

Submission
No 246

**INQUIRY INTO HEALTH AND WELLBEING OF
KANGAROOS AND OTHER MACROPODS IN NEW SOUTH
WALES**

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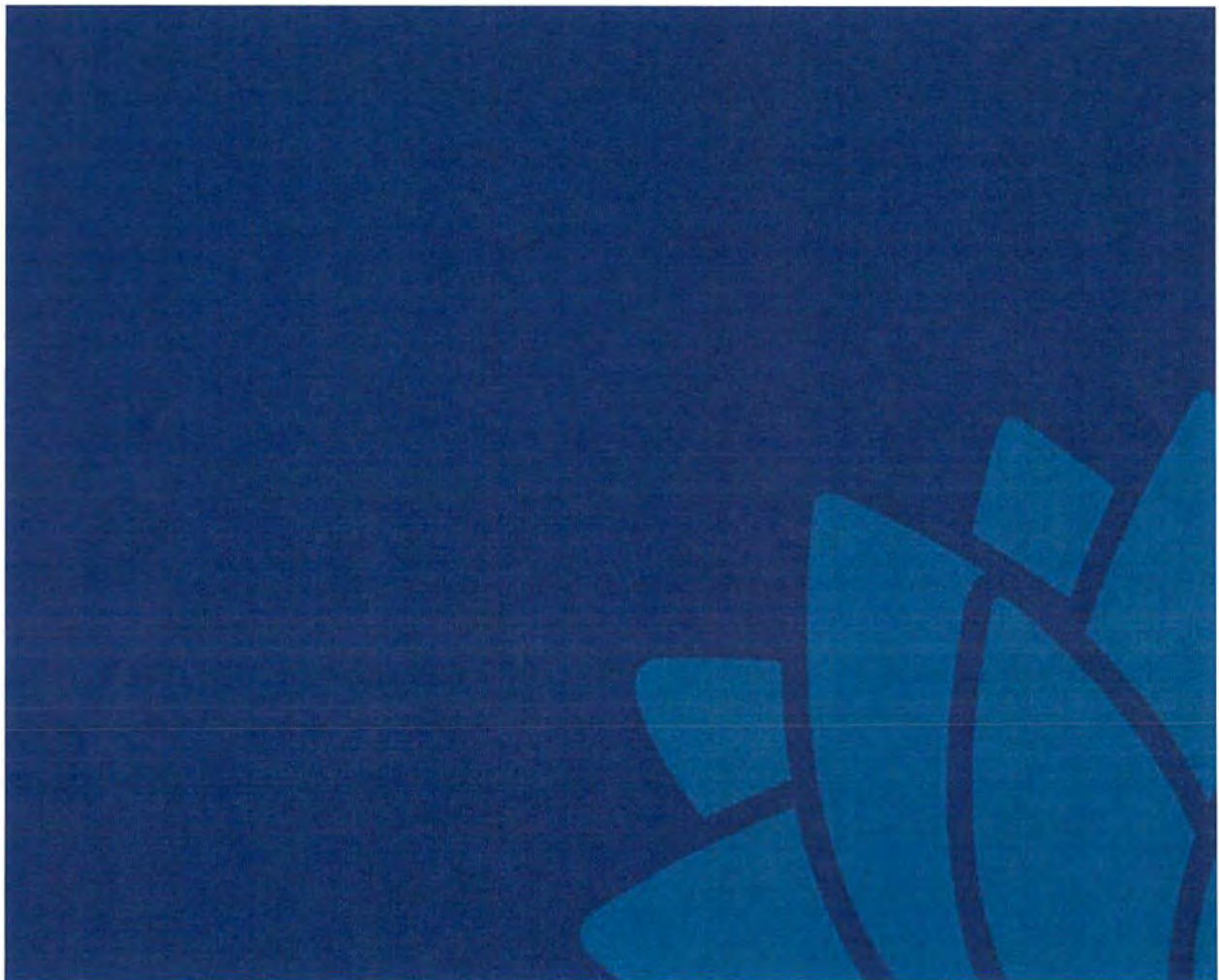


PORTFOLIO COMMITTEE NO.7 – PLANNING AND ENVIRONMENT

NSW Government Submission

Inquiry into the health and wellbeing of kangaroos and other macropods in New South Wales

April 2021



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Response to the Portfolio Committee Terms of Reference

- (a) Historical and long-term health and wellbeing indicators of kangaroos, and other macropods, at the local, bioregional and state levels, including the risk of localised extinction in New South Wales

Historical health and wellbeing indicators of kangaroos

Kangaroo populations are dynamic and affected by a range of factors including climate variability. Availability of water and food sources are primary drivers of kangaroo mortality (Hacker et al. 2004), with droughts a clear cause of population decline historically (Caughley et al. 1985; Robertson 1986; Pople 1996). Flooding has also been found to affect the short-term distribution and abundance of kangaroos, as it is associated with occasional localised or widespread viral diseases that may cause populations to decline (Clancy et al. 1990; Hale 2004).

