years. Individual trees within treatment coupes of varying fire frequencies and with logging present or absent were re-surveyed 29 years after logging. We measured tree stem size to determine relative growth rates and senescence ratings gauged mortality across sites. New recruits were counted in subplots. Mortality of eucalypts increased in larger diameter trees and in frequently burnt areas, but only on logged sites. Relative growth rates were unaffected by fire frequency; however trees in logged sites had a greater growth rate compared to unlogged sites. The effect of fire frequency on recruitment was dependent on logging, with the greatest number of recruits on frequently burnt, logged sites. This

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017

11:00 AM - 1:00 PM

Wattagan Room

Oral presentation

Watson G [1] , Collins L [2] , French K [1]

[1] University Of Wollongong, Wollongong NSW, Australia

[2] La Trobe University, Melbourne Vic, Australia

Disturbance and demography: Fire and logging alters tree recruitment, growth and mortality

long-term study has operational relevance to management practices with far-reaching application, as frequent prescribed burning has the capacity to alter forest demography through increased recruitment and mortality in logged forest.

Maggie Watson

Biography

Maggie Watson is a parasitologist interested in symbioses especially in birds and lizards, and now, apparently, crayfish!

EcoTAS abstract

The survival of Australian freshwater crayfish, especially /Euastacus/, spiny crayfish, is under increasing threat due to land clearing, water pollution and climate change. Australian crayfish are host to specialised Temnocephala ectosymbiotic flatworms, and very little is known about the role they play in maintaining the health of their host. There is some anecdotal evidence that these flatworms are very sensitive to water quality. In order to disentangle the relationship between crayfish and their temnocephalan symbionts, we examined the haemolymph of the Common Yabby /Cherax destructor/, the Murray Crayfish /E. armatus/ and the New Hairy Crayfish /E. neohirsutus/. Here we discuss the usefulness of these techniques and the evidence supporting the existence of a parasitic to mutualistic continuum in Temnocephala-crayfish interactions. We propose the use of the temnocephalan-crayfish as a model across fisheries biology to advance our understanding of how environmental change will influence

Open session (4)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Oral presentation
Watson M [1] , Leung T [2]
[1] Charles Sturt University, Albury NSW, Australia
[2] University of New England, Armidale NSW, Australia
A complicated symbiosis: understanding the parasitic-mutualistic continuum between Temnocephala and crayfish

the ecological outcomes of symbiotic relationships.

Patricia Werner

Biography

Population ecologist. Experimental field ecologist in disturbed habitats. Currently honorary professor, Fenner School of Environment and Society, ANU. Former positions: CSIRO, Darwin, NT; National Science Foundation (USA); professor at Michigan State University (USA) and professor at University of Florida (USA).

EcoTAS abstract

Three decades of field data on the effects of fire on individual eucalypt trees of the humid wooded savanna in north-central Australia are integrated into a stage-based matrix population model. The model explicitly considers how fire season and understory influence parameters of growth, survival, and recruitment for eight different life-history stages. We investigated both the long-term population growth rates (λ) and transient population dynamics under 10 different scenarios of fire seasons and fire frequencies, each using deterministic and stochastic simulations of timing of fires. For stochastic fires, we also developed an estimate of probability of persistence (POP). A 21-year history of fires in Kakadu National Park provided a unique opportunity to test model predictions against field populations.
We found that fire is necessary for long-term persistence, but most populations could not survive under annual burning. Deterministic timing of fires tended to yield lower population growth rates than stochastic timing, even under

Disturbance Ecology (Fire)
Tuesday, November 28, 2017
4:00 PM - 6:00 PM
Cypress #3
Oral presentation
Werner P [1] , Peacock S [2,3]
[1] Australia National University, Canberra ACT, Australia
[2] University of Toronto, Toronto ONT, Canada
[3] University of Calgary, Calgary ALB, Canada
Savanna canopy trees under fire: Stage-based matrix population model, transient dynamics, and long-term persistence

the same average fire frequency. Long-term growth rates (□) were highly dependent on fire regime and understory (as was POP, ranging from 0.061 to 0.915), and were insensitive to changes in recruitment and seedling survival. Changes in population stage distribution over time also depended on fire regime, with implications for savanna physiognomy.
This study is a novel and integrative contribution to our understanding of fire in savanna biomes that can inform management regarding long-term viability of savanna canopy tree populations. The model is relatively simple, generalizable, and adaptable to further investigate the population dynamics of savanna trees under fire.

Carol West

Biography

Carol West is an Honorary Research Associate with the Department of Conservation based in Wellington, New Zealand. She has recently retired from her role as Director of the Terrestrial Ecosystems Unit in the Science and Policy Group of DOC's National Office. In her roles as a scientist and team leader within DOC over the past 25 years, she has conducted or facilitated research to understand what management interventions might be necessary to conserve Aotearoa/New Zealand's natural and historic heritage. Her research has focussed on plant ecology, primarily forest dynamics, island ecology, and the impacts of invasive plants. She has undertaken research throughout the NZ archipelago from subtropical Raoul Island to subantarctic Campbell Island, providing advice to managers not only in New Zealand but also in Australia (Lord Howe Island) and

KEYNOTE PRESENTATION: Dr Carol West
Monday, November 27, 2017
2:00 PM - 2:45 PM
The Convention Centre
Keynote
West C [1]
[1] Department of Conservation, Wellington, New Zealand
Putting ecology to work: improving biodiversity outcomes in the Pacific

Japan, where she was based in 2004–2005 as Visiting Professor in the Centre for Research on Wild Plants, Utsunomiya University. Her knowledge as a plant ecologist has provided fundamental contributions to weed eradication strategy and the classification of naturally uncommon ecosystems, as examples.

