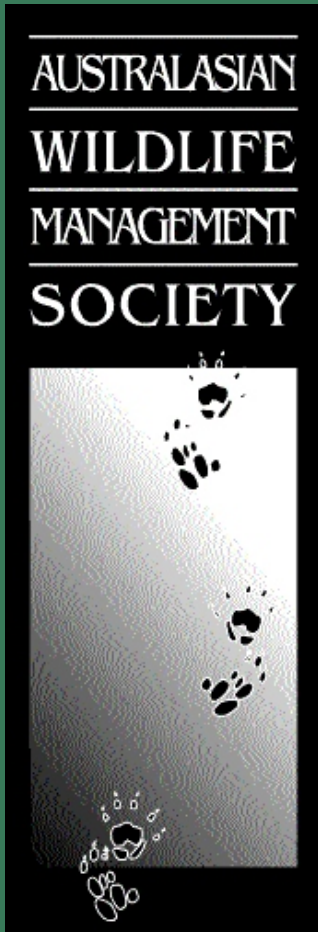


AWMS

Conference

2005



18th Scientific Meeting
and Annual General Meeting
21-24 November

Hobart, Tasmania

Sponsored by:



Natural Heritage Trust

Helping Communities Helping Australia

An Australian Government Initiative

Invasive Animals



Cooperative Research Centre



AUSTRALASIAN WILDLIFE MANAGEMENT SOCIETY

2005 CONFERENCE, HOBART

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AUSTRALASIAN WILDLIFE MANAGEMENT SOCIETY
 18th Scientific Meeting and AGM
 21-24 November 2005, Wrest Point Hotel, Hobart Tasmania

DISCLAIMER

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Copies of this publication will be available on the AWMS website: www.awms.org.nz

THE CONFERENCE SOCIAL PROGRAM

SUNDAY 20 NOVEMBER

ICEBREAKER BBQ

To be held in the grounds of Wrest Point, Sandy Bay Road, Hobart. The function will start at 6.30pm and run through until 8pm. The cost of \$28 includes your meal and drinks for the hour and a half.

The Registration Desk will be set up to take your registrations.

WEDNESDAY 23 NOVEMBER

CONFERENCE DINNER

In Wrest Point commencing at 7pm for 7.30pm. The theme for the evening is "Antarctic" and if you are unable to bring a costume with you, a local fancy dress company will set up in our trade exhibition area during the Wednesday lunch break. The average price of hire is around \$30 and costumes can be returned the following day.

STUDENT DINNER

Details will be available from the registration desk.

THURSDAY 24 NOVEMBER

FIELD TRIP TO WARA RESEARCH STATION

Complete details will be made available to participants prior to the trip. Bus will depart from Wrest Point at 1.00pm returning to the hotels at approximately 7pm that evening.

COMPUTER WORKSHOP

This will be held in the University of Tasmania Computing School which is a short walk from Wrest Point. Please ask at the Registration Desk if you are unsure.

THE POSTER PROGRAM

JUSTINE LEWIS

Mating systems and multiple paternity in the wild estuarine crocodile (*Crocodylus porosus*)- a study in a Northern Territory population using microsatellites

VICKI STOKES

Occurrence of species of *Angiostrongylus* in populations of *Rattus rattus* and *Rattus fuscipes* in coastal forests of south-eastern Australia

PETER SPENCER

Pharkin Feral Pigs: A triple threat species & how DNA profiling can support management

BRENDAN TAYLOR

Wild roads: understanding and mitigating the impact of roads on wildlife

TINA BALL

How useful are 'gliding poles' as surrogate tree corridors?

NICOLA AITKEN

Microsatellite DNA markers for tracking possum movement

JOHN DOWLING

Diets of stoats in a braided river valley: impacts on shorebirds

G WHILE

The development of a natural habitat research base for golden monkeys (*Rhinopithecus roxellana*): A step forward for captive primate management in Asia

LISA EVANS

Bats in boxes: a method for monitoring without disturbance

LEE WEBLEY

Male-biased dispersal in urban populations of Brushtail possums

LEE WEBLEY

Population genetics of European Fallow Deer in Tasmania

AMY WINNARD

Success and failure of Eastern Barred Bandicoot *Perameles gunnii* reintroduction in Victoria



Australasian Wildlife Management Society

Date Monday 21/11/2005

Hobart 2005 - Conference Program

Opening and Keynote

0830	0900	Welcome	
0900	0945	Plenary	Taberlet, Pierre
0945	□1015	MORNING TEA	

Wildlife Genetics for Management Symposium

Chair Andrea Byrom

1015	1030	Hair today not gone tomorrow: monitoring demography and long-term habitat use in the northern hairy-nosed wombat	Taylor, Andrea
1030	1045	Molecular genetics and conservation: Advances in the conservation management of the Australian quoll, with emphasis on the eastern quoll (<i>Dasyurus viverrinus</i>)	Cardoso, Maria
1045	1100	Non-invasive Sampling Techniques: Applications for Mapping the Genetic Variation of Powerful Owls	Hogan, Fiona
1100	1115	Evaluating recombinant sex-ratio distortion as a technique to control invasive pests	Bax, Nicholas
1115	1130	Improving the accuracy of DNA-based methods for population estimation of vertebrate pests: incorporating genotype uncertainty into mark-recapture models	Byrom, Andrea
1130	1145	Identifying bias in trap-catch monitoring by comparison with a genotype-derived complete population inventory	Morgan, Dave
1145	1210	Know thy enemy: a molecular approach to understand the ecology and management of the feral pig in south-western Australia	Spencer, Peter
1200	1215	Where are the Tasmanian foxes? An early look using DNA approaches	Sarre, Stephen
□1215	□1330	□LUNCH	

Open Session

1330	1345	Habitat-specific population density of sambar (<i>Cervus unicolor</i>) in Yarra Ranges National Park, Victoria	Bennett, Ami
1345	1400	Estimating feral horse abundance on the Bongong High Plains using an aerial mark-recapture estimate	Miller, Cameron
1400	1415	Ecology of red deer (<i>Cervus elaphus</i>) in the Grampians National Park, Victoria	Roberts, Cathryn
1415	1430	Assessing GPS-collar performance in southern New South Wales and analysis of the home range, core utilisation distribution movement and interactions of wild dogs	Robley, Alan
1430	1445	Impact of the introduced black rat (<i>Rattus rattus</i>) on native small mammals in coastal forests of eastern Australia: Implications for the management of introduced and native rodents	Stokes, Vicki
1445	1500	Nutritional ecology of eastern grey kangaroos	Billing, Justin
1500	□1530	□AFTERNOON TEA	

Open Session

1530	1545	Silver Gull populations in the Port Lincoln area	Harrison, Shelley
1545	1600	Dry season use of space, habitats and shelters by the short-eared rock-wallaby, <i>Petrogale brachyotis</i> , in the wet-dry tropics	Telfer, Wendy
1600	1615	The accuracy of ground-based estimates for assessing hollow abundance	Koch, Amelia
1615	1630	The role of <i>Xanthorrhoea semiplana</i> (grass tree) as refugia for <i>Rattus fuscipes</i> in the Mount Lofty Ranges, South Australia, and implications for other native wildlife	Frazer, Deborah
1630	1645	The diet of the western pygmy possum, <i>Cercartetus concinnus</i> , at Innes National Park, South Australia	Pestell, Angela



Australian Wildlife Management Society

Date Tuesday 2/11/2005

Hobart 2005 - Conference Program

		<i>Chair</i> Menna Jones, Wildlife Management Branch, Department Of Primary Industries	
Tasmanian Wildlife Management Symposium			
0845	0900	Are we making progress recovering Tasmania's threatened species – a 15 year review.	Bryant, Sally
0900	0915	Epidemiological features of a new disease in the Tasmanian devil (<i>Sarcophilus harrisii</i>)	Hawkins, Clare
0915	0930	Management of Tasmanian devil populations in response to the Devil Facial Tumour Disease	Jones, Menna
0930	0945	Alternative management strategies to 1080: how far have we come in 10 years?	O'Reilly-Wapstra, Julianne
0945	1000	Distribution and abundance of roadkill on Tasmanian highways: human management options	Hobday, Alastair
1000	1030	MORNING TEA	
		<i>Chair</i> Menna Jones, Wildlife Management Branch, Department Of Primary Industries	
Tasmanian Wildlife Management Symposium Continued			
1030	1045	Using predictive regression to identify local road features associated with wildlife road-kill	Shaw, Richard
1045	1100	Effects of low-intensity fuel reduction burns on populations of <i>Mastacomys fuscus</i> , <i>Antechinus minimus</i> , and <i>Rattus lutreolus</i> in montane buttongrass moorland, Tasmania	Driessen, Michael
1100	1115	Management of avian issues at Tasmanian Wind Farms	Hull, Cindy
1115	1130	Conservation of hollow-bearing trees in Tasmania's production forests.	Munks, Sarah
1130	1200	Responding to fox incursions in Tasmania; an update	Mooney, Nick
		<i>Chair</i> Colin Southwell, Australian Antarctic Division	
Antarctica And Wildlife Management			
1200	1215	Perturbations in the Southern Ocean ecosystem due to exploitation: evidence from a top level predator, the crabeater seal	Southwell, Colin
1215	1230	Leopard seal (<i>Hydrurga leptonyx</i>) sightings at Macquarie Island appear to follow natural cycles and only minor management action is required.	Burton, Harry
1230	1330	LUNCH	
		<i>Chair</i> Colin Southwell, Australian Antarctic Division	
Antarctica And Wildlife Management			
1330	1345	Quantifying exogenous and endogenous processes influencing elephant seal abundance trends	De Little, S.C.
1345	1400	The difficulties in monitoring a partially hidden penguin population	Emmerson, Louise
1400	1415	The Scientific basis for Australia's management of current and proposed whaling activities in the Southern Ocean	Gales, Nick
1415	1430	Understanding variation in penguin responses to human activity to enhance management on Macquarie Island	Holmes, Nick
1430	1445	Seabird bycatch mitigation in fisheries	Robertson, Graham
1445	1500	The behavioural responses of lactating Weddell Seals and their pups (<i>Leptonychotes weddellii</i>) to Pedestrian approaches	Van Polanen Petel, Tamara
1500	1530	AFTERNOON TEA	
Open Session			
1530	1545	Developing a cat specific bait - Capsule consumption by feral cats (<i>Felis catus</i>) and non-target species in the field	Bencini, Roberta
1545	1600	Welfare aspects of zinc phosphide poisoning in brushtail possums	Fisher, Penny
1600	1615	The impact of using Probaits for fox control on Chuditch (<i>Dasyurus geoffroyi</i>) in the wild.	Morris, Keith
1615	1630	Development of a humane toxin for the control of stoats, feral cats and wild dogs	Murphy, Elaine
1630	1645	What was in Snow White's apple – and would it work on possums?	O'Connor, Cheryl
1645	1700	Movements of wild birds between Asia and Australia and implications for avian influenza	Tracey, John



Australian Wildlife Management Society

Date Wednesday 23/11/2005

Hobart 2005 - Conference Program

Open Session

Chair Kerry Borkin, Landcare Research

0845	0900	The Koala and Kangaroo Contraception Program (KKCP)	Cooper, Des
0900	0915	Protocols for the reliable measurement of testosterone secretion in the koala: tools for reproductive assessment	Allen, Camryn
0915	0930	Seasonal plasma progesterone profiles and fertility in female koalas treated with gestagens for fertility control	Hynes, Emily
0930	0945	The preservation and management of Koala genetic diversity using reproductive biotechnology and molecular genetics: a model for endangered Australian marsupials	Johnston, Steve
0945	1000	Management of a tamar wallaby population on North Island using the long-acting contraceptive Suprelorin®	Herbert, Cathy
1000	1030	MORNING TEA	

Chair Dave Forsyth, Arthur Rylah Institute For Environmental Research

Monitoring Animal Populations For Management

1030	1045	Wildlife detection: one parameter or two?	Efford, Murray
1045	1100	Optimising wildlife monitoring to detect rare species or disease	Ramsey, Dave
1100	1115	Estimating detection probabilities in freshwater ecosystems	Nicol, Simon
1115	1130	What sample size is needed to estimate age distribution accurately?	McLeod, Steve
1130	1145	Optimal monitoring frequency for harvested populations across a gradient of aridity	Pople, Tony
1145	1200	A national trap-catch protocol for monitoring brushtail possum populations in New Zealand	Warburton, Bruce
1200	1215	Estimating changes in deer density using faecal pellet counts	Forsyth, David
1215	1230	A hair-tube survey protocol and sampling framework for estimating site occupancy by the spotted-tailed quoll	Nelson, Jenny
1230	1330	LUNCH	

Chair Dave Forsyth, Arthur Rylah Institute For Environmental Research

Monitoring Animal Populations For Management

1330	1345	Addressing the problems of monitoring burrow-nesting seabirds	McKechnie, Sam
1345	1400	Using a Bayesian model to analyse monitoring data for the Corangamite Water Skink, <i>Eulamprus tymphanus marnieae</i>	Scroggie, Michael

Open Session

1400	1415	Establishing tourist approach distance guidelines at Seal Bay Conservation Park, South Australia	Terijo, Arianna-Lovasz
1415	1430	Grey-headed Flying-foxes: still damned by image and lack of public knowledge?	Ballard, Guy
1430	1445	Visitor perceptions of current and proposed native Australian wildlife management policy in Australia	Rosewarne, Michael
1445	1500	Does small-scale species distribution modelling, consistent with recent wildlife management practices, give realistic results?	Murray, Justine

Open Session

1530	1545	On using monitoring data to evaluate theory and assist wildlife management	Hone, Jim
1545	1600	Combining monitoring data for threatened wildlife and exotic predators to project the level of predator control needed to maintain native populations	Armstrong, Doug
1600	1615	Monitoring the freshwater goanna following the arrival of cane toads using site occupancy models	Griffiths, A.D.
1615	1630	A bigger road with less impact? Monitoring fauna-friendly road crossings on Compton Road, Brisbane	Jones, Darryl
1630	1645	Managing Tasmanian devil (<i>Sarcophilus harrisii</i>) populations affected by the Devil Facial Tumour Disease (DFTD): The effect of DFTD on demography, population dynamics, and fine-scale population genetic structure	Lachish, Shelly
1645	1700	Using wildlife detector dogs to locate, manage, and reduce the spread of the invasive Brown Treesnake in Guam	Winford, Kristin



Australian Wildlife Management Society

Date Thursday 24/11/2005

Hobart 2005 - Conference Program

Open Session

0845	0900	Simulation modelling of extinction proneness and recovery in the critically endangered grand and Otago skinks.	Tocher, Mandy
0900	0915	Strategising recovery of the critically endangered grand skink and Otago skink: an ecological 'worst case scenario'.	Reardon, James T.
0915	0930	Modelling the effect of roads and other disturbances on wildlife populations in the peri-urban environment to facilitate appropriate management	Ramp, Daniel
0930	0945	Evidence-based management of fox predation on brush-tailed rock wallabies in NSW	Henry, Steve
0945	1000	Predicting qualitative ecosystem outcomes of single species pest control	Norbury, Grant
1000	1030	MORNING TEA	

Chair **Sylvana Maas, Australian Government Department Of The Environment And Heritage**

Conservation Assessment

1030	1045	Macropod assemblages form simple nested subsets in remnants of Box-Ironbark	Holwell, Greg
1045	1100	Identifying threshold responses to habitat loss: how much habitat do koalas need?	Rhodes, Jonathan
1100	1115	IUCN's list of "species of least concern" differs from the NSW schedules of threatened species	Lunney, Dan
1115	1130	Species Information Partnerships: sharing knowledge on threatened species	Lawrence, Amanda
1130	1145	Assessing the conservation status of ecological communities for listing under the EPBC Act.	Maas, Sylvana

Open Session

1145	1200	Monitoring small predators for management or conservation	King, C.M.
1200	1215	Short-term responses of fur seals to visitation by tourist boats at Montague Island, New South Wales.	Shaughnessy, Peter
1215	1230	National Assessment of Invasive Animals – program in development.	West, Peter
1230	1330	LUNCH	

Computer Workshop

1330	1530	Spatially explicit capture-recapture using the software Density	Efford, Murray
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CONCURRENT OPEN SESSION

0845	0900	Day and night time tree utilization and diet of St Bees Island (Queensland) female and sub-adult koalas	Tucker, Gail
0900	0915	Decay rates of koala dung	Lunney, Dan
0915	0930	The Koala Conservation Plan.....a better future for South East Queensland koalas.	De Villiers, Deidre
0930	0945	Koalas and Koala management on Kangaroo Island: a comparison of attitudes and opinions held by different stakeholder groups	Wilks, Sarah
0945	1000	Use by koalas of reconstructed landscapes, key inputs for land managers.	Woodward, William
1000	1030	MORNING TEA (Sponsored by the Koala Foundation)	

CONCURRENT OPEN SESSION

1030	1045	Landscape influences on avian diversity in urban remnant vegetation	White, John
1045	1100	Fire affects the survival of small mammals in a tropical savanna	Griffiths, A.D.
1100	1115	Does microbat activity differ between sites which have similar vegetation characteristics?	Prevett, Patrick
1115	1130	Bunkers Conservation Reserve: Can volunteers turn around 150 years of ecosystem damage in a semi-arid environment?	Herbst, Kaz
1130	1145	A successful case of pro-active kangaroo management	Bilton, Amanda
1145	1200	Management of Canada geese (<i>Branta canadensis</i>) in New Zealand	Coleman, J.D.
1200	1215	Community-based Shorebird Conservation on the South Coast of NSW	Dawson, James
1215	1230	Banding and radio-tracking juvenile Powerful Owls in Melbourne, Victoria: trials and tribulations	Cooke, Raylene
1230	1330	LUNCH AND CONFERENCE CLOSE	
1300	1900	FIELD TRIP TO WARA RESEARCH STATION	

ABSTRACTS

(in program order)

MOLECULAR GENETICS AND CONSERVATION: ADVANCES IN THE CONSERVATION MANAGEMENT OF THE AUSTRALIAN QUOLLS, WITH EMPHASIS ON THE EASTERN QUOLL (*DASYURUS VIVERRINUS*)

Presenter

Maria Cardoso
 School of Biological, Earth and Environmental Science,
 University of NSW

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 Mooney, Nick
 Sherwin, William
 Firestone, Karen

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Session MONDAY 21/11/2005

ABSTRACT

Quolls (*Dasyurus* spp.) are amongst the largest of the carnivorous marsupials in the world, only exceeded in size by the Tasmanian devil. All six known species are endemic to Australasia and function as top-level native marsupial predators in all the ecosystems they inhabit. All four of the Australian quolls are under severe threat due to a variety of interacting factors, including habitat loss, direct and indirect effects of introduced predators, indirect mortality from non-target 1080 poisoning, the spread of cane toads, and purported disease epidemics. With the recent introduction of foxes in Tasmania and the alarming disease outbreak in devils, Tasmania's eastern and spotted-tailed quolls could come under serious threat, while cane toad invasions into the Northern Territory are having a significant impact on one of the few remaining strongholds for northern quolls. More and more frequently, molecular techniques are being used to address significant questions in ecology, evolution, behaviour and conservation. The overall aim of this project is to use genetic markers to gather information on, and better understand Australia's large carnivorous marsupials. Microsatellites and the mitochondrial DNA (mtDNA) control region (CR) are highly variable markers that have a broad range of applications in conservation and evolutionary genetics and have been widely used in population, parentage, and phylogeographical studies. These markers, previously developed for Dasyurids, will be used to identify and characterise genetic partitions within quoll species for biodiversity assessment, to measure population parameters of concern for management (genetic diversity, effective population size, and degree of gene flow between populations) and to understand the evolutionary forces acting on translocated populations. Eastern quolls are currently presumed extinct on the Australian mainland, only to be found in the wild in Tasmania. One of the main aims of this project is to assess the genetic structure of populations of eastern quolls (*Dasyurus viverrinus*) from different geographical regions in Tasmania. The information gathered will be used as baseline data to allow wildlife managers to make decisions about the current and future management of these populations in light of continued environmental and anthropogenic threats.

