

**Submission
No 297**

INQUIRY INTO DINGOES IN NATIONAL PARKS IN NEW SOUTH WALES

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NSW Government Inquiry into Dingoes in National Parks -submission

I welcome the opportunity to provide my submission to the Inquiry as set out below. I was an employee of the NSW National Parks and Wildlife Service for over 35 years, having retired recently. For most of this time I was employed as an operational manager responsible for national parks and other conservation reserves, working in different parts of the state. I have two science bachelor degrees and extensive experience in the management of conservation and pest management programs.

1) That the Animal Welfare Committee inquire into and report on the treatment and the cultural and ecological significance of dingoes in national parks in New South Wales, and in particular:

a) The genetic status of dingoes, the distinction between dingoes and dogs and recent research into the genetic profile of NSW dingoes

Under the federal Environmental Protection Biodiversity Conservation (EPBC) Act 1999 the dingo is a native animal, having been present on the Australian continent for thousands of years BP, well before the 1400 AD threshold, which defines a native animal under that Act. Under the proposed “Nature Positive” legislation reforms to the EPBC Act passed in 2025, there is no indication this definition will change.

Recent research on dingo genetics by Cairns et al 2023¹ used SNP whole genome testing techniques which far surpass the accuracy of previous genetic work on dingoes. This research demonstrates the genetic characteristics and differentiation of dingoes within the Australia-wide dingo population and between dingoes and domestic dogs. Despite almost 250 years since the introduction of the domestic dog in Australia, Cairns et al’s research shows dingoes to be genetically pure across most of Australia and share only a minor amount of domestic dog genes within the south-eastern Australian population, which includes NSW. Even within the NSW dingo population, there is minimal historic domestic dog hybridisation, certainly not sufficient to warrant widespread culling to protect dingo genetic integrity. The fundamental conclusion of this research is that dingoes have largely retained genetic integrity from domestic dogs.

Contrary to popular belief, Cairns et al found pelage (coat colour) is not a guide to the degree of hybridisation with domestic dogs and that pelage variation is a natural occurrence within pure dingoes.

Whilst there remains debate on whether the dingo is a distinct species, there are key characteristics which support this distinction, including genetics, behaviour, including a complex pack structure, highly developed hunting skills, an annual breeding cycle, and morphological features, including skull proportions. Banks 2021² presents a strong argument for recognising the dingo as a native species based on eco-evolutionary analysis. Banks argues the dingo has evolved separately and is distinct from its ancient ancestor, other native species respond to the dingo as a dangerous predator, and the dingo does not have an exaggerated predator impact, benchmarking with other native predators. My view is that the dingo should be regarded as a native animal and a distinct species for the purpose of ensuring its conservation across Australia.

The widespread use of the term “wild dog” has developed over many decades, under the mistaken belief that the native dingo was at risk of being “hybridised to extinction.” Cairns et al’s work has proved this not to be the case. NSW government land management departments and the agribusiness industry use the term “wild dog” to acknowledge hybridisation, but in doing so it has also assigned a lesser value to the native dingo and to justify its routine and widespread killing as a “worthless” hybrid dog. I have witnessed endless debates over the colour of a dingo’s coat defining their genetic purity, which, based on Cairns et al’s work, now proves to be totally misinformed. The NSW government should lead the process of removing the term “wild dog” from the vocabulary of government and only use “dingo”, in recognition of the intact genetic continuity of the dingo as a native animal of Australia. Whilst hybridisation of the dingo is a risk, the ongoing widespread large-scale lethal control programs undertaken by government departments, including NPWS, which continually disrupts dingo pack structure across NSW, is the most significant act which can lead to further hybridisation with domestic dogs.

a) Key points

- The dingo is a native Australian animal which meets an eco-evolutionary definition of being a distinct native species.
- Recent genetic analysis confirms most wild dogs in Australia are not hybrids and are genetically pure dingoes.
- Ongoing, widespread, large-scale lethal control programs present the most significant risk to further hybridisation within dingo populations.

a) Recommendations

- The dingo should be recognised under NSW legislation as a distinct native species to better support its conservation in NSW.
- The NSW government should remove the term “wild dog” from its vocabulary and replace it with “dingo”, in recognition of recent genetic findings on the dingo.
- To protect the genetic integrity of dingoes, widespread, large-scale lethal control programs that disrupt dingo pack structures should cease.

