

Native Mammal Keepers of NSW

“Dedicated to providing information and education regarding the conservation of native animals in the wild and the keeping and breeding our native fauna in captivity.”

**Response to the Office of Environment and Heritage
Wildlife Licensing Reforms 2018**

Introduction:

To the Wildlife Licensing Reforms Team,

I am pleased to present the submission from the Native Mammal Keepers of New South Wales regarding our concerns relating to the *Discussion Paper: Towards a Risk Based Approach to Wildlife Licenses*. I hope you feel our excitement in the opportunity this review offers in providing the basis of a cohesive discussion of the benefits of increased native mammal ownership, whilst catalysing discussions over appropriate administrative and regulatory mechanisms so that animal welfare can be maintained. It is our belief that NSW is proverbially 'behind-the-times' relative to Victoria and South Australia which both have an expansive native mammal community. Within these states native mammal keeping has been legal and active for 43 and 46 years respectively. In the remainder of this document you will find a compelling case for expanding the NSW mammal species list as well as drawing to your attention our concerns over statements in the current Office of Environment and Heritage (OEH) policy *Why you can't keep native mammals as pets*.

Rationale:

Globally it is accepted that pet ownership has positive impacts on human wellbeing (Szyper, 2017). Pet keeping, and by extension animal keeping have evolved dramatically over the past decades with the emergence and popularity of non-traditional pets such as reptiles or small mammals. Native pets hold an immense value as companion animals as they offer both the traditional positive influences on human wellbeing as well as creating an emotional connection between people and native animals. Native mammals are one of the most imperilled groups of organisms in Australia, as of 2015 it was recognised that 29 Australian endemic mammals were extinct as the legacy of European settlement (Woinarski, Burbidge, & Harrison, 2015). By enabling an expanded native mammal species list in NSW there is an avenue to create an effective means of raising awareness of mammal declines across Australia. Furthermore, with a correctly managed implementation of native mammal ownership there is the ability to contribute to conservation of wild mammals fiscally. Furthermore, by generating public awareness and capitalising on that awareness we can better educate the community about preserving our native animals.

Viewing the other States:

As previously noted native mammal keeping has been legalised and promoted interstate for over 40 years. Currently the Victorian schedule has 31 mammal species (15 basic and 16 advanced) and the South Australian licensing department has provided evidence of 39 species of native mammal legally held as of June 2018 (see attached document). The most comprehensive data between the states shows that in 2009 there were over 7000 native mammals held privately. Within both Victoria and South Australia there are representative groups that promote the ethical ownership of captive native mammals and appreciation for their wild counterparts. The Marsupial Society based in Victoria is the representative body for most native mammal keepers in Australia and has over the years developed a positive relationship with government licensing bodies as well as the zoo sector (<http://www.marsupialsociety.org.au>). The other states provide a clear precedent that native mammal ownership can be implemented, managed and regulated without catastrophe.

Comments on the policy - *Why you can't keep native mammals as pets:*

In this section of our submission we offer a response to each of the concerns highlighted in the policy. We actively disagree with some of the statements put forward in the policy - particularly ones that are incorrectly scoped or are generalised. However, we do agree that other sections are valid considerations. Our belief is that due to these considerations, it isn't best practice to prohibit ownership of native mammals, rather appropriately regulate it so that any risk associated with them can be controlled accordingly. It is important to note that the policy is overly broad and fails to recognise important distinctions between groups of taxa, whether it be at the species, genus or family level. Most importantly, the concerns highlighted in this policy aren't exclusive to native mammals - something we highlight. Many of the statements also apply to other native animals legally allowed in NSW, begging the question, why have these statements selectively been applied to mammals to prohibit their ownership? We have scoped our arguments in the context of the risk-based framework identified in the discussion document, highlighting the low risk nature of native mammal ownership, and where realistic risks need to be mitigated.

Not every species is going to be suitable to every household or family, it is the role of OEH and key stakeholders to work out a framework to best implement appropriate measures to ensure welfare needs can be met.

Some native mammals, particularly wallabies and kangaroos, are prone to diseases caused by the stress of contact with humans, domestic pets (cats and dogs) and noise

Taxa specific diseases or ailments are an important consideration as are the potential for mixed species homes (domestic and native mammals). This statement is overly broad; however, it seems to be touching on the concept of myopathy – an ailment that affects a number of species (not just native mammals) and ultimately causes death. Admittedly, large macropods appear to be predisposed to capture myopathy after exerting themselves, however protocols have been established and implemented through the zoo sector as well as private keeping minimising such impacts (Jackson, 2003). More importantly, it is our belief that large macropods aren't suitable to most households and hence our recommendation of an endorsement system (Appendix 1.)

Another prudent concern alluded to in the statement is the susceptibility of native mammals to toxoplasmosis. *Toxoplasmosis gondii* is bacteria spread by cats in their faecal matter and the resultant infection is lethal to most macropods and other native mammals. This can either be shortly after contraction of the bacteria or when periods of stress cause them to become immunocompromised. We agree that this is a valid concern in determining appropriate mammal management protocols, however it is by no means a reason to prohibit ownership. Careful measures implemented to limit exposure to cat faeces; including correct fencing and cat proof food storage are required in the Code of Practice (COP) to minimise these risks.

