ISLAND ARKS SYMPOSIUM IV
NORFOLK ISLAND
FEBRUARY 2016

Monday 22nd	Welcome drinks & Registrations - 5-7PM – Puppies Point, Anson Bay Road (If weather is adverse the venue will be at Paradise Hotel in the rotundas or Sirius Room (conference venue)
Tuesday 23rd	Day 1. Paradise Hotel & Resort Conference Room Queens Elizabeth Avenue
	Social Drinks – Castaway Restaurant & Bar
Wednesday 24th	Day 2, Paradise Hotel & Resort Conference Room Queens Elizabeth Avenue
	Social Drinks – Rumours Bar (next to Foodland Supermarket)
Thursday 25th	Day 3 Paradise Hotel & Resort Conference Room Queens Elizabeth Avenue
	6:30PM Conference Dinner – Castaway Hotel
Friday 26th	Half-day workshop scheduled for Friday the 26th February - Saving species on Australian islands; Threatened Species Management on Islands: failures, successes and lessons learned
	Venue TBA

Field trip itineraries will be advised by the Norfolk Island Travel Centre call +6723 22502 or 22502 if using a local Norfolk Island phone

DAY 1 TUESDAY 23RD FEBRUARY 2016

Tuesday 23rd February
0830 Opening - Derek Ball 0840 Welcome - Ken Christian
0845 Keynote: Graeme Wood, Graeme Wood Foundation
0930 Invited Speaker: Keith Springer - Macquarie Island Recovery
1000 Morning Tea
1045 Session 1 (4 x 20 min) *Seabirds*
Contrasted foraging strategies of frigatebirds ranging from nearby inshore and offshore islands. Rowan Mott, **Rohan Clarke**, School of Biological Sciences, Monash University, VIC 3800, Australia.
Lightweight unmanned aerial vehicles do revolutionise population monitoring. Jarrod C. Hodgson, Shane M. Baylis, Ashley Herrod, Rowan Mott & **Rohan H. Clarke**. School of Biological Sciences, Monash University, VIC 3800, Australia.
The decline of a once common species, the wedge-tailed shearwater in the Great Barrier Reef. **Graham Hemson**, Queensland Parks and Wildlife Service.
Keeping tabs on Queensland's seabirds, a pragmatic new approach. **Graham Hemson**, Queensland Parks and Wildlife Service.
1215 Lunch
1315 Session 2 (6 x 20 min) *Bat Conservation*
Bats on islands, conservation challenges to the world's biggest bats. Tammy **Mildenstein**, Cornell College, USA Presented by **Frank Bonaccorso**
Bats on islands: peculiar biology and implications for conservation. **Stuart Parsons**, Queensland University of Technology, Australia
The Christmas Island flying-fox – towards an action plan for its conservation. **Justin Welbergen**, Hawkesbury Institute for the Environment, Australia

The current population status of the Christmas Island flying-fox. **Christopher M. Todd**, Hawkesbury Institute for the Environment, Australia
Recovery of flying fox populations in American Samoa. **Adam C. Miles**. Department of Marine and Wildlife Resources, American Samoa
Genetic approaches to understanding populations and diets of the Hawaiian hoary bat. **Corinna A. Pinzari,** Hawaii Cooperative Studies Unit, University of Hawaii at Hilo
1515 Afternoon Tea
1545 Session 3 (4 x 20 min) *Invasive Ants*
Towards the eradication of the invasive African big-headed ant, Pheidole megacephala from Lord Howe Island. **Haselden, Christo** and Hoffmann, Ben
Treasure Island. Management of Yellow Crazy ant on Atafu Atoll, Tokelau. **Paul Craddock**. Co-Authors: Viv Van Dyk, Dr Monica Gruber, Dr Rafael Barberi, Dr Allan Burne.
Optimising resource allocation for eradications of invasive island species **Christopher M. Baker**, Jarrod C. Hodgson, Elena Tartaglia and Rohan H. Clarke . The University of Melbourne Monash University Presented by **Rohan Clarke**
Wrap up
1700 Finish
1800 Social event

DAY 1 TUESDAY 23RD FEBRUARY 2016

Invited Speaker – Keith Springer

Post-eradication ecosystem recovery on Macquarie Island

keith.springer@gmail.com

Macquarie Island is a sub-Antarctic island lying 1,500 km from Hobart, Tasmania, and about ½ way between New Zealand and Antarctica. Introduced mammals established soon after discovery in July 1810, and for nearly two centuries the Macquarie Island ecosystem was impacted by established populations of dogs, cats, rats, mice, weka and rabbits. Dogs died out, and weka and cats were removed by 1988 and 2000 respectively. An eight-year project targeting the remaining three introduced pest species – ship rats, house mice and European rabbits – was successfully completed in March 2014, after an aerial baiting phase in winter 2011 and 2½ years of rabbit hunting and monitoring using hunting teams with trained detection dogs.

*In the absence of grazing rabbits and predatory rodents, recovery of the islands ecosystem has been dramatic, although early in a recovery phase. Native vegetation cover is rebounding quickly, with tussock (*Poa *spp.) and the two megaherbs* Pleurophyllum hookeri *and* Stilbocarpa polaris *early beneficiaries of the removal of rabbits.* Poa litorosa *has dramatically increased its recorded range in the absence of grazing pressure. Grassland communities on the uplifted plateau, dominated by* Agrostis *and* Festuca *on the uplifted plateau, are now much more abundant and dense. The prickly shield fern* Polystichum vestitum*, once grazed almost to oblivion, is now growing vigorously in several areas. Smaller plants like the Ranunculus and Coprosma are also benefiting strongly from the absence of grazing. Slope stability is increasing as improved vegetation condition establishes better soil binding capacity.*

Rodents, in particular ship rats predating eggs and chicks, had been considered a primary reason for the absence of many burrowing bird species from the main island, along with predation of adult birds by cats. With both predators now removed, birdlife recovery is dramatic,

although the extent of recolonisation varies greatly amongst species. Blue petrels, with remnant populations on off-shore rat-free rock stacks, were quick to re-establish populations on the main island, with numerous colonies totalling hundreds of burrows evident. Grey petrels, which re-established breeding colonies around 2000 after the removal of feral cats, have expanded distribution and increased breeding success. Soft-plumaged petrels and diving petrels have been confirmed breeding on the island in 2014/15, and Cape petrel breeding, while still in single figures, is also increasing over previous levels. With rabbits gone as a food source, skua breeding is less prevalent on the plateau and becoming more concentrated in the coastal areas.

While empirical data is absent, field observations confirm a marked increase in invertebrate abundance and activity around the island.

Combined, these results confirm the impact that introduced grazers and predators were having on Macquarie Island's ecosystem. While it may take decades to reach a relative equilibrium, it is clear that without the pressures of introduced pests, the natural biota of Macquarie Island is well on the way to a major recovery of natural processes.

Session 1 – Seabirds

"Contrasted foraging strategies of frigatebirds ranging from nearby inshore and offshore islands".

Rowan Mott & **Rohan Clarke**, School of Biological Sciences, Monash University, VIC 3800, Australia.