b) The legislative, regulatory and policy frameworks governing the management of dingoes in New South Wales in national parks

NSW legislation relevant to the management of dingoes in NSW national parks includes:

National Parks and Wildlife Act 1974

This Act requires the NPWS to conserve heritage values within its reserves including fauna, flora, natural and cultural heritage, landscapes and ecosystem processes. The Act enables NPWS to undertake works to conserve species and where necessary, undertake pest management activities. In this regard, the dingo can be conserved or controlled, depending on the circumstances and considerations of NPWS reserve managers. It must be noted that

under this legislation, the primary purpose of national parks and nature reserves is to conserve and protect the suite of native species, ecosystems and landscapes that occur within each reserve, including the dingo.

Biosecurity Act 2015

This Act places an obligation on managers of private and public land, including the NPWS, to uphold a general biosecurity duty to undertake control of pests, including on dingoes/wild dogs, where there is a significant biosecurity risk, particularly to livestock.

The Act also requires the preparation of pest management strategies and plans to guide a coordinated multi-agency approach to the management of pest plants and animals. This Act is strongly focussed on the protection of agribusinesses.

Biodiversity Conservation Act 2016

This Act is for the purpose of conserving NSW biodiversity, its ecosystems, and ensuring their resilience into the future, with particular emphasis on threatened species and ecological communities. The Act specifically excludes the dingo as a protected species. The Act provides for the formation of a Scientific Committee whose role is to determine listing of threatened species and ecological communities and threatening processes, which impact biodiversity, including threatened species.

On 31 July 2009, the Scientific Committee listed “Predation and Hybridisation by Feral Dogs (*Canis lupus familiaris*) -key threatening process” under the Threatened Species Conservation Act 1995, now superseded by the Biodiversity Conservation Act 2016. The information which informed this decision is now substantially outdated and an inaccurate interpretation of dingo genetics across Australia, including NSW.

In my view, there should be a review of the “Predation and Hybridisation by Feral Dogs (*Canis lupus familiaris*) -key threatening process”, so that recent scientific research can better inform decisions of land managers concerning management of dingoes in NSW for both conservation and their impact on agribusiness. The predation pressure from “feral dogs” on listed threatened species in this Scientific Determination should also be reviewed, as it appears to be flimsy evidence at best that the main cause of decline of these species is due to dingo predation in NSW. Their decline is more likely the result of fox and cat predation, along with habitat reduction and disturbance. The listing of these species as threatened due to dingo predation is akin to identifying a native predatory bird (e.g. wedgetail eagle -which has been reported to prey on rock wallabies) that has been around for thousands of years, as the cause of decline and subsequent listing of a threatened species (e.g. Yellow-footed rock wallaby -which has also existed for thousands of years), when the main predatory agents threatening extinction are the introduced fox and cat, exacerbated by other competitive pests (all introduced less than 250 years ago).

The Biodiversity Conservation Act 2016 should be amended to include the dingo as a protected native animal, in recognition of its genetic integrity and fundamentally important role over thousands of years as the apex predator in Australian ecosystems. Once listed as protected, there is capacity for legislation to describe areas where the dingo is unprotected to recognise the legitimate need for control in certain areas.

Policies and statutory plans relevant to dingo management in NSW national parks includes:

The NSW Wild Dog Management Strategy 2022-2027

This strategy aims to reduce the negative impacts of dingoes/wild dogs in NSW. The strategy emphasises a cooperative approach across public and private land managers and other community in managing dingoes, primarily through preparation and implementation of area-specific Regional Strategic Pest Animal Management Plans and “Wild Dog Management Plans”. Strategy 1.2.2 in the NSW Strategy identifies control in areas of higher risk of negative impacts, rather than across the entire area of wild dog distribution. It follows that where there are widespread, large -scale lethal control programs and little evidence of significant dingo predation impact on agribusiness or biodiversity, such programs should be discontinued.

