

FENNER CONFERENCE ON THE ENVIRONMENT

incorporating the
20th AWMS Annual Conference

Wildlife Population Dynamics and Management



Shine Dome, Canberra ACT
Australian Academy of Science

2-5 December 2007

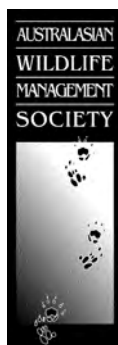
PROGRAM & BOOK OF ABSTRACTS



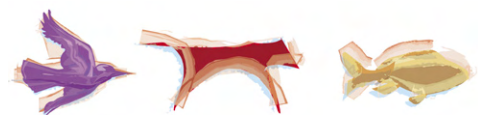
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Cover artwork of Himalayan tahr by Malcolm Studios
(www.users.bigpond.com/Malcolm.Studios)

DISCLAIMER

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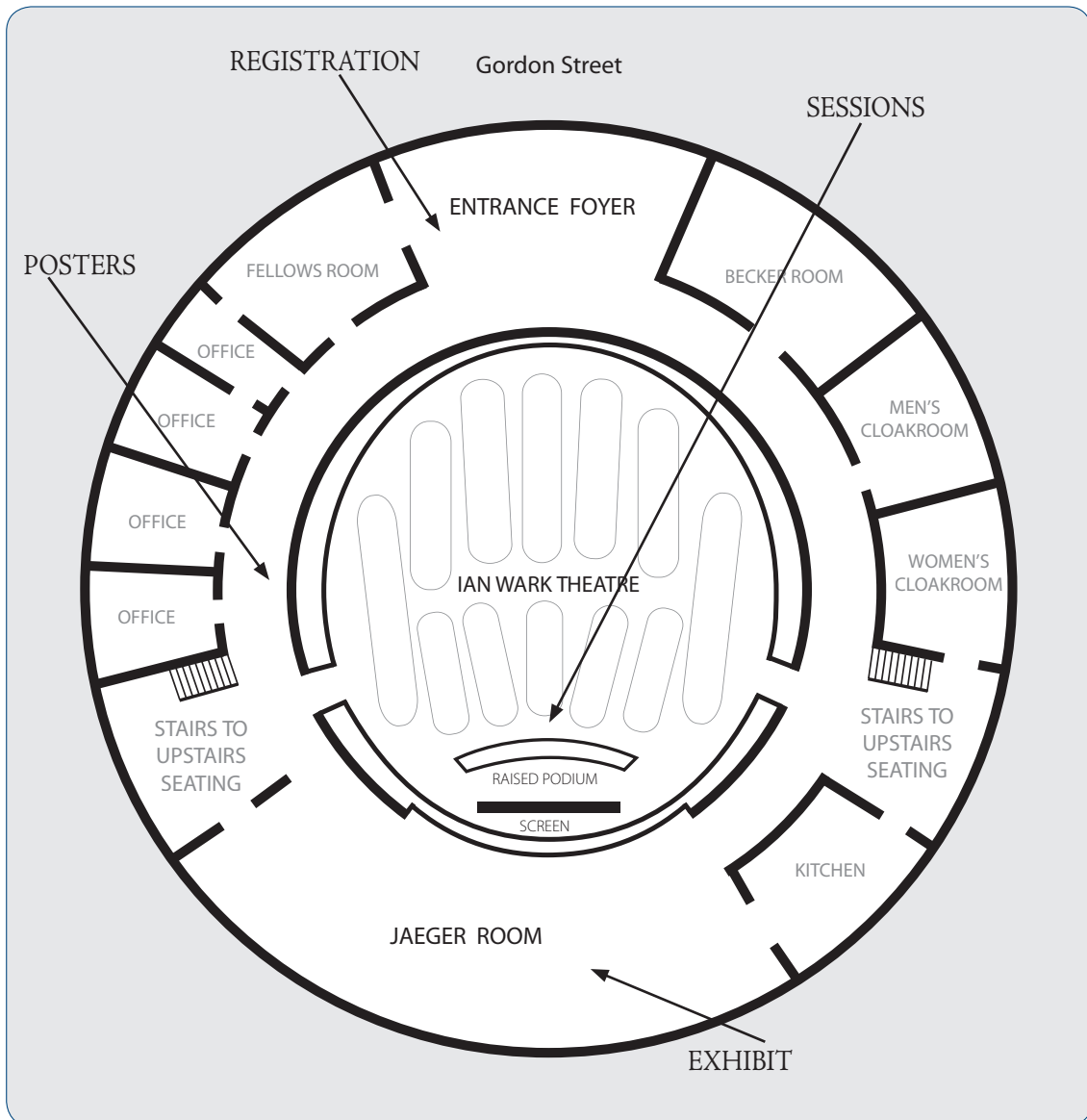
For information about the Australasian Wildlife Management Society see www.awms.org.nz