Notes:

NON-INVASIVE SAMPLING TECHNIQUES: APPLICATIONS FOR MAPPING THE GENETIC VARIATION OF POWERFUL OWLS

Presenter

Fiona Hogan
School of Ecology and Environment, Deakin University,
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Session MONDAY 21/11/2005

Author(s) and/or Co-Presenters

Hogan, Fiona
Cooke, R
Norman, J
Burridge, C

ABSTRACT

The Powerful Owl (*Ninox strenua*) is endemic to Australia, being resident in the three eastern mainland states and the Australian Capital Territory. It is classified nationally as of conservation significance and vulnerable in the state of Victoria. The elusive nature of this owl, along with its dispersed distribution, low population density and difficulty in identifying individual birds, limit the collection of ecological data. Molecular methods can be used to obtain crucial ecological information, essential for Powerful Owl conservation.

Non-invasive sampling is a relatively new method used for obtaining genetic material from free-ranging animals. This type of sampling however, is generally overlooked as a potential DNA source. Shed hair and feathers, faeces, urine, skins and eggshells are all potential sources of DNA. Non-invasive sampling regimes may be the only alternative for the genetic analysis of endangered and/or elusive species that are difficult to sample otherwise.

Powerful Owls moult annually. Shed feathers therefore, can be collected from under roost trees and used for genetic analysis. Feathers collected provide DNA that is unique to the individual and can provide additional ecological knowledge of the species.

In this study we collected shed Powerful Owl feathers during 2003 and 2004. In order to obtain samples from across the owl's large distribution, public awareness about the project via the way of flyers, mail-outs, media sources (radio, newspapers and magazines), email lists and public seminars was initiated. Overall, the collection strategy was very successful with over 500 Powerful Owl feather samples being collected.

Genetic information obtained from the analysis of DNA from feathers can enable a more rigorous assessment of population viability of the Powerful Owl. Specifically designed molecular markers will facilitate unequivocal identification of individual birds ("DNA fingerprinting"). Through the application of molecular techniques we can collect ecological information about the Powerful Owl such as, genetic divergence, population structure, dispersal patterns, migration and inbreeding. These questions can not be addressed via traditional data collection and will contribute significantly to the successful conservation of the Powerful Owl and potentially other raptor species.

Notes:

IMPROVING THE ACCURACY OF DNA-BASED METHODS FOR POPULATION ESTIMATION OF VERTEBRATE PESTS: INCORPORATING GENOTYPE UNCERTAINTY INTO MARK-RECAPTURE MODELS

Presenter

Andrea Byrom
Landcare Research, Lincoln NZ

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Session MONDAY 21/11/2005

ABSTRACT

The use of genetic tags (DNA derived from material collected non-invasively, such as hair or faeces) to identify individual animals is increasingly common in wildlife studies. The method has huge potential, but while it is possible to generate significant amounts of data from these non-invasive sources of DNA, the biggest challenge in the application of the approach is overcoming errors inherent in samples collected.

Genotyping errors arise when the poor quality or insufficient quantity of DNA leads to heterozygotes being scored as homozygotes (termed 'allelic drop-out'). These error rates will be specific to a species, and will depend on the source of samples. If errors go undetected and the genotypes are naively used in mark-recapture models, significant overestimates of population size can occur. In this paper we argue that it is essential that researchers using such data model genotyping error (termed 'mismatch probability'), and build this uncertainty into population models.

Most methods used to overcome genotype errors involve repeating PCR amplifications for each sample to be certain of the genotype. However, this is usually not possible when using DNA sources from non-invasive samples, because there is often only a small amount of material to work with. In this paper, we instead focus on the quality and quantity of the starting sample of DNA using a dataset derived from faecal DNA collected from possums (*Trichosurus vulpecula*). In order to increase the accuracy of identifying individual possums using faecal DNA, we have developed a real-time quantitative PCR (polymerase chain reaction) amplification using a possum-specific microsatellite sequence (Tv12) labelled with fluorescent dye. We use this to compare the amounts of PCR product in each faecal sample to a set of standard templates containing known amounts of DNA.

Quantifying this relationship between template concentration and allelic dropout provides an empirically-based criterion for accurate genotyping. A predicted dropout rate can then be used to determine the number of replications required per sample in order to achieve a desired level of certainty in genotype assignment. However, if the required number of replicates cannot be obtained due to lack of sufficient starting material, or if it is not cost-effective to do so, we can use these samples despite uncertain genotype assignment.

Unless the issue of errors in genotyping is addressed, DNA-based information will have only limited utility in wildlife studies. Our approach enables cost-effective use of DNA-based data. Our next step is to model genotype uncertainty in mark-recapture models. This will provide accurate and precise estimates of abundance for ecologists and managers to work with.

Notes:

**IDENTIFYING BIAS IN TRAP-CATCH MONITORING BY COMPARISON WITH
A GENOTYPE-DERIVED COMPLETE POPULATION INVENTORY**

Presenter

Dave Morgan
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Session MONDAY 21/11/2005

ABSTRACT

Strategic management of possum populations in New Zealand is presently dependent on the use of a standardised trap-catch procedure for monitoring population trends. Where this has been used in the first few months after control, calculated rates of increase often far-exceed known reproductive and dispersal rates, suggesting that trapping-based population indices immediately following control are biased low. We are investigating the problem using genotyping of DNA collected from possum faecal pellets as a means of obtaining a complete inventory of populations. We have developed a 'real-time' quantitative polymerase chain reaction (PCR) amplification using a possum-specific gene labelled with fluorescent dye, and compared the amounts of PCR product to a set of standard templates of known DNA amounts. This approach increases the accuracy of individual identification from faecal DNA and addresses the problem of 'allelic dropout'. In a replicated field study, faecal collections have been made in the field at the same time as standard trap-catch surveys are conducted before control, and at 1, 4 and 9 months after control. Samples of ear tissue collected from trapped possums are genotyped and matched with genotypes of faecal DNA, revealing which possums were present at each occasion but not trapped. Detection of 'new' genotypes in successive surveys also permits unbiased assessment of the contribution of possum dispersal to post-control population recovery. Improved understanding of these influences on estimation of population trends will allow either direct correction of bias in the trap-catch method, or optimisation of the timing of monitoring in relation to control to minimise bias.

Notes:

KNOW THY ENEMY: A MOLECULAR APPROACH TO UNDERSTAND THE ECOLOGY AND MANAGEMENT OF THE FERAL PIG IN SOUTH-WESTERN AUSTRALIA

Presenter

Peter Spencer
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Session: MONDAY 21/11/2005

ABSTRACT

In many areas around the world, feral pigs (*Sus scrofa*) act as 'triple threat species' (biodiversity, agriculture and public health). They are seen as a very significant vertebrate pest in Australia, with population estimates of 20 million animals. Using 14 microsatellite loci from over 350 pigs, a molecular approach was used to identify some aspects of the ecology of feral pigs in a large area (>4000 km²) of south-western Australia, an approach that has been under-utilised in pest-species management - and the focus of talks today. Feral pigs from WA were identified as originating from eight inferred populations (clusters), with a high level of differentiation ($R_{ST} = > 0.18$). There was a low level of dispersal between populations, but high amounts estimated within river catchments. Some populations appeared to be acting as sources for the re-invasion of surrounding areas (subjected to control operations), whereas control measures have not been effective in reducing effective population size in others. Using a Bayesian modelling approach, anomalies were detected in the putative origin of some individuals. Samples from these few 'suspicious' animals corresponded closely to public road access and towns.

Given the large distances immigrants were found from their assigned population of origin (> 350 km), the generally low levels of dispersal of south-west feral pigs, grouping and sex of these pigs, it could be reasonably suggested that these individuals had been deliberately dumped to supplement recreational hunting stocks. The molecular data offers considerable insights into the dynamics of the feral pig populations that may allow for better control of this highly destructive and invasive vertebrate pest.

Notes

HABITAT-SPECIFIC POPULATION DENSITY OF SAMBAR (*CERVUS UNICOLOR*) IN YARRA RANGES NATIONAL PARK, VICTORIA

Presenter

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Session MONDAY 21/11/2005

ABSTRACT

Sambar (*Cervus unicolor Kerr*) were introduced to Australia in the 1860s and are one of six species of deer found in Australia today. Sambar are a tropical species native to India and Sri Lanka, but are highly adaptable and have occupied a wide range throughout much of central and eastern Victoria and into southern New South Wales. Sambar populations are managed through recreational hunting, but only in designated areas. Information on sambar in Australia to date has been largely anecdotal, with scientific data lacking on many aspects including population ecology, behaviour and impacts on the environment.

To successfully manage a wildlife species, population estimates are essential. This study was conducted in the Upper Yarra catchment, Yarra Ranges National Park, approximately 100 km northeast of Melbourne, Victoria. Transect surveys of faecal pellet group counts were completed in six Ecological Vegetation Classes near the Upper Yarra Reservoir adjacent to an open, herb-rich area known as 'the flats'. Transects were 510 m long, following a zig-zag pattern within a 1-ha area. A plot of 2-m radius was surveyed every 10 m along each transect line, and within each plot, the standing crop of faecal pellet groups, forest type, and understorey height and cover were recorded. Separate population estimates of sambar were calculated using pellet groups, defecation rate and decomposition rates for each Ecological Vegetation Class. Preliminary results indicate that sambar have no preference for a particular habitat when in close proximity to an important food source such as 'the flats'.

Notes:

ESTIMATING FERAL HORSE ABUNDANCE ON THE BOGONG HIGH PLAINS USING AN AERIAL MARK-RECAPTURE ESTIMATE

Presenter

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Session MONDAY 21/11/2005

ABSTRACT

Feral horses pose a risk to biodiversity in the Alpine National Park (NP). They previously have been surveyed twice in the Alpine NP using an aerial line-transect survey. Whilst useful for large areas of the Park, line-transect surveys are considered inappropriate for the Bogong High Plains (BHP) because of the low precision of abundance estimates for this area. The area of concern within the BHP is approximately 60 km² and contains a small isolated population of feral horses.

Parks Victoria is concerned about the population within the BHP and wanted to:

- . Develop a precise aerial survey protocol to measure feral horse abundance within the BHP.
- . Assess the validity of that protocol and the degree of visibility bias (undercounting) associated with aerial counting of feral horses in the BHP;
- . Provide an accurate estimation of resource requirements to apply the protocol; and
- . Refine current assessments of the abundance and distribution of feral horse populations within the BHP.

Dr Michelle Dawson was commissioned to develop the protocol and implement the survey. The survey used mark-recapture methods to estimate abundance and required all horses to be clearly identified from their natural markings so that they could be readily identified if sighted on subsequent occasions. The survey was carried out between the 6th and 8th of April 2005 in a Bell Jet Ranger helicopter. A total of 31 groups of horses were sighted one, two or three times and feral horse abundance was estimated to be 97 (95% confidence interval: 86 - 115) using the Chao estimator (Chao 1988). The protocol was considered successful in obtaining a precise population estimate of feral horses. This method will be important in monitoring the population over time and measuring the effectiveness of any feral horse control in the BHP. In addition, it provides valuable test of alternative aerial survey methods for monitoring feral horses in moderately sized open areas, difficult to access on foot.

Notes:

ECOLOGY OF RED DEER (*CERVUS ELAPHUS*) IN THE GRAMPIANS NATIONAL PARK, VICTORIA, AUSTRALIA

Presenter

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ABSTRACT

Little is known of the ecology of red deer in the Grampians National Park (GNP) and information is required for their effective management. This study aimed to estimate the population size; diet composition; movement; and relationships with habitat of deer in the park.

Faecal accumulation plots were used over two seasons within three woodland habitats to estimate the population density of red deer. Density estimates of 0.4 to 7.4 red deer/km² were obtained across the three habitats, with the highest estimates recorded in Damp Sands Herb-rich Woodland.

The diet of red deer was examined using micro-histological analysis of faecal pellets and sorting of stomach contents. A limitation to the former method was that 50% of fragments could not be positively identified. Two stomach samples from road kills in the area were examined by physical sorting. A high proportion of *Banksia marginata* (Silver Banksia), evergreen tree species (*Callitris rhomboidea* and *Allocasuarina muellerana*), woody dicots, and grasses were recorded from both samples. Results from the two methods of diet analysis were broadly similar in the proportion of forage classes, with the exception of evergreen tree species, which were under-represented in faecal analysis results.

Movement of red deer was examined using a GPS collar fitted to a red deer hind. The recorded points showed the hind had a home range of over 700 ha but that many locations were clumped in areas that may be used for resting and feeding. Recorded points were superimposed onto topography, hydrology, and vegetation GIS layers to examine relationships with habitat. Most recordings (58%) were in Damp Sands Herb-rich Woodland, confirming data from the population estimates that it is a habitat of high use by red deer.

Whilst this study was conducted in only a part of the GNP it has indicated that there is a significant population of red deer and, since they appear to spend much of their time feeding in particular habitats there is the potential for significant impact. It is essential to extend this data to other areas of the park and to implement monitoring of population levels.

Notes:

ASSESSING GPS-COLLAR PERFORMANCE IN SOUTHERN NEW SOUTH WALES AND ANALYSIS OF THE HOME RANGE, CORE UTILISATION DISTRIBUTION MOVEMENT AND INTERACTIONS OF WILD DOGS

Presenter

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Session MONDAY 21/11/2005

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ABSTRACT

We attached collars fitted with global positioning system (GPS) receivers to nine wild dogs captured in state forest in southern New South Wales during autumn 2004. GPS-collars were programmed to acquire a location every 2-hours from 1900 hours to 0700 hours seven nights a week for 30 nights. Collars recorded three to five locations out of a possible seven each night/animal. Sixty-seven percent of all attempted fixes were successful with no difference between males and females. Locations were more accurate from 1900 hours to 0100 hours compared to 0300 hours to 0700 hours. The mean nightly home range size (100% MCP) of males was 41 km² (s.d. = 2 km²) and females was 72 km² (s.d. = 50 km²). Males and females were constantly active throughout the evening; males were marginally more active than females. Wild dogs displayed two types of movement similar to what Harden (1985) described as searching and exploratory. Males were located more frequently than females within 250 m of roads/tracks ($\chi^2_{1, 200} = 4.10, P = 0.04$), and females were located more frequently than males within 250 m of drainage lines ($\chi^2_{1, 622} = 18.01, P = <0.00$). Two groups of wild dogs were identified based on their overlapping home ranges. The degree of overlap in 50% core utilisation distribution varied among individuals (range 16% to 100%); and no individual in either group had an exclusive core area. Group one individuals rarely interacted. In group two the two females were recorded together more often than was the male with either of the females. We found that the use of GPS-collars in forested habitat can provide information on a range of aspects of wild dog ecology. We discuss how this information could assist managers with wild dog control programs.