Regional Local Land Service pest strategies and LGA specific pest plans

Whilst the NSW Wild Dog Management Strategy 2022-2027 identifies conservation of dingoes as a component of the state-wide strategy, it primarily translates into the lower-level plans as a lethal control plan, with little attention given to non-lethal control or conservation of dingoes. An example of this can be found in the Hunter Regional Strategic Pest Animal Plan (RSPAP) 2024-2028 p32 which states “Due to the wide distribution, control effort is focussed on areas where the negative impact is greatest, known population harbours and dispersal corridors.” This focus on population harbours and dispersal corridors is contrary to the NSW Wild Dog Management Strategy -Strategy 1.2.2. The Hunter RSPAP inappropriately places focus on large tracts of natural land which are often NPWS reserves, as a source of dingoes that should be lethally controlled.

NPWS Wild Dog Policy

The NPWS Wild Dog Policy recognises the potential of dingoes and their hybrids as a threat to agribusiness activities and the obligation on NPWS to undertake control to meet its biosecurity duty under the Biosecurity Act 2015. The policy includes consideration of dingoes and their hybrids to impact on biodiversity, including threatened species. Importantly, the policy also states dingoes and their hybrids should be left to perform their ecological role as an apex predator within NPWS reserves, where there is a low risk of impact on agricultural activities.

In my opinion the current widespread, large-scale, lethal aerial 1080 baiting program targeting foxes and dingoes undertaken by NPWS is inconsistent with the agency’s own Wild Dog Policy.

NPWS Region Pest Management Strategies

NPWS Region Pest Management Strategies (RPMS) identify the priority plant and animal control programs across the NPWS Region, based on management of risk to a variety of assets including threatened species, people and agricultural enterprises. The most recently prepared RPMSs were for the period 2013-2017. Within these strategies the NPWS identified wild dog control as, almost exclusively, a risk to livestock and not to threatened species. Control techniques used included limited aerial 1080 baiting, primarily in areas where sheep farming occurred. However, the main techniques used were ground 1080

baiting and trapping where localised threats to assets, almost exclusively livestock, were to be targeted under a cooperative, ground-based program with other landholders.

More recently, NPWS has prepared a state-wide feral animal management strategy. This strategy places a more rigorous framework around the planning and implementation of pest animal control programs, including the need to monitor effectiveness and adapt programs to achieve objectives. In my view, the strategy brings into question the need to justify continuing the state-wide lethal 1080 aerial baiting program of dingoes and foxes conducted by NPWS. As there is observational evidence that dingoes suppress mesopredators and they are not recognised as causing a significant threat to native species extinction, NPWS should be using its best efforts to retain viable populations of dingoes within its reserves. In turn, this will help suppress fox and cat numbers within these reserves.

Individual NPWS reserve Plans of Management

Individual reserve Plans of Management are statutory plans adopted by the Minister for Environment which describe the values of a NPWS reserve, the risk to these values and the management actions NPWS intends to implement to protect the values. These plans usually include a section on plant and animal pest control and include dingo/wild dog control, where there is evidence of impact on assets. Almost always, the assets identified to be at risk from dingoes are livestock on neighbouring lands and the response proposed by NPWS is to participate in strategic or reactive lethal cooperative control programs undertaken by private landholders and public land managers. These have historically been small-scale ground-based programs focussed in areas where stock impacts have been known to occur.

b) Key points

- Under legislation, NPWS has a duty to conserve and protect the dingo on NPWS estate and to control dingoes where they present a significant biosecurity risk.
- The Biodiversity Conservation Act 2016 specific excludes protection of the dingo as a native animal.
- Based on recent genetic research on the dingo, the 31 July 2009 Scientific Committee listed key threatening process “Predation and Hybridisation by Feral Dogs (*Canis lupus familiaris*)-key threatening process” is outdated, and predation pressure from “feral dogs” is a weak argument as a key threatening process on listed threatened species.
- The NSW Wild Dog Strategy 2022-2027 identifies control in areas of higher risk of negative impacts, rather than across the entire area of wild dog distribution.
- The NPWS Wild Dog Policy recognises its biosecurity duty and obligation to allow dingoes and their hybrids to perform their ecological role as an apex predator within NPWS reserves where there is a low risk of impact on agricultural activities.
- Lower-level Regional and local LLS plans are principally wild dog lethal control plans, with little attention given to non-lethal control or conservation of dingoes.