Two important statements sum up our opposition to this statement:

1. All species, regardless of being a native mammal or domesticated mammal will have the potential to contract diseases. This doesn't mean they should be prohibited. Cats are the biggest carrier of *Toxoplasmosis gondii*, yet they are allowed unregulated in NSW households. We suggest rather than prohibition, steps be taken to minimise potential contraction or spread of disease through a COP.

2. This point focuses primarily on large macropods – a group of species which most keepers in NSW would not consider keeping. There is a select keeping niche that will have facilities and interest in maintaining these animals. It is for this reason we suggest a large macropod endorsement system (Appendix 1) so that those equipped and interested in keeping these species are given the opportunity while proving welfare needs can be met.

Many native mammals have large home-ranges and need to be kept in large outdoor enclosures

Why should this be a prohibitive measure on the ownership of native mammals? Firstly, it is long recognised that the comparison of wild and captive home ranges is tenuous. Domestic cats and dogs that are let to go feral have behavioural shifts where domestic behaviours revert to wide ranging behaviours required for survival. As of the 2015 returns 223 Lace monitors (*Varanus varius*) were legally held in NSW – these animals have large home ranges and generally need to be kept in large outdoor aviaries. Similarly, a number of aviculturists throughout NSW have large outdoor aviaries to accommodate larger native birds. *Varanus brevicauda* the second smallest varanid species in the world has a general activity range of 14-25m (James, 1996), yet as per the latest OEH COP the species can be acceptably housed in areas of 0.18m². Whilst it is obvious that the husbandry of reptiles and mammals differs considerably, two key points are made in the previous statements. Firstly, keepers are willing to invest in large enclosures (outdoor or indoor) to adequately maintain the wellbeing of their pets. Secondly, captivity provides a release from the pressures that result in large home ranges (e.g. competition, resource limitation, predation, etc). With the above said, we advocate appropriate husbandry of these species, including adequate enclosure sizes and enrichment. As such we have attached a draft COP from Victoria and the recommended minimums advocated by the Australian Marsupial Society, we hope this can be the basis of an NSW COP covering recommended enclosure sizes.

Most native mammals are nocturnal and some, such as possums and gliders, can only be kept in fully enclosed outdoor aviary-type enclosures

Most native mammals are primarily nocturnal or crepuscular, that is an undeniable facet of their biology. The question that presents itself is – why should this prohibit their ownership? Currently NSW legally allows the ownership of two native mice, both of which are nocturnal as well as reptile species (specifically geckos and snakes, but certain skinks as well), amphibian and bird species that are primarily or exclusively nocturnal. Accommodating the nocturnal behaviours of these animals is not a new concept to native animal keepers and can be easily managed. Moreover, most people work daytime jobs, so having a naturally nocturnal pet is beneficial as it's natural behaviours suit a modern schedule.

Regarding fully outdoor aviary type enclosures, I direct you back to the argument presented previously regarding large outdoor enclosures.

Same-sex members of some species, such as quolls and antechinus, cannot be housed together for most of the year because they will fight, often to the death

This statement is not exclusive to native mammals, several reptiles and most parrot and cockatoo species have same-sex conflicts that need to be adequately managed. With birds and reptiles this

fails to prohibit their ownership, so why is it selectively applied to mammals? With mammals there is a strong body of evidence of how to manage and mitigate these conflicts, such as concentrated resources which are shown to promote tolerance or sociality in some species (Jackson, 2003). With species that display conflicts within sexes, interstate breeders supplying the animals will make new owners aware of conflicts (as is common practice with any native animal transaction). Furthermore, instead of prohibiting ownership, it is the place of OEH to work with stakeholders to generate an appropriate COP that can ensure animal welfare outcomes regarding same-sex conflict.

Some animals, such as male wallabies and kangaroos, become aggressive when they reach sexual maturity and can be dangerous to humans

A comment that has yet again been selectively applied to mammals, but not other taxa. Lace monitors (*Varanus varius*), perenties (*Varanus giganteus*), olive pythons (*Liasis olivaceus*), scrub pythons (*Simalia kinghorni*) and most elapid species have a potential to cause human harm if maintained or interacted with incorrectly. These species are all licensed in NSW. There is no denying that adult male macropods have the potential to harm humans, however like the species previously mentioned they should not be prohibited. Rather, it is more appropriate to introduce a tiered licensing system with taxa specific endorsements for animals such as large macropods. Endorsements would require adequate skills and facilities before these animals can be lawfully acquired. Furthermore, like zoos or wildlife parks there is the ability of keepers to easily develop management plans to reduce risk when interacting with potentially dangerous species. Such management plans could be submitted when applying for a large macropod endorsement.

Native animals have a short life cycle of birth, breeding and death and can quickly become inbred, so new animals with different genes need to be constantly introduced

This is both an outdated and misleading statement. Like most situations regarding the distinction between wild and captive animals, there is a legitimate failure to distinguish between wild and captive lifespans. Most species held privately in reasonable numbers have lifespans equivalent to that of most currently owned domestic animals – this includes gliders, possums and macropods. Some of the dasyurids have short lifespans in captivity, however few species are maintained privately at present and this is yet to be recognised as a concern by the keepers that maintain them. Furthermore, interstate there are provisions in place for zoos and wildlife parks to move excess stock onto private keepers. This process serves as a legal source of new genetic diversity when available (see example stock list attached).