Notes:

IMPACT OF THE INTRODUCED BLACK RAT (*RATTUS RATTUS*) ON NATIVE SMALL MAMMALS IN COASTAL FORESTS OF EASTERN AUSTRALIA: IMPLICATIONS FOR THE MANAGEMENT OF INTRODUCED AND NATIVE RODENTS

Presenter

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Session MONDAY 21/11/2005

ABSTRACT

The black rat (*Rattus rattus*) is an introduced pest of unknown impact in Australia. Although it has extended its range across much of coastal Australia, its distribution across habitats and its impact on native fauna is unknown. Black rats are primarily associated with disturbed habitats and are often thought to not displace native rodent species. This study demonstrates that the black rat will successfully occupy intact coastal forests to the detriment of populations of the native bush rat (*Rattus fuscipes*). The findings are part of an ongoing study examining competitive interactions between black rats and native small mammals in forests surrounding the north (Beecroft Peninsula, New South Wales) and south (Booderee National Park, Jervis Bay Territory) of Jervis Bay. Empirical study of black rat and native rodent populations has revealed very different distributions and abundances in the north and south. These differences provide some insight into potential interactions between the two rodent species. Experimental removal of black rats has revealed that populations at high densities limit the abundance of native bush rats. Black rats appear to inhibit juvenile recruitment within bush rat populations. These findings highlight the need to better understand the distribution and habitat preferences of black rats in Australia. There is also need for management of introduced rodent populations in habitats where they may be impacting on native species.

Notes:

NUTRITIONAL ECOLOGY OF EASTERN GREY KANGAROOS

Presenter

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Session MONDAY 21/11/2005

ABSTRACT

Imagine being able to pick up a kangaroo scat from a paddock, bring it back to the lab, and predict not just the protein content of its food, but also the amount of food it ate. To date, nutritional ecology has been limited by an inability to measure food intake. Diet quality has been measured to some extent from microscopic analysis of faecal contents, but intake has eluded us. Until now.

In this project, captive eastern grey kangaroos (EGK) were fed a diet with a known crude protein (CP) content. Their intake of this diet was then recorded in the form of digestible dry matter intake (DDMI). The resultant faeces were then collected and scanned with a Near Infrared Reflectance Spectrometer (NIRS). The scanned spectrum from each faecal sample was then statistically related to the CP and DDMI of the diet being assessed. With only 56 diet/faecal spectra pairs, I was able to develop predictive equations for determining the CP content ($Rsq = 0.97$) and DDMI ($Rsq = 0.88$) of the food eaten by EGK. I then applied these predictive equations to 177 wild shot kangaroos and was able to show a close link between the trends of increasing rainfall with increasing DDMI and subsequently, an increase in body condition.

Notes:

SILVER GULL POPULATIONS IN THE PORT LINCOLN AREA

Presenter

Shelley Harrison
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ABSTRACT

It is very evident that the abundances and distribution of Silver Gulls in Australia have been impacted greatly by human activities - particularly our refuse disposal and fishery discard practices. In some circumstances Silver Gull populations have increased almost exponentially and this has caused management issues ranging from nuisance to human health problems. Previous responses to such rapid expansions in Silver Gull numbers have included egg pricking and culling of birds (most recently practiced at Lake Eyre in 2000).

In the Port Lincoln area, Silver Gull numbers have risen from 3,300 pairs in 1999 to 35,000 pairs in 2005. This population increase is, at least partially, attributed to the local Southern Bluefin Tuna aquaculture industry, with some of the industry's feeding practices making the baitfish feed readily available to the gulls. Data collected from several sites around Port Lincoln suggest an increase in reproductive output (due to an extended breeding season, higher clutch size and/or fledging success), compared to control sites.

Apart from the extra feed costs that Silver Gull scavenging causes the tuna aquaculture industry, there are also social, health and nuisance problems being caused by the growing population of gulls around the City of Port Lincoln and surrounding areas. This expanding population of scavenging gulls has the potential to cause ecological problems. Several previously known breeding sites for other bird species have been impacted (via displacement and/or restriction) due to breeding gulls. Furthermore, there are reports of Silver Gulls preying on eggs and chicks of these other bird species.

This presentation will detail the results of recent studies on Silver Gull populations in the Port Lincoln area and discuss possible management approaches to the growing problem.

The assistance and input of Dave Ellis from Tuna Boat Owners Association of South Australia is gratefully acknowledged.

Notes:

Horizontal lines for taking notes.

DRY SEASON USE OF SPACE, HABITATS AND SHELTERS BY THE SHORT-EARED ROCK-WALLABY, *PETROGALE BRACHYOTIS*, IN THE WET-DRY TROPICS

Presenter

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Session MONDAY 21/11/2005

ABSTRACT

For conservation and management of rock-wallabies it is important that we understand their requirements for shelter sites, but also the range of habitats and food resources used in the vicinity of these shelters. This information is particularly poorly understood for the little studied species of north-western Australia in the wet-dry tropics. We investigated the dry season home range, and use of habitats and shelter sites of the short-eared rock wallaby (*Petrogale brachyotis*) in Litchfield National Park, Northern Territory, Australia. We radio-tracked ten individuals on foot to locate diurnal shelters, and with fixed towers to determine their nocturnal positions. *Petrogale brachyotis* used a range of rock piles and outcrops for diurnal shelter, and showed a strong preference for rocky habitats and adjacent woodland. On average, animals used four outcrops for den sites, as well as more exposed resting sites. Individual rock-wallabies sometimes shared areas of outcrops for diurnal shelter, but there appeared to be male-male intolerance of simultaneous use of shelter areas. Mean home range in the dry season was 18.3 ha, and there was no significant difference in home range area between sexes. The food resources required by *P. brachyotis* appeared to have been met within the rocky areas and adjacent woodland, and fire regimes should be maintained that ensure the persistence of these resources.

Notes:

THE ACCURACY OF GROUND-BASED ESTIMATES FOR ASSESSING HOLLOW ABUNDANCE

Presenter

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Session MONDAY 21/11/2005

ABSTRACT

Tree hollows are essential for the survival and reproduction of a number of animal species in Tasmania. Current prescriptions in Tasmania state that in production forest, two trees must be retained every five hectares to provide habitat for fauna (Forest Practices Code 2000). The guidelines for selecting these trees state that they should have "nesting hollows and other old-growth structural elements". Estimating the abundance of hollows from the ground can be difficult because hollows may be obscured by branches, be smaller than they appear or be oriented vertically. This project aims to determine the type of hollows that are not located during ground-based surveys and investigate which attributes of the tree and surrounding forest influence whether a hollow is observed or not. The results of this work will provide insight into the value of ground-based surveys for assessing hollow abundance and their utility as a management tool.

The research was done on logging coupes in *Eucalyptus obliqua* forest in Tasmania. Around ten trees were assessed at each site and examined for potential hollows by a single observer. The approximate location and dimensions of the hollow were recorded to enable later identification. Basic structural measurements of the tree and site were also taken. The trees were then felled as part of normal forestry operations, whereupon each tree was searched for hollows. Hollows seen during pre-fall surveys were identified (where possible) allowing an assessment of the number and types of hollows that were correctly observed from the ground and those that were missed.

In this paper we discuss the accuracy of ground-based surveys for identifying tree hollows, in the context of habitat tree selection for fauna conservation in production forests.

Notes:

THE ROLE OF *XANTHORRHOEA SEMIPLANA* (GRASS TREE) AS REFUGIA FOR *RATTUS FUSCIPES* IN THE MOUNT LOFTY RANGES, SOUTH AUSTRALIA, AND IMPLICATIONS FOR OTHER NATIVE WILDLIFE

Presenter

Deborah Frazer
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Session MONDAY 21/11/2005

ABSTRACT

There has been little research to quantify the role of animal and *Xanthorrhoea* (grass tree) associations, most records are anecdotal. The focus of this study was to examine the role of grass trees as refuges for native vertebrate wildlife. We studied shelter and microclimate properties of the South Australian grass tree, *Xanthorrhoea semiplana* and investigated their use by *Rattus fuscipes* (southern bush rat). The research from this study is particularly important because an exemption under the *Native Vegetation Act 1991(SA)* permits clearance of *X. semiplana* for salvage takes without permit.

Radio-tracking of *R. fuscipes* (n = 8) in Scott Creek Conservation Park in August and September 2005 indicated that *X. semiplana* was vital at the micro- and macrohabitat scale, and was the preferred shelter by bush rats for predatory protection and nest site selection over other understorey vegetation. Observations also suggest that *X. semiplana* is utilised by vertebrates on foraging bouts or for resting, as indicated by the presence of diggings and scats.

Grass trees act as a buffer for wildlife against temperature extremes and offer protection against rainfall, analogous to the function of hollows. *semiplana* have important implications for wildlife in relation to thermoregulation, nest site selection, and periods of inactivity. The microclimate and protection provided from *X. semiplana* is a determining factor in the selection of habitat for small native vertebrates.

Notes:

THE DIET OF THE WESTERN PYGMY POSSUM, *CERCARTETUS CONCINNUS*, AT INNES NATIONAL PARK, SOUTH AUSTRALIA

Presenter

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Session MONDAY 21/11/2005

ABSTRACT

Recent surveys of the southern Yorke Peninsula of South Australia revealed that a relatively healthy population of western pygmy possums, *Cercartetus concinnus*, still inhabits the largest remnant of native vegetation remaining on the peninsula, largely encompassed by Innes National park. Although the species was recorded for the area, its survival is significant because pygmy possums and bats are the only native small mammals remaining in the region, and also because it is typically associated with proteaceous vegetation, particularly *Banksia spp.* This intriguing arboreal marsupial has remained relatively unstudied because of its cryptic nocturnal habits and its size (8-18 g); to date, the few studies of *C. concinnus* have concentrated on the species' biology and nest site preferences. From studies of other pygmy possums, particularly the eastern pygmy possum, *C. nanus*, as well as the only diet study of *C. concinnus* to date, it is believed that the species is predominantly nectarivorous and insectivorous, although there appears to be no specific evidence of insectivory despite anecdotal records. The present study aims to determine the diet of *C. concinnus* at Innes National Park, South Australia, by conducting faecal and pollen swab analyses, as well as recording reproductive phenology of nectar-producing plants for a one-year period and determining invertebrate biomass in autumn and spring. Preliminary results have revealed a predominance of *Eucalyptus* pollen grains in the faeces, but we have yet to confirm the presence of invertebrate remains in faeces. Interestingly, we have observed an individual pygmy possum destructively feeding on *Acrotriche patula* flowers, a behaviour previously unknown in burramyids, and that has implications for the role this species plays in the pollination of nectar-producing vegetation.

Notes:

ARE WE MAKING PROGRESS RECOVERING TASMANIA'S THREATENED SPECIES – A 15 YEAR REVIEW

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

Between 1990 and 1995 Tasmania had produced 59 threatened species recovery plans and received a total of \$2.1 million Commonwealth dollars for their preparation or implementation. At that time there were 61 of Tasmania's threatened species listed on the Commonwealth Act.

In 1995 a review of the effectiveness of the recovery process in Tasmania wanted to determine whether these seemingly positive outcomes had translated into advances such as an increase in population numbers or species security in the wild. The review found that very few primary gains had been made. It concluded that species recovery was a long-term process and although the demands for threatened species protection were increasing, the funds available were not. It recommended single species recovery programs be replaced by multi-species plans, functional groups or a landscape approach. Actions such as specific legislation, a coordinated approach and covenants and management plans on private land were also needed.

A further ten years down the track it's timely to again consider whether our current practices are being effective in recovering threatened species and what progress has been made. Many of the review recommendations have now been adopted including the growth of a network of government and non-government groups with threatened species responsibilities. However, the number of Tasmanian species on the EPBC Act has now more than doubled to 140 and funding has barely stretched past the original group of priority species.

Notes:

**EPIDEMIOLOGICAL FEATURES OF A NEW DISEASE IN THE TASMANIAN
DEVIL (*SARCOPHILUS HARRISII*)**

Presenter

Clare Hawkins

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Session TUESDAY 22/11/2005

ABSTRACT

Evidence is presented that Devil Facial Tumour Disease (DFTD) is an emerging disease that is now widespread and constitutes a serious threat to the Tasmanian devil *Sarcophilus harrisii*. This cancerous disease, found exclusively in wild devil populations, appears to be consistently fatal to afflicted individuals. Trapping, spotlighting and public observation data from across Tasmania are analysed to assess the impact and distribution of this disease. The dramatic tumours characteristic of DFTD were first reported in 1996. There were no reports of these symptoms in any of more than 2020 individuals trapped previously by biologists. Since 1996, DFTD has been confirmed in individuals from 38 locations, covering 51% of Tasmania. From the few locations for which timing of DFTD emergence can be estimated, there is some evidence for geographical spread of the disease. All but 7 out of 147 devils with DFTD-like symptoms were sexually mature. Up to 83% (15/18) of trapped adults displayed symptoms at any one site. Spotlighting surveys and trapping indicated a significant local association between population decline and date of first report of DFTD. In the region where the disease was first reported, mean spotlighting sightings declined by 80% since that first report.

Notes:

MANAGEMENT OF TASMANIAN DEVIL POPULATIONS IN RESPONSE TO THE DEVIL FACIAL TUMOUR DISEASE

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

The newly emerged Devil Facial Tumour Disease has given serious cause for concern for the survival and future appearance of wild populations of Tasmanian devils. The first year of the management response has focussed on establishing captive insurance populations sourced from the last remaining apparently disease-free parts of the state, minimising the risk of the disease entering existing captive populations, and finding opportunities for maintaining isolated disease-free populations in the wild. Captive insurance populations representing eastern and western genetic provenances of devils were established early in 2005 with weaning-age juveniles brought in from the wild. An adaptive management trial on disease suppression has commenced on the Forestier and Tasman peninsulas.

Notes:

RESPONDING TO FOX INCURSIONS IN TASMANIA; AN UPDATE

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

After a fox 'escaped' a ship at Burnie in 1998 and accumulation of evidence of a fox incursion in the northern midlands the Tasmanian Government created a Fox Free Taskforce with 22 staff. Three years of intensive, repeated 1080 baiting across three main areas totalling up to 23,000 baits over about 230,000ha per year resulted in decreased evidence in those areas but credible sighting reports persist from fringe areas and temporal patterns of sighting reports reflect those in known fox areas on mainland Australia. Emphasis on monitoring is increasing while still conducting strategic baiting. Monitoring uses DNA analysis of scats, more sophisticated automatic cameras integrated with spotlight surveys and searches for footprints and dens. While efforts continue to eradicate foxes, monitoring is being designed to match with triggers to further action. Risk assessment for especially vulnerable species is being continued to allow planning to cope with a worse-case scenario. The demise of Tasmanian devils, the obvious potential buffer against foxes, due to Devil facial Tumour Disease is being considered in risk assessment and planning.

Notes:

DISTRIBUTION AND ABUNDANCE OF ROADKILL ON TASMANIAN HIGHWAYS: HUMAN MANAGEMENT OPTIONS

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

An obvious sign of potential human impact on animal populations is roadkill. In Tasmania, this impact is perceived as relatively greater than in other Australian states, and is oft noted by visitors and locals alike, and calls for management action are common in the popular press. The goal of this recently completed three-year study was to assess the frequency and distribution of species killed on five major Tasmanian highways. Seasonal surveys were completed along five major routes, for a total of 141 trips. Over 15,000 kilometers of road were surveyed, and 4,000 individuals in 51 taxa recorded. Over 50% of encountered roadkill could be identified to species, with brushtail possums and red-necked pademelon the most common species identified in both overall numbers and frequency of trips encountered. The seasonal occurrence, relationship with road speed, and clustering in local hotspots for particular taxa all suggest that mitigation measures, such as vehicle speed reduction in specific areas may be effective in reducing the number of fauna killed. Mitigation measures, however, will not apply equally to all species, and the success depends on animal as well as human behaviors.

Notes:

USING PREDICTIVE REGRESSION TO IDENTIFY LOCAL ROAD FEATURES ASSOCIATED WITH WILDLIFE ROAD-KILL

Presenter

Richard Shaw
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Session TUESDAY 22/11/2005

ABSTRACT

Wildlife-vehicle collisions can be significant conservation, economic and aesthetic issues. Road managers need practical tools that are easy to use to predict the location of road-kill so that management intervention can occur at the planning, rather than *post-hoc*, stage. We used generic logistic regression procedures to predict road-kill blackspots using local-scale information (data collected on 21 road and environmental attributes at road-kill and random sites) that is easy to measure, and provide a practical graphical tool (nomogram) that is straightforward to use, to predict the probability of finding a roadkill on a 50 m stretch of road. We used bootstrapping for internal validation of the model and penalised maximum likelihood methods to ensure that the models were not overfitted. Three variables, visibility, roadside barriers, and escape routes, were identified as the most important predictors of the probability of finding a road-kill in eastern Tasmania. Increasing the number of barriers, decreasing visibility, and providing escape routes on both (not just one) sides of the road substantially increased the probability of finding a road-kill. The full penalised model contained 11 variables, but six variables contributed little explanatory power to the model, and omitting these variables resulted in an approximate model that retained 93% of the accuracy of the full model. Use of the full (penalised) logistic regression model is desirable when the goal is to identify blackspots that warrant potentially costly mitigation measures or experimental trials, as the full model is the most accurate. The approximate model is simpler but probably provides sufficient accuracy for broad-scale surveys. The model is deliberately based on local-scale parameters. A good local-scale predictive model can be used to experimentally test landscape-scale effects. This procedure needs to be applied to local situations as the importance of different variables is likely to be species, or at least fauna-class, specific. While most variables are easy to score, managers are advised to carefully define these types of variables for their local situation and to use photographic catalogues to assist in scoring them in the field.

Notes:

EFFECTS OF LOW-INTENSITY FUEL REDUCTION BURNS ON POPULATIONS OF MASTACOMYS FUSCUS, ANTECHINUS MINIMUS, AND RATTUS LUTREOLUS IN MONTANE BUTTONGRASS MOORLAND TASMANIA

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

Over a ten-year period, populations of small mammals, Mastacomys fuscus, Rattus lutreolus and Antechinus minimus, were monitored at two montane moorland sites before and after separate fuel reduction burns. A nearby control population was also monitored. Immediately after the burns, capture rates of all three species declined dramatically. Recovery of the full suite of mammal species to pre-burn levels took four years and appeared to be related to vegetation densities also re-establishing at pre-burn levels. Mastacomys fuscus, a species thought to require habitat that had not been burnt for a relatively long time, recovered to pre-burn capture rates approximately three years after the fuel reduction burns, when vegetation densities were 75% of their pre-burn levels. Implications of these results for current and proposed fire management in Tasmania will be discussed.