- NPWS pest management strategies and reserve plans of management have acknowledged a biosecurity duty to undertake cooperative ground-based wild dog control programs where required to protect livestock.

b) Recommendations

- Under legislation NPWS must continue to balance its legislative obligations to conserve and protect dingoes on NPWS estate while managing biosecurity risk to assets where it is high.
- The 31 July 2009 Scientific Committee listed Determination “Predation and Hybridisation by Feral Dogs (*Canis lupus familiaris*) -key threatening process” should be reviewed, in light of recent research.

c) The ecological role of dingoes in national parks

Dingoes are widely recognised as the apex predator on the Australian mainland and have performed this role since their introduction some millennia ago. There is a large body of scientific information on the role of apex predators in global ecosystems. Their fundamental role is to maintain the health of ecosystems through population regulation of lower order species, which in turn regulates species fitness and ecosystem balance. The reintroduction of the grey wolf in the Yellowstone region in USA is an example of the trophic cascade benefits which flow from an apex predator. When reintroduced, the wolf population had a suppressive effect on the over-abundance of large herbivores such as elk, which led to a more diverse and healthy vegetation community, particularly benefitting waterways and increasing biodiversity.

Maintaining the ecological role of the dingo on NPWS estate is essential to ensure the health of ecosystems and this is recognised in the NPWS Wild Dog Policy. The ecological role of dingoes is independent of their genetic status, that is, their functional role is the same in areas where hybridisation has historically occurred, compared to areas where there is no genetic evidence of hybridisation.

Research on the diet of dingoes shows their primary diet overwhelmingly consists of macropods (kangaroos and wallabies), although, like most predators, they will consume a wide variety of native animals and even plants. Through their primary diet preference, dingoes can help reduce grazing pressure on farmland caused by an over-abundance of macropods and feral animals such as goats and deer.

Within Australia there is very little documented evidence that dingoes have been directly responsible for causing a serious population decline in any threatened species. Very few species recovery plans in Australia explicitly recommend any form of dingo control. The principal predatory agents of population decline listed in these recovery plans are foxes and feral cats. In instances where dingo control is recommended, there has been very limited evidence presented that a dingo has preyed on a threatened species within a localised small population. Often the certainty of dingo predation has been of low confidence and more led by inference.

Reproductive behaviour of dingoes is distinct from the domestic dog, in that they breed once annually. Ecologists report that dingo numbers are controlled by the alpha male/female pair within packs, with alpha females usually the only animals within a pack to breed. I have witnessed inter- pack killing behaviour by dingoes, which serves to regulate the population. If pack structure is disrupted, more females may breed.

Widespread indiscriminate dingo culling through lethal baiting programs serves to disrupt stable pack structures, leading to a potential loss of inter and intra -pack population control, a greater risk of hybridisation with domestic dogs and potential increase in livestock predation.

Prior to the initiation of the NPWS state-wide aerial 1080 baiting program in 2020, lethal control of dingoes/wild dogs on NPWS managed land was much more targeted and usually part of smaller, cooperative, ground-based strategic or reactive programs, where livestock impacts were reported to occur. In this regard, impact on the dingo's ecological role from lethal control activities was more localised rather than widespread across NPWS reserves.

c) Key points

- Dingoes have performed the role of apex predator in Australia for millennia.
- Apex predators regulate lower- order species populations and maintain ecosystem balance.
- Maintaining the ecological role of the dingo on NPWS estate is essential to ensure the health of ecosystems.
- The principal predatory agents of population decline listed in threatened species recovery plans are foxes and feral cats, not dingoes.
- Dingo numbers are controlled within packs by the alpha male/female pair, with alpha females usually the only animals to breed, and inter and intra -pack killing a form of population control.
- Widespread indiscriminate dingo culling disrupts stable pack structures, resulting in a greater risk of hybridisation and potential increase in livestock predation.
- Prior to commencement of the NPWS state- wide aerial 1080 baiting program, lethal control programs on NPWS estate were smaller scale, on-ground and targeted in response to stock loss reports, reducing impact on the dingo's ecological role in NPWS reserves.

c) Recommendations

- NPWS must maintain the ecological role of the dingo within NPWS estate, independent of their genetic status, to ensure the health of ecosystems, consistent with the NPWS Wild Dog Policy.

