

MANAGEMENT OF KANGAROO-RELATED ENVIRONMENTAL AND ANIMAL WELFARE ISSUES

EXPERT PANEL ASSESSMENT – AUGUST 2007

Panel members

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Introduction: Management Objectives

One of the major components of the Defence Environmental Strategic Plan 2006-2009 is biodiversity conservation and landscape management. Included in its stated goals are, on the lands for which the Department is responsible:

- to protect biodiversity and landscape values
- to protect ecological processes

It was within these broad policy objectives, and operating under its Terms of Reference (**appended**), that the Expert Panel visited the Belconnen Naval Transmitting Station (BNTS) site on 11 August 2007. The principal purposes of the visit were to assess the environmental impact of the current on-site population of Eastern Grey Kangaroos (*Macropus giganteus*) on the ecological integrity of the entire site and to recommend actions that would ensure that kangaroo numbers and key ecological processes are sustainable.

The BNTS contains a variety of habitats, but the greater part consists of a virtually treeless remnant of the original temperate native grasslands that were once a conspicuous part of the ACT landscape. It is this remnant that is most impacted by the resident kangaroo population.

Further, as the BNTS site is securely fenced, the kangaroo population is effectively a captive population, mandating that the Department of Defence manage it in such a manner that it does not result in a diminution of biodiversity and landscape values or degrade on-site ecosystems.

Consequently the Committee set, as the principal objectives of its visit, to:

- Assess whether the current density of the resident population of eastern grey kangaroos was sustainable in terms of their health and reproduction;
- Assess the impact of current kangaroo numbers on the health and ecological integrity of the remnant native grassland;
- To assess options for reducing kangaroo numbers in a humane and ethical manner if it should be determined that these numbers and their environmental impacts are currently excessive, and to determine a target density for sustainability; and
- To make a broad assessment of the biodiversity conservation significance of the BNTS site and to identify immediate (i.e. short-term) actions needed to reduce or eliminate practices and processes that currently threaten the integrity of its biota and ecosystems.

Ecosystem qualities associated with sustainable management

The sustainable management of a grassland requires that sufficient plant material (biomass) be present to provide habitat for the range of species associated with it. Plant biomass accumulates as a result of energy capture from the sun and thus provides the primary energy source to support ecosystem functions. Biomass provides the primary food source for all the species in the grassland food web. In addition, the physical presence of the grass sward provides the means of protection of soil and the physical structure necessary for the shelter, foraging and breeding requirements of all grassland species.

A healthy soil-plant system is necessary for sustainability. Loss of soil, dead plant material and excessive loss of water reduces primary productivity of the grassland. A sustainable grassland is therefore conservative of soil and plant material. The structure of the grassland should prevent this material being washed off the site, even during heavy rainfall events. Loss of plant litter and dung inhibits essential recycling of nutrients and limits the effectiveness of rainfall absorption.

Because species vary in their requirements, variation in grassland structure provide a means by which the maximum number of species can persist. For example, the need for large tussocks with accompanying thick litter might be associated with the provision of shelter (e.g. for lizards, insects), structure for foraging (e.g. the use of tall flowering stems to attach spider webs) or for food supply (e.g. thick litter providing a damp organic layer for invertebrates). A short grass sward may be essential to provide open foraging areas for some species.

Grassland structure is intimately associated with the grazing effects of large herbivores (e.g. kangaroos, domestic livestock, hares). Little or no grazing allows for the accumulation of biomass and selects for tall-growing grazing-intolerant plant species. Moderate grazing allows the herbivores to graze selectively and in native grasslands, this creates patchiness - areas of both tall and short grass swards. Heavy grazing pressure results in non-selective grazing - the herbivores eat virtually all plants on offer and the resulting grass sward is very short and lawn-like. Plant selected for under heavy grazing

pressure are grazing tolerant and short-growing (even when ungrazed). The relative amounts of different patch structures is an important consideration in the sustainable management of grasslands. The high priority for soil protection means that tall and medium height patches are essential over the majority of a grassland area. In commercially grazed native pastures, the maximum recommended area of short patches (lawn areas grazed non-selectively) is one third of the grassland area.