Notes:

Multiple horizontal lines for taking notes.

MANAGEMENT OF AVIAN ISSUES AT TASMANIAN WIND FARMS

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

Wind energy is a relatively recent phenomenon in Australia, although it has been in existence for a number of decades in Europe and USA. Given its newness in Australia, the techniques used to assess the impacts of wind farms on birds are not static, and the mitigation measures used to minimise impacts are not well developed or tested. While the overseas experience can inform Australian projects, most data reside in literature that has not been reviewed by the scientific community. This situation exacerbates the often emotive debate in the general community about wind farms and risks misinformation about the actual impacts of wind farms on birds. In Tasmania, Hydro Tasmania currently has one wind farm approved and partially constructed (Woolnorth), and two (Musselroe and Heemskirk) currently undergoing assessment. At each of these sites the avian issues differ, necessitating different strategies to assess the impact of each project. Due to the "novelty" of the industry, it has been necessary to develop the strategies for conducting risk assessments and monitoring at each of these sites. We have found it essential to use scientifically rigorous data (and reinforce the need to the Regulators), without which wildlife management decisions in relation to wind farms are based on subjectivity, rather than sound species management processes. The issues with birds and wind farms, and the approaches used to monitor and mitigate impacts will be detailed during the talk.

Notes:

**CONSERVATION OF HOLLOW-BEARING TREES IN TASMANIA'S
PRODUCTION FORESTS**

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

Land clearing has resulted in the depletion of hollow-bearing trees in extensive parts of Australia, including Tasmania. Policies catering for the maintenance of the hollow resource have been adopted by most forest management agencies. Work is currently underway to assess the effectiveness of existing mechanisms for the protection of habitat for hollow dependent fauna in Tasmania's forests. As a part of this work, information was collected on the distribution of potential hollows in dry eucalypt forest on the State's east coast. The relationship between environmental variables and the occurrence of potential hollows was examined using generalized linear modeling. The forest types looked at contained between 17-30 potential hollow-bearing trees per hectare. Occurrence of hollows was best explained by: vegetation type; topographic position; dead trees on the ground; the age of the stand; the average total basal area of all trees; the height of the over storey vegetation and various interactions between these and other variables. Models developed using a subset of the environmental variables, were coupled with GIS data to develop a map of predicted occurrence of trees with potential hollows. Coupling this map with information on implementation of current measures across the study area enabled estimation of the rate at which trees with potential hollows are captured. The adequacy of this rate for the conservation of hollow dependent fauna is discussed.

Notes:

[Lined area for notes]

ALTERNATIVE MANAGEMENT STRATEGIES TO 1080: HOW FAR HAVE WE COME IN 10 YEARS?

Presenter

Julianne O'Reilly-Wapstra
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Session TUESDAY 22/11/2005

ABSTRACT

Browsing of young seedlings by native marsupial herbivores is a major problem in plantation forestry. Browsing can result in reduced seedling growth rates, changes in tree form and ultimately seedling death when browsing is severe. Research for the past 10 years at the CRC for Temperate Hardwood Forestry and CRC for Sustainable Production Forestry has investigated possible alternatives to 1080; the current dominant management strategy. Research has concentrated on (1) understanding the relationship between herbivore foraging behaviour and aspects of seedling and plantation characteristics that contribute to increased risk of browsing, with a view to (2) utilising, altering or manipulating these characteristics to reduce browsing damage. Promising results have indicated that genetically based natural plant resistance of different *E. globulus* populations, alteration of seedling growing environment and manipulation of seedling palatability via foliage repellants can all reduce feeding by marsupial herbivores. Research has also shown that management of non-seedling vegetation growing on plantations can act to protect seedlings against browsing. Plantation characteristics such as shape, size and surrounding vegetation types can also determine the degree to which seedlings are browsed. With the banning of 1080 in Tasmanian State Forests by the end of 2005, large scale intensive field trials will determine the success of these alternatives as effective management strategies.

Notes:

LEOPARD SEAL (*HYDRURGA LEPTONYX*) SIGHTINGS AT MACQUARIE ISLAND APPEAR TO FOLLOW NATURAL CYCLES AND ONLY MINOR MANAGEMENT ACTION IS REQUIRED

Presenter

Harry Burton

Author(s) and/or Co-Presenters

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Session TUESDAY 22/11/2005

ABSTRACT

Leopard seals are periodic, and sometimes numerous, visitors to Macquarie Island; but they do not breed there. The island has been serving as a fixed and regular observation platform of leopard seal arrivals since 1948 with some isolated records from even earlier. Thus in 2005 there is a 57 year data-set span (three years with missing data) which is a considerable and unusual record of marine mammal behaviour from Antarctic and Sub-Antarctic waters. The two sexes haul-out in near equal numbers (952 seals with sex determined), first appearing in July, and with the last sightings in November. Seal body condition was classed as 'good' in ~74% of sightings, 'medium' in ~17% and 'poor' in ~9%. This fact is apparently at variance with the current belief that they are poor condition vagrant seals (in years of poor foraging) which are seen at the island as they disperse out from the ice-edge which lies to the south.

Years (at ~ four year intervals when greater numbers of seals were recorded) have similar sea-ice concentrations and sea-surface temperatures that also relate to the sea-level pressures at the island in the previous year. There is an apparent discontinuity, however, in the years prior to the 1960s when the relationships appear to have been out of phase. Therefore seal numbers at Macquarie Island seem very much controlled by ocean and atmospheric conditions. Management responsibilities need to ensure that the seals resting on the beaches do not meet with large-scale and numerous disturbances that would 'drive' them out to sea.

Notes:

QUANTIFYING EXOGENOUS AND ENDOGENOUS PROCESSUS
INFLUENCING ELEPHANT SEAL ABUNDANCE TRENDS

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

Both intrinsic and extrinsic factors play an important role in animal population dynamics that dictate trends in abundance over time. Quantifying these factors for a declining population is a key focus of conservation and management actions. Due to the difficulty in obtaining datasets of sufficient magnitude and quality required to identify the most-important of these factors influencing population trends, particularly for long-lived species, assessment and subsequent model parameterisation is often poorly done or neglected. To determine the intrinsic and extrinsic factors affecting the dynamics of the southern elephant seal population at Macquarie Island, we used multi-model inference based on information-theoretic criteria to test for (1) the type and strength of density dependence; and (2) the type and strength of environmental variation correlated with population fluctuation. Extrinsic variability in survival was characterised by El Nino Southern Oscillation (ENSO) events, and intrinsic variability (density dependence) was mediated by shifts in carrying capacity. The analyses also revealed that the Macquarie Island population has undergone a carrying capacity shift occurring in the some time in the 1960s or early 1970s. This was evident in the fact that unless the two phases of the time series on either side of the carrying capacity shift were analysed separately, no evidence for density dependence was found.

Notes:

THE DIFFICULTIES IN MONITORING A PARTIALLY HIDDEN PENGUIN POPULATION

Presenter

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Session TUESDAY 22/11/2005

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ABSTRACT

Population counts are useful for monitoring populations as they can indicate both the ecological history and the present condition of a population. We have conducted an annual population census of Adélie penguins at Béchervaise Island since the breeding season of 1990/91 as part of our long term monitoring program. Each population count is conducted at the beginning of the breeding season when these birds come ashore. While most mature penguins return to the island every year, up to 20% of each cohort are absent for at least one season. When away from the island during the breeding season, these birds form part of an 'itinerant population' whose whereabouts is unknown. Young birds contribute significantly to the itinerant population as fledglings generally do not return until their second or third year and can even take up to nine years to return to the island for the first time. We estimate that the number of birds in this itinerant population can be as large as 1200 birds, with the current size of the Béchervaise Island penguin colony being approximately 4300 birds. The existence of this itinerant population has consequences for both the use of population counts for population monitoring and the management of these populations. Interannual variation in population counts is due not only to birth and death processes but also migration between the itinerant population and the Béchervaise Island population. Surveys of nearby islands show that the itinerant population does not simply inhabit these colonies. These results suggest that our monitoring needs to be conducted at a much broader scale to obtain a greater understanding of the spatially explicit nature of this and other populations.

Notes:

THE SCIENTIFIC BASIS FOR AUSTRALIA'S MANAGEMENT OF CURRENT AND PROPOSED WHALING ACTIVITIES IN THE SOUTHERN OCEAN

Presenter

Nick Gales
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Session TUESDAY 22/11/2005

ABSTRACT

Whaling is the largest extractive industry to have occurred in the Southern Ocean and is certain to have led to enormous and quite possibly irreversible ecological impacts that we are only now attempting to quantify. Following the collapse of most great whale populations a global moratorium on commercial whaling was established in 1986. Much of the Australian science conducted on whales since that time has focused on measuring the recovery of whales in the post-exploitation era, and more recently on assessing real and potential threats these populations might face. But there remains a place for strategic science to focus on threats that whaling may yet present. Since the moratorium nearly 7,000 Antarctic minke whales have been killed in the Southern Ocean as part of Japan's scientific whaling programs. Each year at the meetings of the International Whaling Commission (IWC) discussions and votes take place concerning the possibility of a resumption of commercial whaling under new management procedures. The Southern Ocean, which is home to the largest biomass of the worlds great whales, is an area of great interest to whaling nations. In this talk I will describe the strategic science program developed by the Australian Government, with broad collaboration, that assesses the current management need for scientific whaling programs, develops non-lethal tools to provide insights into whale ecology, determines population structure and abundance, and looks at the role of whales (and other predators) in the Southern Ocean Ecosystem.

Notes:

UNDERSTANDING VARIATION IN PENGUIN RESPONSES TO HUMAN ACTIVITY TO ENHANCE MANAGEMENT ON MACQUARIE ISLAND

Presenter

Nick Holmes
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Session TUESDAY 22/11/2005

ABSTRACT

From 2001 - 2004, a project was undertaken on subantarctic Macquarie Island to investigate the variation in responses to pedestrian activity by King *Aptenodytes patagonicus*, Gentoo *Pygoscelis papua* and Royal *Eudyptes schlegeli* penguins. The overall aim was to produce management oriented information both for commercial tourism in the subantarctic and Antarctic, and for Antarctic Treaty national operations. A series of experimental and observational studies were employed to quantify aspects of physiology, behaviour and reproductive success of subantarctic penguins exposed to pedestrian activity - the most common form of human activity on Macquarie Island. We investigated key aspects of penguin ecology likely to yield information valuable to management, including 1) the phase of breeding / moult during which penguins are most sensitive to pedestrian activity, 2) the role of habituation in penguin responses to pedestrian activity, 3) the effect of visitor group size on penguin responses to pedestrian activity, 4) comparative responses to human activity between the three species examined, and 5) the efficacy of current minimum approach distance guidelines for visitation to penguins. Here, we describe key results from these five studies.

Notes:

SEABIRD BYCATCH MITIGATION IN FISHERIES

Presenter

Graham Robertson
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Session TUESDAY 22/11/2005

ABSTRACT

Seabird bycatch in fisheries is a global conservation concern. We will discuss bycatch mitigation initiatives that we have been pursuing on vessels from two different fisheries; demersal longliners fishing for Patagonian Toothfish and Hake and pelagic longliners in the Australian East Coast Tuna and Billfish fishery. These initiatives include experiments with a variety of line weighting regimes, which when used in conjunction with Tori lines, have proven effective in reducing seabird bycatch.

Notes:

THE BEHAVIOURAL RESPONSES OF LACTATING WEDDELL SEALS AND THEIR PUPS (*LEPTONYCHOTES WEDDELLII*) TO PEDESTRIAN APPROACHES

Presenter

Tamara Van Polanen Petel
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Session TUESDAY 22/11/2005

ABSTRACT

Although guidelines exist for approaches to Weddell seals (*Leptonychotes weddellii*) in Antarctica, there has been no scientific assessment of the effectiveness of these guidelines in minimising disturbance to the seals. This study examined the immediate behavioural response of lactating Weddell seals (and their pups) to approaches on foot, and the factors affecting the seals' response. Most lactating Weddell seals and lone pups responded to visits on foot (from 20-5 m from the seals) by becoming alert. Using proportional odds regression models we developed contour maps which showed that the separation distance at which the cows became alert was dependent upon the approach type (a single person or group of people), the distance a cow was from the water, the distance she was from a conspecific, and whether her pup was exposed (i.e. whether the pup was between the approachers and the cow). In all but one scenario, the proximity of the cow to a conspecific was important in determining the stage of approach that people could reach before seals responded. The proximity of water in affecting seal responses was also inconsistent, but results nonetheless indicated that distance to water can influence Weddell seal response. The influence on response (of the cow) of the position of the pup is not obvious and therefore does not allow specific 'pup exposure' oriented guidelines to be developed. The relative importance of these factors indicated that the seals perceived pedestrians to be a threat, but that the level of threat was low. These associations have implications for the development of management guidelines and can therefore be incorporated into visitor guidelines in order to increase their effectiveness and sensitivity.

Notes:

DEVELOPING A CAT SPECIFIC BAIT - CAPSULE CONSUMPTION BY FERAL CATS (*FELIS CATUS*) AND NON-TARGET SPECIES IN THE FIELD

Presenter

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Session TUESDAY 22/11/2005

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ABSTRACT

Dried meat baits containing 1080 have been successful for fox control in Western Australia but they are not taken by cats. Recently CALM has developed soft cat baits (ERADICAT), but these may pose a risk for non-target species as they are readily consumed. The use of a toxic capsule within ERADICAT baits may increase the specificity of cat baits and lower the risk for non-target species. A total of 38 chuditch (*Dasyurus geoffroyi*), 24 woylies (*Bettongia penicillata*), 18 southern brown bandicoots (*Isodon obesulus*), 12 brushtail possums (*Trichosurus vulpecula*), 6 brushtail phascogales (*Phascogale tapoatafa*) and 81 semi-feral tip cats were trapped to test the consumption of ERADICAT baits and a non-toxic capsule (represented by a 5 mm diameter non toxic ball bearing) by each species. All animals were trapped using Sheffield cage traps and food lures. The amount of bait consumed was measured on site with controls for desiccation. The consumption of the non-toxic capsule was monitored using magnets and hand-size metal detectors.

Of the 6 native animal species tested 29% of chuditch, 17% of woylies, 33% of possums, 17% of phascogales and none of the bandicoots consumed the capsules, while 86% of cats consumed them. Of the native species, only the phascogales may have ingested enough bait to die if the capsule had contained 1080, but this was based on a small number of captures.

Notes:

WELFARE ASPECTS OF ZINC PHOSPHIDE POISONING IN BRUSHTAIL POSSUMS

Presenter

Penny Fisher
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Session TUESDAY 22/11/2005

ABSTRACT

In New Zealand, zinc phosphide (ZP) has been identified as a potential toxicant for brushtail possum control. Information regarding animal welfare aspects of ZP use against possums is scant, however consideration of the humaneness of ZP is required in the context of public concerns, animal welfare legislation, pesticide registration and pest control industry standards in New Zealand. We conducted a behavioural observation pen trial where possums voluntarily ingested a lethal dose of ZP (50 mg/kg) as a microencapsulated formulation; we used recently-described guidelines to assess the type, intensity and duration of effects in poisoned possums. In mammals, ZP poisoning typically appears to cause gastrointestinal pain and nausea, and our observations in possums were consistent with this. The first sign seen in all poisoned possums between 50 min to 2.5 h was an abnormal sitting or standing posture; it generally coincided with retching, which first occurred at approximately 1.5 h. In 4 of 8 poisoned possums, retching was closely associated with vomiting, and both tended to occur as distinct bouts. Convulsions occurred in 4 of 8 poisoned possums and appeared to represent a more advanced stage in toxicosis, always occurring after retching or vomiting. Convulsions preceded the first observations of unconsciousness by 25-37 min, and possums were usually conscious until just before (6-30 min) death (n = 6), or did not appear to become unconscious before death (n = 2). Times to death ranged from 02:50 to 06:54 with a mean of 04:41. On average, welfare was potentially compromised for 3.25 h in possums poisoned with 50 mg/kg ZP. The standardised data collected in this study can be used to make comparative assessments of humaneness against other vertebrate pesticides evaluated in possums. This work was a contracted project for the Animal Health Board, Wellington, New Zealand.

Notes:

THE IMPACT OF USING PROBAITS FOR FOX CONTROL ON CHUDITCH (*DASYURUS GEOFFROII*) IN THE WILD.