EcoTAS abstract

Putting ecology to work: improving biodiversity outcomes in the Pacific
Carol West,
Research underpins achievement of outcomes and is the basis for advice. A solid understanding of ecological principles along with wide experience of ecosystems and keeping abreast of new knowledge enables general provision of advice.
Underpinning the revegetation of Tiritiri Matangi and subsequent reintroduction of numerous native animals, primarily bird species, was research on the potential for regeneration of native forest on this largely deforested island. Seed rain and native seedling establishment were investigated alongside known successional pathways but a natural pathway that would ultimately result in native forest recovery was not described in NZ at the time. Nonetheless, advice on revegetation could be provided to enable people to enjoy the unique birdsong of Aotearoa/New Zealand and understand just how altered the mainland ecosystems are today.
Native ecosystems often benefit from the removal of invasive plant species but knowing whether an invasive plant species needs management depends on an

understanding of species biology and plant succession. While there will be biodiversity benefits, there are also usually economic and sometimes human health benefits. New Zealand has been at the forefront of practice, public policy, and legislation to manage invasive species, all of which has been based on ecology. I will describe some of that journey as it relates to invasive plant species. Advice and support in the wider Pacific has facilitated weed, rat and mongoose eradication from islands in Japan, weed eradication on Lord Howe Island, and sought to improve protection of coastal wetlands and mudflats in the Yellow Sea region.

Martin Westgate

Biography

Martin Westgate is a Postdoctoral Fellow in ecology and conservation biology at the Fenner School of Environment and Society at the Australian National University. Following a background in quantifying change in biotic assemblages, his research now focusses on the role of synthesis in supporting scientific development and evidence-based ecosystem management

EcoTAS abstract

Modern science produces thousands of peer-reviewed articles every year. How can scientists hope to condense this vast quantity of information into usable evidence for improved policy and management? This question is particularly important for ecologists, given the central role of ecosystem science in helping to manage critical societal needs such as clear air, water, and carbon abatement, and

KEYNOTE PRESENTATION Next Generation Ecologist: Martin Westgate

Thursday, November 30, 2017

1:45 PM - 2:30 PM

The Convention Centre

Award Presentation

Westgate M [1]

[1] Australian National University, Canberra ACT, Australia

Mainstreaming text mining for rapid synthesis of biodiversity science

informing ways to avert biodiversity loss. Recent developments in computer science provide a set of tools that can make the synthesis process more efficient, sometimes reducing project times by up to 97% in the (predominantly medical) applications where they have been trialed. Many of these tools remain poorly tested in ecology, however, meaning that there remains a risk of reducing effort only at the cost of increased bias. Further, this bias may be exacerbated in ecological and conservation applications due to the diversity and complexity of the problems being investigated, and the evolving nature of the language used to describe them. In this talk, I will outline a range of new and existing software tools that can increase efficiency and rigor of systematic reviews and meta-analyses. More importantly, I will discuss the risks of uncritically drawing on complex decision-support software, both in terms of potential bias within individual synthesis projects, and in relation to the influence of text-mining algorithms on the process of scientific learning and discovery. I conclude by outlining how future research can address these issues by drawing together computational and ecological expertise in a structured way.

Mark Westoby

Biography

Westoby's main research interests are in plant ecological strategies. He has been a contributor to ESA for more than 40 years.

Open session (4)
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Oral presentation

EcoTAS abstract

Nitrogen concentration in plant tissues, as an indicator of total protein, has been widely used to model or interpret

photosynthesis, respiration and herbivory. Different proteins obviously have different functions, but it has not previously been practicable to quantify individual proteins in most ecological work. We have developed new proteomic methods that permit one-pass quantification of more than 2000 proteins. Here we report patterns in calvin-cycle and photosystem proteins across 32 eucalypt species along major environmental gradients. Calvin cycle proteins per leaf area increased towards lower temperatures, presumably because they function more slowly when cold, and to a lesser extent towards lower rainfall, presumably to achieve stronger drawdown of CO2 concentration within the leaf and hence improved water use efficiency. This was achieved in part via increasing leaf mass per area, though there was considerable variation in protein concentration per leaf mass also. Photosystem proteins similarly increased with decreasing temperature, and also with decreasing illuminance. In other words, the ratio of photosystems to calvin cycle increased in lower light. We expect this study to be harbinger of many that will address a wide range of ecological functions via quantification of individual proteins.

Van Sluyter S [1] , Breakwell K [1] , Carroll A [2] , Clarke V [1] , Dennison S [1] , Lawson J [1] , **Westoby M** [1]
[1] Macquarie University, Sydney NSW, Australia
[2] Australian National University, Acton ACT 2601, Australia

Individual protein quantities in eucalypt leaves across eastern Australia

Maggie Wheeler

Biography

My BSc (Hons) was from Macquarie University and UNE, with Prof. Jeremy Bruhl. I worked at SCU on a local wild rice, with Prof. Robert Henry. My PhD was from Murdoch University. I have published seven papers in international journals.