Most native mammals do not domesticate well and cannot be 'enjoyed' in the same way as dogs or cats.

Most native mammals are not domesticated like traditional pets; however, such a broad statement is poorly scoped. People generally do not own these animals as a substitute for domestic companion animals. There certainly are people that seek out non-traditional pets, however Australian native mammals will never replace the niche of pet dogs or cats. These animals and their unique behaviours are enjoyed in numerous ways by the right owners. In stark contrast to the policy, certain species show an excellent propensity as a companion animal – for instance, Sugar gliders are a multimillion dollar industry overseas because they make such good pets (<https://www.sugargliderinfo.org>). Making comparisons between native mammals and domestic companion animals is fundamentally incorrect. It's an apples and oranges debate, where some like one, some like the other or certain people like both.

In the future there is the potential for animals to become more suited to captivity. Recent evidence has shown that native mammals, quolls specifically, have had genetic changes in behaviour over 13 generations due to changes in environment (Jolly, Webb, Phillips, & Jolly, 2018). Similarly, a large body of evidence shows how plastic native mammals behaviours are – a trait that is important in reviewing the suitability of species to captivity (Driscoll, Macdonald, & O'Brien, 2009; Ewer, 1968; Favreau et al., 2014; Griffin, Evans, & Blumstein, 2002; Llewelyn, Webb, Schwarzkopf, Alford, & Shine, 2010). These plastic and genetic responses as well as the potential for other forms of non-genetic inheritance mean that these animals can easily respond to the conditions of captivity. It is for this reason we have not strongly promoted native mammals as an insurance population. Long term captives have very little likelihood to survive in the wild without appropriate pre-release measures, especially given factors like competition (within the species and between species), predation and resource limitation. Conversely, this also highlights the low risk potential of establishment in non-native areas in the event of escape.

Prevent and reduce the incentive for illegal trapping and trade in protected and threatened native mammals

The impact of such a claim is overstated. Given the risk-based approach presented in the review for most species illegal collection would be a low risk to the viability of populations (both locally and across the species range). Before any comment is made on the likelihood of illegal collection, it must be stated that both land clearing and predation by feral species are the two biggest and most significant killers of Australian mammals. A report published in 2007 provides estimates that close to 104 million native animals were killed due to land clearing operations in NSW between 1998 and 2005, with 89 million being reptiles and the remaining 24 million being mammals and birds (Johnson et al., 2007). Furthermore, it is highlighted in the discussion document that OEHL views harm to certain native mammals as a low impact activity by the number of licenses provided by OEHL to conduct harmful activities to native mammals (macropods, wombats and possums).

Most of the species that will foreseeably be in high demand are the smaller and more manageable animals such as sugar gliders, squirrel gliders, dunnarts, bettongs and other small macropods. Most of the species have a least concern conservation status in the wild and as previously stated the biggest impacts to local persistence and species persistence are land clearing and predation by introduced species such as foxes or cats. Furthermore, data from the other states highlights that there are extensive captive numbers of the species in captivity meaning that there is less potential for illegal take from the wild.

Two important statements sum up our opposition to this statement:

1. The notion of illegal wild collection (for most species) is a straw man argument – captivity is an easier target for a bigger problem. Land clearing and invasive predators are the biggest impact to native mammals – This is undisputed. Illegal collection is only of concern where local populations are genuinely at risk or a species has a threatened conservation status where the viability of the species may be imperilled by animals being removed from the wild.
2. Welfare concerns related to the illegal wild collection of mammals are minimal. Illegal wild collection of mammals will always be small, hence only very few animals will be impacted. People undertaking these activities will most likely implement conditions to prevent extensive harm to the animals as it would decrease the value for them. Contrastingly, as previously highlighted the low welfare conditions of land clearing activities on native

mammals are a significantly more high-risk impact on native mammal welfare (Finn & Stephens, 2017).

Reduce the likelihood of support for illegal native pet trade and interstate export

Concerns relating to the above are covered in the previous paragraph.

Minimise the potential of animals escaping or being intentionally released and becoming a threat to NSW's native ecosystems.

This claim is overstated conjecture. Firstly, this claim applies to all native captive animals including reptiles, amphibians, birds and fish – so why is it being selectively applied to prevent mammal ownership in NSW? Feral populations of native animals introduced outside of their range are a low risk consideration. Within NSW most species identified as being a problem are illegally held and unregulated exotics (<https://www.dpi.nsw.gov.au/animals-and-livestock/nia>), with very little evidence showing the establishment of species outside of their native range. There is evidence showing some native species establishing outside of their native range (e.g. *Wollumbinia latisternum*), however there is no evidence to show that these animals are impacting other natives (Glenn Shea, pers comm.). Furthermore, using the other states as a precedent, captive native mammals have not been shown to have major detriment to the environment when they escape. The most likely outcome is that any animal to escape that was not re-captured would most likely perish as previously stated.

