SUBMISSION:

DRAFT MACROFAUNA MANAGEMENT PLAN

ADI Residents Action Group

1 October 2003

Introduction

The ADI Residents Action Group objects to any cull or relocation of kangaroos that is premised on the removal of their grazing lands in order to make way for a development.

It finds the Draft Macrofauna Management Plan to be an insufficient basis on which to make a decision about the fate of the kangaroos and emus on the ADI site.

Summary

The basic premises of the Draft Macrofauna Management Plan (DMMP), that:

- the ADI site is 'overpopulated' with kangaroos and
- that the animals need to be culled for reasons of 'protection of rare flora and to ensure welfare of the animals'

are fundamentally flawed.

No evidence is presented in the DMMP that either assertion is currently the case, nor even that they are likely to become so if development goes ahead.

Indeed, there is evidence that culling kangaroos will be the sole cause of cruelty to Macrofauna and that it may directly threaten the rare flora of the whole ADI site. Our own surveys (1) and research reveal that the macrofauna (at the current population levels) are certainly not showing any signs of stress. We have veterinary advice that the kangaroos are healthy). (2)

Our research and surveys also reveal the ecological benefit that macrofauna provide for the site's rare flora. Reducing or altering Macrofauna by culling could actually be predicted to have threatening effects on the existence of the rare flora, including EECs and EPBC/TSC listed species/populations. It is the complete lack of data regarding the relationship of the macrofauna with the ADI site's ecology, and at times the misunderstanding of that relationship, that renders the DMMP scientifically invalid, and should lead to dismissal of the plan.

A full and proper independent scientific study must be undertaken before decisions are made that will affect the welfare of the animals and the site's internationally important biota. To accept a plan that threatens both these considerations would be managerially irresponsible, immoral & dismissive of statutory obligations.

Comments on the Draft Macrofauna Management Plan

The DMMP presented by the Developer, when taken into account with the Draft Precinct Plan Documents, is intrinsically flawed because the developers' consultant shows little knowledge and at times serious misunderstanding of the site's ecology. Taken together, these documents are flawed, and ignore reputable scientific advice and data.

The plan abounds with content that is **unsubstantiated, incomplete, inconsistent, misleading, incorrect , vague and based upon unclear reasoning**. These inadequacies are dealt with below.

Unsubstantiated claims

'Overabundance' & Macrofauna Health

Kangaroos

The premise proposed throughout the plan that Kangaroos are 'overabundant' is nowhere substantiated, either in relation to kangaroo health or ecological pressures.

Our own veterinary advice is that the kangaroos are healthy. There is no evidence of physical stress due to 'overabundance'. The developers do not attempt to show any professional opinion to the contrary.

Emus

No reference has been made to the effects of the process of excluding Emus from the Eastern Sector, both in terms of Humane treatment (discussed here) or Ecological implications (discussed to some degree here, and to be applied with reference to population dynamics later under 'Overabundance & Ecological Effects').

Emu relocation is fraught with difficulties. Most of these revolve around the complex processes of Emu egg-laying, Incubation and brood-care. (11)

The disruption of emus during any of these processes will cause abandonment of eggs or chicks, or great physical stress on Adult male Emus.

Emu eggs are laid sequentially (on average 4 days apart) and the male does not begin sitting until 20 - 36 days after the first 5 - 9 eggs are laid, but in some years it can be even longer than this for the male to begin incubation. Any attempt at relocating Emus during this period would mean a possible generation loss if all Emus were nesting at the same time in this area. If Emus were nesting at different times, then there would be a population depression.

Both situations could result in a terminal population decline when that affected generation becomes adult.

Eggs can be laid subsequently to the male's initiation of incubation, with a total of 9 - 12 eggs being an average clutch size, but up to 20 being standard in better years. The process of additional egg laying after the male's latent incubation means that in normal years, the last eggs don't hatch until at least 3 months after they are laid, but it will be even longer than this if conditions are good (more eggs) or bad (longer time between egg laying).

Any interruption to the males while sitting will kill the eggs if the air temperature is above c.33 degrees celsius, as males have to keep the eggs cooler than ambient temperatures in these conditions. (Emu incubation temperatures are lower than most birds'.) The male Emu does not leave the nest during this process and normally looses 11 - 22% of his body weight.