Barbara Rice Memorial Poster Session (Monday)
Monday, November 27, 2017
5:45 PM - 7:30 PM
The Event Centre
Poster presentation

Wheeler M [1]
[1] Not applicable, Mullumbimby NSW, Australia

Reduction of exotic plants within regenerating riparian rainforest in sub-tropical New South Wales

EcoTAS abstract

Riparian rainforest regeneration was recorded in 2005 and 2012 in a lowland subtropical rainforest area of NSW. Seed dispersed downstream during floods, and by birds. Exotic plants were prevalent and sometimes invasive. Significant reductions were observed in exotic and rainforest plants.

The property of 17ha contains 964 metres of a partly fenced riparian zone of a large creek. In 1988 the riparian zone consisted of approximately 60% exotic and 40% native vegetation. Grazing pressure was reduced to five to nine horses. Quadrats of 2m2 [number of stems/species] and 20m transects [number of species] were installed every 20 metres for 500m along the riparian zone. Characters used were fenced, not-fenced, weeded and not-weeded. All weeding was by hand or cut-and-paint using 50% glyphosate/water. Increases or decreases in abundance/diversity were recorded, with statistically significant values ($p<0.05$) determined using paired, two-tailed t-test analyses.

In 2005, 132 species were found (100 indigenous and 32 exotic), and in 2012, 108 species were found (88 indigenous and 20 exotic). The significant reductions found in exotic species diversity ($p<0.000002$) reflect weeding and greater shade cover. Also canopy rainforest species diversity reductions ($p<0.0008$), reflecting the loss of mature riparian rainforest plants during the bumper 2012 flood.

Under-grazing assisted the early stages of riparian regeneration. Sections of creekbank that in 1988 were dominated by camphor laurel seedlings and setaria, were under-grazed until 2005, by 2012 had an emerging canopy

of Bangalow palms, blue figs and large camphor laurels. Riparian restoration is difficult to implement due to flood events.

Naomi White

Biography

Naomi is a PhD student in the Centre for Biodiversity and Conservation Science, School of Earth and Environmental Sciences at the University of Queensland. She is interested in ecological modelling, conservation, landscape ecology, and animal movement and resource utilisation patterns.

EcoTAS abstract

Patterns of conflict in a number of carnivorous species have demonstrated that human-wildlife conflicts may be predictable. However, minimisation of human-wildlife conflict depends on the ability to anticipate the behaviour of each party involved, as well as the timing and location of conflicts. Conflict mitigation requires knowledge of the drivers of these conflicts, including patterns of landscape utilisation of the wildlife species involved. This presentation discusses spatial and temporal patterns of the dingoes on Fraser Island, and compares them to other canid species. We investigated resource selection and landscape utilisation by Fraser Island dingoes by evaluating for the effects of habitat type and distance to landscape features and areas of high human usage. We used resource utilisation functions (RUFs) to compare resource utilisation at the dingo population level, as well as individuals grouped by sex, age class and day phase. We demonstrate the manner in which resource utilisation is influenced by geographic factors (i.e. variation in habitat), population

Landscape Ecology (2)

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Cypress #2

Oral presentation

White N [1] , King R [2] , Apan A [2] , Adams A [3] , Rhodes J [1] , Moss P [1]

[1] University Of Queensland, Brisbane QLD, Australia

[2] University of Southern Queensland, Toowoomba QLD, Australia

[3] Museum Victoria, Melbourne Victoria, Australia

Impacts of spatial and temporal landscape utilisation patterns on a canid species

dynamics (i.e. sexes and age), temporal influences (i.e. day phase), and anthropogenic factors (i.e. proximity to areas of high human usage). We also highlight the importance of factoring temporal influences (i.e. day phase and season) into analyses. These findings have direct management implications for reducing conflict between people and the dingoes of Fraser Island and demonstrate the importance of knowledge of landscape utilisation patterns in strategies to minimise human-wildlife conflict, particularly in seasonal species such as canids.

David Whitehead

Biography

David leads research to increase soil carbon and reduce nitrogen losses from grasslands and forage crops and is currently working with dryland and irrigated lucerne. David also works at the science/policy interface to mitigate greenhouse gas emissions and was elected as a Fellow of the Royal Society of New Zealand in 2012.

EcoTAS abstract

Grasslands in New Zealand are extensive, comprising 14 Mha (55% of the land area), and they are a major component in the national carbon inventory. Net primary production from managed grasslands is high but most of the above-ground biomass is exported as meat and milk by grazing animals. Much greater amounts of carbon are stored in grassland soils than that in biomass accumulation and a major concern for the national carbon inventory and the contribution of vegetation to offsetting greenhouse gas emissions is the vulnerability of soil carbon to modified

SYMPOSIUM: Vulnerability and resilience of grasslands in Oceania to climate change

Wednesday, November 29, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

Whitehead D [1] , Moinet G [1] , Graham S [1]

[1] Landcare Research, Lincoln , New Zealand

Vulnerability of carbon storage in New Zealand’s grasslands to management and climate change

management practices and climate change.

We present findings of annual net carbon balance for three contrasting grassland systems in Canterbury in response to applications of nitrogen fertiliser, irrigation and temperature: high-producing grassland used for dairy production, low-producing grassland grazed by sheep and low-producing tussock. Annual carbon balance for all systems was close to zero with small rates of carbon accumulation in the tussock and high-producing grassland but a net carbon loss from the low-producing grassland. Addition of nitrogen and irrigation increased biomass production but this was offset by more intensive grazing.