- To reduce impact on the dingo's ecological role, NPWS lethal dingo control programs should, wherever possible, be limited to small- scale, cooperative on-ground programs, targeted near reported stock losses.

d) The cultural significance of dingoes for First Nations communities

In my work as a NPWS manager over 30 years, I became aware of the high cultural importance of the dingo to First Nations communities in various parts of NSW. First Nations people in my management area actively sought to participate in dingo conservation programs and undertook repatriation ceremonies to place deceased dingoes “back on country.” It should be expected by this Inquiry Committee that the vast majority of First Nations people who regard the dingo to be culturally significant will not provide a submission to this Inquiry. However, there is ample evidence across Australia of the significant cultural importance of the dingo to First Nations people. This is evident from recent historical accounts, ancient art sites, archaeological records and dreamtime stories. NSW government agencies, including NPWS, should seek to better understand and incorporate the First Nations community's cultural perspective on the dingo into their dingo management activities.

d) Key points

- First Nations communities place high cultural importance on the dingo.

d) Recommendations

- NPWS and other NSW government agencies should seek to understand and accommodate First Nations community's cultural perspective on the dingo into their dingo management activities.

e) The impact of current government policies and programs for the management of dingoes in national parks

Historically, livestock farmers and rural industry government departments alike have largely adopted a zero-tolerance approach to dingoes in NSW and indeed, across Australia. Despite this policy approach and the significant annual cost of dingo control, little benefit can be shown from attempts to control predation by dingoes on livestock. It should be noted that stock loss is minimal, compared to total livestock held. Dingoes still occur over much of Australia, including either side of the dingo fence.

Victoria is the only state or territory in Australia that publishes government- verified data on livestock killed or maimed by dingoes. The verification is based upon reported stock incidents confirmed through contact with landholders by government DEECA officers. Although it is considered an incomplete census as it relies on incidents being reported, it is the most rigorous in Australia and can be used as an indicator of the extent of impact on stock from dingo attacks. Australian Bureau of Statistics estimated that Victoria had 16-17 million sheep and 4.17 million cattle in June 2024. During 2023-2024, government records show 1,619 livestock were killed or maimed by dingoes in Victoria. This amounts to 0.008%

of the total livestock in Victoria killed or maimed in 2023-24. Using the figures for 2024-2025 in Victoria, there were an estimated 20.2 million sheep and cattle. 2,734 livestock were verified by government as killed or maimed by dingoes in 2024-25. This represents 0.014% of the total livestock held by Victoria in that year. Although these are negligible percentages, it should be acknowledged there could be localised heavier impacts in some areas, particularly on sheep, which are more commonly attacked. Based upon the cost of lethal dingo control programs, this tiny proportion of stock loss does not reflect good value for money.

There is no verified NSW government data recording the number of livestock killed annually in NSW. Although there is acknowledgement by NSW DPI and LLS that livestock, particularly sheep and to a far lesser extent other small stock e.g. calves, goats and alpacas are killed or maimed by dingoes, no official data is kept and collated. There is, however, data collected on the metrics of wild dog control programs, such as kilometres of aerial baits laid or estimated number of wild dogs killed in programs. This control effort metric provides no evidence of the effectiveness of the lethal control programs in terms of conservation or agricultural outcomes.

Clearly the scale of impact on livestock from dingo attacks is minimal, and unlikely to represent a significant economic loss, except in rare cases. Yet there is pressure on NPWS from some landholders and LLS officers to undertake ongoing annual or biannual lethal dingo control programs, based upon very minimal stock impacts or sometimes based merely on sightings of dingoes. Over my time with NPWS, many small-scale strategic and reactive ground-based programs were conducted by NPWS staff in my management area, as part of a cooperative effort with adjoining landholders and other government land managers. Success was generally measured by number of baits taken or dingoes trapped/shot. At times, the momentum for running such programs was driven by sightings and sounds of dingoes, rather than actual stock loss records. I am aware of some farming areas where the biannual dingo control effort was so continuous that kangaroo numbers increased to such an extent that they were negatively impacting on grazing pastures on farms. In this instance the dingo control programs were being conducted as strategic population reduction programs, not in response to significant stock attacks, but sightings and sounds of dingoes.