The natural instinct of an adult Emu is to run when forced. Emu chicks, on the other hand, rely on cryptic coloration and remain motionless and hidden. Therefore any attempt to herd Emus when adults are nurturing a brood of chicks will result in the death of chicks through starvation of young chicks and/or predation. The emaciated male, too, during this process of disturbance and separation is likely to suffer adverse health effects, possibly leading to death. A reduced or delayed ability to care for future chicks may also be expected, resulting in a future population depression with the attendant problems listed above.

The male attends to his brood for an average of 18 months. Not only does this mean that the period of adverse ecological effects associated with forced removal is lengthened even further, but it results in a compounding of population loss, as rearing is not an annual process, but rather determined by total number of adult males.

No mention has been made in the DMMP as to the minimum population size required to maintain viability of the ADI Emu population. This question was raised by ADI RAG at the Macrofauna Working Group, but no answer was given. Would the decrease in habitat size and disturbance during proposed Eastern Sector exclusion and the proposed development make the population unviable in the long term? In considering this question, the resulting effects of Emus on the TSC listed EECs and species need to be considered.

As not all known TSC listings on the ADI site were noted by the developer in the DMMP or DPPs, no decision on Emu exclusion/development can be made with regards to TSC listings until this failing is rectified.

Another issue that relates to both the health and welfare of the Emus, as well as to their ecological relevance revolves around their proposed exclusion from the Eastern Sector.The Eastern Precinct's soil landscapes are different to the rest of the site. (12) Emus require the sustained ingestion into their gizzards of large (average 2.5 cm) stones to assist with their unique digestive system. (14) Stones of this size are essentially restricted to the east of the site, where nodular laterite is found on the soil surface. (1),(13) The only free stones found west of the proposed fence are far less frequent, located within the soil matrix, softer & non-nodular, and much smaller. Even the soil base particles are useless for Emu gizzard pre-digestion, as they are microscopic clay particles, as opposed to the sand particles of the Eastern Sector.

'Overabundance' and Ecological Effects

In terms of the macrofauna 'overgrazing' the 'rare flora', again absolutely no evidence is given that suggests this is happening or would happen. There is no specific mention of what the species of rare flora are, or of their ecological relationship with the macrofauna (eg palatability, seed dispersal, germination, maintenance of plants sexual vigour, phytotoxicity, etc). The only reference that the developers' consultant attempts to make regarding the effects that the macrofauna may now be having on the rare flora is a comparison of a single study on stocking rates in the ACT.

This single report from a different (unnamed) ecosystem, with different (unnamed) plant and animal species, in a different climatic area is all the data that the developer's consultant relies on to come to the conclusion that the ADI site is ‘overpopulated’ and ‘placing the rare vegetation at risk’.

What is of greater concern is that this Draft Management Plan misquotes the figures of the very report it refers to. (3) It describes a density of 63 kangaroos per square km as being high, with 10-30 per square km being more normal, whilst claiming 194 - 207 per square km on the ADI site. **This is in fact wrong**. Actual densities on ADI, using the consultant's own population estimates would be **168-207 per square km**. (4)

Apart from this mathematical error, the figures quoted in the ACT report are for captive and rural land, not applicable to the ADI site. (5) The same ACT report says that the average for open woodland ecosystems, more applicable to the ADI site, is actually 240 per square km. (6)

No mention is made whatsoever of the interrelation between macrofauna & threatened animal species, including the Endangered Cumberland Land Snail.

The developers’ consultants, in the Draft Precinct Plans that accompany the DMMP, have actually omitted/denied the existence of at least three Endangered Species in the actual Eastern Precinct Study area. (7) Even more have been overlooked in their study of TSC listed flora and fauna in the ‘locality’. (8) There is no specific mention of any of the threatened species (including those species both considered and ‘forgotten’ in the biodiversity report) in the DMMP.

A total Situation Analysis Report document on Kangaroos in the environment obtained from NPWS (9) actually states that...

> ‘grazing pressure can then be used for example, to alleviate impact (if that impact is in fact a negative impact) on...a rare plant, or a plant community. **It requires a model to be developed of the relationship between the impact and the causes of that impact (herbivores).** The herbivores can be managed to keep the impact above the desired level, **presumably** at which they are damaging the species or system.’

The report then continues to discuss the great problems with carrying capacity theory, which is heavily relied on in the DMMP.