Evidence from measurements of the response of carbon balance to temperature has confirmed increases in respiration. However, this is attributable to respiration from autotrophic components with the rate of soil organic matter decomposition being insensitive to changes in temperature. Regulation of the rate of soil organic matter decomposition by substrate availability rather than temperature has important implications for forecasting the response of carbon balance in grasslands to climate change.

Tai White-Toney

Biography

Hello! My PhD project covers the establishment of jarrah and marri following bauxite mining in the beautifully biodiverse jarrah forest, including the resilience of these dominant species to climate and management practice

Restoration Ecology (1)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Bimbadeen Room
Oral presentation

variability and characterizing seed contribution from alternative sources.

EcoTAS abstract

The first year is arguably the most stressful period in the life of a tree, and consequently, early establishment success has been shown to be indicative of stem density in the adult forest. The study of the patterns of mortality and emergence can help to understand which factors are most important during early establishment and be used to guide rehabilitation practices. This study was aimed at understanding the highly variable early establishment densities of jarrah (Eucalyptus marginata) and marri (Corymbia calophylla) in the northern jarrah forest following bauxite mining. Rehabilitation practices and microhabitat characteristics were determined for 60 quadrats across 10 spatially separate rehabilitation sites. Both emergence and mortality were tracked between September 2016 and May 2017 (the point of industry-standard 9-month early establishment monitoring). Early establishment density had a relationship with aspect, debris cover, soil colour, nitrogen, potassium, organic carbon and total nitrogen (GLM; z= 2.75; p>0.006). Variation in density was evident at both the rehabilitation site and quadrat level, and periods in which emergence and mortality were experienced did not match expectations for the jarrah forest system. New recruits were observed throughout monitoring, all with an unknown seed sources and anticipated to be from adjacent forests. While some results highlight factors outside of what can be manipulated during the preparation of the sites for rehabilitation (e.g. aspect and some soil nutrients), there is the opportunity to adjust others (e.g. proximity to forest and seed sources) to improve the quality of microhabitat and maximise establishment.

White-Toney T [1] , Korczynskyj D [1] , Grigg A [2] , Bulsara M [1]
[1] University of Notre Dame Australia, Fremantle WA, Australia
[2] Alcoa of Australia, Pinjarra WA, Australia

When things don’t add up: unexpected establishment patterns of dominant trees in jarrah forest rehabilitation

Trisha Williams

Biography

The Birriliburu Rangers are experts at looking after their country.

EcoTAS abstract

In order to prevent the further decline of the Greater Bilby, an iconic Australian mammal, it is essential that the role of Indigenous Rangers is recognised. Traditional Owner input and leadership is essential during planning, mapping, research and on-ground works undertaken to protect the species.

Birriliburu Rangers see Muntalngaku (the Greater Bilby) as more than a threatened species: it is part of their country and a sign of the health of their country. Stories, connections, places and knowledge relating to Muntalgnaku have been passed down for thousands of years.

Birriliburu Rangers revisit known burrow locations and undertake searches in new areas of suitable habitat using traditional tracking-based methods to monitor the species on their country. The Rangers also undertake landscape-scale traditional mosaic burning to reduce the instance of wildfire and maintain a patchwork of food resources and cover from feral predators. Digital data capture and fire scar mapping are some of the ways that modern technologies are being incorporated into the monitoring and management approach.

There is regional momentum building about sharing

SYMPOSIUM: Indigenous Ecological Knowledge

Monday, November 27, 2017

11:00 AM - 1:00 PM

Sugarloaf Room

Oral presentation

Long L [2] , **Westcott V** [1] , **Ingle A** [2] , **Williams A** [2]

[1] Bush Heritage Australia, Crawley WA, Australia

[2] Mungarlu Ngurrarankatja Rirraunkaja (Aboriginal Corporation), Wiluna WA, Australia

Looking after Birriliburu Bilbies: a two-way science approach

knowledge and working together with other ranger groups including the commencement of an indigenous ranger led annual Bilby Blitz so that it will be possible to track change in their activity through time over larger areas.

Jane Williamson

Biography

Jane Williamson is a PhD student in the School of Science at the Australian Catholic University and a terrestrial ecologist. Her research focus is fire ecology with particular interest in the impacts of current fire regimes on fauna habitat.

EcoTAS abstract

Prescribed burning is used to limit wildfire extent and intensity but can also have conservation objectives. Such ecological burning can create mosaics of vegetation of differing successional stages based on time since last fire. In NSW managers are required to maintain percentages of vegetation formations within, above or below recommended fire intervals (based on fire responses by groups of plant species) and report on how well they meet these percentages (OEH, 2013). There is currently no detailed analysis of the distribution of fires in relation to guidelines for each formation. I used GIS analysis to quantify the temporal distribution of fires for each vegetation formation in NSW based on RFS and OEH fire-history databases. For the extent of each vegetation formation in NSW, I determined between-fire interval for the two most recent fires and analysed where fires occurred across the fire-interval timeline and in relation to threshold

Disturbance Ecology (Fire)

Tuesday, November 28, 2017

4:00 PM - 6:00 PM

Cypress #3

Oral presentation

Williamson J [1] , Taylor J [1] , Ellis M [2]

[1] Australian Catholic University, North Sydney NSW, Australia

[2] Office of Environment and Heritage, Hurstville NSW, Australia

Compliance with habitat maintenance fire-interval guidelines in Land Management Zones

guidelines. Preliminary analyses show differences among vegetation formations. Arid Shrublands and both sub-formations of Semi-Arid Woodlands had most (50-70%) fires clustered towards the lower threshold, with few longer–interval fires. However, there were many small fires and the percentage of each formation burnt at any time since fire was more evenly spread across the timeline. Heathlands and Dry Sclerophyll Forests (grassy sub-formation) both had the majority (~60-80%) of fires within recommended guidelines, whereas most (~68%) fires in Grasslands formation were beyond the upper threshold. I will discuss the factors driving differences among formations and implications for fauna habitat.