This section is the most sensible to include comments on the 'unnatural' selection of captive mammals and how it somehow will impact wild populations. For a long time, proponents against native mammal ownership in NSW have stated that captivity will promote 'unnatural' and 'designer' native animals such as the albino, fairy floss and other colour varieties of sugar glider seen overseas. Whilst it is undeniable that with colour mutations, various markets for them will be created, it is rather obvious that the likelihood of such mutations establishing feral populations is ludicrous. In most circumstances when colour variety mutations appear, owners will be overly prescriptive and ensure there is no potential for theft or escape due to monetary value. As these varieties become more common they will be individuals that have well-selected captive traits (docility, lack of anti-predator response, etc.) meaning that they will most likely not fare well in the wild. The idea that all sugar gliders on the east coast will suddenly become albino from a few escaped captives is absurd, and it is clear from other states where brush tailed possum colour varieties exist that impacts on natural populations are negligible. Furthermore, to root this firmly back in reality, consider that the budgerigar is probably the most widely kept and unregulated pet bird, with countless colour mutations, yet there aren't rampant feral populations threatening the viability of wild animals.

As a final remark, why are native mammals being prohibited based on the potential of being a threat to native ecosystems, when cats are unregulated? Cats are nationally recognised as being one of the most detrimental factors to native ecosystems and fauna, yet they are not prohibited in NSW. Maybe it would be more prudent of OEHL to have stronger regulations around domestic cat-wildlife interactions rather than prohibition of mammals.

Concerns from the rehabilitation sector:

We acknowledge already that one of the single biggest opponents to the expansion of the native mammal species list will be the wildlife rehabilitation sector. We are happy to constructively work with them in alleviating their concerns, however we have strong reservations against their motives for limiting access to native mammal ownership. Currently in SA and Vic the wildlife rehabilitation sector and native mammal keepers have a positive relationship, so it poses the question why can't such relationships be formed in NSW? At a grass roots level there are a number of carers that would gladly have permanent native mammal pets. Members of the NMKN Working Group have even sold wildlife carers pet native mice species. The extent of interest in maintaining native mammals as pets within the rehabilitation community is exemplified by the claims within the community that animals unable to be released are discretely moved into permanent care without OEH's knowledge.

It has been brought to our attention that the most serious reservation made by animal rehabilitators is concerns over welfare; both relating to incorrect husbandry as well as the possibility of 'dumping' unwanted pets. Whilst neither of these concerns will ever be invalid, they are generally greatly over-exaggerated and probably influenced by the already encumbered OEH policies relating to rehoming native fauna pets. Looking at both Victoria and South Australia, there aren't widespread and illegally dumped feral native mammals. Correspondence with the Marsupial Society of Australia has indicated that mammal supply and demand are always in a steady equilibrium, and as such dumping isn't a problem due to the ability to move animals onto new homes readily. The proactive role OEH could take is to create a framework in which people can rehome native mammals.

Finally, we wish to highlight a perceived conflict of interest wildlife rehabilitation groups may have with changes to native mammal ownership within NSW. Currently, NSW wildlife rehabilitation groups are the only people (other than private institutions) that can legally interact or maintain native mammals at their residences. Along with that privilege comes a unique social status and marketing point for fundraising. Whilst these claims may seem like a twisted fact, it is documented in minutes from the Australian Wildlife Council (attached) that they are currently seeking changes to their license to allow members to use native fauna at fundraising events.

It is our belief that anyone with a strict animal liberationist or animal rights agenda or affiliation to organisation of those values should not be considered a stakeholder in discussions going forwards.

Comments on the Australian Native Mammals as Pets - A feasibility study into conservation, welfare and industry aspects:

In 2010 a feasibility study on the viability of increased native mammal ownership in NSW was created, titled *Australian Native Mammals as Pets - A feasibility study into conservation, welfare and industry aspects*. The study was commissioned with the intent of investigating stakeholder perspectives on native mammal ownership and assessing the viability of a native mammal keeping industry. The study concluded that there was feasibility of a native mammal industry and that it would require appropriate regulation and not over-regulation by government organisations. The study is attached in the submission.

Benefits and the importance of doing things right:

We believe that due to the fact this has been a hotly debated topic in NSW for over a decade there is ample opportunity for native mammal ownership to be used as a powerful conservation awareness

tool. Mammal ownership within the State is in its infancy and with that any industry around it can be shaped much easier than established keeping sectors like birds and reptiles. There are so many potential options that could be taken by government regulators, keepers and the pet industry to commercialise (ethically!) native mammals to the point where both interest and finances around them could be directed back into conservation efforts. For example, a levy could be attached to all native mammal sales through pet shops or from recognised breeders. This levy could then be funnelled directly back into a grant scheme directly related to native mammal research and conservation or government management of non-degraded habitat.

For too long there has been a taboo on the notion of making a profit on the controlled sale and ownership of wildlife in NSW. What we are stating here isn't to throw animal welfare and the five freedoms (http://kb.rspca.org.au/five-freedoms-for-animals_318.html) out the window for profit, but rather to follow the industry that has developed through the Africa subcontinent where financial associations (hunting industry, ecotourism, etc) with wildlife have had positive impacts on population viability and human-wildlife interactions. At present very few people genuinely value or even have knowledge and exposure to wildlife. The advent of a native mammal industry within NSW offers OEH the opportunity to try a novel method of having major conservation outcomes through a non-traditional means.