To recommend a management option for a threatened species or ecological community based simply on unsubstantiated guesswork is inadequate and foolhardy. There are a multitude of examples where even best practice has resulted in species loss because assumptions were made as to species ecology or status. (10)

To outline even briefly some of the issues involved would fill many volumes, but in the interests of elucidation of some of the many factors involved, a brief list of just some of the questions requiring further research regarding ecological interactions between macrofauna and threatened species will be outlined here.

Persoonia nutans

Persoonia nutans has only thirteen known populations in the world. Of these, four occur on the ADI site, and three of them in the Eastern Sector, where the DMMP proposes exclusion of Macrofauna, including Emus. It is important to note that *Persoonia laxa,* a now presumed extinct (TSC Act) species and also a Sydney endemic, was the most closely related species to *P. nutans*. The reasons for its demise are ironically the same as those listed as threatening processes for *P. nutans*.(15).

It is also important to note that *Persoonia nutans* reproduces by 'outbreeding'. It is not known whether effective pollination for these populations is carried out by native bees, and hence their effectiveness of outbred genetic exchange, vital for this species. Obviously there is a strong chance that more widespread and keystone effective genetic exchange between individual genotypes is effected not by pollen transfer, but by seed dispersal. This other form of genetic distribution can be the vital process in ensuring 'outbreeding only' species maintain the obligate genetic movement necessary for their survival. If Emus and Kangaroos are indeed the species' main seed vector, then their exclusion from three out of thirteen known world populations could promote the rapid extinction of this species. Even the simple exclusion of the fourth western population of *Persoonia nutans* in the ADI site from seed exchange with the eastern populations, through macrofauna control, may also be enough to initiate terminal population decline.

The following research questions need to be looked at for *Persoonia nutans* ecology in relation to macrofauna:

- Denaturing of hormone/auxin derived in-situ germination inhibitors through time and temperature controlled exposure in digestive tract of Emus and kangaroos.
- Leaching of germination inhibitors through process of fruit digestion by Emus and kangaroos.
- Alcohol-leaching of alcohol-soluble germination inhibitors during Emu scat fermentation.
- Physical (gizzard) scarification of seed as an aid to germination by Emus.
- Chemical (acid) scarification of seed as an aid to germination by Emus.
- Exposure to concentrated plant growth regulators/phytoestrogens during digestive process as an aid to germination by Emus and kangaroos.
- Post defecation conditions as an aid to seed recruitment, eg increased organic matter, increased nutrient levels.
- Effects of Emus and kangaroos as seed dispersers to new areas as an aid to recruitment of new sites. (16)
- Effects of Emus and kangaroos on genetic transfer through seed dispersal. (16)
- Protection of seed from seed-predators such as rodents through storage in repellent conditions

of Emu Scats. (17)

- Effect of Eastern Grey Kangaroos' grazing of grasses, encouraging germination of *Persoonia nutans* in more open seed beds. (16)
- Effects of Soil disturbance by Macrofauna as a germination promoter. (16), (18)
- Maintenance of a higher maximum fuel load, through selective grazing of grasses by Eastern Grey Kangaroos, encouraging a less frequent, higher intensity fire regime, and this effect on *Persoonia* seedling recruitment, as well as more sustainable lower frquency of adult plant obligate seeding. (18)
- Effect of unique Emu digestive process of bacterial aided digestion, on seed germination(through partial bacterial digestion of lignin in seed coat).
- Bacteria as root formation initiator for non-proteoid rooting Proteacae during digestive process. (19)
- Effect of Bacteria on Fruit/seed bound seed inhibitors including emission of stimulating chemicals during digestive process, and chemical denaturing of in-situ germination inhibitors.
- Effect of alcohol leaching of alcohol soluble germination inhibitors during Emu digestive process.
- Effect of Emu and kangaroo scats as possible inoculating environments for germination of non-proteoid rooting Proteaceae by endomycorrhizal association
- Effect of foraging by macrofauna on held fruit in relation to pollination & genetic exchange during periods of simultaneous flower anthesis and fruit (food) holding by plants.
- Effect of localised soil nitrogen accumulation during high uric acid content of Emu droppings for non-proteoid rooting Proteacae, with reference to higher comparative nitrogen requirements by *Persoonia* spp cf. proteoid rooting Proteaceae during seedling recruitment
- Effect of localised soil nitrogen accumulation over time by promotion of nitrogen-fixing legumes seedling recruitment from Emu scats. Relevance to *Persoonia* nitrogen requirements as above.