Tim Wills

Biography

I am a botanist working in ecological consulting with GHD. My primary research interest involves the response of ecosystems to disturbances such as fire, flood, pest animals and weed invasion.

EcoTAS abstract

Natural wetting and drying regimes in the floodplain forests of the Murray-Darling Basin have been modified since European settlement due to river regulation and water extraction, and exacerbated by drought. Toward the end of the Millennium drought, the MDBA initiated a study across six icon sites to understand the response of these forests to flooding and application of environmental water. This study presents results of a long-term monitoring program at Koondrook-Perricoota Forest, the second largest River

Forest Ecology (1)
Wednesday, November 29, 2017
11:00 AM - 1:00 PM
Bimbadeen Room
Oral presentation
Wills T [1]
[1] GHD, Melbourne VIC, Australia
Koondrook-Perricoota Forest Vegetation Condition Monitoring Program: Long-term vegetation response to flood and drought

Red-gum forest in Australia. After seven years of monitoring, including forest-wide floods in 2010 and 2016, and allocation of environmental water in 2014, results indicate that vegetation condition variables in different water regime classes (WRCs) (i.e. River Red-gum forest, Grey/Black Box woodland, ephemeral wetlands) responded positively to flooding. Stand condition score (comprised of plant area index, live basal area and crown extent) and individual tree crown condition both responded to the 2010 flood, taking three years to reach peak response before declining. Forest understorey condition responded rapidly to the 2010 flood, with native richness and the cover of plant functional groups characteristic of individual WRCs all improving markedly and peaking within one year of flooding. Following the peak response, and in the absence of flooding, all variables gradually declined until the 2016 flood. Post-flood monitoring indicates that forest condition is rebounding, but from a better baseline than 2010. Results clearly indicate that the forest requires large-scale floods to gain any condition improvement, with improvement amplified if more than one large flood occurs per decade.

George Wilson

Biography

George Wilson is Honorary Professor at the Australian National University, Fenner School of Environment and Society. He focuses on developing wildlife industries and tourism opportunities that support conservation, and integrating traditional knowledge and wildlife science into the management of Indigenous Aboriginal land.
His qualifications are Master Veterinary Science (University

Conservation Biology (1)
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #3
Oral presentation
Wilson G [1]
[1] Australian National University, Fenner School of Environment and Society, Canberra ACT, Australia

of Sydney) and PhD in Zoology (University of Aberdeen). He is also a commercial pilot and aircraft owner. He has conducted extensive aerial surveys of wild animals and has over 4000 hours' aeronautical experience.
He has continuing interest in kangaroo management and population ecology, survey techniques and modelling.

EcoTAS abstract

Current kangaroo management could be much improved. Most of Australia's 40 m kangaroos continue to be regarded by the landholders on whose properties they occur as pests that compete with livestock, rather than as assets. The kangaroo harvesting industry is currently declining and is ineffective in reducing populations, largely due to animal rights campaigns. In recent years less than half the annual quota has been taken. Consequently, graziers are erecting kangaroo-proof fences around groups of properties and lowering numbers through various other means. Most have poor animal welfare and biodiversity outcomes.
If kangaroos were as valuable as goats or deer, landholders would have an incentive to co-produce kangaroos alongside conventional livestock and take advantage of kangaroo's adaptations. Doing so could help address the falling sustainability of many rangeland production systems.
Governments currently set harvesting quotas as a proportion of existing (variable) populations. An alternative would be to set population targets based on total grazing pressure that takes account of densities of other herbivores. It would reverse the situation where landholders are expected to carry an unstated number of animals that has no relationship to the carrying capacity of their properties, seasonal conditions or competing land uses. Landholders would have a form of proprietorship over

kangaroos.
Such changes are paradigm shifting but necessary to improve kangaroo welfare, reduce current wastage and enable sustainability. They could lead to less livestock and more kangaroos of higher value, bringing sustainability and other benefits to both Indigenous and other landholders on whose properties they occur.

Boyd Wright

Biography

Boyd wright is a fire ecologist whose research focuses on understanding the post-fire regeneration syndromes of mast seeding arid zone plants such as mulga and spinifex. He is currently based in Botany at the University of New England.