The NPWS state-wide aerial 1080 baiting program was initiated by NPWS in 2020 to coincide with the introduction of the National Bushfire Recovery federal funding program as a conservation response to the extensive impact on native species from the 2019-2020 bushfires. It has remained a continuing biannual departmental state-wide program to this day. NPWS staff must meet a prescribed quota of a state-wide, specific kilometre total (roughly 30,000km) of bait lines at a density of 10 baits (target foxes) or 40 baits (target wild dogs) per kilometre. The sheer scale of this quota means that most NPWS reserves in rural areas are currently being aerially baited twice annually. Bait lines across NPWS reserves are flown to ensure thorough coverage of each reserve being baited.

I understand that currently in the Hunter LLS area, justification for conducting NPWS aerial baiting programs is based upon records where on-ground or aerial 1080 baiting wild dog control programs have previously occurred, including records where a dingo has been killed. An extremely coarse-scale dingo density map, which is based upon various publicly

unverified DPI -sourced information, is also used to justify the need for aerial baiting a NPWS reserve. Verified information from LLS on actual stock losses attributed to dingo attacks is not provided to NPWS as a basis for deciding on the need for large-scale aerial lethal control. Therefore, the driver for continuation of these programs is primarily based on previous control effort, including estimates of number of dingoes killed. It is not a direct, targeted response to stock losses.

The large-scale aerial 1080 baiting program currently undertaken by NPWS is contrary to the department's own Wild Dog Policy, in that this practice is killing dingoes in NPWS reserves where there is negligible to no impact on livestock. To my knowledge, there has been no credible scientific evidence presented by NPWS to date that the biannual aerial 1080 baiting program being conducted by NPWS is having any benefit to the conservation of native species within NPWS reserves. Indeed, there is a greater likelihood that the loss of dingoes and disruption of stable dingo packs arising from this baiting program is placing native species under greater threat from increased predation from foxes and cats.

There is growing observational scientific evidence that the presence of dingoes has a suppressive effect on mesopredators, including foxes and cats. The presence of foxes and cats in NPWS reserves will have a direct negative impact on critical weight range fauna, many of which are listed as a threatened species in NSW. These species are threatened primarily because of the Key Threatening Processes of fox and cat predation.

Non-selective dingo destruction from lethal baiting programs may also impact pack behaviour and result in a loss of hunting skills, leading to greater predation on agricultural stock.

e) Key points

- Livestock farmers and rural industry government departments alike in NSW have largely adopted a zero-tolerance approach to dingoes.
- There is no verified NSW government data kept on the total number of livestock killed by dingoes.
- Although there is data kept in NSW on lethal dingo control effort there is no evidence of their effectiveness in terms of conservation or agricultural outcomes.
- Recent data from Victoria shows a very low (far less than 1%) impact of stock losses from dingo attacks, against total stock held.
- There is pressure on NPWS from the rural industry to undertake ongoing annual or biannual lethal dingo control programs, based upon very minimal stock impacts or sometimes based merely on sightings of dingoes.
- The NPWS state-wide aerial 1080 baiting program commenced in 2020 and remains a continuing biannual state-wide program, despite no credible evidence that it benefits native species conservation within NPWS reserves.

- The NPWS state-wide aerial 1080 baiting program has an annual quota of approximately 30,000km, meaning most NPWS reserves in rural areas are being baited biannually.
- The NPWS state-wide aerial 1080 baiting program is contrary to the department's own Wild Dog Policy, in that this practice is killing dingoes in NPWS reserves where there is negligible to no impact on livestock.
- Previous wild dog control effort, estimates of dingoes killed, and a very coarse, unverified dingo density map, rather than a direct, targeted response to stock losses, is the basis for continuing NPWS broad-scale aerial 1080 baiting of dingoes in NPWS reserves in the Hunter LLS area.
- There is growing observational scientific evidence that the presence of dingoes has a suppressive effect on mesopredators, including foxes and cats.