Pimelea spicata

This species is not even mentioned in the Draft Precinct Plans that accompany the DMMP, although it is listed on the NPWS Atlas in the Eastern Precinct Study Area. It is unclear from the map whether this population occurs inside or outside the fence proposed to separate the eastern sector.

The following research questions need to be considered for *Pimelea spicata* ecology in relation to Macrofauna:

- Effect of Macrofauna herbivory on reducing senility/maintaining sexual vigour
- Degree of germinatibility in high organic matter soil associated with macrofauna scats

(Pimelea spicata was far more common in the mid 1800s in soils associated with cow/ horse manure eg roadsides)

- Effect of herbivory on seeds by macrofauna and resulting germination after passing through digestive tract.
- Effect of soil disturbance by macrofauna on germination rates
- Effect of soil storage of seed by ants (myrmecophilous seeds) particularly 'after ripening' as an aid to germination, and subsequent dispersal of such stored seed by myrmecophagous Emu behaviour
- Macrofauna as seed dispersers to new sites
- Macrofauna as vectors of genetic exchange through seed dispersal
- Effect of shallow phenotypic selection through current herbivory levels (such as reduced height) and the ability of the plants and their F1 generations to compete with sudden increased growth of ungrazed grasses/weeds

The point of these condensed and by no means complete questions for further research is that any positive ecological benefits macrofauna may be having on these two endangered plants would be removed should the DMMP recommendations be implemented. The impact would also be immediate, leaving no time period for other ecological influences to compensate. Yet no specific studies have been done on these plants, nor upon any other threatened species/populations/ communities in the SMP (indeed, one of the aforementioned subject species is ‘not known’ by the consultant to occur on the site, despite available data confirming its presence.) A broad, unjustified assertion deems the inaccurately-derived macrofauna stocking rate to be threatening to these species. This is negligent in both the practical and the statutory sense.

Palatability

Apart from the developers’ consultants failing to make themselves aware of NPWS listed threatened species data, and hence failing to inform the public during a period of public exhibition, neither the consultants nor their panel of experts have been able to answer basic questions to do with the palatability of the most common weed species, let alone palatability of threatened native plants. (21) The members of the expert panel could not name any of the threatened plant species on ADI, with John Rodger saying that ‘orchids’ may be threatened by grazing. In fact there are not currently known to be any threatened orchid species on the ADI site.

When asked about the palatability to kangaroos of *Eragrostis curvula*, African Love Grass (supposedly one of the main weeds of the site and one of S-E Australia's most common grass weeds), David Robertson (ERM), Assoc.Prof. David Morgan (Melb.Uni.) and John Rodger (Uni NSW) couldn’t answer the question. From our own research and field studies, this species is very rare in the west of the site (and only palatable when young). Yet it grows directly outside the fence, where there is no kangaroo grazing. When asked about the palatability of two other

common weeds, namely *Sida* and *Myrsiphyllum*, the 'experts' had not even heard of these species. We have observed Red kangaroos browsing on *Sida*.

Weeds, Feral Animals & Fire

The DMMP makes no reference to weeds/macrofauna relationships in the DMMP. It is our observation that virtually all the main weeds on ADI are all reduced by macrofauna grazing habits including *Sida, Eragrostis, Axonopus* and *Bidens*. Where macrofauna is excluded from grazing by obstacles such as fallen branches etc, (but where rabbits and hares would not be excluded), these weed species are seen to be much more vigorous.

Although African Olive is utilized by Emus, and much seed survives its digestive system, it is an important food source in the Eastern Sector that would be made instantly unavailable during planned exclusion of Emus from this area. This would equate to Net Feeding Habitat Loss.

The only main weed that seems to be ignored by macrofauna is Fireweed. From numerous germination tests of Emu scats, the only weed we were able to germinate was *Bidens*. Observations of Emus eating Blackberries were made, but no germination was visible out of scats, pressumably because of digestion of seed within the bird. Foxes would account for the main spread of this species. Indeed, this competition for food source and inhibition of their spread could keep blackberry numbers down. Rabbit numbers, too, could be kept down due to Kangaroo grazing through food competition and habitat alteration. Because of this, fox numbers could also be further reduced.

A reduction of Kangaroo numbers would mean more grass, which would equate to the potential for more frequent, cold burns, which would be expected to have a negative effect on biodiversity.

These examples listed above emphasize the complexities of Macrofauna and their relationship to weeds, feral animals & fire. These issues are barely dealt with in the DMMP, yet these issues are listed as direct Threatening Processes for Endangered Ecological Communities and Threatened Species on the Site (TSC Act).