The restrictions imposed by central-place foraging mean that the waters surrounding large seabird colonies are often heavily exploited by foraging individuals. Different foraging strategies are exhibited by different species thereby acting to partition resources. Similarly, nearby colonies of conspecific individuals often target different areas for foraging. We sought to investigate patterns of resource partitioning between species at a single location, and between inshore and offshore breeding sites located in close proximity to one another. Two species of frigatebirds were investigated using a combination of GPS tracking data, stable isotope analysis and regurgitated prey sample collection. Frigatebirds are pelagic foragers consuming a diet

primarily consisting of flying fish. This diet specificity limits opportunities for partitioning of resources. The foraging ecology of frigatebirds then poses the challenging question – how does such a large degree of ecological overlap reconcile with traditional niche partitioning theory? This research is significant because the study sites were located off the north-west coast of Australia in the understudied eastern Indian Ocean. A number of BirdLife International Important Bird Areas are located in the area and the tracking data indicate that frigatebirds frequently forage well beyond existing marine protected area boundaries and cross international borders. This suggests that current management measures are not sufficient to adequately protect the resources utilised by frigatebirds.

"Lightweight unmanned aerial vehicles do revolutionise population monitoring".

Jarrod C. Hodgson, Shane M. Baylis, Ashley Herrod, Rowan Mott & **Rohan H. Clarke**. School of Biological Sciences, Monash University, VIC 3800, Australia.

The benefits of unmanned aerial vehicles (UAVs) compared to traditional techniques for population monitoring at biologically relevant scales have yet to be fully demonstrated. Much has been published about the technology's potential to reshape ecological monitoring and practitioners continue to refine UAV sampling protocols, demonstrate functionality of consumer packages and improve understanding about the complex issues surrounding wildlife disturbance. Through UAV-facilitated monitoring of seabird colonies in both tropical and subantarctic environments we demonstrate a superior data collection method. We show UAV counting provides an order of magnitude improvement in the level of precision, while providing count sizes that are similar or consistently larger than traditional ground counts. Although the uptake of UAVs for wildlife monitoring is likely to be rapid, careful consideration will be required to transition traditional monitoring programs without loss of data continuity.

"The decline of a once common species, the wedge-tailed shearwater in the Great Barrier Reef".

Graham Hemson, Queensland Parks and Wildlife Service.

The Capricornia Cays in the Southern Great Barrier Reef host the second largest rookeries of breeding wedge-tailed shearwaters in Australia. The species is considered common and abundant and estimates of breeding numbers made from burrow counts on the four largest cays between 1998 and 2001 place the breeding population at around 530,000 pairs. With support from Wild Mob and the Australasian Seabird Group the Queensland Parks and Wildlife Service re-established these surveys in 2011 and are now quite confident that the breeding population has declined to around 340,000 pairs. At the same time we have undertaken ground breaking work on developing autonomous monitoring systems for the rookeries using acoustic sensors. We consider the likely drivers for this decline and early efforts to establish management responses to mitigate impacts and improve the viability of the rookeries and describe plans to monitor the population size and reproductive success into the future.

"Keeping tabs on Queensland's seabirds, a pragmatic new approach".

Graham Hemson, Queensland Parks and Wildlife Service.

Queensland has over 100 years of data on seabird breeding colonies along its East Coast and particularly within the Great Barrier Reef. The Queensland government has been gathering data on seabird colonies for at least 30 years. In 2010 an analysis commissioned by the Great Barrier Reef Marine Park Authority to determine whether there were any climate change related signals in the seabird data uncovered that only a small proportion of the data was useful for determining the condition and trend of seabird populations. In response to this the Queensland Parks and Wildlife Service and partners in the Department of Environment and Heritage Protection and GBRMPA have established the quantitative requirements of understanding trends and revised the seabird monitoring strategy. The process integrated quantitative expectations and logistic constraints and used a novel decision support tool to inform decisions about which sites to be visited and when. At the same time QPWS is also evaluating whether technology such as cameras and acoustic sensors can provide better or lower cost alternatives to frequent visits to remote areas. We describe the pertinent history of seabird monitoring in Queensland the process of revising the monitoring strategy and progress in evaluating sensors.

Session 2 – Conservation Challenges for Preserving Bat Biodiversity in the Indo-Pacific Region

Session Organizer: Frank J. Bonaccorso, Pacific Island Ecosystems Research Center, U. S. Geological Survey, Hawaii, USA

Introduction: A large proportion of the 1,300+ species of extant bats occupy islands. As ecological threats to island biotas worldwide mount, many challenges threatened the survival and management of insular bat populations. This symposium examines both broad overviews of conservation issues about bats through the Indo-Pacific region as well as species-specific case histories of ongoing research and conservation action plans including examples from islands of New Zealand, Australia, American Samoa, and Hawaii.

Bats on islands, conservation challenges to the world's biggest bats.

Tammy Mildenstein, Cornell College, USA

Presenter Frank Bonacorrso

Three quarters of the world's 196 species of Old World fruit bats (Pteropodidae) are found on islands where they act as ecological keystones for seed dispersal and pollination and often represent important cultural icons to local human communities. Although nearly half of these species may be threatened, the conservation status of most of these pteropodids remains largely unknown because of the lack of research on many of the remote islands within the Indo-Pacific region. This presentation reviews the many challenges facing island bat conservation including the threats and population-limiting factors as well as the action plans that are being developed to support the recovery and management of these threatened species. Examples will be drawn from case studies in insular SE Asia and the Mariana Islands.

Bats on islands: peculiar biology and implications for conservation.

Stuart Parsons, Queensland University of Technology, Australia

This talk discusses unique aspects of bat biology on islands and how this can inform conservation management decisions. A case study from New Zealand focuses on the conservation biology and management of the lesser short-tailed bat, Mystacina tuberculata. An example of a translocation aimed at helping to protect this endangered species is presented. Finally, implications of the recent discovery that the short-tailed bat is a major pollinator for at least some of the plants it visits emphasizes the importance of exploring this species' role as a pollinator.

The Christmas Island flying-fox – towards an action plan for its conservation.
Justin Welbergen, Hawkesbury Institute for the Environment, Australia

Christmas Island is a remote and ecologically unique part of Australia, but like many islands of the Indo-Pacific region, its biodiversity is under threat. Following the recent extinction of the Christmas Island pipistrelle, the Christmas Island flying-fox (CIFF) is the last remaining indigenous mammal on the island. However, the CIFF is in critical decline, and unless current population trends are reversed, the species may soon share the pipistrelle's lamentable fate. Recently, a multi-institutional consortium, with expertise in conservation biology, wildlife disease, isotope ecology and ecotoxicology has been established to identify and remedy causes of the CIFF's decline. This talk outlines plans to provide the information and tools essential to understand and reverse the decline and safeguard ecological functions performed by this bat on Christmas Island.

The *current* population status of the Christmas Island flying-fox.
Christopher M. Todd, Hawkesbury Institute for the Environment, Australia

The Christmas Island flying-fox (CIFF), once reported as a "common sighting" throughout Christmas Island, is in precipitous decline. In 1985 populations were estimated at 6000 individuals. Surveys conducted between 2012 and 2014 indicated a further population decline with an estimated population size of 900 ± 569 individuals in 2014, however, the causes of the decline are unknown. Here we provide our preliminary assessment of the population size, distribution, and roosting and foraging requirements of the CIFF. These data are the critical first

step to the development of recovery plan designed to conserve the last native mammal occurring on Christmas Island.

Recovery of flying fox populations in American Samoa.

Adam C. Miles. Department of Marine and Wildlife Resources, American Samoa

The Samoan flying fox (Pteropus samoensis) and the Insular flying fox (P. tonganus) are indigenous to the islands of American Samoa. Populations of both species were heavily impacted during the 1980's by commercial and subsistence hunting. Flying fox populations were further reduced as two severe hurricanes struck American Samoa in 1990-91. Some estimates suggested an 80% decline in flying foxes on the island of Tutuila; therefore, a full hunting ban was instituted in 1995. Over the past 20 years, P. tonganus populations have rebounded suggesting the hunting ban has been an effective recovery tool for this species, while P. samoensis populations have recovered to a lesser extent. We explore how ecological differences between the two species has led to different recovery rates.

