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Hello everyone.

Gail, Delma, Bill and I want to thank you for your support over the 14 months of koala research on St Bees Island. With your help, we have gathered good data about the koalas on St Bees Island and the way they use the island forests. Later this month we are taking our understanding of island koala ecology and habitat utilisation to a meeting of about 45 of Queensland's national park managers to talk about how this knowledge can influence the management of the St Bees Island national park. We'll also be using the meeting to talk about how this is a case study of research and monitoring informing national park management across the state. This is your work making a difference in the management of Queensland's conservation reserves. It would not happen without your contributions and field assistance.

Three of our trips were disrupted by cyclone and gales but we managed to gather data all the same – despite having some equipment (and a boat) suffering from the weather. Thanks again to those team members for being patient and then working in inclement weather. Despite those storms we are still on the worst drought for a century and many communities in Australia are dealing with severe water restrictions – and of course the wildlife continues to suffer.

In addition to the koala data we also have a growing understanding of the ecology of Earthwatch volunteers. This is making a difference to us as well and we appreciate the opportunity to work with you. Gail is trying to stay in touch where she can so please send her an email if you want to know what the latest gossip is about the koalas or the research team. On that note, Gail will be taking leave from the project for a few months for "family" reasons. Send her a note for the news. Despite being on leave she will be very keen to hear from you. Bill has set up a web page where St Bees reports are posted. The address is koalaresearch.net.au. You can also get local community information from cqkoala.org.au and see more of Gail's photos. We also send report to Earthwatch.

Gail is still writing up the thesis and preparing some publications with some of your data. Delma is fighting to dominate new technology with her radio/temperature collars and we hope to have them fully deployed during this year.

All the best from Gail, Delma, Bill and me.

Alistair
Dr Alistair Melzer
Co-Principal Investigator
Koala Ecology

The Koala Research Centre is an initiative of the Rockhampton City Council, Queensland Parks and Wildlife Service and Central Queensland University. It aims to foster research for koala conservation, habitat rehabilitation and management in Central Queensland.

Data Collection and Results

a) Give a concise account of the data you have collected during the past field season.

Trends in abundance have been developed from mark-resight data collected during previous years. This year we have increased the extent and intensity of marking koalas on the island. This greater spread will increase the accuracy of population estimates that will be made in subsequent expeditions; Diet has been determined through the collection and analysis of faecal pellets and comparison of the leaf cuticle fragments with leaf cuticles in reference collections; Patterns of tree use by day and night (species, size) have been collected and compared with the occurrence of these species and tree sizes in the woodlands to identify any particular preferences or avoidances that may be evident. Previously the night tree use data collection was restricted to females and offspring. Since May 2005 we have started collecting data on a range of adult male and female koalas; Radio location of koalas was undertaken to identify any patterns in plant community use. There appears to be some differences between population size in contrasting plant communities. Standard searches have confirmed this and detailed analyses of the plant communities are underway to find the reason for this. Previously we had identified two distinct forest types with contrasting koala densities. This season we identified a third community dominated by a dry-season deciduous eucalypt. A floristic analysis of the three contrasting habitat types has now been completed. Relationships between structural characteristics of these communities and koala density will be sought in the next research period. Breeding success of adult females and the fate of the sub-adults (postgraduate study 1) has been studied intensively. The ranging behaviour of male, female and sub-adult koalas has been determined and is continuing. Tissue and blood has been taken for assessment of disease (mainly *Chlamydia*) and DNA studies related to inbreeding and population structure. Studies of the water utilisation and strategies for regulating metabolic rate by koalas are currently being pursued (postgraduate study 2). Morphological data from skeletal remains have been collected and are being compared with data collected from across the state to ascertain the frequency of bone disease and aging.

b) What progress have you made towards achieving your original objectives?

We have largely completed Objective 1 and are compiling these data for publication. We are initiating work on aspects of Objective 2 and have one post-graduate working on an aspect of this.

c) Please provide a summary of your results (even if they are preliminary).