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The Shine Dome, Canberra



AUSTRALIAN ACADEMY OF SCIENCE

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CONFERENCE PROGRAM

SUNDAY, DECEMBER 2

09:00 Registration

10:00 Welcome

Dave Forsyth (President of AWMS)

10:20 Population dynamics after Caughley: the grand vision

Charles Krebs

11:00 Morning tea/coffee

CONSERVATION BIOLOGY

11:30 The ecological impact of invasive cane toads

Richard Shine FAA

12:10 Distinguishing between individual and population effects: impacts of invasive cane toads on Australian predators

Sean Doody et al

12:30 Lunch & posters

14:00 Range contraction in New Zealand birds accounting for detection uncertainty

Richard Duncan

14:20 The croak of the corroboree frog - is extinction inevitable or preventable?

Murray Evans

14:40 The success of re-releasing wild bobucks into their original habitat after short-term captivity

N. Currie, Kath Handasyde & J. Hufschmid

15:00 Afternoon tea/coffee & posters

SOCIAL ASPECTS OF WILDLIFE MANAGEMENT

15:30 Human dimensions of wildlife management in Australasia

Kelly Miller

16:10 Regional wildlife development plan for indigenous communities

George Wilson

16:30 Community initiatives in conservation - case study in Eravikulam National Park, India

Mohan Alembath

16:50 The ethics of native animal welfare: engaging communities and science

Steve Garlick

17:10 Assessing stakeholder potential: a missing step in strategic planning for cooperative wildlife management?

Guy Ballard

18:00 Icebreaker BBQ at the Shine Dome

CONFERENCE PROGRAM

MONDAY, DECEMBER 3

SINGLE SPECIES DYNAMICS

- 09:00 Graeme Caughley and the fundamentals of population ecology
Richard Sibly
- 09:40 Investigating range dynamics for imperfectly detected species
Darryl MacKenzie
- 10:00 The effect of contrasting ecological traits on the conservation and management of koalas
A. Melzer & Bill Ellis
- 10:20 Morning tea/coffee & posters

TROPHIC INTERACTIONS AND DYNAMICS

- 10:50 Trophic models for rodents in New Zealand forests
Roger Pech
- 11:30 Population dynamics of kangaroos in a temperate environment
Don Fletcher
- 11:50 Seeing the forest rather than the trees – lessons from the long-term study of an arid zone koala population
S. Fitzgibbon et al
- 12:10 Lunch & posters

STRATEGIC MANAGEMENT

- 13:30 Translating Caughley into management actions - the case of Himalayan tahr
John Parkes
- 14:10 Are Caughley's paradigms used by threatened species recovery planners?
Sue Briggs
- 14:30 Adjusting the focus on threatened species management goals
Rick Southgate
- 14:50 Afternoon tea/coffee & posters

STUDENT SYMPOSIUM

- 15:20 Slow release contraceptive implants containing the GnRH agonist deslorelin: Koalas
Kris Carlyon et al
- 15:30 Fine-scale genetic variation in declining koala populations in southeast Queensland
Kristen Lee et al
- 15:40 Genetic variation in translocated northern quoll island populations – management implications
Maria Cardoso et al
- 15:50 Study of a demographic crash of western lowland gorillas
Romane Cristescu et al
- 16:00 Combining intrinsic and extrinsic dynamics into models for disease vector control
Siobhan de Little et al
- 16:10 Short break
- 16:30 Demographics and management of western grey kangaroos by female sterilisation
Chris Mayberry et al
- 16:40 Monitoring starvation in over-abundant kangaroo populations
Justin Billing et al
- 16:50 Functional response of rabbits on improved and semi-improved pasture in a dryland ecosystem
Liz Rayner et al
- 17:00 Ecology of feral cats and their response to large scale fox control in East Gippsland
Tony Buckmaster
- 17:10 Den use of the brushtail possum in logged and unlogged forest in south east Tasmania
Lisa Cawthen & S. Munks
- 17:30 AWMS AGM
- 19:00 Student dinner

CONFERENCE PROGRAM

TUESDAY, DECEMBER 4

AFRICAN LARGE MAMMALS: DYNAMICS AND MANAGEMENT

- 09:00 Caughley in Africa: advancing concepts of wildlife management
Tony Sinclair FRS
- 09:40 A tale of two species: mutual lessons from management of black rhinos and hihi
Doug Armstrong & Wayne Linklater