Macrofauna Population Data

The consultants have not only failed to transfer published data (NPWS Atlas) to their Draft Plan of Management; but in the past have been seen to provide results during census/population counts that differ markedly from those of other ecologists. When assessing *Grevillea juniperina ssp juniperina* (a TSC listed plant) on the ADI site, David Robertson of ERM calculated 10 times the number arrived at in a census conducted by Australian Museum Business Services. (22) Grevilleas don't move, whereas Kangaroos are mobile, making the margin for error for a macrofauna census even higher. Our own observations of scat densities and tracks along with visual counts in the grassy western sector during early evenings from elevation suggest far fewer kangaroos actually on the site than suggested by ERM. It also suggests a lower ratio of Red: Eastern Grey.

The echo or rebound effect also makes the *Distance* (Buckland) methodology used inaccurate and prone to overcounting due to the fence creating flowback of already counted individuals.

No reference is made to the methodology of ascribing Emu population count to age groups. Does this include or exclude chicks, immature, sub-adults and adults? A gender ratio is also necessary for such a small population in order to make management decisions, particularly in the case of emus, where both genders play a direct role in post-mating reproduction.

Monitoring of Macrofauna Populations/Vegetation

The suggestion that future native vegetation monitoring being undertaken 'after the development' is a valid method of change measurement is redundant based on the paucity of knowledge displayed by the developers' consultant now, before the development has begun. (1), (7)

Methodology such as recording: *'average % cover of green feed (grass) in the key feeding areas' and 'average % cover of dry feed in key feeding area'* is flawed.

Firstly, *'…green feed (grass)…'* does not consider the different palatabilities of grass species, particularly with the changed floristics that would be expected with the proposed development.

Secondly, much of the 'grassy' areas contain a dominant assemblage of not grasses, but sedge species. (1)

Grassland Floristics

The consultants state in this and accompanying documents in the DPP that the site's grassed areas are mainly 'exotic pasture'. (pp iv,21) This is totally incorrect. (1), (23)

Incomplete information

Licencing

The DMMP states that legal requirements were reviewed, but there is no mention of what sort of licence is to be applied for from NPWS. We believe that there is no licence that could be issued, as neither commercial nor non-commercial licence categories would apply.

Considering that the NPWS minister announced, before the DMMP release for public exhibition, that no culling would be allowed, it is inconsistent for the developers' consultant to assume that such a licence could be issued.

Draft Plan of Management for Regional Park

Without a Draft Plan of Management for the Regional Park, the development consent must assume that the NPWS will be accepting of changes to Macrofauna occurence.

It is of concern that the NPWS and the State Minister for the Environment are not signatories to the Development Agreement. (24) A Draft Plan of Management for the Proposed Regional Park

must be submitted to the Consent Authority at the time or before the DMMP proceeds so that proper processes can occur regarding planning permission.

Cumberland Plain Woodland Recovery Plan

Legislative responsibilities must also be brought to bear by the immediate submission and adoption of the overdue Cumberland Plain Recovery Plan before any decisions regarding NPWS land containing this EEC are made. (25)

Inconsistencies

Grazing

The DMMP states that the main kangaroo species, Eastern Grey Kangaroo, and the only species left after the proposed Red Kangaroo 100% cull, is purely a grass eater. Yet assertions that herbivory will lead to threatening rare flora, when none of the threatened plant species are grasses is nonsensical.

'Overgrazing' and 'putting pressure on rare flora' is simply not proven to be the case. Indeed, Eastern Grey Kangaroos may be promoting the vigorous regrowth of the TSC/EPBC listed plants on the site, all of which are unpalatable to them. Grass competition to these species would be reduced by Eastern Grey Kangaroo grazing.

'Overpopulation' and Macrofauna Stress

The DMMP proposes that the 'overpopulation' is a cause of stress to kangaroos. Yet the kangaroos are not stressed. The development process will be the sole instigator of stress to kangaroos. (pp 47, 55)

Wild/Not Wild Status of Kangaroos

There seems to be some confusion and inconsistency as to whether the kangaroos are 'wild' or 'not wild' (pp 18, 35, 41) These two statements are antithetical. Their status must be determined for legal purposes such as licences and responsibilities under Duty of Care (PCA Act).