Population

Annual census of koalas on St Bees Island indicates a population varying between 65 and 200. (2002 – 200, 2003 – 65, 2004 – 113). These are cautious estimates, as we are probably not evenly sampling the koala habitat on the island. The data do indicate that the population is not increasing dramatically. We have now expanded the tagging programme to cover more of the island to increase the evenness of sampling and hopefully improve population estimates.

Gender ratio

There is a slightly skewed ratio of males to females (43.4♂ : 56.6♀) but this probably reflects the highly territorial nature of males. That is, males will be more widely distributed than the females.

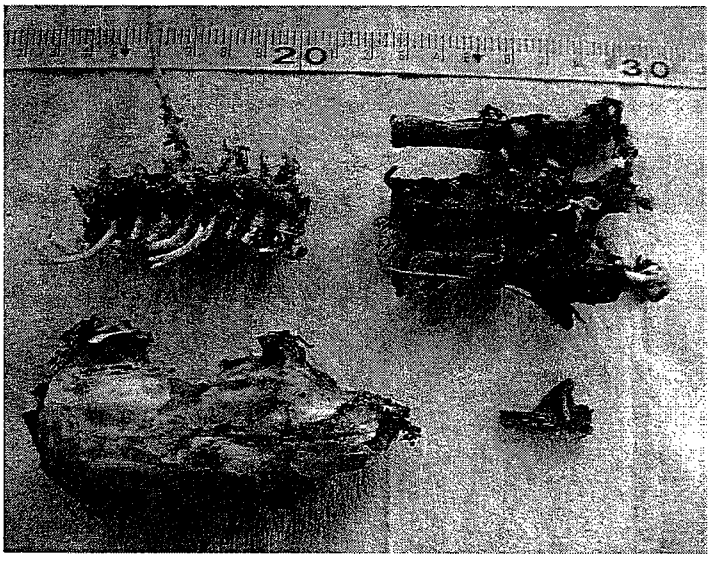

Figure 2 Remains of a koala taken by an eagle on St Bees Island

A number of dependent young koalas have gone missing and are presumed dead as they were too small to survive independently. A number of koala offspring were monitored each year from 2000 (Table 1). Many of these were lost each year before they were sufficiently mature to survive independently. As no dead were found and none of the young showed any indications of poor health or poor body condition we are unable to provide any likely cause for these losses. The percent loss was high in some years and if this is an ongoing feature of the population it must influence the population dynamics on the island.

Table 1. Fate of young koalas monitored from 1999 to 2003.

	1999	2000	2001	2002	2003
No. of young	15	5	9	8	7
Weaned	No data	0	2	4	6
Presumed dead	No data	3	7	2	0
No data	all	2	0	2	1

Day time tree use by koalas

Koalas use a range of tree species but predominantly use *Eucalyptus tereticornis*. When the pattern of use is compared with the pattern of occurrence in the forest there is a suggestion of "preference" for *E. tereticornis* and an apparent avoidance of most other forest species.

Table 2 A comparison of tree species occurrence the use of those species by koalas on St Bees Island. The Data in this table are indicative results from one field trip in the 2003/04 seasons.

Tree Species	Frequency of Tree Species Occurrence	Frequency of tree species use by koalas
Eucalyptus tereticornis	56.3	69.8
Allocasuarina littoralis	47.9	1.7
Diospyros germinata	37.5	1.7

Table 3 Koala density estimates for contrasting koala habitats on St Bees Island

	May 02	July 02
***Eucalyptus tereticornis* woodland**	**12**	**8**
Corymbia intermedia		
***Allocasuarina littoralis* shrubby woodland**	**3**	**2**

Disease studies - *Chlamydia*

Chlamydia infects the eyes and urino-genital tract (ugt) of koalas. Urogenital and ocular swabs were taken from 75 koalas and tested using polymerase chain reaction and analysed to identify the rate of infection for the years of the study:

- 1999 - 79%;
- 2000 - 10%
- 2001 - 43%
- 2002 - 0%

Infection rates apparently declined from 1999 to 2002. The females were fecund (Table 4) so the infection was not causing infertility. Indeed, generally there were few overt signs of chlamydial infection and body condition was generally good. Interestingly, although we can detect the presence of the chlamydial organism and of antibodies there has been no clear incidence of overt disease symptoms. It has been hypothesised that the expression of Chlamydia in a population may be related to environmental stress. This may explain the lack of overt disease symptoms on St Bees Island but much more research is needed here.