Observations of the current situation

(a) State of the grasslands

Sward condition

The grassland sward is very heavily grazed, as evidenced from its uniform low height across the site (Figs 1-6) and fenceline comparisons indicating higher biomass in adjacent paddocks. An earlier survey (HLA-Envirosciences, May 2006) reports sward heights of 15 cm in the most widespread community (*Austrodanthonia* dominated grassland) the current height is estimated to be less than 3 cm. The grassland is in a particularly vulnerable situation having experienced heavy grazing over a time of severe drought (Spring 2006). The coming growing season (Spring - Summer 2007) is a critical time for plant recovery and seeding and even in a commercial situation, immediate destocking would be a recommended practice during drought recovery. If there was insufficient rainfall for Spring-Summer growth, destocking would still be recommended to prevent further damage to plants. The physical state of the grassland indicates non-selective grazing and suggests that any grazing-sensitive species (plants or animals) will have already been lost, or are at risk of being lost.

Soil condition

There is evidence of extensive, and in some cases severe soil erosion (Figs 4 - 6) at the Belconnen grassland site. This is apparent from the presence of pedestals and erosion scalds. Indications of further erosion hazard are the presence of extensive bare ground and the degree of crust brokenness associated with trampling. Both these expose the grassland to soil loss. In addition, the short sward does not provide any obstruction to overland flow of water during heavy rainfall. The large amounts of dung and the more limited amounts of trampled litter are therefore highly vulnerable to being washed off the site, losing this organic matter from the ecosystem will disrupt nutrient recycling and water infiltration processes.



Fig. 1. View indicating the extent of short patches that result from non-selective grazing and heavy grazing pressure.



Fig. 2. Close up of short patch indicating very close cropping of the grass sward. The plant cover here is reasonably good, but the shortness of the sward enables overland flow to transport dung and loose plant litter over the surface at times of heavy rainfall.



Fig. 3. Heavy grazing at this site has exposed high levels of bare ground. Heavy kangaroo traffic has damaged the surface crust that is generally protected by growth of lichens, algae, liverworts and mosses (cryptogams). The broken crust makes soil erosion more likely with rainfall run-off.



Fig. 4. General view showing short swards, red areas of bare soil and eroding areas in the background indicative of gully initiation.



Fig. 5. General view showing short sward, and extensive areas of bare eroded soil.



Fig. 6. Close up of area depicted in Fig. 5, showing pedestalling. The perennial grasses provide relative more soil protection and soil erodes from around them, leaving the tussocks sitting at the original soil height.

(a) Other species (Biodiversity)

The BNTS site, while consisting mostly of open grassland, also contains a number of other habitats. These include native eucalypt woodland, unoccupied residences and other buildings (some with gardens and ancillary areas planted with numerous exotic trees and shrubs), stony outcrops and small areas of ungrazed grassland.

Monitoring of threatened plant species by HLA-Envirosciences in the period 2005-2007 has resulted in extensive lists of plant species present, while also providing valuable baseline data with which to compare changes in both plant diversity and the condition of the native grasslands over time.

However systematic faunal surveys have not been conducted on the site, with most studies confined to particular threatened species (e.g. the sun moth, *Synemon plana*) or problem species (e.g. eastern grey kangaroo). The Vulnerable Perunga Grasshopper (*Perunga ochracea*) is also recorded from the site, but no systematic study of this species appears to have been undertaken on the site. We have yet to determine the extent to which insects and other invertebrate groups found on the site have been documented.

Of eight threatened species of birds recorded from the ACT, none have been recorded from the BNTS site.

Of three threatened reptiles, only one (the Striped Delma, *Delma impar*) has been recorded from the site (date uncertain). Of the remaining two species the Grassland Earless Dragon (*Tympanocryptis pinguicolla*) has a high probability of having been present on the site in the past, and is likely still be present. The very small area of suitable habitat for the Pink-tailed Worm-lizard (*Aprasia parapulchella*) makes its presence unlikely but possible.

While the extensive native grassland on the site is the preferred habitat of the first two lizards cited above, the grassland is at this time so heavily overgrazed that ground cover that would normally provide small, terrestrial organisms with sufficient shelter from predators and excessive solar radiation is virtually absent. The low growth, with some early levels of erosion, makes it highly unlikely that either lizard species is currently present on the BNTS grazed grassland. This contrasts with the structurally more diverse grassland on private grazed land adjacent to the BNTS, and to those parts of the BNTS between the outer and inner fences of the property.