Landscape Ecology (2)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #2
Wright B , Albrecht D , Latz P , Silcock J , Hunter J , Fensham R
Relationships between fire severity and recruitment of waputi (Aluta maisonneuvei [Myrtaceae]), an obligate-seeding desert shrub

EcoTAS abstract

In fire-prone systems, severity of pyric disturbance can have important impacts on seedling recruitment owing to the close relationship between burn severity, soil heating, and seed mortality and germination processes. Accordingly, knowledge of seedbank densities, germination biologies and the depth distribution of seedbanks in relation to soil heating during fire are crucial for predicting the regeneration potentials of populations after fire. We examined fire-severity effects on recruitment of waputi (Aluta maisonneuvei ssp. maisonneuvei [Myrtaceae]), an obligate-seeding shrub of Australian sandridge deserts. Specifically, we 1) compared recruitment rates between high- and low-severity-burnt and unburnt shrubs; 2)

quantified the vertical distribution of seed populations in the soil; and 3) investigated whether waputi seeds require fire-related cues for germination. Much higher rates of seedling regeneration occurred beneath high- than low-severity-burnt shrubs, and almost no recruitment occurred beneath unburnt shrubs. Despite the positive effect of fire on recruitment, the germination trial did not detect a fire-related germination cue in seeds. Waputi shrublands appear to be tolerant of high-severity burning, with post-fire regeneration mediated by the maintenance of dense, long-lived seedbanks that are buried at sufficient depth to escape lethal heat during fire. We hypothesize that high-severity burning enhances post-fire recruitment not via an interaction with a fire-related germination cue, but by either killing adults (which would reduce root competition on seedlings) and/or by heating soils and destroying allelopathic compounds that inhibit germination.

Ian Wright

Biography

Ian Wright is an ecologist interested in relating plant structure to function, as a means to understand plant ecological strategies

EcoTAS abstract

Leaf size is a hallmark of biological diversification, varying over a hundred thousand-fold among species worldwide. Although 19th Century plant geographers noted that the wet tropics harbour plants with exceptionally large leaves, the latitudinal gradient of leaf size has not been well quantified, nor the key climatic drivers convincingly identified. Here we characterise worldwide patterns in leaf

Global Change
Wednesday, November 29, 2017
4:00 PM - 6:00 PM
Cypress #2
Oral presentation
Wright I [1]
[1] Macquarie University, Macquarie University NSW, Australia
Global Climatic Drivers of Leaf Size

size. Globally, leaf size shows a “twisted plane” response to climate. Large-leaved species predominate in wet, hot, sunny environments; small-leaved species typify hot, sunny environments only when arid; small leaves are also found in high latitudes and at high elevations. By modelling the balance of leaf energy inputs and outputs we show that day- and night-time leaf-to-air temperature differences drive geographic gradients in leaf size at global scale. This knowledge has potential to enrich ‘next-generation’ vegetation models, where leaf temperature and water use during photosynthesis play key roles.

Chung-Huey Wu

Biography

Chung-Huey Wu is a PhD student affiliated with the Quantitative & Applied Ecology Group in University of Melbourne. His research interests are spatial-temporal prioritisation and optimisation of management actions, especially on the control of pests, disease vectors and invasive species.

EcoTAS abstract

Containing the spread of invasive species is critical to effective management. Targeting the most connected habitats in a landscape has been proposed as an effective tool in controlling invasion spread in spatial networks, but its performance has not been examined in real landscape with heterogeneous dispersal resistance surface and habitat suitability. Besides, the relative performance between connectivity-based approach and the more intuitive, targeting invaded site-surroundings requires

Barbara Rice Memorial Poster Session (Monday)

Monday, November 27, 2017

5:45 PM - 7:30 PM

The Event Centre

Poster presentation

Wu C [1] , Gong W [2] , Yang Y [2]

[1] University of Melbourne, Melbourne VIC, Australia

[2] National Dong Hwa University, Hualien, Taiwan (R.O.C)

Stay focused on sites that connect: integrated connectivity analysis in containing spread of invasive frog

elicitation, especially under imperfect knowledge about initial invasion sites and long-distance dispersal events. Using spotted-leg tree frog (Polypedates megacephalus) invasion in northern Taiwan as example, we investigated the effectiveness of connectivity-based site prioritization in controlling invasive spread across an artificial water body network. We first rank sites (water bodies) by their contributions to the integrated index of connectivity (IIC) of the network, computed based on least-cost distances and habitat suitability for the species. We then use stochastic, discrete-time model to simulate invasion spread across the network under 1) no control action; 2) focused control of random sites; 3) focused control of sites with highest connectivity ranking; and 4) dynamic control of sites nearest to known invaded sites at each time step. Connectivity-based approach consistently outperforms the null strategies (no action, random sites) in slowing down the spread, and is superior to the dynamic control approach when long-distance dispersal events are present and when locations of initial invasion are not known. We conclude that focusing on sites of high-connectivity could be a robust strategy under imperfect knowledge for containing the spread of species invasion.

Rumana Yeasmin

Biography

My research focus on the area seeking new insight into the plant ecophysiology as well as their interaction with their environment both above-ground and below-ground, plant and leaf level physiological responses associated with future climate change and extreme weather events.