e) Recommendations

- NSW government officers should verify information on stock loss from dingoes to use in determining an appropriate cooperative response in areas where the risk of further stock losses is high.
- NPWS should discontinue its large-scale 1080 biannual aerial baiting program because it is not consistent with its Wild Dog Policy concerning management of biosecurity risk on livestock, there is a lack of credible evidence of its conservation benefits and there is observational evidence that dingoes suppress numbers of foxes and cats.

f) Dingo management including opportunities for incorporation of indigenous knowledge and leadership in dingo conservation in national parks

NPWS should more faithfully comply with its Wild Dog policy within its NPWS reserves. This requires the cessation of widespread, large-scale lethal 1080 aerial baiting programs within its reserves, to enable dingoes to perform their role of apex predator without removal of individual animals and disruption to pack structure. NPWS should continue to participate in targeted, cooperative lethal dingo control programs with adjoining landholders, but such programs should be based upon verified stock impacts, collated and verified by LLS, and not based on sightings or sounds of dingoes in the vicinity. Regular, strategic cooperative lethal control programs should only be done where verified, ongoing stock losses occur. The best approach would be to identify the offending animal(s) from camera trapping and target their removal in a reactive program.

NPWS needs to undertake research and collect data to publicly demonstrate the benefits of dingoes to ecosystems. This relates to presence/ absence and density of foxes and cats and presence/ absence and density of a range of threatened and protected species, where stable dingo populations exist, compared to areas where dingoes are heavily targeted for lethal control or absent.

The Myall Lakes Dingo Project undertaken by the University of NSW Centre for Ecosystem Science and Taronga Conservation Society is a collaborative project with NPWS and MidCoast Council. I was the NPWS manager who helped initiate this research project and its collaboration with land managers. The research aims to inform evidence-based management by studying dingo social ecology and dynamics in a relatively stable population of genetically pure dingoes and their coexistence with people within the reserve and land surrounding local townships, along with other species in the ecosystem. It also aims to develop and test potential wildlife management tools and strategies including non-lethal control actions and community education, that support coexistence with dingoes. One benefit from this research includes the ability to target control of individual problem dingoes, rather than apply indiscriminate control. The research has demonstrated that dingoes are coexisting with a significant population of critical weight range native wildlife, including threatened species. Foxes are very rare, and an occurrence of an inferred killing of a red fox by dingoes has been recorded in Myall Lakes National Park by the researchers. Inter-pack killing by alpha dingoes has also been recorded, resulting in a reduction of dingoes in the study area. The Myall Lakes Dingo Project should continue as an ongoing program as it produces invaluable information for land managers to support their decision-making concerning dingo conservation and risk management.

The NPWS EcoHealth program underway in NPWS national parks and reserves is an excellent tool for data capture and analysis concerning dingoes and understanding their benefits to ecosystems. The EcoHealth program in Myall Lakes National Park will provide park managers further information on populations of critical weight range native fauna and introduced predators, including foxes and cats. EcoHealth data will establish a baseline on these and other native species and enable ongoing monitoring to better inform conservation management decisions. This program should be expanded and continue to support evidence-based conservation management on NPWS estate in NSW.

NPWS should seek to understand the cultural importance of dingoes to First Nations people to better shape its policy and programs. NPWS should invite involvement of First Nations people into their dingo management policy decisions, program development and where possible, on-ground involvement in management activities. This could range from dingo data capture through camera trapping, scat collection, genetic analysis and threatened species monitoring.

Where desired, First Nations peoples should be given opportunities to express their cultural relationship with dingoes. This may include gaining an understanding of the local dingo population, genetics and land management issues, through to participation in on-ground research programs and conducting on-country repatriation ceremonies.

f) Key points

- NPWS needs to undertake research and collect data to publicly demonstrate the benefits of dingoes to ecosystems through presence/ absence and density studies of predators and threatened and protected native prey species.
- The Myall Lakes Dingo Project informs evidence-based dingo conservation and risk management by studying dingo social ecology and dynamics in a relatively stable

population of genetically pure dingoes and their coexistence with people, along with other species in the ecosystem, including threatened species.