MANAGEMENT OF HARVESTING

- 10:00 Managing wildlife harvest under global change
Barry Brook
- 10:40 Indigenous harvest, exotic pig predation and local persistence of a long-lived vertebrate
Damien Fordham et al
- 11:00 Morning tea/coffee & posters

MANAGEMENT OF PESTS AND DISEASES

- 11:30 Management of wildlife and disease in Australia and New Zealand
Andrea Byrom
- 12:10 Inter and intra-sexual interactions in wild possums
Weihong Ji & Dianne Brunton
- 12:30 Orally delivered BCG vaccine protects wild brushtail possums against bovine TB
Dan Tompkins & Dave Ramsey
- 12:50 Lunch & posters
- 14:00 Life history characteristics of feral swamp buffalo used to optimise disease control
Clive McMahon et al
- 14:20 The role of revegetation in fox impacts on lamb predation
Tony Arthur et al
- 14:40 The response of native fauna to fox control under the NSW Fox Threat Abatement Plan
Paul Mahon & S. Lassau
- 15:00 Examining the practical and economic efficiencies of fox control
Steve Lapidge et al
- 15:20 Afternoon tea/coffee & posters

GENETICS AND CONSERVATION

- 16:00 Genetics and conservation: a revolution in the time since Caughley
Stephen Sarre
- 16:40 From molecules to landscapes: genealogical concordance and defining bioregions
Arthur Georges
- 17:20 Revisiting the role of genetics in species conservation
Dianne Gleeson & I. Jamieson
- 19:00 Conference dinner at National Botanic Gardens
Announce new Committee, student winners, GCTF award and GC medal

CONFERENCE PROGRAM

WEDNESDAY, DECEMBER 5

WATERFOWL DYNAMICS AND MANAGEMENT

- 09:00 Tracking waterbird populations with aerial surveys - what have we learnt?
Richard Kingsford

KANGAROO MANAGEMENT

- 09:40 Kangaroo ecology: individuals, associations and populations
Graeme Coulson
- 10:20 Short-term effects of GnRH vaccine (GonaCon™) in tammar wallabies
Lyn Hinds et al
- 10:40 Is translocation of eastern grey kangaroos a viable option?
Karen Higginbottom & Skye Page
- 11:00 Morning tea/coffee & posters

POPULATION ESTIMATION

- 11:30 Is wildlife management well served by poor measures of animal abundance?
Dave Choquenot & Richard Barker
- 12:10 TBA

- 12:30 Lunch & posters

MANAGEMENT OF INTRODUCED MAMMALS IN NZ

- 13:30 Management of introduced ungulates in NZ
Dave Forsyth
- 14:10 Management of damage by, and populations of, wild mammals
Jim Hone
- 14:30 Close
Dave Forsyth
- 14:40 Ice cream or Afternoon tea/coffee

THE SOCIAL PROGRAM

SUNDAY

ICEBREAKER BBQ, 6pm on the grass lawn outside the Shine Dome, following on from Conference Sessions. Catch up with colleagues and enjoy the evening. Drinks will be sponsored by Sirtrack.

MONDAY

STUDENT DINNER - Please ask at the registration desk for more information.

TUESDAY

CONFERENCE DINNER, 7pm for 7.30pm at the National Botanic Gardens.
Dinner will be outside so remember to bring a light jacket or cardigan. DJ and the Karizmakatz will provide the music after the formalities have been completed. Delegates are to make their own way to the venue and a shuttle service will deliver guests back to their city hotels from 10.30pm.

PHOTOGRAPHIC COMPETITION DISPLAY

Submitted photos will be on display in the Exhibition area for the duration of the Conference. Photos may be submitted all day Sunday. Contact Desley Whisson for full contest rules and to register your intention to enter the contest.

POSTER PROGRAM

The poster topics have been grouped to the topics of the spoken papers and hence are on the same day as the spoken topics. Student posters are marked with an asterisk.

Poster presenters are offered a five minute scheduled opportunity to speak to their poster over the lunchbreaks. To ensure equal opportunity for everyone, it is imperative each speaker keeps to time - 3 minutes for presenting, 2 minutes for questions/answers.