Macrofauna Genetics

On Page 9 the DMMP notes that Kangaroos show genetic markers that could suggest that they are not native to the local area. (Genetic marking is both interpretative & prone to varied results. For example, Des Cooper's (Macqu. Uni) students' studies found different results from those of Des Cooper himself.) (26), (28) There is much anecdotal evidence that the kangaroos were certainly not

all introduced, and there has always been a resident population, with transfer between inside and outside the boundary. (27)

But in direct contradiction to the assertion on page 9 of the DMMP, page 24 reveals that there is no substantial genetic differentiation across the range of this species in NSW. In fact, while there is extensive diversity within individual populations, there are no distinguishing genetic differences between populations. It is therefore difficult to assert that the current population is any less genetically integral to the area than other populations of Eastern Grey Kangaroo in NSW. Using studies of genetic markers in Eastern Grey Kangaroos, it is impossible to say where any population is native to. There is also the expected intra-population genotypic variation within the ADI site. This variation would render the genotype different to the surrounding populations through relative isolation. (28) There could even be expected to be remnant genetics within the ADI population that have been lost in Western Sydney.

Decontamination

At the St Marys Macrofauna Management Working Group meetings, Graham Duncan, representing Comland, was asked by ADI RAG representatives whether there was any risk of bullets used in the culling hitting unexploded ordnance, including within the proposed far Eastern part of the Regional Park. He stated that there was no risk because the whole site was decontaminated and that he had the audit. ADI RAG representatives then asked for confirmation by pointing to the Eastern Triangle area of the Proposed Regional Park on the 1:2000 map (ie very large scale) and he said again that there was no risk due to contamination of unexploded ordnance.

However the Eastern Triangle has not been decontaminated/remediated to a level deemed safe for compliance by the EPA auditor, and in fact Comland has recently submitted a DA for the decontamination of this area. These meetings were part of the process of writing the DMMP, and Graham Duncan is the representative of the landowner, indicating a disturbing lack of attention to accuracy where public safety is concerned.

Consent Authority

The NSW Minister for the Environment (and hence the NPWS Minister) announced in the week prior to the DMMP being submitted, that there ‘will be no culling of kangaroos’. The developers therefore were surely aware that their proposal to cull was invalid before the time the DMMP was submitted for public display, and they should have changed their DMMP to be commensurate with the consent authority’s public statement that consent would not be given. Other non-lethal options are dismissed in the DMMP. These are primarily disqualified for reasons of cost to the developer, although stress to animals is clearly a potential factor.

Vague Statements/ Unclear Reasoning

Exclusion of Macrofauna from Eastern Sector

No logical reason is given for why the Eastern Section will have its Kangaroos culled and Emus removed. If the regional Park is to be fenced (and the eastern triangle is certainly to be fenced off due to its contamination), then the presented issues of Kangaroo/Human contact will not be manifested. The developers have previously proposed that 32 kangaroos would be managed in this area. (29)

Culling Definitions

The developer's consultant does not say from what stage of growth a kangaroo counts in the total number to be culled. Does a joey count if it is not yet furred, furred pouch bound, Young at foot etc? This needs to be clarified.

Code of Practice for Humane Shooting of Kangaroos

The details of the Code of Practice for the Humane Shooting of Kangaroos have not been included. Yet in other reports in the Draft Precinct Plans, the consultant has supplied copies of much of the relevant State Government published information such as guidelines and profiles of legislation.

The DMMP is on public display, yet many members of the public would find details outlined in the code, such as recommending the decapitation of joeys or hitting post shooting orphaned joeys on the skull, inhumane. That the DMMP be considered humane is one of the Working Group requirements.

It is also important to note that the RSPCA, a member of the Macrofauna Management working group has called for a moratorium on all non-commercial licences. (30)

It is also important to note that the Developers' consultants refer to the out of date Code of Practice from 1985 and not the current version (1990).

Macrofauna Management Working Group Failings

The meetings of the Macrofauna Management Working Group was a process that raised more questions than were answered. Essentially none of the vital ecological questions of macrofauna impact on the ADI site were or could be answered. The expert panel (David Morgan) actually suggested that the ADI RAG needed to talk to a plant-animal ecologist with specific knowledge of Western Sydney, but one was not supplied. (21)

Identification of Macrofauna Species

The presence of Western Grey Kangaroos on the site was supported by one of the experts (David Morgan). When ADI RAG asked him about Eastern Greys, he corrected the RAG representative, and said he was referring to the site's Western Grey Kangaroos. (21) Discussions with NPWS's Jeff Hardy resolved that there is hybridisation of Western Grey with Eastern Grey on the site. (31) This is not known to happen in the wild. (32)

Surely the experts need to agree on the status of the species involved as a primary objective.