There is broad agreement that kangaroo numbers have increased in NSW since European arrival (Frith 1964; Newsome 1975; Shepherd and Caughley 1987). Decreased predation from dingoes (due to increased wild dog control), the proliferation of artificial water sources, and the introduction of modern agriculture are all factors thought to have contributed to this population increase.

Maintaining ecologically viable kangaroo populations

The NSW Government has a statutory obligation under the *Biodiversity Conservation Act 2016* (BC Act) to ensure ecologically viable populations of kangaroos in NSW and works to maintain ecologically viable populations through the commercial kangaroo management program and management of non-commercial culling licences. The commercial program is guided by the *NSW Commercial Kangaroo Harvest Management Plan 2017-2021* (the Harvest Plan), which must demonstrate how harvesting will be managed to ensure it is humane and the population remains ecologically viable.

To ensure the kangaroo populations remain ecologically viable, the Harvest Plan must include conservative annual harvest quotas based on regular population monitoring, and include measures to mitigate, monitor and respond to any environmental impacts of harvest activities. Adaptive management and precautionary principles may be applied to reduce or suspend harvest in some or all harvest zones if necessary, for example in response to lower populations.

The commercial program manages and regulates the commercial harvesting of four species of kangaroo:

- Eastern grey (*Macropus giganteus*)
- Western grey (*Macropus fuliginosus*)
- Red (*Osphranter rufus* formerly known as *Macropus rufus*)
- Wallaroo (*Osphranter robustus* ssp *robustus* formerly known as *Macropus robustus* ssp *robustus*).

Each of these species are monitored annually to maintain reliable population estimates. Kangaroo population estimates and population fluctuations in NSW have been consistently monitored through the commercial program since 1975. As prescribed in the Harvest Plan, annual surveys are used to estimate kangaroo populations and determine conservative quotas for the number of kangaroos available for commercial harvest each year. Surveys are conducted on private land where commercial harvesting occurs.

Commercial quotas are set at a maximum limit of 15% of the population estimates for wallaroos, eastern and western grey kangaroos, and 17% of the red kangaroo population. Low kangaroo populations are further protected by the incorporation of harvest thresholds in the plan. The above percentages are reduced, or the harvest suspended (zero quotas) if the population of a species falls below the relevant thresholds in that zone.

Monitoring data to date has shown that no species included in the commercial kangaroo management program is at risk of extinction. Kangaroo populations in NSW have high genetic diversity, and there is no identified risk of impacts to genetic viability or phenotype alteration due to commercial harvesting (Hale 2001). Similarly, sales of commercial tags to professional harvesters and submission of returns indicate that extant populations are healthy with no apparent risk of extinction. Analysis of data for macropods rehabilitated for disease or parasites between 2014 and 2018 (DPIE 2021) does not indicate any change in kangaroo population health. In addition, post mortem inspections by veterinarians in human consumption meat processing works has not revealed any concerns about kangaroo population health.

Threatened macropod species

The NSW Threatened Species Scientific Committee (TSSC) is established under the BC Act. It is an independent committee of scientists appointed by the NSW Minister for the Environment. The committee is responsible for assessing the risk of extinction of a species in Australia and deciding which species should be listed as threatened in NSW.

The following macropods are listed as threatened under the BC Act:

Vulnerable

- Parma wallaby (*Macropus parma*)
- Red-legged pademelon (*Thylogale stigmatica*)

Endangered

- Black-striped wallaby (*Macropus dorsalis*)
- Brush-tailed rock-wallaby (*Petrogale penicillate*)
- Yellow-footed rock-wallaby (*Petrogale xanthopus*)

Presumed extinct

- Eastern hare-wallaby (*Lagorchestes leporides*)
- Bridled nailtail wallaby (*Onychogalea fraenata*)
- Crescent nailtail wallaby (*Onychogalea lunata*)

Information on these species, including distributions, threats, and conservation actions undertaken through the NSW Government's Saving our Species program, is available on the Department of Planning, Industry and Environment's (DPIE) website.

The TSSC made Final Determinations in 2015 to reject proposals to list the Eastern grey kangaroo (*Macropus giganteus*), Red kangaroo (*Osphranter rufus*), Western grey kangaroo (*Macropus fuliginosus*) and Common wallaroo (*Osphranter robustus*). The final determinations are available on the [DPIE website](#).

- (b) the accuracy with which kangaroo, and other macropod, numbers are calculated when determining population size, and the means by which the health and wellbeing of populations is assessed,

Population monitoring methods and accuracy

In NSW, kangaroo population sizes are estimated using sophisticated statistical methods that are acknowledged in the scientific community as the best available for broad-scale surveys of wildlife abundance (Payne 2008). Reliable population estimates are fundamental to ensuring the ecological viability of kangaroo populations. The NSW Government has been researching and monitoring kangaroos under the commercial program since the 1970s and has made improvements in that time to the design of the surveys, based on developments in the peer reviewed science.

Aerial surveys are integral to the management of many wildlife species for conservation, harvest and pest management. Aerial surveys are usually the most cost-effective method for obtaining broad-scale (i.e. over 100s of square kilometres) estimates of abundance of wildlife. Fixed-wing aircraft have a relatively long-range, allowing good coverage of the extensive rangeland environments in semi-arid and arid Australia where kangaroos are harvested (Caughley & Grigg 1981).