It follows that the success of any effort to rehabilitate the grassland in order to conserve its biodiversity will depend (for all non-flying species) on the residual biota present on those parts of the site outside the grazed areas, or on adjoining properties. Knowledge of the state of these other areas (through appropriate surveys) is an important precursor to planning the rehabilitation of all or part of the grassland for biodiversity conservation. Without an on-site source of recolonisation, especially of any threatened species that are known to be present or believed to have been present in the past, the only effective approach would involve recruitment of key taxa by their reintroduction from areas outside the BNTS site.

(c) State of kangaroo feed

Standing crop

The standing crop of forage available to kangaroos is currently low, and is composed entirely of green pick. However, while the sward is obviously kept short by kangaroo grazing, there was no evidence that the population is currently limited by food availability: the kangaroos were resting during the day rather than feeding intently as they would if food was seriously limiting. There was also some evidence of bark stripping in a stand of low trees, consistent with kangaroos seeking fibre to compensate for the absence of dry grass in sward, but this was not extensive or severe.

Grass production

The production of new grass biomass in the months ahead will be primarily a function of rainfall. If rainfall is average, or better, there is likely to be sufficient production to sustain the current population of kangaroos and the young that will soon leave the pouch permanently. There is unlikely to be a surplus of biomass, even in good conditions, because the low stature of the sward will restrict its growth for some time. On the other hand, if the next few months are drier than average, there may be inadequate forage for the current population, leading to more severe grazing impacts on the vegetation and soils, and having negative effects on the welfare of the kangaroos.

(c) Health of the kangaroos

Very high density

- 450 per square km is an extremely high density for a free-ranging population

No current evidence of starvation

- Muscle masses are normal
- Mobs are lying down in the afternoon, apparently with full stomachs
- Age structure appears normal
- Sex ratio appears normal
- Almost all adult females were carrying large pouch young
- Numerous young at foot, the first to suffer when nutrition fails, were present
- Older animals appeared to be moving freely and not stressed

Conclusions

1. The structure of the grass sward and the condition of the soil are indicative of very heavy grazing.
2. The long-term sustainability of the grassland is threatened by this ongoing grazing pressure.
3. Eastern grey kangaroos are the only significant grazing species on the site.
4. Reduction of kangaroo density, and hence grazing pressure, is essential to allow the grassland to regain appropriate structure and soil condition.

Key recommendations

1. Control the kangaroo population
 - Reduce population by 400
 - Suppress rate of increase of remaining 100
2. Provide supplementary feed
 - To save grass and soils; not needed for animal welfare
 - As a prelude to darting in enclosures
3. Reduce population through combination of
 - Translocation
 - Euthanasia
4. Slow subsequent growth with fertility control
5. Implement the following management procedures to obtain an even-aged population of approximately 100 kangaroos

Translocate as many as possible

- If reception sites for adults can be found
- If hand rearers are available
- If cross border movement and release can be done legally
- If animal welfare issues central to translocation and release can be addressed
- Offer pouch young and juveniles for hand rearing
 - Less onerous animal welfare standards due to smaller size
- Anticipate great difficulty finding acceptable receivable sites for adults
 - ACT
 - No translocation reception sites in ACT
 - NSW
 - Wildcare says it can take 100 to a site 'owned by NSW Government' which is leased by Bill Waterhouse and is adjacent to a nature reserve in the Braidwood district
- NSW permits will be required
 - Department of Environment and Climate Change will need to authorise import of kangaroos into NSW and then authorise their release.
- Translocation must meet animal welfare standards
 - Catching
 - Transporting
 - Releasing

Initiate capture for translocation, euthanasia and fertility control

Enclosure

- Erect an enclosure
 - With a gate that can be closed remotely
- Supplementary feed in the enclosure
 - Pellets, Lucerne, molasses flavoured pellets with high protein
 - To reduce the impact of population on grass recovery

Darting techniques

- Free ranging capture darting has been recently undertaken
 - Low return per effort
- Dart within the enclosure
 - Operate in late afternoon
 - Softly with minimal personnel

Driving into wire yards or nets

- Not recommended - can lead to large numbers in nets and injuries

Oral tranquiliser

- Chloral hydrate in feed or water
 - Unlikely to get enough ingested

Euthanasia

Lethal injection by dart

Shooting has not been approved by AFP

- High powered rifles unacceptable in built up area
- Shotguns or low powered rifles not permitted under code of practice
- Explosive projectiles a possibility

Fertility control

To avoid population increasing rapidly again and requiring further culling, fertility control is needed on remaining 100 kangaroos

- Include those that are part of the existing fertility control project
- Vasectomise other males
 - Only requires one treatment
- Maintain even age structure in population