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

This paper reports on a trial to determine the impact of using a new sausage fox bait, Pro bait, on a wild population of the threatened chuditch *Dasyurus geoffroii* in Western Australia. Previous studies have shown that fox control using dried meat baits impregnated with 4.5 mg of sodium fluoroacetate (1080) is effective at promoting the recovery of medium sized mammals in the south west of WA. Increasing costs and concerns about continuity of bait supply led to CALM developing a cheaper sausage type bait, or Pro bait. This bait is as effective at killing foxes as the dried meat baits, however it also needed to be demonstrated that it had no detrimental impacts on native fauna, particularly carnivorous mammals. Bait acceptability trials in the laboratory concluded that the dasyurid marsupials chuditch, mulgara *Dasyercus cristicauda*, and south west WA phascogale *Phascogale tapoatafa* were potentially at risk from toxic Probaits. This study was undertaken to assess the likely risk of operational use of toxic Probaits on chuditch. Chuditch were monitored by trapping and radio-tracking before, during and after two successive aerial baitings using toxic (3mg 1080) and rhodamine marked Probaits (5 baits / square km) at Julimar conservation park. The trial was undertaken from November 2004 to June 2005, at a time when young born in July 2004 were growing and dispersing from their natal home ranges. A total of 61 individual chuditch were trapped during this study. Trap success rates varied between 3 and 9 %, and none of the 15 radio-collared chuditch died as a result of ingesting toxic probaits. Approximately 87 whisker samples were collected from 61 individual chuditch, and rhodamine fluorescent banding indicating bait consumption, was recorded in 26 (43%) of these. Traces of rhodamine dye were also found in the scats of six individuals. These results indicate that chuditch will find and consume toxic Probaits in the wild, but that they do not consume a sufficient quantity of baits (> 2-3 baits at a time) to be at risk. The results of this study are important in the process to obtain national registration for this alternative fox bait and for CALM to continue broad-scale fox control programs for fauna recovery in WA.

Notes:

DEVELOPMENT OF A HUMANE TOXIN FOR THE CONTROL OF STOATS, FERAL CATS AND WILD DOGS

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

The endemic fauna of New Zealand evolved in the absence of mammalian predators and their introduction has been responsible for many extinctions and declines. Predator control will have to be on-going if some native species, such as kiwi, are to survive on the mainland. Currently, predator control relies largely on labour-intensive trapping, so the development of a humane predator-specific toxin would be a valuable additional control method.

Para-aminopropiophenone (PAPP) is being investigated as a toxin for stoats, feral cats and wild dogs in New Zealand. The toxic effects of PAPP appear to be related to the rapid formation of methaemoglobin in some species, which leads to a rapid and lethal deficit of oxygen in cardiac muscle and the brain. Carnivore species appear to be much more susceptible than birds, so it potentially has a high target specificity, at least in the New Zealand context.

Pen trials with micro encapsulated PAPP pellets inserted into a meat bait have been undertaken on stoats and dogs and are currently underway for feral cats. The results from the trials will be discussed.

Notes:

WHAT WAS IN SNOW WHITE'S APPLE – AND WOULD IT WORK ON POSSUMS?

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

Poisons will remain essential for cost-effective vertebrate pest control in New Zealand in the short-to-medium term. We therefore have an ethical duty to minimise the suffering of animals that results from ingesting poisons during control operations, by mitigating or avoiding any noxious effects. One option is through the use of drugs with specific actions (e.g. anti-emetics, analgesics, anticonvulsants) or by reducing the duration of noxious effects through inducing unconsciousness (i.e. anaesthetics).

In a pilot study we found that adding a recognised sedative to ingested food did not appear to mitigate noxious effects of 1080 or phosphorus poisoning in possums. The dose of sedative used may have been ineffective as oral doses often need to be substantially higher than parenteral doses to produce the same effects. It is also quite possible that the pharmacodynamics of drugs in possums are different to those in eutherian mammals, or it may have been due to the drug having a different temporal effect to that of the poison.

With these parameters in mind we recently pen-tested a selection of orally-administered drugs that could potentially induce sedation, anaesthesia, or analgesia in captive possums. We have identified an effective oral drug, with an onset and duration which may prove effective in mitigating painful or stressful signs of 1080 or zinc phosphide poisoning in possums.

Notes:

**MOVEMENTS OF WILD BIRDS BETWEEN ASIA AND AUSTRALIA AND
IMPLICATIONS FOR AVIAN INFLUENZA**

Presenter

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Session TUESDAY 22/11/2005

ABSTRACT

Outbreaks of highly pathogenic avian influenza in Asia have raised serious concerns for human and animal health in Australia. Waterbirds are natural reservoirs for low pathogenic avian influenza and have been implicated as the primary source of infection in outbreaks of highly pathogenic forms. There are many bird species known to undertake movements between Asia and Australia. The species involved, their movements, behaviour and ecology are all of importance when assessing the risk of introducing foreign subtypes. This paper considers the interchange of wild birds between Asia and Australia with relevance to their potential role in the epidemiology of avian influenza. Recommendations for surveillance and preliminary results of field sampling are presented.

Notes:

THE KOALA AND KANGAROO CONTRACEPTION PROGRAM (KKCP)

Presenter

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Session WEDNESDAY 23/11/2005

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ABSTRACT

The KKCP represents the outcome of a successful ARC Linkage application (funded 2005-2009) by the above partners and their organisations. Both koalas and some species of kangaroos pose substantial management problems in some areas of their geographic range. Some populations can increase rapidly to the detriment of the environment, the animals' wellbeing and the long term viability of populations of these and other wildlife species occupying the same habitats. Humane and cost effective methods of fertility control could provide a solution to these problems. We aim to test a commercially available long-acting contraceptive on large populations of kangaroos and koalas, and to devise efficient, economic and practical ways of delivering these contraceptives to the animals in the wild. The outcome will be a system of controlling the number of these animals which is economically realistic and ethically acceptable to national and international communities. The contraceptive is administered as a small, subcutaneous implant on the upper back. It can be inserted very quickly and has no harmful side effects. Success with this technique in Australia would open this approach for potential use with other wildlife species that pose management problems around the world. This paper, will present a fuller description of our program.

Notes:

Horizontal lines for notes.

PROTOCOLS FOR THE RELIABLE MEASUREMENT OF TESTOSTERONE SECRETION IN THE KOALA: TOOLS FOR REPRODUCTIVE ASSESSMENT

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

As testosterone secretion in mammals is known to be episodic, a single point venipuncture is unlikely to give a reliable estimate of the prevailing steroidogenic capacity of the testis. In this study, we confirm the episodic nature of testosterone secretion in the koala (n = 6) over a 24h period and report on the successful development of a hormone stimulation test for measuring testosterone concentration using either GnRH or hCG. IM injection of GnRH (4ug/mL) or hCG (1000 IU) resulted in a subsequent maximal peripheral plasma testosterone concentration 90 mins later. The GnRH stimulation test is ideal for field work and is currently being used to document the seasonal reproductive status of a wild population of Koalas in SE Queensland. Recently, the hCG stimulation test has been used to investigate the efficacy of a Suprelorin implant (GnRH agonist) to impair koala testicular function for captive management. Preliminary results for both studies are presented

Notes:

SEASONAL PLASMA PROGESTERONE PROFILES AND FERTILITY IN FEMALE KOALAS TREATED WITH GESTAGENS FOR FERTILITY CONTROL

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Active management of overabundant koala populations in south-eastern Australia is essential because of the habitat destruction caused by overbrowsing. Management of an iconic species such as the koala is under socio-political constraints. Culling is unacceptable to the general public so managers have used other techniques. Translocation has been used to reduce local population density but now most suitable habitat in south-eastern Australia has been saturated. Surgical sterilization of females can slow population growth but is impractical in large populations. Both of these practises are expensive and potentially traumatic for the animal. A promising alternative is to use long-acting sub-cutaneous contraceptive hormone implants. We are evaluating the effect of two gestagen silastic implants (levonorgestrel and etonogestrel) on the fertility, physiology and behaviour of free-ranging koalas. In October 2003 we inserted 70 mg levonorgestrel implants (n=16), 34 mg etonogestrel implants (n=8) and control (inert) implants (n=8) in female koalas on French Island (Western Port, Victoria). In June 2004 we inserted 68 mg etonogestrel implants in another eight females. Females are caught monthly to check for the presence of pouch-young and take blood for monitoring plasma progesterone. Urogenital smears are also taken to detect oestrus. Females implanted with control silastic or etonogestrel continued to cycle and produce young. In contrast, none of the females with levonorgestrel implants have bred. Levonorgestrel implants appear to offer an effective and long-term fertility control option for wild management of koala populations.

Notes:

Series of horizontal lines for taking notes.

THE PRESERVATION AND MANAGEMENT OF KOALA GENETIC DIVERSITY USING REPRODUCTIVE BIOTECHNOLOGY AND MOLECULAR GENETICS: A MODEL FOR ENDANGERED AUSTRALIAN MARSUPIALS

Presenter

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ABSTRACT

The Koala is arguably Australia's most iconic and endearing species, so that there is considerable public demand (national significance) and expectation for both its conservation in the wild and exhibition in zoological institutions. With increased fragmentation of Koala habitat, it is becoming increasingly important to take action in genetic management of these populations in order to avoid genetic drift and inbreeding depression (Sherwin *et al.*, 2000; Seymour *et al.*, 2001). There has also been an increased demand for the international transfer of "disease free" Koalas to international zoos. Currently, the transfer process is expensive and there are animal welfare issues associated with transport of live animals (Johnston *et al.*, 2003a). Assisted breeding technology, including semen cryopreservation and artificial insemination, offers a real alternative to the traditional methods of Koala genetic management. The future genetic management of Koalas will most likely involve the use of genome resource banks in which Koala gametes can be safely stored frozen for hundreds of years and subsequently thawed and used in artificial insemination programs; such programs provide an important insurance policy against the loss of heterozygosity and in some extreme circumstances (e.g. if the effects of global warming are worse than predicted), the whole species. Whilst the Koala is not currently classified as endangered, it has been scheduled as vulnerable in the south-eastern bioregion of Queensland and in New South Wales. The collection and storage of genomic material from rare and endangered species confers substantial advantages in the preservation and genetic management of captive populations of Australian marsupials (Johnston and Holt, 2001). Although the promise of this technology is significant, testing of genome resource bank principles and large-scale use of the concept in wildlife populations throughout the world is limited to only a handful of species. Given the success of studies by Johnston and colleagues (Johnston 1999; Johnston *et al.*, 1994; 1997; 1998; 2000a; 2000b; 2000c; 2003a), artificial insemination in the Koala using fresh semen is now almost routine, so that the Koala represents an ideal prototype to establish a specific genome resource bank for a marsupial. The collection and cryopreservation of Koala semen from genetically important populations and its subsequent use in artificial insemination programs provides a vital new tool in the preservation and management of biodiversity in Australia and represents a world first in terms of a large scale proactive strategy in the conservation of a marsupial.

Notes:

MANAGEMENT OF A TAMMAR WALLABY POPULATION ON NORTH ISLAND USING THE LONG-ACTING CONTRACEPTIVE SUPRELORIN®

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Tammar wallabies are endemic to East and West Wallabi Islands, within the Houtman Abrolhos archipelago, approximately 50km offshore from Geraldton, WA. There have been at least two introductions of tammar wallabies from East Wallabi to North Is., a 180ha island located 20km further north. The latest introduction of animals in 1987 has resulted in a large population of tammar wallabies, with current estimates suggesting that there may be up to 400 animals on the island. This dense population of animals is causing widespread damage to island vegetation resulting in dune de-stabilisation.

In May 2005 a fertility control program was initiated on the island. The aim of this program is to determine if fertility control can be employed to reduce the population density on the island and if a reduction in population density over time corresponds with increases in the health of the vegetation on the island. Suprelorin contraceptive implants were administered to all females that were captured. A total of 60 adult females and 20 large female pouch young received contraceptive implants over a 7 day period. 23 of these adult wallabies were caught in cage traps, while 37 were caught at night using spotlights and hand nets. With a combination of cage trapping and hand netting, up to 14 females were caught within a 24 hour period. Congruent with contraceptive treatment were the establishment of faecal plots to monitor population trends on North Is. and a control site (East Wallabi Is.) and the continued monitoring of vegetation plots. This project will be discussed in relation to the biology of tammar wallabies on the Abrolhos Islands and the potential of fertility control to achieve the desired outcomes.

Notes:

WILDLIFE DETECTION: ONE PARAMETER OR TWO?

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Approaches to the monitoring of wildlife may be characterised as requiring the estimation of zero, one or two detection parameters. The 'zero' school asserts that variability in detection rate may safely be ignored and that 'indices' provide effective measures of trend. Indices are strongly embedded in the culture of wildlife management in New Zealand and Australia, and in bird counting practice worldwide. Some wildlife statisticians abhor indices and promote methods that estimate the single parameter p , the per capita probability of detection. This parameterisation is appropriate for a population of pre-defined spatial extent. When these methods are applied to samples of unknown extent (e.g. animals trapped on a line) they do not measure absolute population size or density, but rather provide an index of density that depends on the assumption that the spatial extent is constant. A detection model with at least two parameters is generally needed to describe samples of unknown spatial extent.

We describe recently developed methods for fitting two-parameter detection models to capture-recapture data. Evidence is presented that the second, spatial, parameter varies both within and between species. We discuss the future development of spatially explicit capture-recapture methods, and spinoffs for other approaches to wildlife monitoring.

Notes:

OPTIMISING WILDLIFE MONITORING TO DETECT RARE SPECIES OR DISEASE

Presenter

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ABSTRACT

Monitoring the success of eradication programs and the detection of new or recent incursions by invasive species or disease has long been of considerable importance to ecologists and wildlife managers. Monitoring always involves uncertainty, because population processes are stochastic, and because observations are accompanied by sampling error. Critically, there is a risk of obtaining a false negative result - the species or disease may be present but not detected. Monitoring is effective when it minimises the number of false negatives; in statistical terms, the power of the monitoring programme ($1-\beta$) needs to be as high as possible. Unfortunately, the power of monitoring programs to detect the species or disease of interest is rarely quantified, especially prior to undertaking monitoring.

Prediction of power requires a robust model of the detection process. Detection of an animal in a monitoring device depends on the spatial extent and patterns of movement of the animal. Recently developed two-parameter spatial detection functions explicitly model the influence of spatial extent of animal movements on the probability of detection. We show how spatial detection functions can be used to design wildlife monitoring to maximise power through optimising the intensity and spatial configuration of monitoring devices. We illustrate the method with examples of detection problems in possums and detecting bovine Tb using feral pigs as sentinels.

Notes:

ESTIMATING DETECTION PROBABILITIES IN FRESHWATER ECOSYSTEMS

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Detection probability is an important parameter for estimating indices of abundance in wildlife monitoring. In freshwater ecosystems, this probability is generally ignored and treated as a constant in analysis that comprises samples from boat electrofishing. This is largely due to the inability to close a population in large water bodies where boat electrofishing is deployed. This treatment of the detection probability has caused difficulties in evaluating the effectiveness of management actions implemented to aid threatened species recovery. We present a method whereby detection probabilities can be directly estimated. Marking fish with radio-telemetry tags creates an experimental design that satisfies the assumptions of a closed population. On each subsequent sampling occasion the number of radio-tagged fish available for capture in a particular area can be determined by tracking and locating all tagged fish. Detection probability is estimated by analysing the number of fish caught from the known available population. We trialed this method in the Murray River in 2004. Eighty-four fish were radio-tagged and the site was sampled on 4 independent occasions. Results showed that the probability of detection varied according to depth and fish size and there were dependencies between the sampling occasion (explained in terms of fishing time and woody debris). Fish movement was modelled and indicated that the study area needed to be large (approx 2km) and within site movement induces dependency on recapture probabilities. Individual effects were also observed. These results suggest that these factors would be a challenge to model in a standard mark-recapture analysis. The use of radio-tagged fish resolves these challenges by directly modelling the influence of the dependencies.

Notes:

WHAT SAMPLE SIZE IS NEEDED TO ESTIMATE AGE DISTRIBUTION ACCURATELY?

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

The vital rates (fecundity and survival) of individuals are often age dependent and can have a strong influence on the dynamics of a population. Monitoring the vital rates of a population can be an important part of determining a population's well being. Accurately estimating age (or stage) structure in a population is an important part of determining the contribution of the different age classes. Unfortunately, sampling to estimate the age structure of a population is usually time-consuming and expensive. No absolute judgements can be made as to the minimum sample size required to estimate age structure accurately, because it depends on the accuracy required. In his widely read and influential textbook "Analysis of Vertebrate Populations", Graeme Caughley stated that sample sizes of less than 150 were unlikely to be accurate for any purpose. We test this idea using simulation. It has previously been noted that the accuracy of the calculated age distribution depends on: the size of the sample, the number of age classes, sampling bias and the accuracy of the ageing technique. Our results corroborate these findings. To this list we add that the sample size needed to estimate age distribution also depends on the type of survivorship curve (Type I, II or III). Furthermore, we identify the relative importance of sources of error and make some recommendations regarding how best to allocate resources and effort to derive an age distribution at an acceptable level of accuracy.

Notes:

OPTIMAL MONITORING FREQUENCY FOR HARVESTED POPULATIONS ACROSS A GRADIENT OF ARIDITY

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

In wildlife management, monitoring should be efficient and must be linked to management action. Across vast areas of arid and semi-arid Australia, kangaroo population size is estimated annually by aerial survey allowing a commercial harvest quota to be set as a proportion of the population estimate. Trends in population size and in various harvest statistics, while of interest, are secondary. The optimal survey frequency is likely to be a function of the harvest strategy (e.g. harvest rate), rainfall-driven population variability and survey cost. Using a plausible model of kangaroo population dynamics, the risk of quasiextinction increases in a sigmoidal fashion as survey frequency is reduced. The risk is most pronounced in more arid regions and is highly sensitive to harvest rate. An appropriate management regime involves regular surveys in the major harvest areas where harvest rate can be set aggressively close to the maximum sustained-yield. Outside these areas, survey frequency can be reduced in more mesic regions and reduced in arid regions when combined with lowered harvest rates. These models assume harvest quotas are unadjusted between surveys. However, populations can also be indirectly monitored using rainfall-driven population models and a range of harvest statistics allowing adjustment of harvest quotas between aerial surveys. It is generally believed that, in arid and semi-arid environments, kangaroo rate of increase is closely linked to rainfall. Unfortunately, the observed relationship is poor in some regions, particularly those in northern Australia. Nevertheless, there are useful relationships between kangaroo harvest statistics and kangaroo density and harvest rate. However, there is considerable variation among regions and species in the form of the relationship. There is certainly no one relationship that could be applied across an entire state or across species.