Genetic approaches to understanding populations and diets of the Hawaiian hoary bat.

Corinna A. Pinzari, Hawaii Cooperative Studies Unit, University of Hawaii at Hilo

The 'Ōpe'ape'a, or Hawaiian hoary bat (Lasiurus cinereus semotus), is an endangered endemic subspecies and Hawaii's only native land mammal whose current population size and potential movement patterns across the Hawaiian Islands remain largely unknown. Using genetic methods we illustrate the biogeographic history of hoary bats in Hawaii as having multiple colonization events with the timing of dispersal events from North America dating between 10,000 and 800 years before present. This presentation also discusses powerful new genetic techniques to explore current distribution, population boundaries, and differences in dietary composition that exist across the major islands of Hawaii in order to aid local conservation management efforts.

Session 3 – Invasive Ants

Towards the eradication of the invasive African big-headed ant, Pheidole megacephala from Lord Howe Island.

Haselden, Christo and Hoffmann, Ben

The Lord Howe Island (LHI) Board is undertaking a program to eradicate the African Big-headed Ant (ABhA) from LHI. ABhA is listed among the world's 100 worst invasive species, by the World Conservation Union and is subject to a threat abatement plan under the Environment Protection and Biodiversity Conservation Act 1999.

Since 2012, the Board has carried out a comprehensive review of the eradication program focussing on lessons learnt from previous failed attempts to eradicate ants from the Island, the development of a work plan to guide the eradication, training to increase local capacity, the implementation of best practice techniques for surveys, treatment, control of movements within infested areas and recording and monitoring.

The strategy recognises that the successful eradication of ABhA requires access to all properties and requires baiting within every building within the infested areas.

Over the last 12 months, a number of aspects of the eradication program have been improved including the use of alternative chemicals for indoors and cropping areas. The Board has worked closely with other state government agencies to instigate a control order over the Island allowing the Board access to leases where voluntary consent is not obtained to treat mapped infestations.

Monitoring has demonstrated eradication has been achieved throughout most of the treated areas, thereby allowing these areas to undergo natural restoration. Preliminary studies of differences in the invertebrate faunas of treated and untreated areas within the settlement area have shown that there is no persistence of any potential impacts of ABhA and no detectible non-target treatment effects.

The eradication program is expected to run for another 2 years depending on the results of further monitoring. Recommendations including further improvements, particularly in terms of research, biosecurity, communication and community involvement.

Treasure Island. Management of Yellow Crazy ant on Atafu Atoll, Tokelau. Paul Craddock1. Co-Authors: Viv Van Dyk1, Dr Monica Gruber2, Dr Rafael Barberi2, Dr Allan Burne2.

Atafu is a one of three coral atolls that make up the Tokelau archipelago. Located in the humid tropics around 500 km north of Samoa, Tokelau is a non-governing territory of New Zealand.

The population of Atafu is around 400 and lives in Atafu village on the north-western most islet of around 65ha. The invasive Yellow crazy ant (Anoplolepis gracilipes) has been present on other Tokelauan atolls since at least 1934, but was not detected on Atafu until 2008. By November 2014 the infestation covered almost the entire Atafu village islet and was having a significant effect on the local fauna and populace.

A management project for this invasive ant in Tokelau began in late 2014 due to the environmental impacts and concerns from the local Tokelauans. The project is funded by the New Zealand Ministry of Foreign Affairs and Trade through the New Zealand Aid Programme and managed by Pacific Biosecurity (part of VicLink at Victoria University). Field operations on Atafu were led by FBA Consulting, with the assistance of Pacific Biosecurity, local Environment staff and villagers.

This presentation outlines the ant management operations that took place in June 2015 on Atafu atoll. Discussion will be made on the operational challenges and issues in undertaking large-scale ant management in this remote, sensitive and pristine tropical environment. Lessons learnt for other invasive ant management programmes will be offered.

Optimising resource allocation for eradications of invasive island species

Christopher M. Baker1, Jarrod C. Hodgson2, Elena Tartaglia1 and Rohan H. Clarke2 . The University of Melbourne1 Monash University2

Presented by Rohan Clarke

Island ecosystems contain a disproportionately large amount of the world's biodiversity, and consequently, a significant amount of conservation effort is directed towards them. One of the greatest threats to these ecosystems is the presence of introduced species, and island eradications are now commonplace. The islands of Ashmore Reef Commonwealth Marine Reserve, located off the northwest cost of Australia, have been invaded by tropical fire ants (Solenopsis geminata). Due to their impacts on nesting birds and turtles, an eradication project has been proposed. Mathematical modelling has an important role to play in informing conservation actions, and I will discuss how modelling has been used to improve the proposed eradication project at Ashmore Reef.

DAY 2 WEDNESDAY 24TH FEBRUARY 2016

Wednesday 24th February

0830 Invited Speaker: Keith Broome. Pest animals invading islands – are we learning? **Keith Broome** and Euan Kennedy
Andre in here also

0900 Keynote: Ex-situ fauna management in Australia – emerging themes, a fear of failure and the need for change
Abigail Smith
Natural Resource Manager, Norfolk Island National Park, Norfolk Island, Australia
abigail.smith@environment.gov.au

Re-establishment plan of Providence petrels (*Pterodroma solandri*) on Norfolk Island
Anicee Lombal

The continuing legacy of an historical translocation.
David Milledge

1025 Morning Tea

1100 Session 5 (4 x 20 min) *Translocations cont.*

Securing Australia's island biodiversity via ex situ plant conservation: opportunities and challenges.
Lydia K. Guja [1,2,3]*, Tom G. North [1,2,3], Alasdair Grigg [1], Roslan Sani [1], Joel Christian [1], and Abigail Smith [1].
[1] Parks Australia, Australia. [2] Centre for Australian National Biodiversity Research, CSIRO National Research Collections, Canberra, Australia. [3] National Seed Bank, Australian National Botanic Gardens, Canberra, Australia.

Islands of Victoria as Conservation Arks for Mainland Eastern Barred Bandicoots .*__Duncan Sutherland__, Research Department, Phillip Island Nature Parks, PO Box 97, Cowes, VIC 3922, Australia. Amy Coetsee, Wildlife Conservation & Science, Zoos Victoria, Elliott Avenue, Parkville, VIC 3052, Australia. Peter Dann, Research Department, Phillip Island Nature Parks, PO Box 97, Cowes, VIC 3922, Australia.

Montebello Renewal: - fauna reconstruction and recovery on arid WA islands. Neil Thomas, Allan Burbidge and **Keith Morris***. WA Department of Parks and Wildlife. PO Box 51 Wanneroo 6946 WA.