Anecdotal evidence strongly suggests that not all the kangaroos or their ancestors were introduced. It is probable that there have always been kangaroos on the site. Local history attests to this. The population has been, and still is, able to move to some degree on & off the SMP.

Incorrect Floristic Classification

The claim that the grassed areas are 'exotic grassland' is indicative of the fallacies promoted at the most simplistic level. The grassy areas of the western sector are essentially weed free. Over 66% of the sites surveyed contained **no** introduced grass species. Where exotic grass occurred, it occupied less than 2% of the cover. The exotic grass species diversity was also depauperate (4 species). (1)

Mapping Inaccuracies

The Xavier College Site, which was excised from the REP (albeit without explanation) is still considered in the DMMP maps as part of the ADI property. (pp5,6)

The vegetation maps submitted by the developers' consultant have erased vegetation classifications for vast areas of land. Vegetation classifications have been erased from the maps of the vast majority of the Western Precinct, Central Precinct, Dunheved precincts and some of the Ropes Creek and Eastern Precincts. (33)

Recommendations

- That the DMMP be rejected as containing unsubstantiated, incomplete, contradictory, misleading, incorrect and vague/unclear content. Through this, and because of it, it fails to comply with the SREP 30 and EPS Performance Objectives in Conservation (1, 3), Ecologically Sustainable Development.
- That the inadequacy/lack of studies of the Macrofauna on the ADI site, and its relationship to the site's ecology be addressed by ensuring thorough, independent peer-evaluated scientific study.

- That the DMMP and all biodiversity related assessments of the Precinct Plans be independently and scientifically assessed.
- That the overdue CPW Recovery Plan be enacted before any consideration of the DMMP or the Precinct Plans.
- That the Regional Park Draft Plan of Management be submitted before any consideration of the DMMP or the Precinct Plans.
- That the REP be amended to take into consideration the proposed transfer of all the AHC listed land to NPWS or Regional Open Space.

Notes

(1) Surveys carried out for ADI RAG. N-E Corner 8/11/2002,

Western Sector 20/7/03, 27/7/03,

S-W Corner 17/3/03,

N-W corner 8/12/01, 23/2/02, Presented PCC

Xavier College Surveys for Plumb v PCC L&E Court November 2002.

(2) Cr Russ Dickens, Veterinary Surgeon. (Pers. Comm 29/9/03)

(3) ACT Kangaroo Advisory Committee. Living with Eastern Grey Kangaroos in the ACT Rural lands & in Captivity 1996 (a) & (b).

(4) 1543 ha. 2000 - 2600 EGK. 500 - 600 RK.

(5) ACT Kangaroo Advisory Committee. Living with Eastern Grey Kangaroos in the ACT Rural lands & in Captivity 1996 (a) & (b)

(6) ACT Kangaroo Advisory Committee- Appendix Estimated Densities of EGK in Open Woodlands in the ACT 1997.

(7) NPWS Atlas . ADI RAG Licence Agreement 2003.

ADI RAG website 4/9/03

(8) ERM Biodiversity Assesment July 2003

(9) Situation Analysis Report: Current State of Scientific Knowledge on Kangaroos in the Environment, Including Ecological & Economic Impact & Effect of Culling. Penny Olsen & Mark Braysher. Division of Botany & Zoology, ANU

(10) Rails Confused P.M. Driver PhD, Gloucestershire

Conservation & Biodiversity, A.Dobson, Scientific American 1995 p146

(11) Emus, Ecyl. Animals Vol 7, S.J.J.F.D. Davies, CSIRO, Division of Wildlife Research

(12) Figure 5 Soil Groups Regional Environmental Study, DUAP 1996.

(13) NPWS Vegetation of the Cumberland Plain. Tecnical Report.

(14) Emus, Davies, CSIRO Div. Wildlife Research.

Bird Behaviour, R Burton 1985, Granada Publishing

(15) Flora of NSW, Proteaceae, Royal Botanic Gardens2000 UNSW Press

(16) Cunninghamia 6 (4) Royal Botanic Gardens 2000

(17) Ku-ring-gai Council Nursery Germination experiments, unpublished 2002 Sydney

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