SUNDAY POSTERS

CONSERVATION BIOLOGY

- 13:05 Population age structure and effects of mortality sources on grey-headed flying foxes
Anja Divljan et al*
- 13:10 Use of movements to determine optimal mark recapture sampling procedures
Wendy Dimond et al*

SOCIAL ASPECTS OF WILDLIFE MANAGEMENT

- 13:15 Welfare consequences of aerial surveys: a behavioural study of feral goats
John Tracey & Peter Fleming

MONDAY POSTERS

SINGLE SPECIES DYNAMICS

- 12:45 Human disturbance significantly alters population dynamics of tammar wallabies
Brian Chambers & Roberta Bencini*

TROPHIC INTERACTIONS AND DYNAMICS

- 12:50 Challenging our views about dietary specialisation - the golden sun moth
Anett Richter et al*

STRATEGIC MANAGEMENT

- 12:55 Threatened species recovery plans: an analysis of their characteristics and consistency
Alex Ortega-Argueta et al*
- 13:00 The use of tracking tunnels in monitoring New Zealand's amphibians
Amy Frost & P. J. Bishop*
- 13:05 Old dogs, new technology
Rob Appleby & Darryl Jones*
- 13:10 Activity of wild dogs, co-occurring carnivores and key prey species
Tom Newsome & Guy Ballard*
- 13:15 GPS tracking on a budget: an alternative to commercial collars
*Jason Edgar**

CONFERENCE PROGRAM

TUESDAY POSTERS

AFRICAN MAMMALS: DYNAMICS AND MANAGEMENT

- 13:15 Rare or exploitable? Sitatunga, the swamp dwelling antelope of Africa
Janice May & Rolf Lindholm

MANAGEMENT OF PESTS AND DISEASES

- 13:20 Using deslorelin to manage brushtail possums at Perth Zoo
Cheryl Hetherington et al
- 13:25 Repel the invaders: a regional control program for deer, goats, pigs and cats
Pip Masters
- 13:30 Public and postgraduate education for the management of invasive vertebrates
Stephen Sarre et al

GENETICS AND CONSERVATION

- 13:35 Genetic estimates of dispersal and conservation of grey-headed flying fox
Jackie Chan & W. Sherwin*
- 13:40 Conservation genetics, management units and human impacts on marine turtles
Nancy FitzSimmons et al

WEDNESDAY POSTERS

POPULATION ESTIMATION

- 13:00 Distribution and abundance of major mammalian grazers in Grampians National Park
Cathy Roberts et al*

MANAGEMENT OF INTRODUCED MAMMALS IN NZ

- 13:05 Infrared vision in ferrets
Carolyn King & Haylie Newbold

EXTRA POSTER SUBMISSIONS

Oral delivery a viable strategy for vaccination of macropods?
Janine Buist et al

The cryptic distribution of deer in New South Wales: the NSW version of Deer Wars is about to escalate
Daniel Lunney et al

Conservation benefits of commercial kangaroo harvesting in Australian rangelands
Kylie Singh

ABSTRACTS

(in program order)

Distinguishing between individual and population effects: impacts of invasive cane toads (*Bufo marinus*) on Australian predators

J. Sean Doody¹, Brian Green¹, David Rhind¹, Rachel Sims², Christina Castellano¹ and Tony Robinson³

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²Department of Botany and Zoology, Australian National University, ACT 0200

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The marine or cane toad, *Bufo marinus*, has been spreading westward across northern Australia since its introduction as a biocontrol agent in 1935. Because the Australian fauna has not co-evolved with true toads, which contain lethal skin toxins, cane toads reach high densities in Australia and there are numerous reports of mortality of frog-eating predators, especially reptiles, after mouthng or ingesting the toads. Despite these individual effects, quantitative data on population effects of cane toads on predators are absent. We documented the relative abundance of three species of monitor lizards (*Varanus mertensi*, *V. mitchelli*, and *V. panoptes*) and freshwater crocodiles (*Crocodylus johnstoni*) before and after the arrival of cane toads at two sites in tropical Australia, during 2001-2007. Consistent with anecdotal reports, numerous dead lizards and crocodiles were noted as cane toads entered the sites. Dramatic declines in counts of all three monitor species at both sites were generally synchronous with the arrival of cane toads (*V. panoptes* = 83-93%; *V. mitchelli* = 71-97%; *V. mertensi* = 87-93%). In contrast, we found no evidence for declines in crocodiles. This disparity in population impacts among species exhibiting similar individual impacts emphasises the distinction between small individual effects and major population effects.

Notes

The success of re-releasing wild adult bobucks, *Trichosurus cunninghami*, into their original habitat after short term captivity

N. L. Currie¹, K.A. Handasyde¹ and J.Hufschmid²

Departments of Zoology¹ and Veterinary Science², The University of Melbourne, Vic, 3010

Email: k.handasyde@zoology.unimelb.edu.au

The release of captive animals into the wild is widely used in management programs, with variable success. "Soft-release" including pre-release conditioning and post release support (e.g. providing shelter and food) is increasingly used to improve survival. We monitored the success of releasing wild-caught bobucks after 10 weeks in captivity. Ten adult males, fitted with radio-transmitters, were released at dusk in their captive nest-boxes, at the original site of capture. Animals were located daily for four weeks and the GPS position and number of den trees recorded. One apple or pear was broadcast around occupied dens for 14 days and evidence of fruit consumption recorded. Animals were recaptured at 2 and 4 weeks post release and their mass recorded. One bobuck was found dead 3 weeks after release, apparently from unrelated causes. Nine individuals remained close to the area they were originally caught from and 172 den fixes were obtained. Animals used 5.9 ± 0.8 (mean \pm SE) den trees (but never nest boxes) similar to the number used by wild bobucks in the area. Body mass declined after release to a level similar to weight at first capture. The success of re-releasing wild bobucks was probably enhanced by habitat familiarity.

Notes

Human dimensions of wildlife management in Australasia

Kelly Miller

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It is not the function of the wildlife manager to make the necessary value judgments in determining the goal... They should have no more influence on the decision than does any other interested person (Sinclair, Fryxell and Caughley 2006, p.3).

It is now widely accepted that it is important to understand the ‘human dimensions’ of wildlife management issues in order to achieve management goals. This growing field of study was born in the mid-late 1960s and involves an examination of societal values, knowledge and behaviours associated with wildlife and wildlife management issues.

This paper provides an overview of Dr Graeme Caughley’s work in relation to the human dimensions of wildlife management. It synthesizes major themes in human dimensions research, particularly within Australasia; and presents the findings from recent studies examining community attitudes towards species at the centre of wildlife-human conflict issues.

Reference:

Sinclair, A.R.E., Fryxell, J.M. and Caughley, G. (2006). *Wildlife Ecology, Conservation, and Management*. 2nd ed. Blackwell Publishing, Oxford, England.

Notes

Community initiatives in conservation – a case study in Eravikulam National Park, Munnar, Kerala, India

Mohan Alembath

President, Nilgiri Tahr Trust, Kerala, India

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Community involvement in conservation has made remarkable progress in Kerala, India. Till recently, conservation was a strictly regimented Government affair. This did not produce the desired results and in many cases antagonized the local people. Eravikulam National Park in Kerala, India is the home of highly endangered nilgiri tahr (*Hemitragus hylocrius*) red listed by IUCN the World Conservation Union. The park has made great strides in bringing in community participation in conservation. The local stakeholders are intimately associated with the day-to-day administration of the park and they run the tourism in the park. In the process the habitat of the animal has improved and the social capital of the local stakeholders has gone up. The future of the animal looks bright. Dr Graeme Caughley has studied the cousin of nilgiri tahr the Himalayan tahr (*Hemitragus jemlahicus*) extensively. His study has shown that the build-up in species' populations after their introduction to new areas is essentially the same as eruptions in natural mammalian herbivore populations. The growth pattern does not follow a logistic curve as had previously been thought but is an eruption and crash followed by stabilization. These observations have relevance to nilgiri tahr as there are plans to introduce this animal to new locations.

Notes

Population dynamics of kangaroos in a temperate environment

Don Fletcher

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Caughley and his co-workers estimated parameters for his interactive pasture-herbivore model in the semi-arid sheep rangelands at Kinchega National Park. The model for that environment (characterised by years of droughts and years of plenty) showed feeding by a naturally limited kangaroo population reduced the herbage mass of the vegetation by about 40%. Measurements and modelling in temperate south-eastern Australia showed the density is higher of both the pasture and naturally limited kangaroo populations. Also the herbivore offtake is greater, and the kangaroos have a larger effect on herbage mass. Consequently, both kangaroos and kangaroo shooting have potentially larger effects on the vegetation.

Notes

Slow release contraceptive implants containing the GnRH agonist deslorelin: effects on ranging behaviour of female koalas (*Phascolarctos cinereus*) on Kangaroo Island

Kris Carlyon¹, Desley A. Whisson², Catherine A. Herbert¹, Kathrine A. Handasyde³, Tim Trigg⁴ and Desmond W. Cooper¹

¹School of Biological, Earth and Environmental Sciences, University of New South Wales, Kensington, New South Wales 2052, ²Department for Environment and Heritage, 37 Dauncey St, Kingscote, South Australia 5223, ³Department of Zoology, University of Melbourne, Victoria 3010, ⁴Peptech Animal Health Ltd, North Ryde, New South Wales 2113

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Overbrowsing by an estimated 27,000 koalas on South Australia's Kangaroo Island has caused severe defoliation or death in riparian woodland dominated by the rough-barked manna gum (*Eucalyptus viminalis cygnetensis*) which has a fairly limited distribution on the island. Fertility control using hormone implants is a potential management strategy for reducing population density. We are investigating the efficacy of using slow-release contraceptive implants (Suprelorin®, Peptech Animal Health Ltd) containing the GnRH agonist deslorelin in a free-ranging koala population on Kangaroo Island. In October 2006 we inserted 4.7 mg deslorelin implants (n=8) and 4.7 mg control (inert) implants (n=8) into fertile adult female koalas in the Cygnet River catchment. An additional 8 females were surgically sterilised (tubal ligation) under the current government control program. To date, we have not observed any difference in home-range size or movement rate between deslorelin-treated and control females. Surgically sterilised females, however, moved further within larger home-ranges during the breeding season compared to control females. Our observations indicate that the use of deslorelin implants on Kangaroo Island could provide an efficient alternative for management of free-ranging koala populations, whilst minimising any impact fertility control may have on natural ranging behaviours.

Notes

Fine-scale genetic variation in declining Koala populations in Southeast Queensland

Kristin Lee, Seddon, J., Ellis, W., Johnston, S. De Villiers, D. & Carrick, F.
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 Email: k.lee3@uq.edu.au

The Koala (*Phascolarctos cinereus*) is classified as ‘Regionally Vulnerable’ in the Southeast Queensland Bioregion. The species presents an unusual opportunity to examine both Caughley’s “small” and “declining” population paradigms (Caughley & Gunn, 1996) in the one species. Although these authors contend that genetic factors are not usually the primary drivers of population decline, Brussard & Ball (1997) observe “genetic problems always have the potential to make a bad situation worse”. Furthermore, observations of genetic markers can provide information on underlying processes in declining populations (e.g. reproductive isolation). Previous studies have focused on comparing the genetic status of Koala populations in northern and southern Australia to assess the impacts of historical events (hunting, habitat destruction, disease epizootics) and management strategies of the early-mid 1900s (translocations). This study provides a novel opportunity to assess the microsatellite genetic variation of Koala populations in Southeast Queensland on a finer scale than ever before. Three hundred Koalas from six Southeast Queensland Local Government areas (Pine Rivers, Brisbane, Logan, Redlands, Ipswich, Caboolture) were genotyped at six polymorphic, microsatellite loci.

Brussard, P.F. & Ball, L.C. 1997 *Review of Conservation Biology in Theory and Practice* by Graeme Caughley & Anne Gunn *Journal of Wildlife Management*: 61 (4) 1441-1442

Caughley, Graeme & Gunn, Anne 1996 *Conservation biology in theory and practice* 459 pp Blackwell Science, Cambridge, Mass., USA

Notes

Study of a demographic crash of western lowland gorillas (*Gorilla gorilla gorilla*)

Romane Cristescu, Maeva Dewas, Damien Caillaud, Florence Levréro, Sylvain Gatti, Mélanie Douadi, Annie Gautier-Hion & Nelly Ménard

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Since 2001, researchers have been monitoring several populations of western lowland gorillas (*Gorilla gorilla gorilla*) in clearings of the Congo. In 2004, a sharp decrease in the Lokoué's gorilla population was noticed, as Central Africa was plagued by ebola. Another population, Romani, was studied to assess its status.

Seven months of observation revealed the demographic and genetic consequences of the outbreak that affected Lokoué's population. A reduced attendance of the clearing seems to be stabilized, and the low density in animals allows new individuals to migrate to the area. The structure of Lokoué's population changed. Groups are now less numerous than solitary individuals, immature individuals less numerous than adults, and females less numerous than males. Average and maximum size of families decreased, as well as number of young per female. Genetically speaking, the population stays within the Hardy-Weinberg equilibrium, with a normal heterozygosity and an allelic diversity that is not yet reduced. The frequency of alleles and genotypes, however, is significantly different. The population at the Romani clearing shows every characteristic of a healthy population. Attendance is larger and varies from month to month, as did Lokoué's population previous to the epizootic; the population and groups' structures are also similar.

Notes

The functional response of rabbits on improved and semi-improved pasture in a dryland ecosystem of New Zealand

Liz Rayner¹, Grant Norbury² & Philip Seddon¹

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The functional response of a herbivore expresses the relationship between its rate of food intake and food availability. This study describes the pattern of intake of New Zealand rabbits on improved and semi-improved pasture. Results show that rabbits maintain a higher rate of intake on semi-improved pasture compared to improved pasture. This may be due to their digestive capabilities as caecal fermentors, which means they are very efficient at processing low quality forage. Rabbits in this study had a higher intake rate, but lower grazing efficiency compared to rabbits on chenopod shrubland in Australian studies. This variation may be explained by differences in methodology and conditions specific to the current experiment. The research can be used to model pasture dynamics in a New Zealand dryland ecosystem.

Notes

Caughley in Africa: advancing concepts of wildlife management

Anthony R.E. Sinclair,

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Before the 1970s wildlife management in Africa was predicated on the concept of a fixed carrying capacity. Caughley’s paper of 1976 highlighted the confusion around the term ‘carrying capacity’ and provided the logic for management both within protected areas and in community-based conservation areas. Examples are presented for these two different land uses. There followed his work on the use of experimental management, overgrazing, overpopulation, and culling. Case studies will be taken from southern and eastern Africa. Caughley’s works on expanding populations, dampening cycles, interacting trophic levels, age structures and instantaneous rates of increase have been tested in ecosystem studies of the Serengeti. Advances on his original ideas will be illustrated both from Africa and elsewhere.

Notes

A tale of two species: mutual lessons to be learned from population management of the southern African black rhino and the New Zealand hihi

Doug P. Armstrong¹, & Wayne L. Linklater²

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There are remarkable parallels between the population management strategies currently being used for native vertebrates in southern Africa and Australasia. In both cases, expanding reserve systems have resulted in aggressive translocation programs for threatened species, raising similar issues about maximising metapopulation growth rates, sustainably harvesting source populations, and manipulating genetic interchange. Here we compare two prominent recovery programs, for the southern African black rhino and the New Zealand hihi. Both programs place a strong emphasis on population modelling, with ongoing monitoring focusing on mark-recapture surveys and reproduction data for individual females. Rhino populations are largely managed based on *a priori* predictions of carrying capacities, and an associated density-dependent model, and populations are harvested to maximise yields and avoid damage to vegetation through overcrowding. Management of hihi populations has had a less explicit *a priori* theoretical basis, with no consideration for target population sizes. However, it has made good use of adaptive management procedures, with ongoing model development being used to continually improve predictive capabilities. We suggest that both programs would benefit from an integrated approach, where a strong *a priori* theoretical basis is put in place, then updated based on ongoing analysis of monitoring data.

Notes

Examining the practical and economic efficiencies of fox control

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³Pestat P/L, University of Canberra, Bruce ACT 2617

Email: steven.lapidge@pestat.com.au

The costs and benefits of controlling pest species was of research interest to Graeme Caughley. Between 2006 and 2007 we examined the practical and economic efficiencies of currently used versus prospective fox control methods on 24 separate properties (sheep or cattle properties, conservation parks or forestry plantations) in the upper, central and lower south-east of South Australia. Results showed that each technique received a similar level of interest from foxes, as determined by the number of stations where baits had been eaten, partially eaten or missing- presumed eaten. M-44 mechanical ejectors and non-toxic baits were the most readily eaten by foxes, followed by FOXOFF® with FeralMone® and plain FOXOFF®. Coyote Lure Operative Devices (CLODs) proved too tough for all but the most determined foxes. Although M-44's were the most willingly taken form of control, they were also much more time consuming and expensive to set, with FOXOFF® plus FeralMone® and plain FOXOFF® baiting providing better bait take per unit effort respectively. Overall, findings show that FOXOFF® plus FeralMone® followed by standard FOXOFF® baiting is likely to be the most cost effective control technique, however M-44 mechanical ejectors offer an alternative for land managers in wetter soils.

Notes

Genetics and conservation: a revolution in the time since Caughley

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In his influential 1994 review of conservation biology, Caughley questioned the relative importance of genetic factors to the extinction of wildlife and took the opportunity to query evidence for the role of genetics in extinction. His parting comments came on the eve of what has become a revolution in technological advance in genetic approaches that have not even begun to realise their full potential. Here, I will review current understanding of the inter-play between genetic and ecological phenomena and argue that genetic analyses provide key insights that advance dramatically our ability to study and conserve wildlife. In particular, we can link the relatedness of individuals and populations to their position in the landscape providing powerful opportunities to detect and interpret dispersal and dispersal pathways and we can use population relatedness and phylogenetics to identify bioregions. Molecular approaches can also be used to detect wildlife and increasingly, to study directly, individual genetic drivers for important life history traits. I conclude that while some of the questions raised by Caughley about the relevance of genetics to extinction remain, it is clear that genetics has moved ahead dramatically and can make an important contribution to the rational management of wildlife.

Notes

Kangaroo ecology: individuals, associations and populations

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Graeme Caughley’s 1964 papers paved the way for many studies of the behavioural ecology of individual kangaroos and the associations between them. He subsequently pioneered research on the assessment, dynamics and management of kangaroo populations.

At an individual level, habitat selection is understood in terms of the requirement for both food and cover, as Caughley recognised, and the dispersion of individuals in a population at times conform to the predictions of the ideal free distribution. One obvious gap in kangaroo research is the use of longitudinal studies of marked individuals, an approach that has proved valuable in the study of reproductive strategies and dynamics of other large herbivores. Mean group size is now known to be linearly related to population density, as Caughley predicted. Contrary to his views, the high rate of group flux does not represent random movement of individuals.

Caughley showed that the dynamics of populations in the semi-arid zone is predominantly driven by rainfall, and only weakly modulated by kangaroo density. The dynamics of kangaroo populations in the more mesic part of their range is less well understood. These populations often reach extremely high densities and are often considered overabundant, posing complex management problems, as Caughley identified.

Notes

POSTER ABSTRACTS

A study of population age structure and effects of mortality sources on grey-headed flying-fox populations

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Grey-headed flying-fox (*Pteropus poliocephalus*), Australia's only endemic flying-fox, has been federally listed as vulnerable, following a reported population decline of at least 35% during the nineties. Possible causes of this decline include habitat loss and human interference (e.g. disturbance at roosting sites, unregulated shooting, and erection of electric and barbed wires). More recently, increased mortality from heat events has also been reported. However, these causes remain largely unsubstantiated and at present the research to quantify their effects on population growth rates is limited.

Additionally, GHFFs breed seasonally, with females giving birth to a single young each October/November after a six-month gestation. Pups are highly dependant and are weaned between 4-6 months. Thus, flying-foxes are believed to have a low reproductive rate and high maternal investment, indicative of long-lived animals with low natural mortality rates. Nonetheless, current knowledge on age-based population parameters is speculative.

This is the first study to accurately age both live and dead GHFFs. Thus, population age structure, recruitment rates, age at first reproduction and longevity are explored. In addition, we quantify the effects of different mortality sources on the population and hope that this study can provide a baseline for future research and management of *P. poliocephalus*.

Notes

Welfare consequences of aerial surveys: a behavioural study of feral goats

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Helicopters are commonly used for managing wildlife populations, but the potential effect on wildlife welfare is often ignored. In this study, we investigated the behavioural responses of free-ranging feral goats to helicopters and the main determinants of alert behaviour in response to helicopter surveys. Ground-based reporters made 784 observations of feral goat groups during 34 standardised helicopter surveys used to estimate abundance.

During survey periods, no feral goats were observed to be injured nor did any post-partum females desert their young in response to over-flights. However short-term behaviour was affected: feral goats were often alert (44% of observations) and, in 31% of observations, moved (up to 1.5 km) in response to helicopter over-flights. Regression analyses indicated that the distance from the helicopter and prior activity were the most important factors influencing the extent of alert behaviour and the distance moved in response to helicopter disturbance. No marked animals (n=985) moved out of their herd home range in response to helicopter surveys. Fecundity (1.34 kids parturient female⁻¹, s.e. = 0.03, n = 287 observations) and annual survival rates were high (ϕ = 0.992, n=61 radio-collared goats). These results indicate that aerial surveys of feral goats are acceptable on welfare grounds.

Notes

Human disturbance significantly alters the population dynamics of tammar wallabies (*Macropus eugenii*) on Garden Island, Western Australia

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On Garden Island, Western Australia habitat modification by the way of the introduction of irrigated lawns on the HMAS Stirling naval base has significantly altered the population dynamics of the endemic population of tammar wallabies (*Macropus eugenii*). The population on the naval base is also subject to very large numbers of road-kills, with up to 300 animals killed per year. We compared the population on the naval base with an area of undisturbed bushland adjacent to the base and another area approximately 10km to the north. Based on data collected from a two-year mark-recapture study, matrix modelling of the populations showed that the annual finite growth rate of the population on the naval base over the study period was 1.008 (95% C.I. 0.855-1.123), which was not significantly different to the adjacent bushland area at 0.864 (95% C.I. 0.856-1.100) or the northern bushland at 0.873 (95% C.I. 0.752 – 1.062). When the impact of road-kills was removed from the model of the base population the annual finite growth rate increased significantly to 1.182 (95% C.I. 1.047-1.278). These results demonstrate the effects that changes in food availability and road-kills can have on the growth of a macropod population.

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