1220 Lunch

1315 Session 6 (5 x 20 min) *Pests 1: Open Session 1*

Social aspects to successful island conservation - lessons from the proposed rodent eradication on Lord Howe Island. **Ian Hutton**, Lord Howe Island Museum. Leon Bryce – Lord Howe Island. David Kelly – Lord Howe Island Board

A collaborative framework for cat control/eradication on an inhabited island: - Christmas Island. **Dave Algar** [A], Mike Misso **B** and Judy West **B**. [A]Department of Parks and Wildlife, presenting author. [B] Parks Australia
An update on feral cat eradication work on Christmas Island, Indian Ocean. **Dion Maple** [A,C], Dave Algar [B], Matt Hudson [A], Neil Hamilton [B], Tanya Detto [A], Brendan Tiernan [A], Caitlyn Pink [A], Mike Misso [A]. [A] Parks Australia. [B] Department of Parks and Wildlife. [C] presenting author
Pest Free Great Mercury – A partnership for island restoration. **Peter Corson**
Making a Noise - Squawking seabirds, rasping weta, boiling balls of fish - restoring a seabird driven ecosystem to the Noises Islands, Hauraki Gulf, New Zealand. Jo Ritchie, Treescape Environmental and **Sue Neureuter**, Noises Trust.
1455 Afternoon tea
1525 Session 7 (4 x 20 min) *Pests 2: Open Session 2*
Ten year progress report on implementation of the Lord Howe Island Weed Eradication Program. **Sue Bower**, Flora Management Officer, Lord Howe Island Board
Staying ahead of the game: Island pest control in the Great Barrier Reef region. **Bridget Armstrong* and Richard Lindeman***. (National Parks, Sport and Racing: Queensland Parks and Wildlife Service – Field Management Program).
Wildcare's role in contributing to Tasmanian Islands' Natural and Cultural Heritage. **Sally Salier**
Protecting Restoration Investments on Lord Howe Island through improvements to Biosecurity measures. **Hank Bower**, Manager Environment/World Heritage. Lord Howe Island Board. Andrew Walsh, Principal Environmental Scientist – Townsville. AECOM.
Wrap up
1700 Finish
1800 Social event

DAY 2 WEDNESDAY 24TH FEBRUARY 2016

Invited Presentation

Pest animals invading islands – are we learning?

Keith Broome and Euan Kennedy

We Kiwis excel at eliminating pests from islands. Our pests seem to excel at getting back there. Recurrent incursions have a number of explanations. We are now eradicating pests from islands with high rates of visitation or within easier reach of mainland sources of infestation. These vulnerabilities are compounded by inadequate quarantine for visitors. Pests are also swimming further than we have anticipated, and some novel pathways have materialised in recent times. To sustain eradication pay-offs, we must be alert to all likely invasion pathways for new and familiar organisms. We need to improve our conventional tactics of prevention, detection and rapid response. New tools are tantalisingly close but won't be realised without concerted institutional support. Current initiatives in biosecurity awareness and collective knowledge are striving for better public outreach. In these ways, defence of our vulnerable islands is teaching us how to normalise biosecurity consciousness at home on the mainland and sustain pest-free sites there too.

Sessions 4 & 5 Translocations & *ex situ* management

Keynote Presentation – Abigail Smith

Ex-situ fauna management in Australia – emerging themes, a fear of failure and the need for change

Abigail Smith, Natural Resource Manager, Norfolk Island National Park, Norfolk Island, Australia
abigail.smith@environment.gov.au

Australia has the worst species extinction record of any continent. More than a quarter of Australian mammals have gone extinct since European settlement in 1788. Extinctions in Australia are often driven by the presence of introduced mammalian predators. Although mammalian predators have been introduced to many countries around the world their impacts have been particularly devastating in Australia as Australia lacks indigenous eutherian predators and therefore native species are naive. We do not currently have the knowledge or the tools to remove these predators from the Australian continent. However, it is possible to move threatened species away from predators through ex-situ management techniques such as captive breeding or by translocating populations to threat-free environments which are often islands. Currently these translocations are not guided by the best knowledge that is available, reducing their success. In Australia there is no central repository of knowledge relating to ex-situ management techniques, no accepted National guidelines and no strategic direction for use of ex-situ management interventions. These are essential for the adoption of ex-situ management programs on a National basis. Without this guidance a fear of failure has developed among practitioners resulting in a risk adverse approach which prevents fast and effective action amongst government and we are seeing the fallout of this resulting in inaction. I propose that as conservation ecologists we must accept translocation not as an action of last resort but employ this option much sooner in a species conservation program. Furthermore, the success or failure of a translocation program should be analysed across the program in its entirety rather than on an individual translocation event.

Re-establishment plan of Providence petrels (*Pterodroma solandri*) on Norfolk Island

Anicee Lombal, Ph.D. Candidate**,** University of Tasmania

Seabird translocations are being increasingly proposed during the last decade in response to the large number of seabird species threatened with extinction throughout the world (28%). However, this method of biodiversity conservation generally has low success rates, and six issues require assessment (stability of the source population, suitable quality at the release site, geographic imprinting, avoidance of genetic risks of hybridization and inbreeding depression, and development of suitable techniques for transfer). Here we assess the likely success of the re-establishment of Providence petrels (Pterodroma solandri) on Norfolk Island, where they used to

breed (~1,000,000 breeding pairs) before European settlement, by using Lord Howe Island individuals. We particularly focused on the potential risks of hybridization between the translocated individuals and a small colony discovered in 1986 on Phillip Island (~20 breeding pairs), 7 km off Norfolk Island, that shows different roosting behaviour. We used a total of 25 genetic markers to investigate connectivity and evolutionary history of the two remaining colonies of Providence petrel, and we showed high movement among them (8.5–10.0 individuals/generation), as well as a recent colonization of Phillip Island (50–90 years ago), which suggest high plasticity of behaviour (e.g., social behaviour). These results indicate limited genetic risks surrounding the re-establishment of a key species of pelagic seabird on Norfolk Island, and provide a practical case study in the context of maximizing persistence and resilience of seabird translocations.

The continuing legacy of an historical translocation.

David Milledge

In the 1920's up to 100 individuals of 5 owl species were introduced to Lord Howe Island to control a population explosion of the Black Rat Rattus rattus that was destroying the settlers' crops and the palm seed industry.

Only the Masked Owl Tyto novaehollandiae successfully established and it has now integrated into the Island's ecology as the top apex predator. It is listed as a Threatened species in its natural range but is considered a pest species on the Island.

On Lord Howe Island the Masked Owl occurs in rainforest at high density, occupies small home ranges that overlap, roosts and nests in a variety of sites and has a diet that consists primarily of introduced rodents although a variety of seabirds and land birds are also taken.

At least 29 Masked Owls were translocated to Lord Howe Island between 1922 and 1929 and as the owls established and consolidated, although they appeared to have little effect on Black Rat depredations on the palm industry, it is suggested that they began to exert some control over the rate of extinction of small terrestrial birds. Compared with the loss of three species immediately on rat colonisation, only two species were lost during owl introductions and two species, the Lord Howe Golden Whistler Pachycephala pectoralis contempta and Lord Howe Silvereye Zosterops lateralis tephropleurus have survived and currently maintain extant populations.

Any attempt to control or eradicate the Masked Owl population, as mandated in the Lord Howe Island Biodiversity Management Plan, should be carefully managed as removal of the Masked Owl without concurrent eradication or substantial reduction of the Black Rat population could lead to meso-predator release, with severe detrimental effects on the Island's biodiversity.

Securing Australia's island biodiversity via ex situ plant conservation: opportunities and challenges.