SYMPOSIUM: Tree Mortality - When, Where and Why Do Trees Die? - Part 1

Monday, November 27, 2017

11:00 AM - 1:00 PM

Wattagan Room

Speed Talk

EcoTAS abstract

The study of the responses of woody plants to environmental stresses has occupied plant ecologists and foresters for a long time, but interest in what are the relationships of leaf gas exchange with growth pattern with stressful conditions, particularly drought and high temperatures, is poorly understood. The objective of this study was to determine growth pattern: tree diameter (DBH), leaf gas exchange: photosynthesis (Aa), stomatal conductance (Gs), transpiration (Ts); non-structural carbohydrate concentration (NSC) on mulga true commonly known as Acacia aneura with a drought period plus increased temperature scenarios. This experiment was conducted in Australian Supersite, Tropical savanna vegetation at Ti tree, Northern Territory, Australia. Measurements were made from mulga trees on a day and night with very variable temperature (40-50°). The strongest correlation with gs with DBH and the highest discriminatination between the different day and night temperatures were achieved by taking the average leaf temperature per plant. Multiple regression analyses (R2) showed that, when variability in leaf temperature at drought period, the (positive) partial slope for each predictor remained significant. In contrast, there was a negative correlation between gs and foliar starch concentration such that, for any given Aa, leaves with a high gs allocated less starch to foliage than leaves with a low gs. Overall, our result reveals the potentials for amplified plant growth in contrast with Ts, Gs and NSC of leaf are important because of the critical issues of water budget and supply for communities and ecosystems in the arid regions of the central Australia.

Yeasmin R [1] , Bonser S [1]
[1] School of Biological, Earth and Environmental Sciences & Ecology and Evolution Research Centre, University of New South Wales, Sydney NSW, Australia

Coordinating leaf gas exchange with growth pattern on mulga tree at Northern Territory of Australia

Alan York

Biography

Alan leads the Fire Ecology and Biodiversity research program within the School of Ecosystem and Forest Sciences at the University of Melbourne. He has been involved in applied ecological research for over 35 years.

EcoTAS abstract

It is increasingly recognised that fire management for biodiversity conservation must account for two kinds of landscape mosaic: the ‘visible’ mosaic of post-fire age classes as a consequence of recent fire events, and the ‘invisible’ mosaic of inter-fire intervals, frequencies and other components of the fire regime as they relate to the cumulative effects of multiple fires. We investigated relationships between fire history heterogeneity and the species richness of two major pollinator groups, flies and wasps, in heathy woodlands of south-eastern Australia. We explored three main hypotheses: 1) local richness increases with fire age diversity at landscape scales, because species differ in their age class preferences (the Patch Mosaic Burning paradigm); 2) local species richness increases with fire frequency diversity at landscape-scales, because species differ in their fire frequency preferences; and 3) local species richness responds to the average fire frequency at the landscape-scale as the number of dependent species varies between fire frequencies. Hypotheses 1 and 3, but not 2, were supported by the data. Fly and wasp species varied in their age class preference and species richness was positively associated with fire age diversity (the visible mosaic). We also found support for the notion that the invisible mosaic, which represents the cumulative effects of the fire regime, influences species richness. To the best of our knowledge, this is the first

SYMPOSIUM: Insect Ecology Research Chapter - insects punching above their weight (Part 1)

Monday, November 27, 2017

11:00 AM - 1:00 PM

Brokenback Room

Oral presentation

York A [1] , Brown J [1,2]

[1] University Of Melbourne, Creswick Vic, Australia

[2] Australian National University, Canberra ACT, Australia

Using insect pollinators to explore the effects of both visible and invisible fire mosaics

empirical test of the invisible mosaic's influence on animal communities.

Lauren Young

Biography

Lauren in a PhD candidate with the University of Sydney and CSIRO Land and Water. Her research focuses on small mammal conservation, particularly defining the characteristics of plains mouse refuges in the Northern Territory.

SYMPOSIUM: Novel methods for identifying and managing refuges across scales and ecosystems

Tuesday, November 28, 2017

1:30 PM - 3:30 PM

Wattagan Room

Oral presentation

Young L [1]

[1] University Of Sydney, Csiro, Alice Springs Nt, Australia

Defining and delineating drought refuges of a threatened desert rodent, Pseudomys australis

EcoTAS abstract

In areas where irregular and unpredictable resource pulses drive small mammal population dynamics, some species persist through long periods of low resource availability in drought refuges. Drought refuges are hypothesised to be small, discrete areas in the landscape that provide a relatively consistent and reliable supply of resources for survival and reproduction throughout these low-resource times. Desert-dwelling rodents, in particular, have been described as refuge-using; however, there has been little research to define the characteristics of these areas and the spatial scale at which they operate. We investigated the spatial scale and dynamics of populations of a threatened native rodent, the plains mouse Pseudomys australis, in cracking clay refuges in central Australia during a dry period. Using live- and camera-trapping data collected over two years and soil and vegetation indices obtained from satellite imagery, we modelled the spatial distribution of the

refuges to test whether soil or vegetation indices provided better predictors of plains mouse occurrence. Soil indices showed a strong relationship with ground cover and soil data collected on-ground, whereas vegetation did not. We found that P. australis fluctuated spatially and numerically over the study period but stayed largely within the refuges, which were delineated best using soil indices. Our research suggests that this refuge-using species is, for the most part, confined to cracking clay during dry periods and that refuge areas are driven primarily by soil type.

Jing Yuan

Biography

My research interests are in climate change, C and N cycle. Publication: J Yuan, LK Cao*. Assessing environmental impacts of organic and inorganic fertilizer on daily and seasonal Greenhouse Gases effluxes in rice field, Atmospheric Environment 155 (2017): 119-128.