Notes:

Multiple horizontal lines for taking notes.

A NATIONAL TRAP-CATCH PROTOCOL FOR MONITORING BRUSHTAIL POSSUM POPULATIONS IN NEW ZEALAND

Presenter

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ABSTRACT

Monitoring brushtail possum (*Trichosurus vulpecula*) populations has been an essential part of managing this pest species in New Zealand for many decades. A range of relative abundance (index) methods have been used, and prior to 1996 monitoring in forest relied primarily on faecal pellet counts and on farmland spotlight counts. However, other methods based on trapping, bait interference, and bait consumption at bait stations were all used to varying extents. As a result of the Animal Health Board undertaking responsibility for nationwide control of bovine Tb, a target for reduced possum population density was set that was predicted to achieve local elimination of the disease, and the opportunity for achieving this was progressively shifted from input-funded governmental pest control agencies to a performance-based system involving private contractors. Under this system, it became imperative that a standard, reliable method was developed for assessing and rewarding contractors' performance against a specified target density. Possible monitoring approaches were assessed against a set of criteria that included ease of implementation, accuracy, precision, repeatability, defendability, and cost. Traps were selected as the monitoring device because contractors were familiar with their use and could intuitively relate to a trap-based index, in contrast to indices based on faecal pellets or bait interference that contractors were less accepting of. Spotlight counts were precluded because, although used extensively on farmland, they were inaccurate and insensitive when used within forest. Consequently, a trap-catch survey method was developed based on the use of No1 leg-hold traps set on randomly placed lines of 10 traps spaced at 20-m intervals and run for three fine nights. A trap-catch target of 5% (i.e. a maximum of 5 possums could be caught for every 100 trap-nights) was set by the AHB, and contractors were paid if their post-control trap-catch index was less than this. In 1996 the National Possum Control Agencies (NPCA) funded the development of the method into a tightly specified National Trap-Catch Protocol, and established a set of training courses to teach field staff how to implement the requirements of the protocol. Subsequently, monitoring also became a contracting business centred around the implementation of the protocol. Although the trap-catch protocol is essentially a 'blunt' instrument, the national application of the method in a standardised way enabled the possum control industry to become very target-focussed as well as contractor-based, and this has enabled significant progress to be made in efficiently dealing with the bovine Tb and conservation problems associated with possums in New Zealand.

Notes:

ESTIMATING CHANGES IN DEER DENSITY USING FAECAL PELLET COUNTS

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

The New Zealand Department of Conservation attempts to control introduced deer (primarily red deer, *Cervus elaphus scoticus*) in some high-priority forests. Hence, there is a need for managers to estimate the effect of control on deer densities. Although faecal pellet counts have been widely used to index changes in deer abundance in New Zealand and elsewhere, few studies have modelled the relationships between the indices and deer density. We examined the relationship between three fecal pellet indices ('total pellets', 'pellet groups' and 'pellet frequency') and the density of deer in 20 enclosures in the North and South islands of New Zealand. In each enclosure the three indices were estimated on 30 randomly located 150-m transects, with each transect having 30 circular plots of 3.14-m². We developed four candidate models (one linear and three nonlinear) to describe the relationship between the indices and deer density. We used a Bayesian analysis to account for uncertainty in the estimates of deer abundance and to facilitate fitting models that included random transect effects. Although the four models explained the relationship between the three indices and deer density similarly well, we based further inferences on the linear model. The slopes of the relationships between the three indices and deer density were all positive, with the value 1.0 well inside 95% credible intervals. Simulations indicated that total pellets is a more efficient estimator of changes in deer density than pellet groups: pellet frequency is the least useful of the three indices. We conclude that faecal pellet indices are a positive and at least approximately linear index of deer density, and we recommend that managers make inferences about changes in deer density using total pellets rather than pellet groups or pellet frequency.

Notes:

A HAIR-TUBE SURVEY PROTOCOL AND SAMPLING FRAMEWORK FOR ESTIMATING SITE OCCUPANCY BY THE SPOTTED-TAILED QUOLL

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

The spotted-tailed quoll (*Dasyurus maculatus maculatus*) is a forest-dependent marsupial carnivore that has declined markedly in range and abundance since European settlement. Quolls are cryptic, mostly solitary and occupy large home ranges, and hence are difficult to detect. During this study a survey protocol using hair-tubes and a sampling framework were developed for estimating whether quolls are present in a management area with a known level of certainty. The probability of detecting the species with hair-tubes was investigated in a series of field trials, by placing different densities of tubes within the home ranges of radio-collared female quolls. A model was fitted to these data to determine the number of hair-tubes required per site to maximise the probability of detecting the species. A sampling frame was devised and Monte Carlo methods applied to estimate the number of sites required in management areas of varying size to be confident of detecting the species, if present. My results indicate that a minimum of 20 hair-tubes placed systematically in a 100-ha site ensures a high probability (>80 %) of detection in that site. Surveying half of the 100-ha sites present in a management area ensures a high probability of detecting the spotted-tailed quoll when the number of sites occupied by the species is low. The proportion of sites occupied by the spotted-tailed quoll provides an index of the relative abundance of the species within a management area that can be monitored to assess trends in species' distribution and relative abundance.

Notes:

ADDRESSING THE PROBLEMS OF MONITORING BURROW-NESTING SEABIRDS

Presenter

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Session WEDNESDAY 23/11/2005

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ABSTRACT

Burrowscoping is increasingly being recognised as the most efficient and accurate method of determining the occupancy of burrow-nesting seabirds. Despite the proliferation of burrowscope use few studies acknowledge the potential biases of this monitoring method. The Kia Mau Te Titi Mo Ake Tonu Atu (Keep the Titi Forever) research project aims to estimate the sustainability of the cultural harvest of sooty shearwaters by Rakiura Maori. The project depends on estimates of burrow occupancy obtained using burrowscopes for both intensive (trend estimation) and extensive monitoring (spatial comparisons of abundance) and for determining breeding success. There have been several indications that detection of burrow occupants is imperfect. Current monitoring may therefore be confounded if detection probabilities vary temporally or spatially, and estimates of breeding success may be inaccurate if a biased sample of occupants (e.g. weaker chicks close to burrow entrances) are detected. We addressed these issues by (i) determining the level of bias and its determinants on three study islands (ii) investigating nest-site selection and (iii) estimating the effect of nest-site characteristics on sooty shearwater chick quality. The implications of our findings for the monitoring of burrow-nesting seabirds are discussed.

Notes:

USING A BAYESIAN MODEL TO ANALYSE MONITORING DATA FOR THE CORANGAMITE WATER SKINK, EULAMPRUS TYMPANUN MARNIEAE

Presenter

Michael Scroggie
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Session WEDNESDAY 23/11/2005

ABSTRACT

The Corangamite Water Skink occurs in a series of isolated populations, dsitributed across the basalt plains of Western Victoria. Most extant populations are confined to narrow strips of rocky habitat on lake shores. As part of the recovery program for this critically endangered taxon, a monitoring program has been conducted at selected populations over the last ten years in order to determine trends in abundance, and to assess responses to management activities at some of the sites. Replicate visual transect counts of lizards have been conducted during spring and summer of most years at each of 13 sites across the geographic range of the taxon. A Bayesian statistical model was used to estimate the long-term rates-of-increase of these populations, as well as the temporal variance of the rates-of-increase. The model allows for a number of problematic features in the data, including a non-normal error distribution, missing data, and an unbalanced data structure. Limited existing knowledge of the taxon's life history was incorporated into the inferences through the use of informative priors for the rates-of-increase. The model has allowed assessment of trends in abundance of the study populations, and provides a framework for future assessment of the impacts of recently implemented management actions at some sites.

Notes:

ESTABLISHING TOURIST APPROACH DISTANCE GUIDELINES AT SEAL BAY CONSERVATION PARK, SOUTH AUSTRALIA

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

The establishment of an appropriate approach distance between wildlife and tourists based on behavioural principles is an essential management tool for natural attractions which host wildlife tourism. These guidelines are especially useful at a location such as Seal Bay Conservation Park, where large numbers (>100,000 annually) of tourists regularly interact with a breeding colony of Australian sea lions, which have recently been listed as threatened under the EPBC Act. In this study, individuals and groups of sea lions were approached by one to ten pedestrians to measure the distance at which the animals reacted and the type of behaviour displayed during that reaction. These trials were performed on both the beach where tourists are allowed access with guides as well as in areas that are usually undisturbed by human activity. At the current recommended minimum approach distance of six metres, 28% of sea lions on the tourist beach and 51% of sea lions in other areas exhibited a change in behaviour. Adult male sea lions initially reacted to approach at the greatest average distance (7.7m), and juvenile males responded at the shortest average distance (5.2m), although there was no significant difference in average distance at first reaction between any of the age-sex classes. These and other results of the study will assist managers in implementing sustainable tourism guidelines at the Conservation Park.

Notes:

GREY-HEADED FLYING-FOXES: STILL DAMNED BY IMAGE AND LACK OF PUBLIC KNOWLEDGE?

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Managing *Pteropus poliocephalus*, Grey-headed Flying-foxes, is problematic because differing public perceptions result in this species being regarded as both threatened and a pest.

To address the important role of human attitudes in the management of Flying-foxes this research, conducted on behalf of the NSW Flying-fox Consultative Committee, sought to develop an understanding of the context for commercial fruit-growers' interactions with Flying-foxes, by also examining the experiences and attitudes of the NSW public.

Observed responses revealed that significant proportions of grower and the public respondents did not accept specific 'facts' which are either the basis of current management or are seen as having potential benefit to management if widely upheld.

These findings exemplify the need to develop an understanding of public opinions of wildlife management scenarios not only to provide some direction for acceptable management but to ensure that knowledge gaps between members of the public and scientists/managers are effectively bridged as part of the management process.

Notes:

DOES SMALL-SCALE SPECIES DISTRIBUTION MODELLING, CONSISTENT WITH RECENT WILDLIFE MANAGEMENT PRACTICES, GIVE REALISTIC RESULTS? A CAUTIONARY NOTE USING SPATIALLY EXPLICIT HABITAT MODELLING OF BRUSH-TAILED ROCK-WALLABIES (*PETROGALE PENICILLATA*) IN SOUTHEAST QUEENSLAND AS A CASE STUDY

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Species distribution modelling has received much attention in recent years with its use in species conservation and management. This has been accentuated by the use of remotely sensed data and Geographic Information Systems (GIS) software with the increase in computer power and accessibility to spatial layers. However, species distribution modelling using spatially explicit data is still restricted by the suitability of the data to define variables of ecological importance to a species. The biological needs of a set of individual animals may not be well represented by a modeller working with a limited set of data. It may also be easy to fall into the trap of modelling species distributions only around the spatial data available. Austin (2002) suggests the importance of selecting variables that represent the biological and ecological constraints of the species while using a combination of statistical and spatial modelling techniques.

I offer a cautionary note by modelling the habitat of the brush-tailed rock-wallaby (*Petrogale penicillata*) at both the site-scale and the landscape-scale. Brush-tailed rock-wallabies are limited to sites with sets of suitable habitat characteristics that appear sporadically across a landscape. On a site-scale they may be limited by suitable resting and refuge sites and on a landscape-scale by dispersal potential within the landscape. My research extends the pilot study that I described at last year's conference to address this problem of scale and draw some clear comparisons at the site and landscape scale.

Notes:

ON USING MONITORING DATA TO EVALUATE THEORY AND ASSIST WILDLIFE MANAGEMENT

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Data on the distribution and abundance of wildlife are often collected in routine monitoring. Such data can be used to assess past trends. The data can also be used to evaluate relevant ecological theory, and to assist management in a pre-emptive manner by indicating likely future trends. This paper describes examples of how these have occurred or could occur. Examples are given for feral pigs in Australia, wild sheep and red deer in the U.K. and lynx in Canada. The data are used to evaluate a range of mathematical models of plant-herbivore and predator-prey population dynamics. The goodness of fit of the models is assessed. The results can be used in wildlife management by providing guidance on expected trends in abundance based on weather conditions, food supply and wildlife abundance. The analyses suggest however that there are limitations to use of the results. A particular limitation is that wildlife managers deal with specifics (particular sites, years and wildlife) and the analyses focus mainly on generalities not specifics. The relevance of the results to wildlife management in Australia and New Zealand is discussed.

Notes:

COMBINING MONITORING DATA FOR THREATENED WILDLIFE AND EXOTIC PREDATORS TO PROJECT THE LEVEL OF PREDATOR CONTROL NEEDED TO MAINTAIN NATIVE POPULATIONS

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Many recovery programs for Australian and New Zealand wildlife rely on ongoing control of exotic mammalian predators. Various indices of predator abundance or activity are used to monitor the effectiveness of control programs. However, the targets tend to be *ad hoc* rather than being based on data showing how low the indices need to be for native populations to recover. It is therefore useful to model how population growth of key native populations changes as a function of predator indices, and this can be done most effectively if vital rates (survival and reproduction) of the native species are monitored. I report an example where a New Zealand robin population was monitored for 5 years after reintroduction to a mainland reserve, and exotic ship rats (*Rattus rattus*) were monitored simultaneously using footprint tracking tunnels. Rat levels changed dramatically over this period due to changes in management policy, giving a good opportunity to assess corresponding changes in robin vital rates. The data gave clear evidence that fecundity and survival of adult females were inversely related to rat tracking, and tentative evidence of a similar relationship for juvenile survival. Plausible models for these relationships were compared using AIC, and parameter estimates and confidence intervals obtained for the best models. I show how these models were in turn used to project the robin population's finite rate of increase (λ) at any rat tracking rate, and how uncertainty associated with parameter estimates, model structure and demographic stochasticity was incorporated into these projections.

Notes:

MONITORING THE FRESHWATER GOANNA FOLLOWING THE ARRIVAL OF CANE TOADS USING SITE OCCUPANCY MODELS

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

The cane toad Bufo marinus is a declared Threatening Process under the Environment Protection Biodiversity Conservation Act 1999. Introduced into Australia in 1935, the cane toad threatens native mammalian and reptilian predators such as quolls, snakes and goannas. However, limited evidence that quantifies the impact is available to assist the management of threatened species. In many cases this is due to the difficulty in monitoring changes in low-density populations. This study documents the impact of the arrival cane toads on the proportion of sites occupied by the freshwater goanna Varanus mertensi. The study was located at Manton Dam Conservation Reserve in the Northern Territory and ran for 12 months from December 2004 to November 2005. Cane toads were first detected at the study site in February 2005. The detectability of Varanus mertensi varied considerably in each of the surveys. During wet season surveys, detectability varied weekly due to rainfall and minimum ambient temperature: the probability of detection ranged from 0.15 to 0.75. In contrast, the proportion of sites occupied by Varanus mertensi at Manton Dam remained high: 0.95 in December 2004, 0.93 in February 2005 and 0.92 in June 2005. The number of cane toads observed was low with only three individuals detected. There has been no demonstrable change in the population of V. mertensi. The method is relatively less labour intensive compared to radio-tracking individuals and shows promise for long-term monitoring.

Notes:
[Multiple horizontal lines for taking notes]

A BIGGER ROAD WITH LESS IMPACT? MONITORING FAUNA-FRIENDLY ROAD CROSSINGS ON COMPTON ROAD, BRISBANE

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Compton Road is a major east-west arterial road located within Karawatha Forest Park within the nationally-significant Greenback Corridor in southern Brisbane. The forests on either side of the road supported a diverse community of vertebrates including greater and squirrel gliders, koalas, three species of macropod and numerous small mammals. The road was a major barrier to animal movement and road kill rates were high. The proposal by Brisbane City Council to double the size of the road from two to four-lanes lead to a significant challenge: 'Can a larger road be designed to have less impact while enabling safe movement by fauna?' During 2004, a range of facilities (including purpose-built fauna culverts, possum road bridges, glider poles and, most spectacularly, a large-scale 'land bridge') were installed during construction. Monitoring of use of the various facilities began in February 2005. Comparison of pre-construction and control sites with post-construction survey data clearly indicate clear success in greatly reducing road kill rates and fauna use of the crossings. Data collected during intensive studies June-November will be presented in the talk.

Notes:

MANAGING TASMANIAN DEVIL (*SARCOPHILUS HARRISII*) POPULATIONS AFFECTED BY THE DEVIL FACIAL TUMOUR DISEASE (DFTD): THE EFFECT OF DFTD ON DEMOGRAPHY, POPULATION DYNAMICS, AND FINE-SCALE POPULATION GENETIC STRUCTURE

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Devil facial tumour disease (DFTD) is a recently emerged disease associated with widespread and major population declines in wild Tasmanian devils (*Sarcophilus harrisi*). First reported in 1996, DFTD has now been recorded in over 51% of the state and has resulted in the loss of at least 20% of the wild devil population state-wide, with local declines of up to 74% having been recorded. These alarming findings give cause for concern and have led to the nomination of the species for Threatened Species status.

This aim of this project aims is to determine the effect of DFTD on the population dynamics and fine-scale population genetic structure of Tasmanian devils, so as to evaluate the consequences and effectiveness of various management actions for the recovery of affected populations.

Data collection for this project will occur at two populations on the east coast of Tasmania, which have been the focus of past ecological studies. By revisiting these previously healthy populations in their currently 'diseased' state, and utilising the datasets collected from these populations prior to DFTD outbreaks, we will be able to explicitly quantify the impact of this disease on individual and population parameters. Estimates of vital rates and population structure will be obtained from capture-mark-recapture trapping data conducted at each site, at key reproductive times each year. These vital rate statistics will be used to construct and parameterize individual-based, stochastic simulation models with which to explore the long-term effects of the disease and the likely population responses to various management scenarios. Impacts on genetic structure will be investigated in relation to the effects of DFTD on matrilineal groupings in the population, utilising polymorphic microsatellite markers to compare genetic relatedness of resident females present in a population before and after disease outbreak.