Lydia K. Guja[1,2,3*], Tom G. North[1,2,3], Alasdair Grigg[1], Roslan Sani[1], Joel Christian[1], and Abigail Smith[1]**.** [1] Parks Australia, Australia**.** [2] Centre for Australian National Biodiversity Research, CSIRO National Research Collections, Canberra, Australia**.** [3] National Seed Bank, Australian National Botanic Gardens, Canberra, Australia**.** [*]Presenting author: Lydia.Guja@environment.gov.au

Due to processes of evolutionary adaptation and species proliferation islands are home to unusual faunas and floras, often unlike those found anywhere else in the world. Island biodiversity, particularly on small and isolated islands, is highly susceptible to the effects of climate change, sea-level rise, and natural disasters. Although plants play a critical role, both harbouring and sustaining biodiversity, flora often receives less conservation attention than fauna. Considering the endemic, endangered and significant plants relied upon by island fauna, we investigated ex situ seed conservation as a means of securing Australia's island plant diversity. We focussed on two Australian island territories; Christmas Island in the eastern Indian Ocean, an extinct volcanic peak; and Norfolk Island in the south-west Pacific, one of few islands on a seamount in the warm temperate zone. Due to the isolation and geomorphology of the islands they contain a large number of endemic or endangered plants. For example, a staggering 46 Norfolk Island plant species are listed as threatened and federally protected, many occurring in extremely small populations of less than 200 plants. To establish a conservation and research program we first tabulated species' attributes, gathered from scientific literature and expert knowledge, to develop a prioritisation process. This process highlighted the lack of information available on the storage behaviour and germination biology of island seeds. The database will inform a program to collect seed for long-term conservation, and to use seed for research and future translocations. Future research will establish 1) whether all target species can be stored under conventional seed bank conditions, 2) how long seeds may survive in ex situ storage, 3) whether seed dormancy is present in some species, and 4) how to germinate dormant

seed so it can be used for restoration or translocation. This work contributes to the conservation of Australia's floral and faunal island biodiversity.

Islands of Victoria as Conservation Arks for Mainland Eastern Barred Bandicoots

*__Duncan Sutherland__, Research Department, Phillip Island Nature Parks, PO Box 97, Cowes, VIC 3922, Australia**.** Amy Coetsee, Wildlife Conservation & Science, Zoos Victoria, Elliott Avenue, Parkville, VIC 3052, Australia. Peter Dann, Research Department, Phillip Island Nature Parks, PO Box 97, Cowes, VIC 3922, Australia**.** * Presenting author

Islands of Australia are used as conservation Arks primarily to protect mainland species from exotic predators such as European foxes and feral cats. The mainland subspecies of the Eastern Barred Bandicoot (EBB) is listed in Victoria as 'Extinct in the Wild', and their decline is attributed to their susceptibility to predation by foxes and to habitat loss. Although outside the known distribution of EBBs, large fox-free islands of Victoria offer the best prospects for self-sustaining populations.

A trial release of 20 EBBs is underway on Churchill Island, off Phillip Island, by the Phillip Island Nature Parks supported by Zoos Victoria and the Eastern Barred Bandicoot Recovery Team. It aims to (1) determine the likelihood of success for releases onto larger fox-free islands nearby, (2) quantify the influences of EBB foraging digs on invertebrate communities, rare and threatened plant communities and soil characteristics, (3) refine EBB management techniques at all release sites by conducting experimental releases into established populations of different densities and under different conditions, and (4) demonstrate to the community what they might expect from an EBB release.

The criteria for success are based on demographic, ecological and social criteria, and will dictate the prospects of future releases on islands. Translocations such as this capitalise on island conservation programs, such as the fox eradication campaign on Phillip Island, which makes possible re-wilding of large islands with species that have been lost and other species like EBBs that cannot persist in the presence of intense predation by introduced carnivores.

Montebello Renewal: - fauna reconstruction and recovery on arid WA islands.

Neil Thomas, Allan Burbidge and **Keith Morris***. WA Department of Parks and Wildlife. PO Box 51 Wanneroo 6946 WA. * Presenting Author

The Montebello group is an archipelago of about 180 islands, many convoluted in shape, located approximately 80 km off the northern Western Australian mainland. This archipelago has been the site of an important fauna recovery and reconstruction project over the last 20 years. Black rats and cats were introduced to the islands in the late 19th century and the British government undertook nuclear weapons testing on the islands in the 1950s. Prior to these disturbances, the Montebello islands supported some unique mammal and bird fauna. The Montebello Renewal project aimed to eradicate the introduced species and reintroduce the native fauna that had disappeared. The Montebello islands have also been a site for introductions of native fauna for conservation reasons. Feral cats were successfully eradicated in 1999 and black rats in 2001, after an extensive baiting program. Two conservation introductions were undertaken successfully in the 1990s: rufous hare-wallaby or mala (Lagorchestes hirsutus) were introduced to Trimouille Island in 1998 and Shark Bay mice (Pseudomys fieldi) were introduced to North West Island in 1999 and 2000. Recently, with offset funding associated with the development of the Gorgon gas fields, reintroductions of golden bandicoots (Isoodon auratus) and spectacled hare-wallabies (Lagorchestes conspicillatus) and a conservation introduction of the burrowing bettong or boodie (Bettongia lesueur) from Barrow Island have successfully been undertaken to two islands in the group. Two birds, the Barrow Island black and white fairy-wren (Malurus leucopterus edouardi) and spinifexbird (Eremiornis carteri) have also been reintroduced to the Montebello islands as part of the fauna reconstruction project. This project has established secure populations of six species of threatened fauna and is another example of the value of islands to improve the long term conservation prospects for Australia's unique fauna.

Session 6 Pests, Communities & Island Restorations

Social aspects to successful island conservation - *lessons from the proposed rodent eradication on Lord Howe Island.*

Ian Hutton, Lord Howe Island Museum. Leon Bryce – Lord Howe Island. David Kelly – Lord Howe Island Board

Islands support some of the world's most remarkable ecosystems. They are also extremely vulnerable to disturbance from human activities and from introduced plants, animals and

disease. Once disturbed, island ecosystems are easily destroyed and may be very difficult to rehabilitate. For these reasons the IUCN has long accorded to islands a high priority for conservation action.

Eradication of feral animals from islands began as early as 1925, but accelerated in the 1980's, led by developments in New Zealand to preserve endangered bird species on predator-free offshore island arks. Large animals such as goats, pigs or cats are relatively easy to eradicate from islands because of their size and limited numbers. Rodents are much harder to eradicate, being smaller, nocturnal, numerous, wily and requiring the application of poisons. To 2014 over 400 islands around the world have been successfully treated to remove rodents. This has involved a range of techniques from hand baiting to aerial bait dropping, or a combination of both.

However, these target islands have mostly been uninhabited. Where humans have been present they have been scientists, eradication workers, itinerant fishermen or mutton birders, or private tourist resort island staff.

Islands with permanent human communities require special consideration when planning conservation programs. Lord Howe Island has a well-established community of around 360, some with a family presence for six generations, and a well developed tourist industry.

The delivery of the proposal to eradicate rodents from Lord Howe Island to the community has shown that the social factors are just as important as technical the aspects of an eradication plan if it is to be successful. Here we give the background to why this is so, and a roadmap to include the social factors for success in island eradication programs, or indeed any island conservation program.

A collaborative framework for cat control/eradication on an inhabited island: - Christmas Island.

Dave Algar[A], Mike Misso[B] and Judy West[B]**.** [A]Department of Parks and Wildlife, presenting author**.** [B]Parks Australia

There is extensive evidence that domestic cats introduced to offshore and oceanic islands around the world have had deleterious impacts on endemic land vertebrates and breeding bird populations. Feral cats have been known to drive numerous extinctions of endemic species on islands and predation by feral cats currently threatens many species listed as critically endangered. In addition to the direct impact of predation by cats on native species, they are

hosts and reservoirs for a number of diseases such as Toxoplasmosis that can affect the wellbeing of wildlife and cause serious human health complications. The presence of wandering cats in residential areas also presents significant nuisance problems.

The collaborative cat eradication program underway on Christmas Island may provide a solid framework for the development of effective cat control programs on other inhabited islands. To mitigate the environmental and social impacts of cats on Christmas Island, key land management agencies initiated the preparation of a cat management plan as a critical first step. The plan was developed with these agencies, interest groups and the broader community. It was supported and endorsed by the various organizations and has been embraced by the public. Initially, local cat management laws were revised to limit domestic and stray/feral cat impacts on native fauna, promoting responsible cat ownership, compliance and enforcement of cat management laws. The amended local legislation required all domestic cats to be neutered, micro-chipped and registered with the Shire. Since then, a staged partnership approach to cat control has been adopted, including a rigorous program to measure the efficacy of control. The collaborative approaches adopted on Christmas Island have built the foundation upon which feral/stray cat eradication may be achieved.

An update on feral cat eradication work on Christmas Island, Indian Ocean

Dion Maple[A,C], Dave Algar[B], Matt Hudson[A], Neil Hamilton[B], Tanya Detto[A], Brendan Tiernan[A], Caitlyn Pink[A], Mike Misso[A]; [A]Parks Australia, [B]Department of Parks and Wildlife, [C]presenting author

Cats (Felis catus) were introduced to Christmas Island at the time of first settlement in 1888 and have since spread to occupy all areas of the island. Cats on Christmas Island have been implicated in the extinction of mammal and reptile species and the dramatic decline of other species, such as ground-nesting sea birds.

Christmas Island, located in the Indian Ocean, is 135 km^2 with 80 km of rugged coastline. The island is terraced where coastal cliffs rise to a central plateau. Two thirds of the island is covered with natural monsoon forest vegetation, with a mixture of undulating soil areas and rugged limestone pinnacle fields, cliffs and scree slopes. This combination of thick vegetation, difficult terrain and tropical climatic conditions logistically makes access to most of the island extremely difficult logistically.

In the dry season of 2015, Parks Australia and the Western Australian Department of Parks and Wildlife, as part of a collaborative multi-year eradication program for feral cats, completed the first of several planned island-wide baiting campaigns. A combination of roadside and forest baiting using Eradicat® 1080 baits was undertaken across the entire island. A series of novel techniques, including the strategic deployment of baits to remote forest and pinnacle areas, aimed at excluding land crab and other fauna, were developed to accomplish this campaign.

The campaign was conducted in-conjunction with the biennial island-wide survey for the exotic yellow crazy ant (Anoplolepsis gracilipes), thereby integrating the management of two of the island's major biodiversity threats.

Pest Free Great Mercury – A partnership for island restoration.
Peter Corson

The Mercury Islands East of Coromandel Peninsular include some of our most precious nature reserves. Rats were removed from most islands during pioneering projects in the late 1980's and early '90s. Great Mercury, the largest and most heavily modified island remained in private ownership with the owners undertaking their own island restoration initiatives whilst operating a sheep and beef farm. In 2013 DOC signed a partnership agreement with the owners to jointly undertake restoration activities on the island, beginning with the eradication of rats and feral cats in 2014 using aerial baiting and follow up hunting of cats. Substantial planning and consultation with stakeholders to foster a partnership project, manage risks to livestock and island residents and to install a culture of biosecurity which would prevent pests reaching Great Mercury and consequently threaten the nearby nature reserve islands. This partnership has provided substantial mutual benefits and has led to further initiatives to enhance the conservation values of the whole island group.

Making a Noise - Squawking seabirds, rasping weta, boiling balls of fish - restoring a seabird driven ecosystem to the Noises Islands, Hauraki Gulf, New Zealand.
Jo Ritchie, Treescape Environmental and **Sue Neureuter**, Noises Trust.

Les Noisettes, more commonly known as the Noises Islands are a collection of small islands and rock stacks. The islands prove that small can be all - they contain the best indigenous cover of all of the inner Gulf Islands including a number of unique species of flora and fauna, low weed problems and lack of exotic mammals. Remnant seabird populations and a diverse range of marine ecosystems provide both a window into the rich native terrestrial and marine biodiversity that would have once been present around many Gulf islands and a unique opportunity to restore these environments.

The Noises have been privately owned by the Neureuter family for the last 75 years. The family remember times from their childhood when many species of seabirds frequented the islands and the rock stacks surrounding them. The marine environment around the islands was alive with the rich and diverse reef and soft shore communities of fish, shellfish, crayfish and kelp forests.

Norway rats were successfully eradicated in 1998. No other species of animal pests are present and with the removal of rats from the closest neighbouring island - Rakino - the Noises are now largely safe from animal pest reinvasions. This along with the predominant native cover, the chain of islands, recovering seabird colonies and a representative range of marine environments - provide the 'bones' for an integrated marine and terrestrial restoration programme. Seabirds are the common denominator in this programme - the islands flora and fauna are heavily influenced by these ecosystem engineers who in turn rely on a healthy and diverse marine environment to feed and pest free islands to rest and breed. People will make the difference - scientists and practitioners working together to effect a change. This presentation is the story of the plan developed and the work undertaken to protect and sustain one of the gems of the Hauraki Gulf.

Session 7 Pests, Communities & Island Restorations

Ten year progress report on implementation of the Lord Howe Island Weed Eradication Program.

Sue Bower, Flora Management Officer, Lord Howe Island Board

The Lord Howe Island Weed Eradication Program is possibly one of the most ambitious weed eradication programs in the South Pacific - if not globally - given the density, distribution and diversity of weed invasions that were present on the island at program commencement. Each

year the program aims to search half of the island to remove all mature, regrowth and previously missed target weeds. Novel techniques to survey and remove weeds on steep and inaccessible terrain are required to ensure that the whole island is searched and treated every second year.

The significant resources invested in the first 10 years of the 30 year program have delivered an 80% reduction in the number of total weeds removed per year and 92.4% reduction in the number of mature weeds removed per year. A total of 2,143,600 weeds have been removed to date at a cost of AUD6.4 million. The program has effectively protected Lord Howe Island's World Heritage ecosystems from the immediate threat of dense and widespread weed infestations.

The strong downward trend in the number of weeds encountered per annum suggests a zero density of most target weeds will be achievable within the forecast 30 year program. As a consequence of success to date and positive future outlook, the program is at a critical stage at risk of eradication fatigue and complacency. Sustained investment needs to be applied to maintain the current weeding effort and to scope new and improved methods to eradicate weeds from Lord Howe Island.

This presentation will report on the outcomes achieved over the past 10 years, the development of novel techniques to survey and treat weeds, and provide a sound basis for continued high level investment to provide long term protection of the island's unique environment.

Staying ahead of the game: Island pest control in the Great Barrier Reef region.

Bridget Armstrong* **and Richard Lindeman***. (National Parks, Sport and Racing: Queensland Parks and Wildlife Service – Field Management Program).

Invasive species, including weeds, pest animals and diseases, represent the biggest threat to biodiversity after habitat loss. Throughout Australia, pests are spreading faster than they can be controlled, and this poses a significant challenge to managers of the Great Barrier Reef World Heritage Area. The cost of controlling invasive species on islands, particularly those that are remote or difficult to access, can be exorbitant. The sooner that pests are detected and controlled, the more effectively island natural values can be protected.

For early detection of invasive species, rangers capture information on a "GBR Island Watch" form about the ecosystem health of islands and cays, and the presence of pests and other potential threats to natural values. The form will be integrated into the tablet-based Field Reporting System (FRS) at an individual island level, for electronic tracking and early reporting of the condition of, and threats to, natural values.

But by far the most cost effective solution is to prevent the arrival of invasive species in the first place. Island biosecurity has been loosely practiced in past, but in-house procedures, particularly incorporating quarantine and surveillance, have become formalised over the last year. All islands in the GBRWHA are allocated a biosecurity rating according to their values, threats and other factors affecting the feasibility of implementing a particular level of biosecurity. Procedures for inspection and cleaning of personal gear, field equipment and machinery, and landscaping and building materials are specified. The next step is a public communication strategy targeting all island users.

Examples of pest control projects are provided to illustrate how management actions focus on early detection at specific sites where direct threats are a high risk, and where interventions will have a positive and ongoing benefit.

Wildcare's role in contributing to Tasmanian Islands' Natural and Cultural Heritage. **Sally Salier**

Wildcare Inc is a unique Tasmanian volunteer organisation of some 6000 members, many of whom assist the Tasmanian National Parks and Wildlife Service, other conservation organisations and land managers, in conserving natural and cultural heritage.

At least eight "Friends of" Wildcare Branches have been formed to specifically care for islands around the Tasmanian coastline. These Islands include Maatsuyker, Deal, Maria, Tasman, Bass Strait Islands, Schouten, Fisher and Snake Islands, each with its own unique issues, be it weed infestations, crumbling buildings, feral animals, degradation from prior occupancy or over use by visitors.

Conservation work includes weed eradication, bird monitoring, eradication of feral animals, the mapping of weeds, aboriginal middens, and bird sightings etc, maintenance of heritage buildings, and in some cases, creating a museum. It also includes hours of fund raising in order to help finance various projects.
All these islands are managed by our state Parks Service, who have limited funding and are by and large unable to provide the time, personnel and finance to restore and keep these unique habitats well maintained and cared for. These Islands vary in distance from Tasmania from over 100km (Deal) to 300 m (Tasman), but access is often difficult and always expensive. Some can only be accessed by helicopter or charter boat, one by ferry, and another by voluneers paddling themselves there in kayaks.
This is where Wildcare Inc has been able to assist. This organisation offers small grants to their branches for specific projects, funding for transport, for training volunteers in the use of equipment and first aid, buying tools and protective equipment, insurance, plus assistance in applying for larger grants from external sources.

Protecting Restoration Investments on Lord Howe Island through improvements to Biosecurity measures.

Hank Bower, Manager Environment/World Heritage. Lord Howe Island Board. Andrew Walsh, Principal Environmental Scientist – Townsville. AECOM.

The Lord Howe Island Board (LHIB) has been implementing targeted multi-species ecological restoration projects since 1979. These include working towards eradicating priority introduced pest plants, animals and diseases, implementing threatened species recovery actions to assist in the restoration of native habitats and ecological processes and preventing the incursion of new pests. The LHIB recognized that failure to implement restoration actions would result in further declines of species and their habitats and impact the islands World Heritage values.

Introductions of pest species commenced as early as the 1820's when passing sailors introduced pig (Sus scrofa) and goat (Capra hircus) as a source of food. Soon after settlement (1834) additional species were introduced including the feral cat (Felis cattus), rodents (Rattus rattus & Mus musculus) and a diversity of exotic plants. Introductions have continued through time but are now regulated through stringent quarantine regulations.

In 1979 pigs and cats were eradicated, resulting in the successful recovery of the endemic and Endangered Lord Howe Woodhen (Gallirallus sylvestris). In 1999 all but three female feral goats were exterminated and are being left to die through natural attrition.

The LHIB are currently implementing an eradication of African Big-headed Ants (Pheilode megacephala), an island wide weed eradication project targeting at least 25 priority pest plants using a systematic grid search approach and the eradication of Black Rat and House Mouse from the island is in the planning and approvals phase.

In total, these projects are expected to cost over $20million and require sound biosecurity measures to protect the investment. In 2015 the LHI Biosecurity Strategy was revised and updated to consider the proposed rodent eradication and provide a framework to prevent incursions of unwanted pests into the future. The strategy recommends a range of actions, including construction of inspection facilities, more regular inspections and greater awareness for residents, businesses and visitors.

DAY 3 THURSDAY 25TH FEBRUARY 2016

Thursday 25th February
0830 Norfolk Island TBA
0900 Norfolk Island TBA
0940 Chair's Address TBA
1000 Morning Tea
1045 Session 8 (5 x 20 min)
The cascading impacts of cyclones on insular ecosystems. **William Goulding** (presenting author)*; Patrick T Moss; Clive A McAlpine.Affiliations: Department of Geography, Planning and Environmental Management. University of Queensland, St Lucia Qld 4068.
Long-term monitoring of island dibbler populations shows their vulnerability to extinction. J. **Anthony Friend*** and Timothy A. Button. Animal Science Program, Department of Parks and Wildlife, Albany Research, 120 Albany Hwy, Albany WA 6331, Australia.*presenting author
Marine Turtles of Norfolk Island. **K Pendoley** and M Christian
Norf'k Ailen – A Dark Sky Community Case Study. **Kellie Pendoley**
The Decline of an Endemic Cushion Plant Species on the Subantarctic Macquarie Island. **J. Whinam** [A], M. Visoiu [B] and J.B. Kirkpatrick [A]. [A] School of Land and Food, University of Tasmania, Private Bag78, GPO, Hobart, Tasmania, Australia 7001. [B] Natural Values Conservation Branch, Department of Primary Industries, Parks, Water & Environment, GPO Box 44, Hobart, Tasmania 7001
1225 Lunch **Poster Displays**
1325 Session 9 (3 x 20 min)
Close **Afternoon field excursions TBA**

DAY 3 THURSDAY 25TH FEBRUARY 2016

Session 8 – Perspectives

The cascading impacts of cyclones on insular ecosystems.

William Goulding (presenting author)*; Patrick T Moss; Clive A McAlpine.Affiliations: Department of Geography, Planning and Environmental Management. University of Queensland, St Lucia Qld 4068.

Anthropogenic climate change is a global phenomenon that will continue to accelerate the loss of global biodiversity. A large portion of global biodiversity is comprised of island species that are particularly vulnerable to change. This vulnerability stems from spatial constraints and insular species' traits, which are the product of unique insular selection pressures. Consequently, climate change has the potential to disproportionately impact island endemic taxa and counteract many of our current biodiversity conservation efforts on islands. Published research relating to biodiversity conservation and climate change has largely been dominated by the potential impacts of long-term shifts in mean climate. Relatively few investigations have documented the near-term impacts of projected climate change or the impacts of human coping strategies on insular biodiversity. The predicted increase in the intensity of tropical cyclones is one component of climate change that is highly relevant to biodiversity conservation in cyclone-prone regions, such as the biodiverse Southwest Pacific. I will present a case study of the impacts of Cyclone Ita on the biodiversity of islands in the Louisiade Archipelago, Papua New Guinea. This graphic example highlights how the event prompted numerous indirect feedbacks and human coping strategies that had immediate impacts on the terrestrial and marine ecosystems. These outcomes are potentially far more deleterious and catastrophic for insular biodiversity in the near-term than the long-term shifts in mean climate. Rather than being an isolated case, these observations are globally relevant to conservation efforts on islands with human populations dependent on subsistence agriculture.

Long-term monitoring of island dibbler populations shows their vulnerability to extinction.

J. Anthony Friend* and Timothy A. Button

Animal Science Program, Department of Parks and Wildlife, Albany Research, 120 Albany Hwy, Albany WA 6331, Australia.*presenting author

The discovery in 1985 of populations of the marsupial dibbler (Parantechinus apicalis) on Boullanger and Whitlock Islands, off Jurien Bay, Western Australia, was followed by a succession of studies into aspects of their biology and ecology. The phenomenon of facultative male die-off was described in the population on Boullanger Island, where males suffer a higher mortality rate than females after the annual mating period in years of low resources, but show similar mortality rates as females in other years. Another study showed that dibbler body size and longevity were greater on Whitlock than on Boullanger, probably due to the high input of nutrients brought to the island by the burrowing wedge-tailed shearwaters (Puffinus pacificus) that breed on Whitlock Island.

Since May 2005, a monitoring program on Boullanger and Whitlock Islands has been carried out, employing uniform trapping effort in May and October each year. Trapping grids cover both islands in an attempt to assess population numbers on each occasion, although the trap density is higher on Whitlock (6.7 traps/hectare) than on Boullanger (3.6 traps/hectare). Numbers known to be alive (KTBA) at trapping sessions varied from 7 to 114 on Boullanger and from 4 to 43 on Whitlock. While complete male die-off apparently occurred once on Boullanger during the 10 years of monitoring, in two other years only two males were known to be alive after the mating season. On Whitlock Island where numbers are generally more stable than on Boullanger, a dramatic decline in population occurred between May 2010 and May 2011. KTBA dropped from 27 to 4, and the population persisted only through the survival through that period of two females and some of their young.

It is likely that island populations regularly approach extinction, but these events will only be recorded and put into context through long-term studies.

Marine Turtles of Norfolk Island.

K Pendoley and M Christian

The first publication in over 200 years to address the status of marine turtles on Norfolk Island was released in 2012 (Pendoley and Christian, 2012). This presentation will summarize the

conclusions from that paper and update the current knowledge on habitat usage and migration pathways. We will argue the case against Norfolk Island having historically supported marine turtle nesting and suggest a potential nesting beaches for the resident turtles observed at Norfolk Island. There have not been any systematic research on Norfolk Island's resident marine turtle populations and consequently nothing is known of the ecology or biology of these populations. Here we suggest some priorities for research projects to start filling this knowledge gap.

Norf'k Ailen – A Dark Sky Community Case Study.

Kellie Pendoley

Globally light pollution is increasingly being recognised for its negative impacts on astronomy, human health and wildlife behaviour. Entire generations of people grow up without ever seeing the Milky Way in brightly lit regions of the USA, Europe and Japan. Astronomers are no longer able to use observatory situated near urban centres and the health impacts of Artificial Light at Night (ALAN) on night shift workers i8snow well recognized with statistically significant increases in cancers observed in night shift nurses. The social impacts of light are also well know and include reduced security, glare and light trespass into neighbouring areas. The impact on wildlife is well known for causing behavioural and orientation problems in marine turtles, bird's insects, mammals and fish.

A dark sky is a resource that must be protected like any other natural value for current and future generations and is the Mission of the International Dark Sky Association (IDA). An IDA initiative in this area is the Dark Sky Places program which encourages communities to preserve and protect dark sites through responsible lighting policies and public education. Of the five program types offered by IDA, Norfolk Island is preparing a submission for a International Dark Sky Community designation making it the first Dark Sky community in the southern hemisphere. The benefits to Norfolk Island include savings in electricity costs, which are the highest in the world at 75c per Kw hour and astro-tourism (star observing, astronomy and astro-photograpy). The steps taken to prepare the application and the lessons learned in the progress towards the goal will be discussed.

The Decline of an Endemic Cushion Plant Species on the Subantarctic Macquarie Island

J. Whinam[A]*, M. Visoiu*[B] *and J.B. Kirkpatrick*[A], [A] School of Land and Food, University of Tasmania, Private Bag78, GPO, Hobart, Tasmania, Australia 7001, [B] Natural Values Conservation Branch, Department of Primary Industries, Parks, Water & Environment, GPO Box 44, Hobart, Tasmania 7001

A decline was observed in the Macquarie Island endemic cushion, Azorella macquariensis during the summer of 2008/2009, resulting in the listing of the species as critically endangered in 2010. Photographs of A. macquariensis in the period 2009-2013 were used to identify types of damage and to determine the likely causes of three distinct types of damage that were distinguished by colour, surface characteristics and size. Grey damage occurred on the most wind-exposed parts of cushions and on the most wind-exposed sites. Speck damage occurred in the opposite situations and was consistent in its location, attributes and timing with rabbit grazing. Yellow dieback was sporadic in its occurrence. Its symptoms were consistent with those of a pathogen. Yellow damage expanded between spring 2009 and autumn 2010, with neither grey nor speck damage increasing. Yellow damage was associated with a marked decline in live cushion cover in plots between 2010 and 2013. The cushion was not eliminated from any plots, despite increased cover of Agrostis magellanica in plots with dead cushions. Only one site not impacted by yellow damage in 2010 had become affected by 2013. Given these results, and given that yellow damage has been observed in the past, 2008-2010 may have been an infrequent extreme outbreak of a pathogen and/or a response of a pathogen to ongoing climatic change.

POSTERS

Raine Island Recovery Project – management actions

Authors: Katharine Robertson[1], Bridget Armstrong[1]* and Andy Dunstan[2]
([1]National Parks, Sport and Racing: Queensland Parks and Wildlife Service; [2]Department of Environment and Heritage Protection)
(* presenter)

Raine Island supports the world's largest green turtle rookery; however there is a high mortality of nesting female turtles, and low reproductive success compared to other green turtle rookeries. Methods to increase the reproductive success and to minimise nesting turtle mortality on the island are being trialled as part of the Raine Island Recovery Project. The project is led by the Queensland Department of Environment and Heritage Protection in partnership with the Queensland Department of National Parks, Sport and Racing (Queensland Parks and Wildlife Service), Great Barrier Reef Marine Park Authority, and Traditional Owners, in collaboration with other government departments, research organisations, and universities. Management actions to minimise the high mortality of nesting females include the installation of cliff top fencing and the rescuing of exhausted turtles. These activities have significantly reduced adult turtle mortality on the island.

Application of UAVs to support pest management and biodiversity counts on Christmas Island

Authors: Guy McCaldin[1], Michael Johnston[2] and Andrew Reiker[1]
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2. Department of Parks and Wildlife, PO Box 51, Wanneroo, Western Australia, 6946.

Land managers of conservation estate can make better decisions when they have access to up-to-date aerial imagery or other data sourced in conjunction with support from the local air charter operator. However, the acquisition of these resources can prove expensive at remote sites. This is specifically the case with Christmas Island which is located 2600 kilometres north-west of Perth and has no local light aircraft operator. Instead, we used two unmanned aircraft to collect the required data across multiple mission objectives in a timely and cost-effective manner.
The primary objective was to assess whether aerial baiting would be an effective method of delivering baits to feral cats given the dense canopy. Baits were dropped over sites comprising representative vegetation communities with ground crews then relocating these baits and determining the proportion that were accessible to feral cats. Secondly, high resolution aerial mapping of these sites was then undertaken with other mapping missions also undertaken over other park infrastructure or revegetation sites. Digital elevation models were then prepared from this imagery.
A thermal video camera was used to evaluate the viability of conducting fauna counts of threatened species such as Abbott's Booby and CI Flying fox.
Examples of the outcomes of this work will be shown at the conference.