Table 4. Reproductive success of female koalas monitored from 1999 to 2003

	1999	2000	2001	2002	2003
Females	21	10	13	12	17
No. with young	15	5	9	8	7
	71%	50%	69%	67%	41%
Male	6	1	2	3	4
Female	8	1	5	1	2
Gender unknown	1	3	2	4	1

Genetics and inbreeding

To date, 116 DNA samples have been gathered from adult male and female koalas and their offspring. Currently there is no evidence of inbreeding (Figure 4). The St Bees Island population shows a greater genetic diversity than island populations and mainland populations derived from island populations in Victoria and South Australia. The population has similar diversity to wild populations on mainland New South Wales and Queensland.

The koala is the only representative of the family and is consequently of international conservation significance. The work will provide an insight into the research and management of isolated populations.

(For example, do your findings, or do you expect your findings will contribute to management strategies or biodiversity conservation action plans at any of these levels?)

b) How do your findings contribute to issues of sustainability?
They contribute to the maintenance of biodiversity in fragmented landscapes and provide direct input into the management processes for national parks and other reserves or intensively managed habitat isolates.

Dissemination of Results
a) Have you provided details of results from your research to or within:

- Scientific papers (indicate status; e.g., peer reviewed or in progress/press)
    - Pfeiffer, A. Melzer, A., Tucker, G. Clifton, D. and W. Ellis (2005) Tree use by koalas (*Phascolarctos cinereus*) on St Bees Island, Qld – report of a pilot study. *Proceeding of the Royal Society of Queensland.* **112**: 47-51.
    - Ellis, W., Goeldner, L., Tucker, G., Melzer, A., Carrick, F.N. (submitted) Field anaesthesia and heart rate of koalas. *The Veterinary* Record
    - Ellis, W., Girjes, A., Lee, K.,Carrick, F., Tucker, G. Melzer, A. (submitted) Chlamydial infection in an island population of koalas. *The Journal of Wildlife Diseases*
    - Melzer, A., Ellis, W., Carrick, F., Tucker, G. and Clifton, D. (in progress) Koalas and their habitat on St Bees Island, Qld.
    - Melzer, A., Gordon, G., Ellis, W., Carrick, F. (in progress) A problem with toothwear as an indicator of age in Queensland koalas. Australian Mammalogy
    - Tucker, G., Ellis, W., and Melzer, A. (in progress) Day and night time tree utilization and diet of St Bees Island (Queensland) female and sub-adult koalas. *Wildlife Research.*
    - Clifton, I. D., Ellis, W.A.H., Melzer, A., Tucker, G., Carrick, F. (in progress) Regional climatic influences on the water turnover of koalas (*Phascolarctos cinereus*) in central Queensland.
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- Management plans and reports (in progress or completed)
    - By who, for whom, and used by which agencies
- Presentations (given or planned)
    - Accepted presentation *Tree use and diet by female and sub-adult koalas on St Bees Island.* Gail Tucker, William Ellis, Australian Wildlife Management Society conference Hobart November 2005
    - Accepted presentation. *St Bees Island National Park – a case study: using research and monitoring to inform on ground management directions and actions*. Natural Resource Management workshop for Queensland Parks and Wildlife natural resource management staff. Airlie Beach, Central Queensland 27th September. Attendees: 54 state Parks and Wildlife staff from across Queensland.
- Popular articles or films (in progress or completed)
- Books, chapters, illustrations
- Posters