Notes:

A series of horizontal lines for taking notes.

USING WILDLIFE DETECTOR DOGS TO LOCATE, MANAGE, AND REDUCE THE SPREAD OF THE INVASIVE BROWN TREESNAKE IN GUAM

Presenter

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Session WEDNESDAY 23/11/2005

ABSTRACT

Brown treesnakes are exotic, invasive nocturnal treesnakes in Guam with a high potential to spread to other islands and tropical locations. The snake is responsible for large destructive economic and environmental losses on this island that did not evolve with the snake present. Detector dogs have been used to find snakes in cargo previously. We are developing a program to detect these snakes in the natural environment using dogs. These dogs have had success finding snakes on Guam in the natural environment, where there is plenty of scent present, and we are planning to take the dogs to other islands should a snake be sighted there. This dog program will serve to monitor the current snake population on Guam, to determine functional limits of dog snake detection work, and to be an additional tool to limit the spread of this invasive species when a snake is sighted in another location. This has broad management implications, as dogs are increasingly being used to detect a wide variety of wildlife species.

Notes:

**SIMULATION MODELLING OF EXTINCTION PRONENESS AND RECOVERY
IN THE CRITICALLY ENDANGERED GRAND AND OTAGO SKINKS**

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

Grand and Otago skinks are critically endangered presumably due to a combination of habitat loss and sustained predation pressure by a large suite of exotic mammalian predators. Recovery of both species may only be possible on mainland New Zealand within predator-exclusion fences. A mark-recapture study was initiated from 1996-2002 to determine abundance trends and to collect demographic data from multiple grand and Otago skink populations. In 4 of the 5 grand skink populations, and in both Otago skink populations, abundance estimates declined over the study period. A single grand skink population was apparently stable. We investigated, by simulation modelling, the robustness of our demographic data to predict observed declines in abundance, or alternatively, a stable population. We used a density-dependent, stage structured model with environmental and demographic stochasticity. We then employed our model to predict likely extinction probabilities for all study populations, and investigated scenarios for survival and/or reproduction that led to population stabilisation. Lastly, we determined the founder population size required for a given rate of recovery behind pest-proof fences.

Our model successfully recreated the population abundance trends generated by mark-recapture data, giving us faith in our ability to model the system. For most grand and Otago skink populations at current annual survival (0.54 for subadults and adults) and reproduction (0.8 young per adult), there was a 99% extinction probability in 10 years. Projecting population recovery was most sensitive to changes in survival. An increase in survival to 0.70 and 0.80 stabilised most grand and Otago skink populations, respectively, and reduced extinction probability to 1%.

There is a concerted effort to avoid extinction of these species in the wild. Eradication of pests inside pest-proof fences is one of the management tools being tested. Our model suggests that with improved survival of at least 0.80 expected in this case, a founder population of at least 15 adult skinks would be needed to ensure population persistence over 10 years. Recovery to half the nominal carrying capacity from 15 skinks is expected to take about 11 years for grand skinks, and about 20 years for Otago skinks.

Notes:

STRATEGISING RECOVERY OF THE CRITICALLY ENDANGERED GRAND SKINK AND OTAGO SKINK: AN ECOLOGICAL 'WORST CASE SCENARIO'

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

Grand skinks (*Oligosoma grande*) and Otago skinks (*O. otagense*) are large saxicolous skinks endemic to Otago, in the South Island of New Zealand. Survey work conducted in the 1980s identified that both species had retreated to <10% of their former range, that both species were rare across their extant range and suggested a continued decline.

The skinks are naïve to mammalian predators and have life history characteristics that disadvantage them from coexisting with introduced mammals. They are omnivorous, feeding on invertebrates and fruits, take four years to reach sexual maturity and are only known to produce less than three viviparous offspring per year in the wild. There are no suitable habitats known on off-shore islands within or outside of their range. The skinks now exist in a radically altered ecosystem, converted from forest-shrubland to seral grassland by early Polynesian burning, further degraded by European agricultural development and introduced weeds.

A predator control operation focused on cats (*Felis catus*) and ferrets (*Mustela furo*) over the range of several grand and Otago skink populations, showed no positive responses in skink populations. The trapping operation also informed us that stoats (*M. erminea*), weasels (*M. nivalis*), rats (*Rattus rattus* and *R. norvegicus*), mice (*Mus musculus*) and hedgehogs (*Erinaceus europaeus*) all exist in the system together with rabbit (*Oryctolagus cuniculus*), hare (*Lepus europaeus*) and possum (*Trichosurus vulpecula*).

Population viability analyses suggest that functional extinction is likely for both skink species within ten years. Skink life history traits offer only a small window of opportunity to identify suitable ecological management that will enable their in-situ recovery prior to functional extinction in the wild. As there is no empirical evidence to indicate most likely agent(s) of decline, it is necessary for all potential agents to be addressed immediately.

Two experimental management treatments have been developed: total mammal eradication using mammal proof fencing technology, and optimal mammal suppression using conventional trapping and control techniques. Populations of both skink species are being monitored within the treatments as well as at control sites outside of the conservation management areas. Estimates of survival and lambda are generated using photo-mark-recapture methods.

Concerns remain that even if one or both of the treatments are successful at enabling the skink populations to recover, they may do so with sufficient initial stochastic fluctuations in population size that success will not be detected until functional extinction in the wild and/or irrevocable habitat degradation has already occurred. Further concerns include a lack of replication within the treatments and the political and economic ramifications of applying prescribed management over a viable metapopulation of grand and Otago skinks in the wild.

Notes:

PREDICTING QUALITATIVE ECOSYSTEM OUTCOMES OF SINGLE SPECIES PEST CONTROL

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

Single species pest management can lead to unexpected and sometimes negative net outcomes for native species we wish to protect. Predicting outcomes is important but it relies on understanding how other key trophic and competitive interactions function in the system. Precise quantitative prediction requires robust data on interaction strengths but this is difficult and expensive to acquire, especially in complex ecological communities. Qualitative prediction, while less precise, demands less robust data and can utilise other sources of ecological knowledge.

New Zealand semi-arid grass/shrub ecosystems abound in exotic species which interact among themselves and impact significantly on a variety of native species. We have quantitative data for only a few of the 15 or so interactions in this system that we consider important. For the remainder, we have assimilated less robust data or have an intuitive understanding of the interactions based on other sources of biological knowledge. Qualitative prediction is an attractive option in this case.

Here we explore the use of a qualitative modelling approach for making broad predictions about the effects of controlling single pest species on other species in this system. We used a food web model and the fuzzy interaction web (FIW) techniques given in Ramsey and Veltman (2005). A FIW is a dynamic model of a food web that depicts a set of state variables (e.g. species/guilds) linked together by causal variables representing the relative amount of "flow" between the state variables. Fuzzy logic can be used to process imprecise relationships between species interactions (interaction strength) or species abundance data using fuzzy set theory.

The response of exotic and native fauna to control of introduced superpredators (cats, ferrets, stoats) is a useful example of the outputs of the model because superpredator control is the conventional means of protecting at-risk fauna in this system. The results suggest that where rabbit haemorrhagic disease (RHD) suppresses rabbit populations, superpredator control would lead to a significant (>60%) increase in rabbit and rodent abundance (because they are primary prey of superpredators), a decrease (20-60%) in hares (because hares compete with rabbits), an increase in native lizards (because lizards are secondary prey of superpredators and rodents), and a decrease in native invertebrates (because of more rodents, and less vegetation due to more rabbits). Where RHD has not suppressed rabbits, superpredator control is predicted to cause no change in rabbit abundance but significant increases in rodents and native lizards - the other responses are expected to be the same.

These kinds of predictions have important consequences for wildlife management. They are also useful for guiding manipulation experiments that seek to better understand interaction strengths in complex ecosystems.

Notes:

MODELLING THE EFFECT OF ROADS AND OTHER DISTURBANCES ON WILDLIFE POPULATIONS IN THE PERI-URBAN ENVIRONMENT TO FACILITATE APPROPRIATE MANAGEMENT

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

Roads and traffic exhibit a multitude of impacts on wildlife populations. Most road ecology research seeks to assess the quantity and diversity of fatalities from collisions with vehicles, while studies documenting the impact of roads on the structure and sustainability of wildlife populations adjacent to roads have been lacking. Populations of wildlife existing within the confines of fragmented reserves are particularly susceptible to fatalities on roads, especially those situated within peri-urban and semi-rural matrices. We chose to examine the effects of disturbances, including fatalities on roads, on two separate swamp wallaby (*Wallabia bicolor*) populations living within protected reserves in the peri-urban environment of Sydney, Australia. Both populations are affected by wildfire, predation and road-based fatalities; however the impact of these disturbances varied between sites. In the Royal National Park (RNP), just south of Sydney, the main predators are foxes, while the park is criss-crossed by a number of frequently travelled roads. In the Muogamarra Nature Reserve (MNR), just north of Sydney, predation is by domestic dogs and foxes, while the only roads are those that line the perimeter of the reserve.

A combination of PVA modelling and sensitivity analysis was used to assess the impact of disturbances on the populations and identify appropriate management options to target disturbances. Given the pressures of the peri-urban environment, under current conditions, both populations were predicted to undergo slow decline over the next hundred years, with a strong possibility of extinction. The two populations differed in their susceptibility to different disturbances, suggesting that the combination of a range of management options such as road fatality prevention and control of predation (particularly after wildfires) could ensure the persistence of both populations. Road management in the peri-urban environment can play a substantial role in ensuring the persistence of isolated populations in protected reserves that are surrounded by, and traversed by, roads. Given the broad geographic scale of roads, their effect on wildlife populations may be best understood from a landscape perspective, taking into account other disturbances that may be influencing population viability. Our results further suggest that populations of even so-called 'common' species are at risk from the threat of roads.

Notes:

EVIDENCE-BASED MANAGEMENT OF FOX PREDATION ON BRUSH-TAILED ROCK WALLABIES IN NSW

Presenter

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Session THURSDAY 24/11/2005

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ABSTRACT

The NSW Department of Environment and Conservation and Department of Primary Industries have established a large-scale management experiment to conserve threatened populations of brush-tailed rock wallabies (*Petrogale penicillata*) in eastern NSW. In the part of the experiment in the Central Coast Region, intensive control of foxes (*Vulpes vulpes*) with 1080 baits is conducted at two of four sites: continuous baiting in national parks and state forests and one-week baiting sessions at two monthly intervals on adjacent farmland. Track counts on sand plots are used as an index of fox abundance. Changes in the size of rock wallaby colonies are monitored using regular counts of scats on permanently marked quadrats. The movements of radio-collared rock wallabies have been measured twice per year at one colony on each of the four sites to test the hypothesis that the animals will modify their behaviour in response to risk of predation. Rock wallabies are predicted to remain on or close to cliffs at all times where foxes are present. Where foxes are removed, rock wallabies should move further from cliffs at night to forage in nearby farmland. This type of behavioural change has been recorded for black-footed rock wallabies (*Petrogale lateralis*) in Western Australia and has potential to serve as an early indicator of reduced predation risk.

Since baiting began in spring 2003, there has been a decline in fox abundance at three sites: one treated and two untreated. At the other treated site, the initial large reduction in fox abundance was followed by a strong recovery to pre-baiting levels. Scat counts, trapping data and capture-mark-recapture population estimates indicate that two untreated colonies and one treated colony have remained small; consistently <10 adults and sub-adults. At the treated site where the reduction in fox abundance was not sustained, the colony doubled to an estimated 20 animals, with relatively few deaths of tagged animals and all adult females breeding at each of three trapping sessions. There were no apparent differences between colonies in average adult body weights. Brush-tailed rock wallabies remained close to cliffs at all times during the pre-treatment telemetry session, despite relatively short distances (250-600 m) to open pasture. Subsequent telemetry sessions indicated no evidence of changes in their movements at either treated or untreated sites.

The results highlight the importance of (a) simultaneously collecting data on fox abundance, to determine whether or not the experimental treatments have been imposed successfully, and (b) monitoring an attribute of brush-tailed rock wallabies that has the potential to respond within the time-frame of the experiment. The experiment has demonstrated clearly the technical and regulatory difficulties of using existing techniques to reduce fox abundance in large areas of rugged terrain bordering agricultural areas in eastern Australia.

Notes:

IDENTIFYING THRESHOLD RESPONSES TO HABITAT LOSS: HOW MUCH HABITAT DO KOALAS NEED?

Presenter

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Session THURSDAY 24/11/2005

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ABSTRACT

Loss of habitat is the most serious threat to the long-term persistence of many wildlife species. Therefore we need to understand the effect of habitat loss on wildlife populations if we are to develop effective management strategies. Of particular interest is whether a population will exhibit rapid increases in extinction risk once the amount of habitat falls below a particular threshold. Although this has important management implications, few empirical studies have addressed the issue. We tested for the existence of threshold responses to habitat loss in koala populations in three study areas; one from each of New South Wales, Queensland and Victoria. Presence/absence data were collected from each study area and we calculated the percentage of koala habitat and forest cover, at a range of extents, surrounding survey sites. We then applied piecewise logistic regression to model the probability of koala occupancy as a function of the percentage of koala habitat and forest cover. This approach allowed us to estimate threshold values for the percentage of habitat or forest cover in the landscape, below which the probability of koala occupancy declined rapidly. We found that there was good evidence for the existence of a threshold at around 40-60% forest cover in the New South Wales and Queensland populations. However, thresholds were apparent at somewhat lower levels in the Victorian population. This study indicates that koalas can require large areas of habitat and forest cover to support viable populations and therefore has important implications for their management and conservation.

Notes:

SPECIES INFORMATION PARTNERSHIPS: SHARING KNOWLEDGE ON THREATENED SPECIES

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

The Australian Government is currently working in partnership with State and Territory Governments to improve consistency between the Australian Government and State/Territory lists of threatened species.

The aim of the species information partnership projects is to move towards a more truly national list of threatened species that is supported by the most up to date information currently available. Such a list will reduce duplication of assessment activities, allow for more targeted expenditure of valuable conservation resources, and enhance government and community efforts to protect and conserve Australia's threatened wildlife.

Over a number of stages, the species information partnerships aim to: 1) improve consistency between the current lists of threatened species; 2) facilitate on-going information exchange on threatened species, and; 3) improve consistency between listing processes across Australia.

Notes:

ASSESSING THE CONSERVATION STATUS OF ECOLOGICAL COMMUNITIES FOR LISTING UNDER THE EPBC ACT

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

The Environment Protection and Biodiversity Conservation Act 1999 is the Australian Government's primary environmental legislation. One of its functions is to list and protect threatened species and ecological communities. Nominations for listing are assessed by a Threatened Species Scientific Committee, an independent scientific body appointed under the Act to provide advice to the Minister for the Environment and Heritage on listing matters.

The assessment of ecological communities is a complex process. Previously, definitions were primarily descriptive and little consideration was given to how degradation influences the definition. The process of defining listed ecological communities has been refined to better account for condition and regional variation.

Definitions now identify three condition categories:

1. Good quality remnants. These remnants form the basis for listed ecological communities and are subject to the protection provisions of the Act.
2. Degraded but recoverable remnants. While these remnants are degraded to the extent they are no longer considered part of the ecological community, they may respond to rehabilitation. As such, they are eligible for national funding sources such as the Natural Heritage Trust.
3. Irrecoverable remnants. These are considered too degraded for viable recovery effort.

The condition categories are identified using a range of ecological attributes and thresholds that are determined separately for each nomination by experts familiar with the ecological community. Attributes may include native species diversity, native species cover, extent of weed infestation or tree density.

The new approach seeks to optimise environmental outcomes. It focuses on legislative protection for those remnants in the best condition to ensure that they remain intact. It facilitates recovery by encouraging landholders to rehabilitate those degraded remnants that have the best potential for improvement. However, the approach also recognises that it is inefficient to direct resources towards remnants that are too degraded for any effective recovery.

Notes:

MONITORING SMALL PREDATORS FOR MANAGEMENT OR CONSERVATION

Presenter

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Session THURSDAY 24/11/2005

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ABSTRACT

This paper summarises a two-year field trial of a new automated bait dispenser for ferrets, the Scentinel®. In the first year we marked and released 15 radio-collared and 6 ear-tagged ferrets over 6000 ha, and observed the reactions to Scentinel and standard Holden live traps (both baited with rabbit meat, and of identical external appearance) of ferrets visiting 5 intensely monitored sites at 2 km intervals, using video and still cameras, proximity recorders ("snarks") and footprint tracking. The average visitation rate by ferrets to Scentinel was 3.4 visits/100 trap-nights, and 6.6 non-toxic rabbit meat baits/100 trap-nights were taken from locked-open Holdens. Six of the 15 collared ferrets came within 8 m of one of the five stations over 8 days, but 3 of the 6 never entered either device; the 3 that eventually did, once each, had all been in the same area on the previous one or two nights without entering one. All 15 survived to the end of the monitoring period. Visits by uncollared ferrets were also recorded by Scentinel (9), Holdens (4), or both (2).

