From: [redacted]
To: LA Committee - ETCS
Cc: [redacted]
Subject: ACT mammal emblem
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I have been encouraged to put in a submission by MLA Tara Cheyne after I commented on the issue on Twitter.

I note that the emblem has been reduced to two, Brush-tailed Rock Wallaby (BTRW) and the Eastern bettong. Both these species are extinct in the wilds of the ACT and only exist in captivity. Neither have much prospect of being re-established in the wild in the ACT, primarily because the factors (note plural) are not fully known or ones that are known (such as fox, wild dog – dingo, and cat predation) cannot be managed over a landscape scale nor for the foreseeable future. If one of these two are chosen, the result will be a mammal emblem that only exists in captivity or one that has to be continually released in an attempt to re-establish it and at great ongoing cost to manage native and non-native predators. We will end up like Victoria with their bird emblem the helmeted honey eater, or which is better known amongst scientists as the helmeted money eater. It is only still in Victoria through a long-term breeding program at Melbourne Zoo and continual release to the wild where they soon die out. Choosing a mammal with similar characteristics for the ACT mammal emblem will lead to a similar situation. Much better to choose a mammal that has good long term prospects in the wild such as the echidna or the swamp wallaby, and spend the limited resources that we have on conserving those species and their habitats that still exist in the ACT.

The ACT recently developed a translocation policy for conservation on which I commented (but received no response to my submission). Neither of the suggested animals meet the essential criteria. For example, I have run the eastern bettong through the criteria to show the problem, see as follows. I haven't done the same for the BTRW but it would be similar. NB, NSW can't maintain BTRW in places like Kangaroo Valley which is prime habitat, despite extensive and intensive fox control. What hope is there in the ACT which is marginal BTRW habitat and we would be using captive reared animals that have poor predator sense.

Identification and critical assessment of the threats that have led to the decline in the species of concern.

Identify all the threats that have led to the decline/extinction of bettongs in the ACT. Critically assess the threats to determine if they are still operating AND whether they can be effectively managed to achieve long-term sustainable populations with minimal resource input (an IUCN/AWMS criterion).

Before embarking on reintroduction programs, proponents need to identify the original cause of decline in the target species and to make clear how they will manage that extinction agent in their translocation. (Note, over the years, the ACT has attempted translocation for conservation for approximately 20 species only one of which I believe has been successful. The Committee should ask ACT Parks and Conservation for a copy of an internal report that assessed past attempts, a report that also would like to see). The tendency in most translocations has been to uncritically accept the accepted wisdom of the causal factor. For eastern bettongs (bettongs), the assumption is that predation by foxes, cats and habitat loss have been the cause. However, as the National Recovery Plan for bettongs states, the full

range of factors that have caused extinction is not clear nor the relative impacts quantified. ***The risk is that if an important factor is not identified and only one or two factors are successfully managed, the translocation will fail.***

Consequently, proponents need to adopt standard scientific methodology for identifying threats. In effect, this means that proponents identify all the possible hypotheses based on the observed data, critically assess each hypothesis and determine which one, or more likely, which combination of factors need to be managed.

Regarding bettongs, predation by foxes is undoubtedly a major cause. However, as has been shown by two major large-scale programs to recover populations of rare and endangered native mammals, Western Shield WA and Glenelg Ark, Victoria, in both cases there was an initial recovery of native mammals after intensive fox control. However, after several years, several native species began to decline again. The accepted wisdom was that either the fox baiting was not working (no evidence for this) or that cat numbers built up and preyed on the natives (again several studies have shown no increase in cat density following fox control – although a couple have shown that cats are more active after fox control). However, there are other possible explanations:

- Disease transmission to natives through increased interaction with cats – namely toxoplasmosis.
- Predation from native predators, dingoes, birds of prey.
- Detrimental habitat changes. Several factors could be at play here.
- Inappropriate fire management – with the focus often on hazard reduction rather than ecological burns.
- Increased frequency and intensity of wild fires due to global warming.
- Reduced availability of resources due to global warming. For example, most species that declined in Glenelg Ark and Western Shield were sub-surface foragers for fungi insects etc. Both areas have experienced severe declines in effective rainfall over the past few decades. The decline in SW WA has been 15% since 1975 with half of the decline occurring since 2000 (www.environment.gov.au/climate-change/climate-science/impacts/wa). Undoubtedly, this would have resulted in drier soils and a likely decline in food.