EcoTAS abstract

Acetate is a key substrate of acetoclastic methanogens in paddy fields. The aim of this research is to investigate the relationships among acetate, methane (CH4) and methanogens during the whole growth season of rice. Here we conducted four treatments based on a long-term located paddy experiment: organic fertilizer (OT), chemical fertilizer (CT), mixed organic and inorganic ferti-lizer (MT), and no fertilizer (ctrl). The results showed that: (1) CH4 fluxes was obviously higher in OT than that in MT, CT and ctrl; (2) Acetate concentration strongly positively correlated to CH4 fluxes from tillering to heading stage, but that

Agro Ecology
Monday, November 27, 2017
11:00 AM - 1:00 PM
Cypress #2
Speed Talk
Yuan J [1] , Yuan Y [2] , Zhu Y [1] , Sha Z [1] , Cao L [1]
[1] Shanghai Jiaotong University, Shanghai Shanghai, China
[2] Irrigation Technology Extension Station of Qingpu, Shanghai Shanghai, China
Acetate indicates the patterns of methane and methanogens under different fertilizer conditions in paddy soil

negatively related at filling stage; (3) There detected four orders of methanogens: Methanocellales (43.54%), Methanosarcinales (25.21%), Meth-anobacteriales (10.99%), and Methanomicrobiales (20.26%); (4) Furtherly, we found 21 genera of methanogens in this rice field. Among them, Methanocella (hydrogenotrophic) and Meth-anosaeta (acetoclastic) were the dominant methanogenic communities; (5) Acetate was negatively correlated to the relative abundance of Methanocella but positively to Methanosaeta and Meth-anobrevibacter. Thus, due to the large accumulation of acetate, organic fertilizer enhanced CH4 fluxes. Moreover, the enrichment of acetate could be beneficial to the growth of acetoclastic methanogens. Nevertheless, it was restrained to hydrogenotrophic methanogens. Consequently, to mitigate the emission of CH4, the application of organic fertilizer should be controlled in a proper extent.

Peta Zivec

Biography

PhD Candidate at the Australian Rivers Institute. My field of research is in vegetation dynamics, ecosystem services, impacts of climate change and wetland. My aim is to create practical and applicable science that can be easily adapted to environmental policy.

EcoTAS abstract

Grazing and climate change represent two major threats to semi-arid wetland vegetation. These vegetation communities typically support a high amount of biodiversity in relation to surrounding uplands and provide critical

Landscape Ecology (2)
Tuesday, November 28, 2017
1:30 PM - 3:30 PM
Cypress #2
Oral presentation
Zivec P [1]
[1] Griffith University , Brisbane Qld, Australia
Resilience of semi-arid riparian vegetation to grazing and climate change

ecosystem services, especially pasture growth and important water sources for livestock and domestic use. This study aimed to identify components of semi-arid riparian vegetation that may be most sensitive to climate change and examine the effectiveness of current grazing management practices (i.e. fencing) in increasing these systems' resilience to such pressures. This study was conducted in the Queensland portion of the Warrego River catchment in the northern Murray-Darling Basin of south-eastern Australia. Mesocosm experiments were conducted to examine the effects of current grazing management on vegetation resilience as well as the response of emerging plant communities to a range of heating and flooding scenarios. The results suggest that both climate change and grazing have the potential to significantly affect plant recruitment from seed and population dynamics in these habitats. However, semi-arid riparian vegetation has also been observed to maintain resilience even when faced with high grazing pressures, high temperatures, variable hydrological regimes and prolonged droughts. Controlled grazing methods through the construction of fencing, however, may not be the most effective or efficient means of conservation for these communities and other management options, e.g. environmental flow delivery, may better promote their conservation and restoration.

Philip Zylstra

Biography

With a background in fire management, my main interest is in the ways that plant species affect fire behaviour. To address this, I developed the first peer-reviewed fire

Landscape Ecology (1)
Tuesday, November 28, 2017
11:00 AM - 12:30 PM
Cypress #2
Oral presentation

behaviour model for SE Australia, along with new methods for empirical analysis.

EcoTAS abstract

It has been widely accepted that bushfire risk increases with time since fire, reflecting the accumulation of fuels. The link between fuel load and fire risk is however tenuous, dependent on grey literature and frequently at odds with the peer-reviewed material. This is problematic, as the question of flammability dynamics is fundamental to our current reality of increasing fire frequency. If recently burnt forests are less flammable, then this internal damping mechanism will balance the external climatic increases, and the system will remain stable (negative feedback). If on the other hand, a regenerating forest is more flammable than a mature one, then internal drivers will amplify the climatic effects (positive feedback), potentially pushing the ecosystem toward collapse.

Using recent and ongoing work, I will show that both case studies and landscape analyses are generally underpinned by implicit assumptions that cause them to incorrectly find negative feedbacks, and that the prevalence of positive feedbacks may be far greater than expected.

From 58 years of mapped fire history across the Australian Alps, I will show that once the assumptions are removed, we see that feedbacks have been pronounced and positive for all broad forest formations. Forest stands have burnt 1.5 to 8.3 times more often in regenerating forest than in mature forest, and crown fires during the 2003 event were mostly confined to regenerating stands. Finally, I will demonstrate that these feedbacks can be predicted from stand ecology using the first peer-reviewed fire behaviour model applicable to SE Australian forests.

Zylstra P [1]

[1] Centre For Environmental Risk Management Of Bushfires, University Of Wollongong, Wollongong NSW, Australia

Feeding fire with fire: positive feedbacks and ecosystem collapse