- The EcoHealth program underway in NPWS national parks and reserves is an excellent tool for data capture and analysis concerning dingoes and understanding their benefits to ecosystems.

f) Recommendations

- NPWS should more faithfully comply with its Wild Dog policy within NPWS reserves.
- NPWS should cease its widespread, large-scale lethal 1080 aerial baiting program within its reserves, to enable dingoes to perform their role of apex predator.
- NPWS should continue to participate in targeted, cooperative lethal dingo control programs with adjoining landholders, based upon verified stock impacts, collated and verified by LLS.
- The Myall Lakes Dingo Project should continue, as it produces invaluable information to support land manager's decision-making concerning dingo conservation and risk management.
- The EcoHealth program should be expanded and continue to support evidence-based conservation management on NPWS estate.
- NPWS should seek to understand the cultural importance of dingoes to First Nations people to better shape its policy and programs.
- First Nations peoples should be given opportunities to express their cultural relationship with dingoes through NPWS dingo management policy decisions, program development and on-ground management activities.

g) Any other related matters

The NSW government should actively lead and support the introduction and significant expansion throughout the livestock industry of non-lethal methods of livestock protection from dingo predation. These include use of guardian animals and exclusion fencing.

Guardian animals including dogs, donkeys and camelids have been used in Europe, Asia and the Americas for centuries to protect livestock from canid predators. There is a clear opportunity for LLS/DPI to promote and lead the training and use of guardian animals by farmers in NSW as a "first response" non-lethal means of dingo control. Although promotion of their use is included in LLS Regional Pest Animal Plans, it is not widely promoted by government.

Government should actively support research and development of new dingo control technology, including olfactory and auditory deterrents. Government agencies including

NPWS and DPI/ LLS should promote the benefit to the natural environment from dingoes as apex predators, not just on NPWS estate.

Historically, government policy in NSW concerning dingo management has treated the dingo as a pest to be lethally controlled and has placed little value on their existence. This policy has been enshrined in legislation and the dingo has been excluded from protection as a native animal. Prior to adoption of the Biosecurity Act 2015, the previous NSW Local Land Services Act 2013 Wild Dog Pest Control Order (PCO) 2015 identified Schedule 1 and 2 lands across NSW in relation to wild dog control. Under the PCO, Schedule 2 lands, consisting of public land including NPWS and State Forest managed land, offered greater conservation protection for dingoes. Schedule 1 land consisted of all other lands, where wild dogs had to be continuously reported and suppressed. It appears that dingoes have less certainty of conservation under the current Biosecurity Act 2015 than they were afforded under the previous Act and PCO. Now, their conservation is more heavily influenced by the content of Regional Strategic Pest Animal Plans and subsequent LGA specific plans. However, despite many decades of lethal control effort, the dingo persists across much of its historic range and attacks on stock remain minimal.

The NSW government should include the dingo as a protected native animal under the Biodiversity Conservation Act 2016. This would recognise its status as a native animal, a distinct species and a critical apex predator in Australian ecosystems. A mechanism under appropriate state legislation (similar to Victoria) to enable lethal control of dingoes only within close proximity to NPWS reserve boundaries would ensure better protection of dingoes within the majority of its reserves.

g) Key points

- There is an opportunity for LLS/DPI to promote and lead the training and use of guardian animals by farmers in NSW as a non-lethal, first response means of dingo control.
- Historically, government policy in NSW concerning dingo management has treated the dingo as a pest to be lethally controlled and has placed little value on them.
- Despite many decades of lethal control effort, the dingo persists across much of its historic range and attacks on stock remain minimal.
- Listing the dingo as a protected native animal under the Biodiversity Conservation Act 2016 would recognise its status as a native animal, a distinct species and a critical apex predator in Australian ecosystems.
- A mechanism under state legislation to enable lethal control of dingoes only within close proximity to NPWS reserve boundaries would ensure protection of dingoes within the majority of its reserves.

g) Recommendations

- The NSW government should actively lead and support the introduction and significant expansion throughout the livestock industry of non-lethal methods of livestock protection from dingo predation.
- LLS/DPI should more actively promote and lead the training and use of guardian animals by farmers in NSW as a non-lethal, first response means of dingo control.
- The NSW government should list the dingo as a protected native animal under the Biodiversity Conservation Act 2016, in recognition of its role as a critical apex predator in Australian ecosystems.

References

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