Once the factors have been identified, IUCN/AWMS guidelines require that the factors can be managed economically in the long term without significant negative impact on other wildlife. Control of foxes is possible but expensive while there is no effective technique for broad-scale control of cats. Indeed, fox baiting is also likely to kill wild dogs (dingoes), animals that are considered to be important top-order predators in the ACT.

It is extremely difficult to control some stochastic risks to populations such as more frequent and higher intensity wildfires. In this case, the optimal strategy would be to ensure several separate populations with buffers between so that one catastrophic event does not eliminate a whole population. As for a decline in food resources due to a decrease in effective rainfall, there is currently little known on how this could be alleviated. Climate change increases the risk of environmental stochastic events, such as fire and drought, and will drive species range shifts, novel biotic interactions and enhanced vulnerability of some threatened species.
Threat mitigation that is resource intensive but necessary for the translocation program/project to be successful in the long-term, is counter to the principle 3 of the ACT translocation guidelines (as well as IUCN) which state that the aim should be to establish a naturally self-sustaining population in the wild with minimal or no human intervention.

Underpinning assumptions for management to be successful.

It is important to identify and critically assess the assumptions that must hold true for management to be successful. For example, some assumptions that would need to be met to maintain a population of bettongs are:

- That fox and feral cat control can be maintained at the appropriate intensity for the life of the program.
- That foxes will continue to take toxic baits and die. We know that some foxes can become bait shy, especially should they take a bait that has been leached of some 1080 toxin due to rain.
- That socio-political support and the necessary resources for management will be there for the foreseeable future. If baiting ceases, foxes will rapidly reinvade.
- That sufficient, trained staff will be available for management for the foreseeable future.
- That catastrophic wildfires will not wipe out the population.

Population Viability Analysis (PVA) – what size population over what area is required for a long-term sustainable population?

A key IUCN criterion is that a viable and sustainable population can be established with minimal management input. One way of assessing this is to undertake a population viability analysis based on available life table and knowledge of the biology of the animal:

- Eastern bettongs become sexually mature at one year and typically live for 4 years in the wild.
- Females have one pouch young at a time and under ideal conditions can reproduce 3 times a year.
- Average territory for a female bettong is 35-55 hectares. They can forage up to 1.5 km for food.
- Next is to determine the survival rate at each life stage – unknown but typically most marsupial young have much less than 50% or less survival rate (unless held in captive populations), with higher survival in subsequent years. At best, this means approximately one female young per adult female per year for 3 years.
- At a guess, a long-term sustainable population would be approximately 1,000 females or a total of 2,000 individuals. To counter the effects of catastrophic bush fires, there should be two such populations. This would require two areas of suitable habitat, approximately 800 km^2 each. Continual high intensity fox control would be required over this are in perpetuity. I doubt that this is possible at least not with extremely expensive ongoing control including on rural lessee land.

In addition, the population size needs to be sufficient in size to minimise the potential impacts of genetic problems associated with small populations. One way of approaching this might be to conduct a PVA to determine the population size that would be required to provide a 95% probability of persistence for 100 years (or some other agreed number) given the particular demographics of the species and the characteristics (e.g. disturbance regimes, threats) of its habitat (examples of the kinds of calculations that can be determined to estimate long-term population requirements for threatened plant species are outlined in Burgman et al. 2001). Using this approach would mean that desired conservation outcomes drive the goals for population size and also provide management targets for key demographic parameters (such as fecundity and survival) and habitat availability and condition. The second step would be a requirement to provide reasonable evidence that the habitat available can sustain the number required to achieve that probability of persistence over the desired time period.

References

Australasian Wildlife Management Society position statement on translocations for conservation; modified from the IUCN Translocation guidelines: https://awms.org.au/translocation-for-conservation

Burgman, MA, Possingham, HP, Lynch, AJJ, Keith, DA, McCarthy, MA, Hopper, SD, Drury, WL, Passioura, JA & DeVries, RJ 2001. A method for setting the size of plant conservation target areas. Conservation Biology 15(3): 603-616.

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