Our suggested system and path forward:

First and foremost, animal welfare is singularly the most important concern for us. We want to stress explicitly that we don't want to see a free for all with sugar gliders being sold for pittance to unprepared and uncommitted keepers. We, at our core are animal lovers, we appreciate them and have no interest in seeing them used or abused. Whilst we believe that illegal collection of animals would be limited, and low impact, we also do not wish to have it occur. We have several suggestions about how the licensing system should be structured, these are as follows:

- 1. A Tiered License System, with an endorsement for specialist care species** – We suggested a tiered licensing system, like that seen with other native taxa currently licensed in NSW. We suggest the two native rodents available in NSW be moved to the newly created coded category due to their abundance, propensity to breed readily in captivity and ease of care. We suggest small, easy to keep and readily available species be placed on the M1 license class. Species that are in lower captive numbers, require specialist care or have potential to be impacted because of increased captive interest we have recommend for M2. The M3 license class has been reserved specifically for species that have demanding husbandry needs such as large facilities, specialist diet or vaccination (bats). We believe that if a prospective owner can prove competency and meet the needs of the endorsement they should be able to lawfully keep M3 species in NSW. A draft species list and endorsement system is available in Appendix 1. For all species not currently available in NSW we are willing to produce RATs as presented in the discussion document, however for the time being we have included a few draft ones (see attachments).

We also support the generation and subsequent use of an E-learning module and online test attached to the M1 license class and above. This e-learning module would be something that would be required to be completed prior to the issuing of a M1 license. It would have the dual benefit of both preventing the impulse buying of mammals such as gliders (which we admit are at risk of that) as well as ensuring people are well informed of

their husbandry needs and legal obligations as per a COP. The wildlife rehabilitation sectors concerns could also be addressed as appropriate paths of surrender or relocation of pets may be included in the module.

We support the current record keeping system presented in the review and suggest a similar approach with Coded having no record keeping and M1 having a yearly statement. M2 and M3 mammals would be required to have transaction a record keeping obligations analogous to current conditions. All animals would require a written receipt of sale from the seller.

- 2. A genuine conservation initiative attached to the system** – We believe that there is potential for increased ownership of native mammals to have a tangible positive impact on wildlife conservation within the state. At present it is acknowledged that one of the greatest benefits of wildlife rehabilitation in Australia is the educational message it spreads and not the reintroduction of rehabilitated animals as studies are showing these animals generally have low survival rates after reintroduction. (Augee, Smith, & Rose, 1996; Tribe & Brown, 2000).

If OEH takes a proactive stance in enabling growth of the private mammal keeping sector, it is possible that such a sector could contribute to conservation awareness of the species too. For instance, subtle links can be made within the COP, where reference can be made to the use of hollow bearing trees by possum and glider species and the need to replicate these in captivity as well as their importance for their wild counterparts. More directly, the establishment of keeping associations and mammal natural history groups (like those of native bird and reptile keeping groups) enables similar public awareness and campaigning to that of wildlife rehabilitation organisations. Finally, and most importantly, it allows for an emotive connection between animal and keeper. By having people emotionally invested in native mammals they create a bond that connects them with wildlife that most would not usually experience. Fat-tailed dunnarts are incredibly widespread across NSW, yet very few people within the state would have interacted with them and even less would know what they are. Bringing these animals into the home and into schools enables people to form personal awareness of Australian fauna.

Native mammal pets can be used as part of the school curriculum to help develop awareness of conservation of these species in the wild. Currently there are such initiatives haphazardly developed across NSW, and of these the majority are at the discretion of the school. OEH's is in a powerful position to collaborate with the Department of Education and promote the holding on native mammals in a classroom setting along with an educational curriculum that raises awareness of the biology and impacts on native fauna. A key example of an impressive and well implemented example of classroom initiatives with captive native fauna is [Lilydale Highschool in Victoria](#). The school has a program where students keep, breed and study over 30 species of native animal as part of the curriculum. They also have the option to get formal accreditations in Captive Animal management through the program.

- 3. A Market framework to generate income for conservation** – We believe that native mammal ownership can be used as a community market mechanism to contribute to conservation efforts. Resentment exists within the keeping community for the fee structure

associated with native fauna licensing as it is viewed as exorbitant for what is gained in return. Understandably, there is a need for OEH to cover administrative and compliance costs associated with licensing – this alone should be covered by the licensing fee. We suggest that market methods could be used to generate conservation funds through the captive keeping community.

Current ex-situ mammal conservation efforts also offer a viable market method of increasing finances for conservation efforts. For example, at present Aussie Ark is breeding an insurance population of Tasmanian Devils. Inadvertently, they will potentially have excess males they do not require. In many ex-situ conservations examples these animals are released back into the source habitat, where more often than not the pressure leading to the need for ex-situ management has not been alleviated (in this case, the facial tumour disease). It is acknowledged that in these circumstances release of captive stocks will still result in population decline (Balmford, Leader-Williams, & Green, 1995). With the devil example, excess male devils could be sold to private captive keepers to help generate funds to support of

4. in-situ and ex-situ conservation of the species. A similar comment can be made about the bettong species currently maintained by the Australian Wildlife Conservancy. Captive breeding of the species in a predator proof environment has proven so effective that control measures (most of which result in mortality of the animals) have been undertaken as the animals are exhausting food supplies. Ultimately, it begs the question of who isn't benefited by such a situation? The project removes a problem with excess stock, the project gains funds to support conservation efforts and a dedicated keeper willing to pay the money for a species they've wanted and are willing to invest in.

Whilst undoubtably, the following is going to be met with unwarranted scrutiny, there also exists the potential for legalised, ethical, low impact wild collection of animals. Ethical trapping of native mammals is well understood and trapping activities occur Australia-wide under approved animal ethics protocols for research and surveying. A regulated wild collection program (either run by OEH or approved collectors) and an associated royalty fee per animal collected creates potential for a sustainable harvest of wild populations as well as generating funds to support mammal conservation. Currently, the Western Australian licensing body uses such a system to help develop the reptile keeping hobby which is still in its infancy over there. There is already a permit system in place for the harvest or harm of macropods, possums and wombats – why could there not be one for sustainable collection for private keeping? Sustainable harvesting of wildlife in Africa has proven to be an effective way of community lead initiatives in the protection of native mammals (e.g the CAMPFIRE program; Archer, 2002) Correspondence with wildlife carers indicates that wild mammals brought in for rehabilitation can and readily adjust to the captive environment.

A false narrative seems to exist with OEH that wild collection for private keeping is inherently evil. Whilst unregulated and unethical collection of animals should be condemned, a sustainable and high-welfare collection is an effective way to universally benefit several parties. Most of the species that would likely be collected would be things like gliders, small dasyurids and native mice – most of which are least concern and undergo population 'boom' events when conditions are favourable. We do not support any form of wild collection of species that are genuinely imperilled and collection pressure would have meaningful impacts on population viability.

5. Working with the Wildlife Rehabilitation Sector and Non-Releasable Native Animals –

Whilst we acknowledge that this issue is being treated independent of native animal keeping licensing in the review, we would like to offer commentary on it as a stakeholder. We believe that in the event an animal is deemed unable to be released there should be an easy pathway for it to go into permanent captivity before euthanasia is considered. Obviously, if the animal's quality of life is going to suffer detrimentally due to the injury sustained the animal should be humanely euthanised for welfare reasons. Such a practice is currently used in South Australia with positive outcomes for both mammals and owners, which in many circumstances are the carers maintain them.

We also want to acknowledge that the wildlife rehabilitation sector has an expansive skill set in the care of native mammals. Albeit that care is oriented specifically towards temporary accommodation and eventual release, it is still important to acknowledge that carers have insights into native mammal care that lay-people and enthusiasts may not currently have. Cohesively and constructively working with these organisations may mutually benefit both parties as keepers may access skills to improve their husbandry, while wildlife care organisations may get an increase variety of people with skills and facilities to help with rehabilitation. Furthermore, some organisations such as WIRES have vast state-wide networks and could be influenceable in the establishment of widespread and ethical mammal keeping in NSW.

With the above said, we also wish to clarify that the wildlife rehabilitation sector's skill set should not be overstated. We concur that native mammals have specific care requirements; however, they are not the only individuals exclusively capable of caring for them. Captive keepers have an unrelenting determination to get husbandry right and for that reason some keepers have been able to maintain and breeder specialist species such as the Thorny Devil (*Moloch horridus*).

As a final note relating to non-releasable native animals, we believe that if animals from a research environment cannot be rehomed to another research institution, they should be allowed to be released into private ownership prior to euthanasia being considered. Captive native animal populations have been maintained across NSW for various research initiatives for decades, in many circumstances these animals are excess to research needs at the completion of a study and cannot be released. General practice dictates that these animals be moved to another research institution or euthanised. We suggest a third potential option where animals excess to research needs be surrendered back to OEH and sold to the private keeping community to generate funds for conservation. Not only does this create a legal source of animals, it also ensures another path of genetic diversity as well as helping generate finances to support conservation throughout NSW.

6. Quantifying it! – The Office on Environment and Heritage is in a unique position to investigate the role that native mammal ownership and engagement may have in conservation and awareness of native mammals. With appropriate pre-meditation conditions could be established to quantify the impact native mammal ownership has on the public's awareness of mammal species as well as if this reasonably translates into powerful conservation outcomes. Understanding such knowledge would be an asset not only to Australia, but also the global conservation effort.

The role of Industry and Important Considerations:

As highlighted in the Discussion document the fauna dealer sector has a significant role in the future of the native fauna keeping industry, mammals are no exception to this. It is important to understand that like reptiles, these species have specific husbandry needs that not every pet shop will be able to meet. There is the potential for speciality pet shops or speciality departments within pet shops to both promote and retail native mammals.

We believe that initially, all pet shops that apply for a Fauna Dealer License to sell native mammals should be enabled to sell coded species only (Appendix 1). We believe that there should be a two year period where pet shops are not allowed to sell M1 small dasyurid species and a three-year period for M1 gliders and possums, however after these periods they may sell the species. At present we do not believe it appropriate for pet shops to sell M1 macropods or M2 species. The reason we suggest periods preventing pet shops from selling species is to allow captive numbers to build up in invested keepers hands, prior to being retailed openly to the public. It is important that numbers be adequately available in NSW to prevent excessive pressure on interstate stock. It is equally important to see these animals retailed appropriately in NSW as it raises the profile and awareness of the species. A prime example of the role pet shops can have in engaging the public with native mammals is evident with the Victorian pet shop Amazing Amazon, where an [advertisement for a male sugar glider](#) received over 170 Facebook likes and over 370 comments.

With this engagement a well-managed OEH based campaign can be used to raise awareness and interest in the conservation of wild specimens. Furthermore, the levy attached to each sale of a native mammal can be used to generate finances for grants relating to the conservation of native mammals in the wild.

A personal note:

As a final personal note, we hope you can appreciate our investment and passion in not only addressing the issue of native mammals in NSW, but also wanting to see it done right. Mammal ownership in NSW has been hampered since it's origins, given the chance to grow there's so much more potential for good than bad. At it's core there's a dedicated group of NSW native fauna enthusiast that just want to keep these already captive animals in a happy and healthy situation. We hope you can see that.

Kind regards,

The Native Mammal Keepers of NSW Working Group

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References:

- Archer, M. (2002). Confronting crises in conservation: a talk on the wild side. *Zoological Revolution. Using Native Fauna to Assist in Its Own Survival*, 12–52. <https://doi.org/10.7882/FS.2002.003>
- Augee, M. L., Smith, B., & Rose, S. (1996). Survival of Wild and Hand-reared Ringtail Possums (*Pseudocheirus peregrinus*) in Bushland near Sydney, (Smith 1995), 99–108.
- Balmford, A., Leader-Williams, N., & Green, M. J. B. (1995). Parks or arks: where to conserve threatened mammals? *Review of Industrial Organization*, 4(6), 595–607. <https://doi.org/10.1007/BF00222516>
- Driscoll, C. A., Macdonald, D. W., & O'Brien, S. J. (2009). From wild animals to domestic pets, an evolutionary view of domestication. *Proceedings of the National Academy of Sciences*, 106(Supplement_1), 9971–9978. <https://doi.org/10.1073/pnas.0901586106>
- Ewer, R. F. (1968). A Preliminary Survey of the Behaviour in Captivity of the Dasyurid Marsupial, *Sminthopsis crassicaudata* (Gould). *Zeitschrift für Tierpsychologie*. <https://doi.org/10.1111/j.1439-0310.1968.tb00019.x>
- Favreau, F. R., Goldizen, A. W., Fritz, H., Blomberg, S. P., Best, E. C., & Pays, O. (2014). Within-population differences in personality and plasticity in the trade-off between vigilance and foraging in kangaroos. *Animal Behaviour*. <https://doi.org/10.1016/j.anbehav.2014.04.003>
- Finn, H. C., & Stephens, N. S. (2017). The invisible harm: Land clearing is an issue of animal welfare. *Wildlife Research*, 44(5), 377–391. <https://doi.org/10.1071/WR17018>
- Griffin, A. S., Evans, C. S., & Blumstein, D. T. (2002). Selective learning in a marsupial. *Ethology*. <https://doi.org/10.1046/j.1439-0310.2002.00840.x>
- Jackson, S. (2003). *Australian Mammals: Biology and Captive Management*. CSIRO Publishing.
- James, C. (1996). Ecology of the Pygmy Goanna (*Varanus Brevicauda*) in Spinifex Grasslands of Central Australia. *Australian Journal of Zoology*, 44, 177. <https://doi.org/10.1071/ZO9960177>
- Jolly, C. J., Webb, J. K., Phillips, B. L., & Jolly, C. J. (2018). The perils of paradise : an endangered species conserved on an island loses antipredator behaviours within 13 generations. <https://doi.org/10.1098/RSBL.2018.0222>
- Llewelyn, J., Webb, J. K., Schwarzkopf, L., Alford, R., & Shine, R. (2010). Behavioural responses of carnivorous marsupials (*Planigale maculata*) to toxic invasive cane toads (*Bufo marinus*). *Austral Ecology*. <https://doi.org/10.1111/j.1442-9993.2009.02067.x>
- Szyper, L. A. (2017). *The therapeutic impact of human-animal interaction on individuals with pets: Perceived benefits and burdens, well-being, and ability to navigate through significant stressful life events*. ProQuest Dissertations and Theses.
- Tribe, A., & Brown, P. R. (2000). The role of wildlife rescue groups in the care and rehabilitation of Australian fauna. *Human Dimensions of Wildlife*, 5(2), 69–85. <https://doi.org/10.1080/10871200009359180>
- Woinarski, J. C. Z., Burbidge, A. A., & Harrison, P. L. (2015). Ongoing unraveling of a continental fauna: Decline and extinction of Australian mammals since European settlement. *Proceedings of the National Academy of Sciences*, 112(15), 4531–4540. <https://doi.org/10.1073/pnas.1417301112>

Appendix 1.

Proposed Species List:

Common Name	Scientific Name	License Class	Functional Group	Pet shops	Comment
Spinifex Hopping Mouse	<i>Notomys alexis</i>	Coded	Small Native Rodent	Yes	Exempt is VIC, SA and NT.
Mitchell's Hopping Mouse	<i>Notomys mitchellii</i>	Coded	Small Native Rodent	Yes	Exempt is VIC, SA and NT
Plains Mouse	<i>Pseudomys australis</i>	Coded	Small Native Rodent	Yes	Held in high numbers breeds readily.
Fat Tailed Dunnart	<i>Sminthopsis crassicaudata</i>	M1	Small Dasyurid	1 year probation	
Sugar Glider	<i>Petaurus breviceps</i>	M1	Glider and Possum	3 year probation	
Squirrel Glider	<i>Petaurus norfolcensis</i>	M1	Glider and Possum	3 year probation	
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	M1	Glider and Possum	3 year probation	
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	M1	Glider and Possum	3 year probation	
Long-nosed Potoroo	<i>Potorous tridactylus</i>	M1	Small Macropod	No	
Red Necked Paddymelon	<i>Thylogale thetis</i>	M1	Small Macropod	No	
Tasmanian Pademelon	<i>Thylogale billardierii</i>	M1	Small Macropod	No	
Brush-tailed Bettong	<i>Bettongia penicillata</i>	M1	Small Macropod	No	
Burrowing Bettong	<i>Bettongia lesueur</i>	M1	Small Macropod	No	
Rufous Bettong	<i>Aepyprymnus rufescens</i>	M1	Small Macropod	No	
Parma Wallaby	<i>Macropus parma</i>	M1	Small Macropod	No	
Tammar Wallaby	<i>Macropus eugenii</i>	M1	Small Macropod	No	
Southern Brown Bandicoot	<i>Isodon obesulus</i>	M1	Bandicoot	No	
Kowari	<i>Dasyuroides byrnei</i>	M1	Small Dasyurid	1 year probation	
Red Necked Wallaby	<i>Macropus rufogriseus</i>	M2	Medium Macropod	No	
Swamp Wallaby	<i>Wallabia bicolor</i>	M2	Medium Macropod	No	

Black Striped Wallaby	<i>Macropus dorsalis</i>	M2	Medium Macropod	No	
Common Wombat	<i>Vombatus ursinus</i>	M2	Wombat	No	
Eastern Quoll	<i>Dasyurus viverrinus</i>	M2	Large Dasyurid	No	
Northern Quoll	<i>Dasyurus hallucatus</i>	M2	Large Dasyurid	No	Talk to Anthony about zoos.
Western Quoll	<i>Dasyurus geoffroii</i>	M2	Large Dasyurid	No	
Tiger Quoll	<i>Dasyurus maculatus</i>	M2	Large Dasyurid	No	
Feather-tail Glider	<i>Acrobates pygmaeus</i>	M2	Glider and Possum	No	
Quokka	<i>Setonix brachyurus</i>	M2	Small Macropod	No	
Rakali	<i>Hydromys chrysogaster</i>	M2	Medium Native Rodent	No	
Koala	<i>Phascolarctos cinereus</i>	M3	Koala	No	Koala Endorsement
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	M3	Bat/Flying Fox	No	Bat endorsement
Ghost Bat	<i>Macroderma gigas</i>	M3	Bat/Flying Fox	No	Bat endorsement
Common Wallaroo	<i>Macropus robustus</i>	M3	Large Macropod	No	Large Macropod Endorsement
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	M3	Large Macropod	No	Large Macropod Endorsement
Kangaroo Island Kangaroo	<i>Macropus fuliginosus fuliginosus</i>	M3	Large Macropod	No	Large Macropod Endorsement
Western Grey Kangaroo	<i>Macropus fuliginosus</i>	M3	Large Macropod	No	Large Macropod Endorsement
Red Kangaroo	<i>Macropus rufus</i>	M3	Large Macropod	No	Large Macropod Endorsement

Coded = No license, follow code of practice

M1 = License, record keeping and E-learning module

M2 = 2 Years of experience and class specific e-learning modules.

M3 = M3 is granted with an endorsement-based system like the current dangerously venomous elapid system. Prospective keepers are required to provide evidence of appropriate facilities, immunisation (bats), skills and experience, etc. Alternative pathways providing recognition of prior training should be available.

Koala Endorsement:

To be able to achieve a Koloa endorsement we suggest the following:

1. An enclosure in line with the NSW COP
2. A lawful supply of eucalyptus foliage in quantities appropriate to support the number of koloas to be held.
3. Experience with the husbandry of Koalas
4. Written recommendations from two individuals with competency in koloa care
5. Statement of intended husbandry practices

Bat Endorsement:

1. Receive all relevant bat immunisations to prevent against zoonoses carried by bats.
2. An enclosure in line with the NSW COP

Large Macropod Endorsement:

1. An enclosure in line with the NSW COP
2. Example husbandry procedure for caring for large macropods.
3. Two years experience with smaller macropods
4. Written recommendations from two individuals with competency in large macropod care