In the second year we aimed to test whether it was possible to deliver bait only to animals of a set target weight. We set out 24 Scentinel in a grid covering 2,400 ha. The Scentinel recorded time, date, weight and 4 digital photographs for every occasion when an animal >50 g entered the tunnel. Animals >400 g also triggered the release of fresh, semi-liquid bait, either an egg/oil mix or homogenised sheep brains. We recorded a total of 1559 visits over the period 11 February to 29 April (1718 trap nights at 24 stations). We made a positive identification for 98% of visitors by combining image and weight information, including 198 visits by ferrets (one collared), 871 by hedgehogs, 283 by rats, 98 by cats, 40 by possums, 3 by rabbits and 38 unknown. The mean weight of ferrets recorded by the Scentinel was 818 g ± 24.8 SE, range 306 -1572 g (n=187), not significantly different from the mean weight of ferrets killed by contractors in the same area (884 ± 51.0 SE, range 477-1336, n=34). The Scentinel delivered 895 baits to visitors >400g (at the rate of 52 baits per 100 trap-nights), and no baits to 543 visitors of <400g. The two bait types were equally available (747 trap-nights for brain, 748 trap-nights for egg/oil). Of the 145 baits dispensed to ferrets, egg/oil bait was more often eaten than brain (P=0.006, paired t-test). Of the 198 ferret visitations, 93% were recorded between 8 pm and 6 am, most often between 9 and 10 pm. After the beginning of April, the number of Scentinel visits recorded by ferrets per day, and the number of sites visited, both fell (p=0.008, 0.021) as ferrets were progressively taken from the study area.

We will discuss the potential applications of this technology for large scale bait-choice experiments in the field, and for monitoring the removal of target species or the recovery of non-target species after control operations.

Notes:

DAY AND NIGHT TIME TREE UTILIZATION AND DIET OF ST BEES ISLAND (QUEENSLAND) FEMALE AND SUB-ADULT KOALAS

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

As part of a population dynamics study of an introduced population of koalas on a Queensland island the behaviour of mother-offspring pairs was investigated. Over four years, the relative exploitation of tree species and individual trees by adult female and sub-adult koalas on St Bees Island was examined using radio tracking and diet analysis. These koalas use both fodder and non-fodder species during daytime, moving into fodder species at night. Vegetation composition was determined using plot less sampling techniques. Koala diets were dominated by *Eucalyptus tereticornis* with *E. platyphylla* and *Corymbia sp.* also represented. Daytime tree use reflected the heterogeneity of the vegetation, while night time tree use reflected the diet composition results obtained from faecal cuticle examination.

Notes:

THE KOALA CONSERVATION PLAN.....A BETTER FUTURE FOR SOUTH EAST QUEENSLAND KOALAS

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

This paper reviews attempts to secure and recover the koala within its natural range in Queensland through the Koala Conservation Plan. The status of the koala was recently changed from 'common' to 'vulnerable' wildlife in the South East Queensland (SEQ) bioregion in response to declines in the regional population associated with habitat loss and development. The revision of status was the impetus for drafting the Koala Conservation Plan and for the inclusion of koala conservation measures in the SEQ Regional Plan which provides a regionally consistent approach to ensure development is guided in a way that is compatible with the conservation of koalas. The Koala Conservation Plan includes comprehensive strategies to mitigate a range of threatening processes such as habitat loss and mortality caused by vehicles and dogs. It addresses management issues such as extractive industry; community education; translocation; and research and monitoring that require consideration for effective koala conservation in Queensland.

Notes:

KOALAS AND KOALA MANAGEMENT ON KANGAROO ISLAND: A COMPARISON OF ATTITUDES AND OPINIONS HELD BY DIFFERENT STAKEHOLDER GROUPS

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

The management of Koalas on Kangaroo Island (KI) has been hotly debated. This complex public and sometimes not so public debate was examined using qualitative analysis.

Qualitative analysis (QA) is a commonly used methodology in the Social Sciences which deals with a distinctive form of data: language and texts, which express our beliefs, concepts, interpretations and opinions about the world. QA requires an interpretative and contextual approach rather than a reductive (eg to figures and graphs) approach; data collection may involve gathering a wide variety of textual materials. nVivo software was used to facilitate analysis.

Semi-structured interviews were conducted in November 2004 on KI. Groups represented included: primary producers, former primary producers now engaged in boutique or tourism focused operations, tourism operators, field scientists, conservation biologists, prominent conservationists, senior politicians and managers. Other textual material including web pages, media statements, 'hate' mail, current affairs programme transcripts, newspaper articles, policy statements, management protocols, science funding applications, and other documents, was included in the analysis. The dataset contained over 500 text articles.

Findings:

- Analysis indicated that members of different stakeholder groups perceive themselves and their colleagues to be members of that group not just because of their own sense of identity, expertise and concept of conservation, but also by exclusion (by a sense of what their own group was *not*). In particular, ascribed motivations provided group definition. -
- Further, the different groups had between them four distinct working concepts of what a Koala is; these different concepts of the animal colour attempted actions relating to the management of Koalas.
- Some groups (eg scientists) were accepted by most other groups as having expertise, while other groups' expertise went unrecognised or un-acknowledged by some. All groups expected 'the scientists' to come up with a solution.
- There were alliances between some of the groups, albeit for different stated reasons. Some groups had attempted to construct and promulgate an 'identity' of other groups as a tool to influence the outcomes of the management discussion (eg by dismissing some conservationists as 'crackpots' thereby attempting to diminish that groups' credibility and level of participation). This has effectively hampered consensus on the issue; the mutual dislike and distrust between some groups has acted as a barrier to any prospect of accord.
- While the groups seek consensus, the Koalas face imminent food shortages with the associated destruction of large tracts of native vegetation.

Notes:

USE BY KOALAS OF RECONSTRUCTED LANDSCAPES, KEY INPUTS FOR LAND MANAGERS

Presenter

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Session THURSDAY 24/11/2005

Author(s) and/or Co-Presenters

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ABSTRACT

The characteristics of areas of natural vegetation that appeal to a species may be absent from reconstructed landscapes, either by design or due to elements beyond the control of the land manager. In such cases a novel environment may be created; does this represent a failure of the rehabilitation process? Our research investigated use by koalas of revegetated ecosystems to understand 1) whether and how koalas would use a novel landscape and 2) what features of the reconstructed landscape provided facilities for the koalas. We discuss the capacity for critical habitat elements to be incorporated into revegetation strategies, providing benefit to target species. We argue that a firmer focus on the needs of the end-users of reconstructed ecosystems, combined with a flexible approach to construction can enhance revegetation outcomes for species such as koalas.

Notes:

MANAGEMENT OF CANADA GEESE (*BRANTA CANADENSIS*) IN NEW ZEALAND

Presenter

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Session THURSDAY 24/11/2005

ABSTRACT

Canada geese (CG) were established in New Zealand in 1905, and have grown to a population estimated at 30,000 to 50,000. They are most common in the eastern South Island, and are spreading to many areas of the North Island. CG were also introduced to Western Australia early in the twentieth century but failed to establish. In New Zealand, the species is listed on the Game Bird schedule of the Wildlife Act 1953, and their management comes under the bailiwick of Fish and Game New Zealand using funding derived from hunter licence fees. As such they are a high-profile game bird, favoured by many hunters. In contrast to their value as a game species, CG are considered a pest species by landowners, airport authorities, and city planners. Graziers argue geese feed socially on newly emergent or irrigated pasture, competing directly with livestock, and exclude livestock from such sites by fouling them with their droppings. Cropping farmers argue that CG graze on emergent grain and often impact heavily on the final crop. Airport authorities argue CG pose a risk to aircraft about airfields, with one near miss recorded at Christchurch last year. City planners report CG favour city parks, wetlands, and sewage settling ponds, where their droppings create a risk of disease to the public, and accelerate the eutrophication of water systems. This paper illustrates the scale of the CG problem in New Zealand, including population trends, and summarises possible management options.

Notes:

Multiple horizontal lines for taking notes.

POSTER PRESENTATIONS

MATING SYSTEMS AND MULTIPLE PATERNITY IN THE WILD ESTUARINE CROCODILE (*CROCODYLUS POROSUS*)- A STUDY IN A NORTHERN TERRITORY POPULATION USING MICROSATELLITES

Presenter

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Session Poster

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ABSTRACT

In Australia, the estuarine crocodile is a protected species that is managed to allow for the harvest of adults and eggs under some jurisdictions and for the removal of problem animals in all regions. Although much is known about the biology of *C. porosus*, research is yet to examine the genetic mating system in a wild population. To investigate this, we used genetic markers (microsatellite loci) to determine parentage and the possible presence of multiple paternity in 13 clutches from the Adelaide River and Melacca Swamp regions in the Northern Territory. Tissue samples were taken from hatchlings for genotyping and eggshell samples were taken from each clutch in an attempt to obtain maternal genotypes. The results of the analysis indicate that 9 out of the 13 clutches had evidence of multiple paternity and this included clutches from both regions. For each clutch demonstrating multiple paternity, there was an estimated range of 2-3 possible fathers. These results will be discussed in relation to the management of wild populations including the sustainable use programs in the Northern Territory in the form of annual egg harvests, harvests of adults and the proposed safari hunt.

Notes:

OCCURRENCE OF SPECIES OF ANGIOSTRONGYLUS IN POPULATIONS OF *RATTUS RATTUS* AND *RATTUS FUSCIPES* IN COASTAL FORESTS OF SOUTH-EASTERN AUSTRALIA

Presenter

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Session Poster

ABSTRACT

Angiostrongylus is a genus of nematode that infects mammals throughout the world. In Australia two species of *Angiostrongylus* have been described from rodents. Both species inhabit the pulmonary arteries of their definitive rat hosts and complete their life cycle in intermediate gastropod hosts. *Angiostrongylus cantonensis* has been recorded from *Rattus rattus* and *Rattus norvegicus* in south-eastern Queensland and Sydney, and is presumed to have been introduced to Australia from Asia with these invasive rodent species. *Angiostrongylus cantonensis* can infect and cause disease in marsupial, eutherian and human hosts. *Angiostrongylus mackerrasae* is considered an endemic species and has been reported from native rodents in south-eastern Queensland (*Rattus fuscipes*) and Tasmania (*Rattus lutreolus*). *Angiostrongylus mackerrasae* has been found to co-infect with *A. cantonensis* in *R. norvegicus*, but not in *R. rattus*.

Occurrence of species of *Angiostrongylus* in *R. rattus* and *R. fuscipes* was measured seasonally for two years in coastal forests to the north and south of Jervis Bay, Australia. Presence of *Angiostrongylus spp.* was determined by autopsy of rats and extraction of 1st stage larvae from faeces. Findings revealed that in the south *R. fuscipes* were infected with *A. mackerrasae* (17.6% prevalence). Lungworm was also sampled from *R. rattus* in the south, but the species was not confirmed. Low larval loads in faeces and degraded adult worms in an autopsied rat indicate that *R. rattus* in the south may be infected with the native *A. mackerrasae* and may not be a suitable host. In the north *R. rattus* were infected with *A. cantonensis* (3.4% prevalence).

Jervis Bay is now the southern most recording of *A. cantonensis* on the east coast of Australia. Its presence in bushland close to campgrounds and rural homes has possible human health implications. Humans may become infected with the nematode by ingesting infected snails or larvae released in slime trails on improperly washed salad vegetables like lettuce. Infection can result in neurological symptoms from severe headaches to disease (eosinophilic meningitis). While risk of infection to humans is low, infections (particularly of small children) resulting from ingestion of infected molluscs can be fatal.

The presence of *A. cantonensis* in *R. rattus* populations also has potential negative implications for native wildlife. Birds and mammals that include snails and slugs as part of their diet will be at risk of infection with possible outcomes being neurological causing disease and death.

Notes:

HOW USEFUL ARE 'GLIDING POLES' AS SURROGATE TREE CORRIDORS?

Presenter

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Session Poster

ABSTRACT

Squirrel gliders (*Petaurus norfolcensis*) are known to live in small areas of remnant vegetation. Innovative ways of reducing human impacts on squirrel gliders in these remnants are needed to prevent local extinctions. Arboreal marsupials are considered to be sensitive to habitat disturbance because clearing and thinning of trees, removes food and den resources and restricts movement if tree distances are greater than the animal can physically glide.

Five power poles were erected across 70m of cleared habitat, to connect two remnant glider habitats. The usefulness of a 'gliding pole' corridor to aid movement of gliders between remnants was assessed.

Eleven squirrel gliders were released and observed on the poles twenty-six times. The majority of gliders chose to glide to a tree in the opposite direction to their habitat, instead of using a 'gliding pole' to glide towards their habitat. However, these animals were later located in their original habitat. An observation was made of a glider using the poles to return to its habitat. A juvenile male was trapped in remnant either side of the pole corridor, which suggests this animal used the poles to disperse. A juvenile female was observed using a refuge on a pole to den.

These trial observations suggest gliding poles may assist gliding marsupials to traverse open areas between remnants. However, further study is required to find ways to increase the effectiveness of the use of gliding poles.

Notes:

DIETS OF STOATS IN A BRAIDED RIVER VALLEY: IMPACTS ON SHOREBIRDS

Presenter

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Session Poster

ABSTRACT

Stoats are arguably the most significant predator of native fauna in New Zealand at the present time. They are widely distributed and are present in most habitat types. They can survive on a wide range of prey and their impacts on threatened species are of particular concern. South Island braided rivers provide important breeding habitat for a number of threatened endemic ground-nesting birds such as black stilt, wrybill, and black-fronted tern and the aim of this study was to document the diet of stoats living in this habitat type.

The study was undertaken in the Tasman River, a large braided river in the Mackenzie Basin, South Canterbury in 2000-01. Stoat scats were collected and analysed to provide information on diet, and these data were supplemented by examination of stoat den contents. Analysis of 196 scats showed that stoats mainly ate lagomorphs (mostly rabbits), birds and invertebrates. Minor components of the diet included mice, lizards, fish and hedgehog. The remains found in 219 den contents tended to be larger items such as rabbits and birds. Scats and dens showed different frequencies of occurrence of the main prey categories.

Twenty-four species (13 native and 11 introduced) of birds were identified in den contents or scats. The most common bird identified in den contents was the banded dotterel. The presence of wrybill remains in 8% of all stoat dens suggests that stoats are having a significant local impact on the wrybill population in this system. The remains of 24 adult wrybills found in dens constitute roughly 20-24% of the wrybill population in this river. The presence of black-fronted tern remains in 10 stoat dens, with a minimum of 25 adults counted, suggests that where stoats are at the densities encountered in this study, they must be considered a serious threat to black-fronted terns as well.

When stoats occur in this system at the levels we found, they are likely to be having a substantial impact on breeding success and survival of shorebirds.

Notes:

THE DEVELOPMENT OF A NATURAL HABITAT RESEARCH BASE FOR GOLDEN MONKEYS (*RHINOPITHECUS ROXELLANA*): A STEP FORWARD FOR CAPTIVE PRIMATE MANAGEMENT IN ASIA

Presenter

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Session Poster

ABSTRACT

The golden monkey (*Rhinopithecus roxellana*) occurs in the Sichuan, Shaanxi, Hubei, and Gansu provinces of central China inhabiting the high altitude temperate broadleaf and conifer forests of these areas. Hunting and habitat fragmentation due to deforestation and human population growth pose the greatest threat to this species, resulting to its inclusion, since 1975, as a 1st class conservation priority in China. Despite this high level of in-situ conservation, ex-situ conservation remains relatively ineffective. The captive management of primate species, such as the golden monkey, in zoos and safari parks throughout China often includes a cyclical management strategy. This involves the mixing of a pair, removal of the male before birth, removal of the infant post weaning, and then returning the male for ongoing mating. This strategy is justified as maximizing breeding efficiency but is at the expense of the wider social, genetic, and behavioural needs of these animals. As many of the rare endemic primates of China are housed in captive wildlife institutes solely within China, the future of these species, many of which are lie in the hands of such institutes and their practices. In order to address this problem and provide an example for captive primate management throughout China, Zhejiang University commenced work on the Lin-an natural habitat research base. With the first phases now completed Lin-an represents the next step in the captive management of primates in China. Central to the base is a 20 ha *Rhinopithecus roxellana* enclosure, one of the largest primate enclosures in Asia. This enclosure structurally mirrors the monkey's habitat of mixed broadleaf and conifer forest, and its size will help facilitate a suitable social and environmental training ground aimed at maximising an individuals behavioural competency. These attributes will greatly increase the breeding potential of the captive population, success of reintroduction into the wild, and the possible transfer to captive institutes both within China and around the world. Furthermore, the base provides a center for both behavioural research and research aimed at addressing captive management problems, such as a biased offspring sex ratios, which have hindered breeding programs in other institutes throughout China. Finally, the base will provide a model for improved primate enclosures throughout South East Asia.

Notes:

BATS IN BOXES: A METHOD FOR MONITORING WITHOUT DISTURBANCE

Presenter

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ABSTRACT

For many native Australian species, tree hollows provide shelter, protection from predators and a stable microclimate for rearing young. The logging of old growth forest has greatly reduced the availability of hollows. Artificial nest boxes may be important tools to help counteract this problem, however, our limited knowledge of hollow use often restricts our ability to provide appropriate substitutes as well as plan for future habitat conservation. We are investigating the roosting habits of forest-dwelling microbats, which often have a number of roosting sites that they move between as frequently as everyday. Why this occurs is unknown, but it is possible that reduced roost availability could influence social structure, parasitism and reproductive success. Our lack of understanding is largely due to the difficulty of simultaneously monitoring many bats in more than one roost without excessive disturbance of roosting sites. To overcome this problem we are using implantable Passive Integrated Transponder (PIT) tags and a network of tag readers to remotely monitor the movement of individual bats using nest boxes. Each box is fitted with a unit that detects and logs the identity of a bat as it enters and leaves the box. The units are linked via a wireless network which relays the data to a single location for ease of download and analysis. This monitoring system will allow us to experimentally investigate bat roosting behaviour and examine roost preference for animals of different sex, age and reproductive classes. Further, this system has potentially wider applications and could provide information on the roosting habits of other hollow-dependent species using both artificial and natural roosts.

Notes:
