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INQUIRY INTO DINGOES IN NATIONAL PARKS IN NEW SOUTH WALES

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The ecological, evolutionary and cultural significance of dingoes in New South Wales

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The authors of this submission have collectively undertaken research on, and continue to study, dingo ecology, genetics, conservation biology and wildlife management for more than two decades at the University of Sydney. Several authors have contributed directly to the scientific literature cited throughout this submission, including research on dingo morphology, ecology, trophic interactions, population genetics and conservation management. This submission is based on the contemporary peer-reviewed scientific evidence regarding the ecological, evolutionary and cultural significance of dingoes in New South Wales.

This submission addresses each of the Terms of Reference by summarising the contemporary scientific evidence regarding the ecological, evolutionary and cultural significance of dingoes and its implications for management within New South Wales national parks.

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Executive Summary

The dingo (*Canis dingo* or *Canis lupus dingo*) is Australia's largest terrestrial predator and has occupied Australian ecosystems for at least 5,000–8,000 years, during which time it has become an integral component of Australian ecosystems and Aboriginal cultures. Contemporary evidence from ecology, genomics, morphology, behaviour and Indigenous cultural studies demonstrates that dingoes represent a distinct evolutionary lineage, function as Australia's apex terrestrial predator, and possess substantial ecological and cultural significance.

Recent advances in genomic research have substantially improved understanding of the evolutionary history of dingoes and their relationship with domestic dogs. While some studies suggest that previous estimates of hybridisation may have been inflated by analytical limitations, others demonstrate that gene flow from domestic dogs has occurred in some regions, particularly south-eastern Australia. Importantly, both bodies of work agree that dingoes remain genetically distinct and continue on an independent evolutionary trajectory. Ancient genomic analyses demonstrate that major dingo population structure has persisted for at least 2,000 years and that modern dingo populations derive the overwhelming majority of their ancestry from ancient Australian dingoes. More recent paleogenomic research further demonstrates that contemporary dingo populations retain strong regional population structure, highlighting the importance of conserving regional genetic diversity, population connectivity and evolutionary history.

The strongest contemporary evidence indicates that habitat fragmentation, population isolation, loss of genetic diversity and intensive lethal control represent the principal threats to the long-term persistence and ecological function of dingo populations. Management within national parks should therefore prioritise the maintenance of ecologically functional, genetically viable and well-connected populations capable of fulfilling their ecological role while conserving regional genetic diversity and evolutionary potential.

Archaeological and ethnographic evidence demonstrates that dingoes have held profound cultural significance for Aboriginal peoples for thousands of years, including documented ceremonial burial practices on Barkindji Country in New South Wales and enduring roles within Indigenous cultural traditions, kinship systems and relationships to Country.

We recommend that the NSW Government recognise the ecological, evolutionary and cultural significance of dingoes; ensure that management decisions are informed by contemporary ecological and genomic evidence; incorporate Indigenous leadership, co-management and Traditional Ecological Knowledge into conservation and management programs; maintain population connectivity, regional genetic diversity and long-term population viability; and ensure that management within national parks is aligned with biodiversity conservation objectives and supports the persistence of ecologically functional dingo populations.

Recommendations

1. Recognise dingoes as a distinct evolutionary lineage with significant ecological and cultural value. (*ToR 1(a), 1(d))*
2. Ensure management decisions are informed by contemporary ecological and genomic evidence and reflect current understanding of dingo population structure, ancestry and evolutionary distinctiveness. *(ToR 1(a), 1(c))*
3. Distinguish clearly between dingoes, feral domestic dogs and hybrids in legislation, policy and management programs. *(ToR 1(a), 1(b))*
4. Manage dingoes within national parks primarily as native apex predators that contribute to biodiversity conservation, ecosystem resilience and ecological function. *(ToR 1(c), 1(e))*
5. Incorporate Indigenous leadership, co-management and Traditional Ecological Knowledge into dingo conservation and management programs. *(ToR 1(d), 1(f))*
6. Require explicit consideration of animal welfare outcomes in all dingo management decisions. *(ToR 1(e), 1(g))*
7. Expand coordinated long-term ecological, demographic and genomic monitoring programs to support evidence-based and adaptive management. *(ToR 1(a), 1(c), 1(e))*
8. Prioritise the maintenance of population connectivity, regional genetic diversity, locally adapted population structure and long-term population viability, particularly in isolated populations exhibiting evidence of genetic erosion or inbreeding. *(ToR 1(a), 1(c), 1(g))*
9. Limit broad-scale lethal control within protected areas except where clearly justified by evidence-based conservation, public safety or other demonstrated management objectives, and where potential ecological, genetic and animal welfare consequences have been explicitly considered. *(ToR 1(e), 1(g))*
10. Support further research into dingo ecology, genetics, ecosystem function, cultural significance and management effectiveness. *(ToR 1(a), 1(c), 1(d), 1(g))*
11. Explicitly consider trophic interactions, mesopredator suppression, herbivore regulation and ecosystem processes when evaluating dingo management programs within national parks. *(ToR 1(c), 1(e))*
12. Review and update the use of the term "wild dog" in legislation, policy and management programs to ensure terminology accurately reflects the biological identity of free-ranging canids in New South Wales and improves transparency in dingo management. *(ToR 1(a), 1(b))*

Terms of Reference (ToR): (a) Genetic status and distinction between dingoes and dogs; (b) Legislative, regulatory and policy frameworks; (c) Ecological role of dingoes; (d) Cultural significance for First Nations communities; (e) Current government policies and programs; (f) Indigenous knowledge and leadership in dingo conservation; (g) Other related matters.

1. Genetic status and taxonomic identity of dingoes (*Terms of Reference 1(a)*)

The scientific evidence strongly supports recognition of dingoes as a distinct evolutionary lineage.

Morphological analyses based on pre-European museum specimens have demonstrated that dingoes possess a consistent suite of anatomical characteristics that distinguish them from domestic dogs (Crowther et al. 2014; Parr et al. 2016; Smith et al. 2019; Cairns et al. 2025). Reviews integrating morphological, ecological, behavioural and genetic evidence have similarly concluded that dingoes are not simply feral domestic dogs, but represent a unique canid lineage that has evolved independently in Australia for thousands of years (Smith et al. 2019; Cairns et al. 2025).

Recent genomic studies provide independent support for this conclusion. Although dingoes share ancestry with domestic dogs and New Guinea Singing Dogs, they remain genetically differentiated and continue to follow an independent evolutionary trajectory (Cairns et al. 2023; Weeks et al. 2025). Contemporary evidence indicates that dingo populations retain substantial genetic and evolutionary distinctiveness despite varying levels of admixture with domestic dogs in some regions.

Ancient genomic analyses provide further independent evidence of this evolutionary history. Souilmi et al. (2024) demonstrated that the major north-western and south-eastern population divisions observed in modern dingoes were already established at least 2,000 years ago, indicating that contemporary population structure reflects long-term evolutionary processes rather than recent hybridisation or modern management practices. Their analyses further showed that modern dingo populations derive the overwhelming majority of their ancestry from ancient Australian dingoes. More recently, Ravishankar et al. (2026) used paleogenomic approaches to demonstrate that contemporary dingo populations retain strong regional population structure and that effective conservation requires recognition of this evolutionary history and regional genetic diversity.

Reflecting this body of evidence, Cairns et al. (2025) concluded that dingoes are on a distinct evolutionary trajectory from domestic dogs and that the most appropriate nomenclature is *Canis dingo* or *Canis lupus dingo*, rather than *Canis familiaris*. This conclusion recognises the prolonged independent evolution of dingoes in Australia and their adaptation to Australian environments.

Accordingly, dingoes should be recognised as an evolutionarily significant native canid whose conservation warrants specific consideration within biodiversity management frameworks. This conclusion is also consistent with broader eco-evolutionary perspectives that argue native status should reflect long-term evolutionary integration within Australian ecosystems rather than solely the historical mode of arrival. Dingoes have undergone substantial evolutionary change since their arrival in Australia and now function as an ecologically integrated native predator within Australian ecosystems (Banks 2021).

2. Hybridisation and genetic integrity (*Terms of Reference 1(a)*)

Concerns regarding hybridisation with domestic dogs have strongly influenced dingo management policy for several decades. However, recent genomic studies have substantially refined our understanding of this issue.

Earlier microsatellite studies suggested widespread hybridisation throughout southeastern Australia (Stephens et al. 2015). Subsequent analyses using the same microsatellite dataset but with substantially denser sampling in New South Wales identified several geographic hotspots of high dingo ancestry and found that true feral dogs were extremely uncommon, suggesting that previous broad-scale assessments may have underestimated the persistence of high-ancestry dingo populations in the state (Cairns et al. 2020). More recent genomic analyses have produced a more nuanced picture. Cairns et al. (2023) and Weeks et al. (2025) argue that some previous estimates were inflated because population structure, isolation-by-distance and shared ancestry were incorrectly interpreted as evidence of recent admixture. More recently, Ravishankar et al. (2026) used ancient dingo genomes and a paleogenomic ancestry-modelling framework to reassess European dog admixture across Australia. Their analyses concluded that both microsatellite and clustering-based approaches can produce biased estimates of admixture, and that contemporary dingo populations generally retain high levels of dingo ancestry despite regional variation in European dog introgression

In contrast, Scarsbrook et al. (2025), using whole-genome sequencing and ancient DNA, detected European dog ancestry in many contemporary southeastern Australian dingo populations. Importantly, however, they concluded that much of this admixture likely occurred during the twentieth century, particularly following major landscape-scale population control programs, and that dingoes have nevertheless retained their distinct evolutionary identity.

Importantly, ancient genomic analyses provide an independent line of evidence that is unaffected by post-European hybridisation. Using genomes from dingoes dating up to approximately 2,700 years before present, Souilmi et al. (2024) demonstrated that the major north-western and south-eastern population divisions observed in modern dingoes were already established at least 2,000 years ago. Their findings indicate that contemporary dingo population structure reflects long-term evolutionary history rather than recent hybridisation or modern management practices. The authors further concluded that modern dingo populations derive the overwhelming majority of their ancestry from ancient Australian dingo populations and possess little genomic ancestry from recently introduced domestic dog lineages. Consequently, contemporary dingoes remain primarily descended from the ancient canids that were introduced to Australia thousands of years ago.

The emerging consensus is that conservation should focus on maintaining ecologically functional, genetically diverse and evolutionarily resilient populations rather than pursuing rigid thresholds of genetic purity. Conservation policy should therefore prioritise population viability, connectivity and evolutionary resilience.

3. Population structure and conservation significance *(Terms of Reference 1(a), 1(g))*

Recent genomic analyses have revealed substantial geographic structure within Australian dingo populations

Cairns et al. (2018) identified major north-western and south-eastern lineages and highlighted the conservation significance of regional genetic diversity. Fine-scale analysis of eastern New South Wales populations subsequently identified multiple geographic hotspots of high dingo ancestry, demonstrating that important reservoirs of dingo genetic diversity persist within the state despite historical concerns regarding widespread hybridisation (Cairns et al. 2020). More recently, Cairns et al. (2023) identified multiple genetically differentiated dingo populations across Australia, demonstrating that dingoes comprise a complex network of regionally structured populations rather than a single panmictic population.

Ravishankar et al. (2026) similarly identified multiple genetically distinct regional populations and demonstrated that much of this population structure reflects ancient biogeographic divisions that have persisted for more than two millennia. Their findings further emphasise the conservation importance of maintaining regional genetic diversity and population connectivity across Australia.

Similarly, Weeks et al. (2025) reported strong isolation-by-distance and geographic genetic structure among Alpine, Desert and Mallee dingo populations. Their analyses identified reduced genetic diversity and elevated inbreeding within the isolated Mallee population, highlighting the potential conservation risks associated with fragmentation and population isolation.

Collectively, these studies demonstrate that dingoes are not a genetically homogeneous population. Instead, they comprise multiple geographically structured populations that represent important components of the species' evolutionary history, genetic diversity and adaptive potential. The persistence of high-ancestry dingo populations in New South Wales further highlights the conservation importance of the state's national parks and protected areas.

Conservation and management strategies should therefore aim to maintain population connectivity, preserve regional genetic diversity, and avoid management actions that further reduce gene flow or accelerate genetic erosion within isolated populations.

4. Ecological role of dingoes *(Terms of Reference 1(c))*

Dingoes occupy the ecological role of apex terrestrial predator across much of mainland Australia and are among the most influential native vertebrates affecting ecosystem structure and function (Letnic et al. 2012).

A substantial body of ecological research demonstrates that dingoes influence ecological communities through both direct predation and behavioural effects on prey and competitor species (Letnic et al. 2009; Letnic et al. 2012; Newsome et al. 2015). Through these mechanisms, dingoes can affect species interactions across multiple trophic levels,

contributing to the regulation of herbivores, mesopredators and associated ecological processes.

Research conducted across arid, semi-arid and temperate ecosystems has shown that dingo populations are associated with reduced abundance or altered behaviour of introduced mesopredators, particularly foxes and feral cats. By suppressing mesopredators, dingoes may indirectly benefit populations of smaller native mammals, reptiles and ground-nesting birds that are otherwise vulnerable to predation. These effects are consistent with the ecological role expected of an apex predator and have been documented across broad spatial scales (Letnic et al. 2009; Letnic et al. 2012; Newsome et al. 2015).

Although dingoes are opportunistic predators capable of taking a wide range of prey species, dietary studies indicate that they frequently target larger mammals, particularly macropods, and generally exert lower predation pressure on small vertebrates than introduced predators such as feral cats and red foxes (Mason et al. 2025). Consequently, the ecological effects of dingoes often differ markedly from those of invasive mesopredators.

Recent evidence from forests of south-eastern Australia further supports the role of dingoes in suppressing invasive mesopredators. Hunter and Letnic (2022) found that fox activity was substantially higher at sites where dingoes were subject to regular baiting, while dingo activity was markedly reduced. The authors concluded that dingoes may suppress fox populations more effectively than poisoning campaigns and that intensive dingo control has the potential to undermine biodiversity conservation objectives if it results in increased fox abundance and predation pressure on native wildlife.

Dingo diets strongly favour large herbivores and can influence both the abundance and behaviour of these species. Studies have demonstrated that dingo presence can reduce the abundance and alter the behaviour of kangaroos, feral goats and other herbivores, thereby influencing grazing pressure and vegetation dynamics. In some ecosystems, these effects cascade through food webs and contribute to changes in plant community composition, vegetation structure and ecosystem resilience (Letnic et al. 2009; Gordon et al. 2017). Experimental evidence from the Strzelecki Desert further demonstrated that suppression of dingoes was associated with increased kangaroo abundance, reduced vegetation cover and lower concentrations of soil carbon, nitrogen and phosphorus, indicating that trophic cascades initiated by dingoes can extend to ecosystem productivity and nutrient cycling (Morris & Letnic 2017).

Importantly, the ecological effects of dingoes are not restricted to direct predation. Dingoes can induce behavioural changes in prey species through the ecology of fear, altering habitat use, foraging behaviour and movement patterns. These non-consumptive effects can be as ecologically important as direct mortality and contribute to broader ecosystem regulation (Letnic et al. 2012). Experimental and observational studies indicate that native prey species recognise dingoes as predators, with behavioural responses reflecting a long evolutionary history of coexistence rather than the predator naïveté typically associated with recently introduced predators (Frank et al. 2016).

Experimental evidence also demonstrates that the removal of dingoes can have unintended ecological consequences. Colman et al. (2014) showed that lethal control of dingoes in temperate forest ecosystems resulted in cascading effects on mammal assemblages, with increases in mesopredators and associated changes in prey populations. These findings

suggest that predator control programs can alter ecological communities in ways that may conflict with biodiversity conservation objectives.

At larger spatial scales, dingo populations have been linked to improved persistence of native mammals, reduced impacts of invasive predators, and broader ecosystem processes, including vegetation dynamics and nutrient cycling (Morris & Letnic 2017). Collectively, these studies support the view that dingoes function as a keystone predator in many Australian ecosystems (Letnic et al. 2009). Newsome et al. (2015) further concluded that dingoes have the potential to play an important role in ecological restoration by restoring top-down ecological processes that have been diminished through the loss of apex predators.

More broadly, a growing body of evidence indicates that dingoes contribute to the maintenance of ecologically functional and resilient landscapes through their effects on herbivores and mesopredators. Letnic et al. (2013) argued that maintaining ecologically functional dingo populations may provide a valuable mechanism for supporting biodiversity conservation and ecosystem resilience in south-eastern Australia. Similarly, recent studies have shown that dingoes influence nutrient transfer through ecosystems, while their absence may facilitate increased nutrient uptake and redistribution by invasive species (Spencer & Newsome 2021; Newsome et al. 2024; Newsome et al. 2026).

The ecological effects of dingoes vary among ecosystems and should not be assumed to operate identically across all landscapes. Nevertheless, the preponderance of evidence indicates that dingoes generally exert a net positive effect on biodiversity through their regulation of mesopredators and herbivores and their contribution to ecosystem resilience (Letnic et al. 2013; Newsome et al. 2015). More broadly, Banks (2021) argued that the ecological impacts of dingoes are consistent with those expected of a native apex predator rather than a recently introduced predator, because Australian prey species recognise dingoes as predators and their impacts generally do not exhibit the disproportionately severe effects characteristic of invasive alien predators.

Importantly, ecological benefits arise not merely from the presence of individual dingoes but from the maintenance of functioning social groups and natural population structures. Recent behavioural research further demonstrates that movement patterns differ according to social status, sex and breeding success, with dominant breeding animals increasingly concentrating their activity within territories as pup numbers increase, highlighting the importance of maintaining intact social organisation and pack structure (Alting et al. 2025). Intensive lethal control can disrupt social organisation, alter predator–prey dynamics, reduce mesopredator suppression and potentially diminish the ecological services provided by dingo populations. Consequently, management decisions within national parks should consider not only dingo abundance but also the maintenance of ecological function.

Within national parks, the ecological role of dingoes should therefore be recognised as a significant conservation value. As apex predators, dingoes contribute to biodiversity conservation, ecosystem resilience and the maintenance of natural ecological processes, all of which are central objectives of protected area management. These ecological functions are particularly relevant in New South Wales, where national parks support extensive populations of native herbivores, threatened mammals and invasive mesopredators whose abundance and behaviour may be influenced by dingo populations.

5. Indigenous knowledge and cultural significance *(Terms of Reference 1(d), 1(f))*

Dingoes possess profound cultural significance for Aboriginal peoples across Australia.

Ethnographic, archaeological and historical evidence demonstrates that Aboriginal communities have maintained close relationships with dingoes for thousands of years (Smith & Litchfield 2009). Dingoes were commonly incorporated into community life as companions, protectors and culturally significant animals, while also occupying important roles within Indigenous knowledge systems, spirituality and cultural traditions. Across Australia, dingoes feature prominently in Dreaming narratives, kinship systems and cultural practices, reflecting their importance well beyond their ecological role. Aboriginal authors have emphasised that dingoes are not simply culturally important animals, but are embedded within kinship systems, cultural law, songlines and relationships to Country. Costello et al. (2021) describe dingoes as "brothers and sisters" within Aboriginal kinship systems and argue that impacts on dingo populations may also affect cultural heritage, cultural responsibilities and connections to Country. Importantly, they emphasise that the cultural significance of dingoes varies among regions and should be understood through meaningful engagement with local Traditional Custodians.

Importantly, Aboriginal peoples generally did not domesticate dingoes in the conventional sense. Rather, wild-born pups were often incorporated into communities while retaining the behavioural characteristics of a wild canid. Many Indigenous languages distinguish between wild dingoes and camp-associated dingoes, reflecting sophisticated ecological knowledge and a long history of coexistence with the species (Smith & Litchfield 2009; Cairns et al. 2025).

Recent archaeological evidence further demonstrates the enduring cultural importance of dingoes to Aboriginal peoples in New South Wales. Koungoulos et al. (2026) documented a deliberate dingo burial ("Garli") on Barkindji Country within Kinchega National Park on the Baaka (Darling River), dated to approximately 963–916 cal BP. The authors concluded that the burial reflects a close relationship between Aboriginal people and dingoes, with the animal receiving treatment comparable to that afforded to human burials. The study extends the known distribution of pre-colonial dingo burial practices within the Murray–Darling Basin and provides direct evidence that Barkindji people have maintained culturally significant relationships with dingoes for at least the past millennium. Importantly, the excavation and interpretation of the burial were undertaken in partnership with the Menindee Aboriginal Elders Council, illustrating the value of Indigenous leadership and collaboration in understanding and conserving Aboriginal cultural heritage.

The cultural significance of dingoes should therefore be recognised alongside their ecological and evolutionary importance when developing conservation policy and managing protected areas. Decisions affecting dingo populations should acknowledge that they may also affect Aboriginal cultural values, cultural responsibilities and relationships to Country.

Accordingly, the Inquiry should support Indigenous-led conservation initiatives, co-management arrangements, Indigenous ranger programs, and the incorporation of Traditional Ecological Knowledge into dingo conservation and management. Such approaches are likely to

improve conservation outcomes while recognising the enduring cultural relationships between Aboriginal peoples and dingoes.

6. Animal welfare considerations *(Terms of Reference 1(e), 1(g))*

Animal welfare should be a central consideration in all dingo management decisions undertaken within national parks and other protected areas.

The Inquiry provides an important opportunity to assess whether lethal control practices currently employed within and around protected areas are consistent with contemporary animal welfare standards, biodiversity conservation objectives and community expectations regarding the treatment of native wildlife. These community expectations are supported by empirical evidence. A national survey found generally low public approval of lethal dingo control, particularly poison baiting, while non-lethal approaches such as fencing and livestock guardian animals received substantially greater support. Support for lethal control increased primarily where there was a clear management justification, such as livestock protection, highlighting the importance of transparent, evidence-based decision-making (van Eeden et al. 2021).

Management interventions directed at dingoes should be evaluated not only in terms of their immediate effectiveness, but also in relation to their welfare consequences for individual animals and their broader impacts on populations and ecosystems. As highly social animals, dingoes live within family groups whose social organisation influences breeding behaviour, territory maintenance and ecological function. Management actions that disrupt these social structures may therefore have consequences extending well beyond the animals directly affected.

Recent population viability modelling of a coastal New South Wales dingo population demonstrated that all forms of lethal control reduced projected population persistence, with the greatest impacts occurring when adult animals, breeding females or entire packs were removed. In contrast, targeted removal of individual problem animals had substantially smaller effects on long-term population viability than indiscriminate culling (Henderson et al. 2025). These findings indicate that the ecological and demographic consequences of management depend not only on whether intervention occurs, but also on how it is implemented.

The scientific literature further suggests that intensive lethal control can have unintended ecological and evolutionary consequences. International studies of wild canids have shown that disruption of social organisation may alter population dynamics, increase dispersal and create opportunities for hybridisation (Pilot et al. 2018). In Australia, disruption of dingo populations may also alter predator–prey interactions, reduce mesopredator suppression and diminish the ecological functions performed by dingoes as apex predators (Letnic et al. 2012; Hunter & Letnic 2022).

Management decisions should therefore explicitly evaluate:

- Animal welfare outcomes;
- Ecological consequences;
- Conservation impacts;
- Effects on social organisation and population function; and
- Long-term population viability.

Such evaluations should occur before lethal management actions are undertaken within protected areas. Where intervention is considered necessary, management approaches that minimise animal suffering, maintain ecological function and avoid unnecessary disruption to social organisation should be preferred wherever practicable.

Given that national parks are established primarily to conserve biodiversity, ecological processes and cultural values, management actions affecting dingoes should be supported by clear evidence, be proportionate to the identified risk, and be consistent with both conservation and animal welfare objectives.

7. Management of dingoes in national parks *(Terms of Reference 1(e), 1(f))*

The management objectives of national parks differ fundamentally from those of agricultural landscapes. While livestock protection may justify targeted management interventions in some production landscapes, national parks are established primarily to conserve biodiversity, ecological processes, cultural heritage and native species.

Consequently, management frameworks developed principally for livestock protection should not automatically be applied within protected areas. Instead, management decisions within national parks should be guided by the objectives of biodiversity conservation, ecosystem function, cultural values and animal welfare.

Within national parks, dingoes should be managed primarily as:

- Native apex predators;
- Native components of biodiversity;
- Contributors to ecosystem function and ecological resilience; and
- Animals of cultural significance to Aboriginal peoples.

A substantial body of ecological research demonstrates that dingoes influence trophic interactions, suppress mesopredators, regulate herbivore populations and contribute to the maintenance of ecosystem processes (Letnic et al. 2009; Letnic et al. 2012; Colman et al. 2014; Newsome et al. 2015). These ecological functions are directly relevant to the conservation objectives of protected areas and should be explicitly considered when evaluating management actions.

Recent continent-wide genetic analyses further demonstrate that true feral domestic dogs are exceedingly rare in Australia, comprising less than 1% of more than 5,000 wild canids tested, while the overwhelming majority of free-ranging canids were identified as dingoes or dingo-dominant animals (Cairns et al. 2022). These findings suggest that the widespread use of the term "wild dog" may obscure important biological distinctions between dingoes and feral domestic dogs and may not accurately reflect the identity of most animals subject to management programs.

This does not preclude targeted management where there is clear evidence of impacts on neighbouring landholders, public safety concerns or other demonstrated management needs. However, such interventions should be evidence-based, proportionate and undertaken in a manner that minimises impacts on the ecological function, social organisation and long-term viability of dingo populations. Recent behavioural research further demonstrates that dingo

movement varies with breeding status, social status and season, highlighting the importance of considering pack structure and breeding behaviour when designing management programs to minimise unnecessary disruption to breeding groups (Alting et al. 2025). Similarly, recent population viability modelling of a coastal New South Wales dingo population demonstrated that all forms of lethal control reduced projected population persistence, whereas targeted removal of individual problem animals had substantially smaller impacts than indiscriminate culling or pack removal. Henderson et al. (2025) concluded that targeted management approaches pose considerably less risk to long-term population viability and ecological function than broad-scale lethal control.

There is also evidence that dingoes can provide both ecological and economic benefits in some pastoral landscapes. In Australia's rangelands, dingoes may reduce grazing competition by suppressing populations of large herbivores, particularly macropods, thereby providing benefits for cattle production (Prowse et al. 2015). Similarly, recent economic analyses identified favourable cost-benefit outcomes for pastoralists operating in unfenced, dingo-inhabited landscapes under some management scenarios (Dawson et al. 2025). At the same time, documented dingo predation on sheep in New South Wales between 2024 and 2025 was low (1,759 sheep), representing approximately 0.007% of the state's sheep flock. Collectively, these findings indicate that management should be proportionate to the demonstrated level of risk, tailored to local circumstances and informed by both ecological and economic evidence.

Protected area management should therefore prioritise ecological integrity, biodiversity conservation and the maintenance of ecologically functional dingo populations. As apex predators, dingoes should be recognised not simply as species requiring management, but as native predators that contribute directly to the ecological values national parks are intended to protect. Maintaining ecologically functional dingo populations may help sustain resilient ecosystems and support broader biodiversity conservation outcomes within protected areas (Letnic et al. 2013).

Evidence from south-eastern Australian forests further suggests that management actions aimed at reducing dingo abundance may not always achieve broader biodiversity objectives. Hunter and Letnic (2022) reported substantially greater fox activity at sites where dingoes were subject to regular baiting and concluded that dingo suppression may, in some circumstances, be counterproductive for biodiversity conservation. These findings highlight the importance of considering indirect ecological effects, including impacts on mesopredator populations and native prey species, when evaluating predator management programs within protected areas.

Consistent with these principles, van Eeden et al. (2021) argued that management of dingoes on public lands should be transparent, clearly justified and communicated using terminology that accurately reflects the animals being managed, particularly where lethal control may compromise biodiversity conservation objectives or the ecosystem services provided by dingoes.

8. Legislative and policy considerations *(Terms of Reference 1(b), 1(e))*

The management of dingoes in New South Wales occurs within a complex legislative and policy framework that seeks to balance biodiversity conservation, animal welfare, cultural values and agricultural interests. While these objectives are not inherently incompatible, tensions can arise where management approaches developed for livestock protection are applied within protected areas established primarily for biodiversity conservation.

The legislative framework relevant to dingo management includes the *Biodiversity Conservation Act 2016 (NSW)*, the *National Parks and Wildlife Act 1974 (NSW)*, together with associated wild dog management policies and protected area management plans. Collectively, these instruments provide the framework through which biodiversity conservation, Aboriginal cultural heritage, land management and agricultural objectives are pursued across New South Wales.

The *Biodiversity Conservation Act 2016 (NSW)* provides the principal legislative framework for conserving native biodiversity and maintaining ecological processes. Contemporary ecological research demonstrates that dingoes contribute to these objectives through their role as apex predators by regulating herbivore populations, suppressing invasive mesopredators and influencing trophic interactions. Consequently, management decisions affecting dingo populations should explicitly consider the ecological functions performed by dingoes and the potential consequences of disrupting those functions.

Similarly, national parks and other protected areas are managed under the *National Parks and Wildlife Act 1974 (NSW)* to conserve biodiversity, natural landscapes and Aboriginal cultural heritage. Within this context, dingoes should be regarded not simply as species requiring management, but also as native apex predators that contribute to the ecological values protected areas are intended to conserve. Management actions undertaken within national parks should therefore be consistent with the conservation objectives of the protected area estate.

By contrast, Wild Dog Management Plans have historically focused on reducing impacts on livestock production. Such approaches may be appropriate in agricultural landscapes where there is clear evidence of stock losses. However, management frameworks developed primarily for livestock protection may not always be directly transferable to national parks, where the primary statutory objectives are biodiversity conservation, ecological integrity and the protection of Aboriginal cultural heritage. Consequently, the application of broad-scale control measures within protected areas should be carefully evaluated in light of their ecological, genetic, cultural and animal welfare implications, together with their potential effects on the long-term viability and ecological function of dingo populations.

A key challenge for contemporary policy is developing management approaches that maintain the ecological benefits provided by dingoes while also addressing legitimate concerns regarding livestock protection in adjacent agricultural landscapes (Letnic et al. 2013). Emerging evidence further indicates that dingoes can provide ecological and, in some circumstances, economic benefits to pastoral enterprises by regulating populations of large herbivores and reducing grazing competition (Prowse et al. 2015; Dawson et al. 2025). These findings reinforce the need for management decisions to be evidence-based, proportionate and tailored to local circumstances.

Contemporary genetic research also raises important questions regarding the terminology used in legislation and policy. Multiple studies have demonstrated that true feral domestic dogs are rare in Australia and that the overwhelming majority of free-ranging canids are dingoes or dingo-dominant animals (Cairns et al. 2020; Cairns et al. 2022). The widespread use of the term "wild dog" may therefore obscure important biological distinctions and create confusion regarding the conservation status and management of dingo populations. Similar concerns have been raised by Aboriginal authors, who argue that the term "wild dog" fails to recognise the distinct cultural identity and significance of dingoes. Costello et al. (2021) note that many Aboriginal communities regard dingoes and feral domestic dogs as fundamentally different animals and

that terminology used in policy can influence recognition of Aboriginal cultural values associated with dingoes.

Terminology also has important implications for public understanding and transparency. A national survey found that only 19.1% of Australians were aware that "wild dog" management includes dingoes, and respondents expressed substantially more positive attitudes towards dingoes than towards "wild dogs", despite these terms often referring to the same free-ranging canids. These findings suggest that terminology used in legislation and management programs can substantially influence public understanding and social acceptance of dingo management (van Eeden et al. 2021).

Legislation, policy and management programs should therefore be informed by contemporary scientific evidence and use terminology that accurately reflects current understanding of dingo taxonomy, genetics and ecology. Greater consistency between biodiversity legislation, protected area management objectives and wild dog management policies would improve transparency, reduce conflicting management outcomes and support evidence-based conservation of dingo populations in New South Wales. More broadly, Banks (2021) argued that conservation policy should recognise dingoes as native because they have undergone extensive eco-evolutionary integration within Australian ecosystems, rather than defining native status solely according to historical origin or human-assisted introduction. This perspective is supported by behavioural evidence demonstrating that mainland bandicoots avoid domestic dogs, whereas Tasmanian bandicoots, which have never coexisted with dingoes, show no avoidance of either dogs or cats. These contrasting responses suggest that prolonged coexistence with dingoes has enabled Australian prey species to evolve appropriate antipredator behaviours (Frank et al. 2016), consistent with the view that dingoes have become ecologically integrated native apex predators. Together, this evidence provides a strong scientific rationale for recognising dingoes as native within protected area management and biodiversity conservation policy.

9. Threats to dingo conservation *(Terms of Reference 1(a), 1(c), 1(g))*

Contemporary evidence indicates that the principal threats to dingoes are habitat fragmentation, population isolation, loss of genetic diversity, intensive lethal control and ongoing habitat degradation. These threats are not independent but interact to reduce population size, restrict gene flow and increase the vulnerability of isolated populations to demographic and genetic decline.

Historically, hybridisation with domestic dogs has often been considered the primary threat to dingo conservation. However, recent genomic studies suggest that the conservation challenges facing dingoes are more complex. While domestic dog introgression occurs in some regions, particularly south-eastern Australia, continent-wide genetic surveys indicate that feral domestic dogs remain rare and that most free-ranging canids retain predominantly dingo ancestry (Cairns et al. 2020; Cairns et al. 2022). Recent whole-genome analyses further indicate that dingoes continue to maintain their evolutionary distinctiveness despite varying levels of admixture among populations (Scarsbrook et al. 2025; Weeks et al. 2025). Consequently, contemporary conservation concerns extend beyond hybridisation alone and

increasingly focus on the maintenance of genetic diversity, connectivity and long-term population viability.

Of particular concern are isolated populations exhibiting reduced genetic diversity and evidence of inbreeding. Both Weeks et al. (2025) and Scarsbrook et al. (2025) identified the maintenance of large, connected populations as a key requirement for preserving evolutionary potential and reducing the risks associated with genetic erosion. Fragmentation of habitat and disruption of population connectivity may therefore pose substantial long-term risks to the adaptive capacity and persistence of dingo populations.

Ancient and contemporary genomic analyses further highlight the conservation importance of maintaining regional population structure. Ravishankar et al. (2026) demonstrated that south-eastern populations exhibit reduced ancestral dingo genetic diversity and that regions of low connectivity are associated with reduced genetic variation. Similarly, Souilmi et al. (2024) showed that major dingo population divisions have persisted for at least two millennia, indicating that contemporary populations represent long-standing evolutionary lineages. Together, these findings suggest that habitat fragmentation and population isolation may erode evolutionary potential and, in some cases, result in the loss of unique evolutionary history.

Intensive lethal control may further exacerbate these threats by reducing population size, disrupting social organisation and limiting opportunities for gene flow among populations. Recent population viability modelling demonstrated that increasing the frequency and intensity of lethal control can substantially reduce the probability of long-term population persistence, particularly where management removes breeding adults or disrupts established social groups (Henderson et al. 2025). Such impacts may be especially important in small or isolated populations already experiencing reduced genetic diversity.

In protected areas, intensive population control also has the potential to diminish the ecological functions performed by dingoes as apex predators, including mesopredator suppression, herbivore regulation and broader ecosystem processes. Consequently, management actions that reduce dingo abundance should be carefully evaluated in relation to their ecological, genetic and demographic consequences.

Management should therefore focus on maintaining ecological connectivity, preserving genetic diversity, supporting naturally functioning populations and ensuring the long-term viability of dingo populations across their range. Conservation strategies that promote population resilience, ecological function and evolutionary potential are likely to provide greater long-term benefits than approaches focused solely on ancestry thresholds or genetic purity.

Conclusion

Contemporary scientific evidence demonstrates that dingoes are a distinct evolutionary lineage that fulfils important ecological functions and possesses substantial cultural significance for Aboriginal peoples across Australia. As Australia's largest terrestrial predator, dingoes contribute to ecosystem function through their influence on herbivores, mesopredators and broader ecological processes, thereby helping to maintain ecologically functional and resilient landscapes.

Although scientific debate remains regarding the extent and conservation significance of admixture with domestic dogs, contemporary genomic studies consistently demonstrate that

dingoes retain their evolutionary distinctiveness and comprise multiple genetically structured populations across Australia. The strongest available evidence indicates that habitat fragmentation, population isolation, loss of genetic diversity and intensive lethal control represent the principal challenges to the long-term persistence, ecological function and evolutionary potential of dingo populations.

The Inquiry provides an important opportunity to ensure that dingo management in New South Wales reflects contemporary scientific understanding and the primary conservation objectives of the protected area estate. Management should be evidence-based, proportionate and recognise the ecological, evolutionary and cultural importance of dingoes, while balancing legitimate concerns relating to livestock protection where they arise.

The Inquiry should support Indigenous-led conservation initiatives, co-management arrangements, Indigenous ranger programs and the incorporation of Traditional Ecological Knowledge into dingo conservation and management. Consistent with the recommendations of Aboriginal authors and Traditional Custodians, consultation regarding dingo management should occur at the local level and recognise the diversity of cultural relationships, responsibilities and knowledge systems associated with dingoes across New South Wales.

By aligning legislation, policy and management with contemporary ecological, genomic and cultural evidence, the NSW Government has an opportunity to strengthen biodiversity conservation, improve transparency and support the long-term persistence of ecologically functional, genetically diverse and culturally significant dingo populations within New South Wales.

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