Kangaroo populations on the Western Plains are surveyed annually, with counting along 8,960 km of transects conducted by fixed-wing aircraft. The NSW Tablelands are split into three broad regions, with one region surveyed each year to establish a rolling three-year (triennial) monitoring cycle. Surveys in the Tableland regions involve counting along approximately 1,600 km (with exact distances depending on the zone and a number of other factors) of transects by helicopter. The Northern Tablelands have been surveyed since 2001, the Southeast Tablelands since 2003 and the Central Tablelands since 2008.

It is well recognised that counts of animals from the air along a survey transect are incomplete as some animals are missed. This visibility bias will be influenced by a range of factors including observer, features of the target species (e.g. colour, size, movement), aircraft height and speed, weather, time of day and vegetation type. Considerable effort has gone into standardising and correcting for these effects to ensure density estimates are repeatable and accurate (Pople 2004).

In 2018 the annual survey in the Western Plains region was redesigned to survey monitoring blocks and using the Mark-Recapture Distance Sampling method, with observations of kangaroos recorded by front and rear observers on both sides of the aircraft. These new methods improve the accuracy and reliability of estimates of population size by reducing observation error.

Population health and well-being

Population monitoring data are used as the basis for determining population health. The harvest of kangaroos is monitored regularly throughout their range to identify threats and to enable early identification of abnormal population trends.

The Department of Planning, Industry and Environment (the Department) is responsible for the issuance and management of licences to harvest kangaroos for commercial purposes in NSW. Regarding broader population health, minimum carcass weights are prescribed in licences to ensure that the harvest does not impact on population dynamics. Average carcass weights are monitored to detect any change in population health. This is used as a trigger to suspend harvest in the affected area so that an assessment of population health can be made.

Kangaroos that are processed for human consumption at Tier 2 registered Export Establishments (Commonwealth) are inspected by the Australian Government on-plant regulatory team including veterinarians who supervise post-mortem inspections. The carcass tagging system enables the Department to trace diseased animals to their place of harvest and to contact harvesters if

required. Similarly, harvesters can identify diseased kangaroos both through observation of behaviour in the wild and while dressing carcasses. Kangaroo management program staff work with Wildlife Health Australia to encourage harvesters to report any observed abnormalities.

(c) threats to kangaroo, and other macropod, habitat, including the impact of:

(i) climate change, drought and diversion and depletion of surface water sources,

Impacts on kangaroos from climate change are not well documented, however the most important effects of climate change on the dynamics of kangaroo populations are related to changes that influence the frequency and intensity of drought (Hacker et al. 2004).

Over the coming decades, average annual temperatures in Australia are predicted to increase, and evaporation will increase commensurately. Rainfall variability is predicted to increase, and there is high confidence that winter and spring rainfall will decrease, and the risk of drought will increase. (CSIRO 2021).

Kangaroos are likely to be affected by any reductions in average rainfall, as well as increased variability in rainfall that occurs as a result of climate change (Jonzen et al. 2010). Rainfall affects plant productivity and water availability and is the single most important factor affecting kangaroo populations. Dry climatic conditions can greatly reduce kangaroo numbers (Pople 2003). Kangaroos, however, are well adapted to a dynamic environment and populations have consistently recovered after drought-driven population declines. As such, drought is not considered a threat to the conservation status of kangaroos. The population monitoring associated with the commercial harvesting program has repeatedly found that episodic population 'crashes' do not affect the sustainability of the populations.

The relationship between kangaroo populations and drought is complex. Not only are kangaroos impacted by drought, but high numbers can reduce ground cover (particularly in rangelands), potentially accelerating the onset of drought conditions. Kangaroo numbers increase in response to periods of above average rainfall, contributing significantly to grazing pressure and thereby exacerbating the effects of droughts. This added grazing pressure adversely affects the ecosystems that form kangaroo habitats. This can reduce landscape resilience to drought and ultimately affects the welfare of kangaroos, which may die from starvation during the drought. The increase and subsequent collapse in population size is well documented in herbivore ecology and through annual aerial kangaroo population surveys, often occurring after good environmental conditions change to less favourable conditions.

The proliferation of artificial stock watering points is one of the factors contributing to increased kangaroo abundance in rangeland areas as animals are less constrained by distance from water in seeking forage. However, red kangaroos have highly efficient water metabolism, large home ranges and require infrequent access to water. Eastern and western grey kangaroos are also less water-focused but have smaller home ranges and possibly a greater requirement for shade than daily drinking. Seasonal conditions and available forage are the main drivers for the health and viability of kangaroo populations.

Drought is considered a threat to the viability of two threatened macropod species. The Saving our Species program identifies the following management actions in relation to the threat of drought:

- Yellow-footed rock-wallaby: The yellow-footed rock-wallaby population is threatened by drought and the impacts of drought are further exacerbated by other threats including predation by feral species and competition from feral herbivores. Management actions include controlling feral animals to improve the resilience of the species to drought.

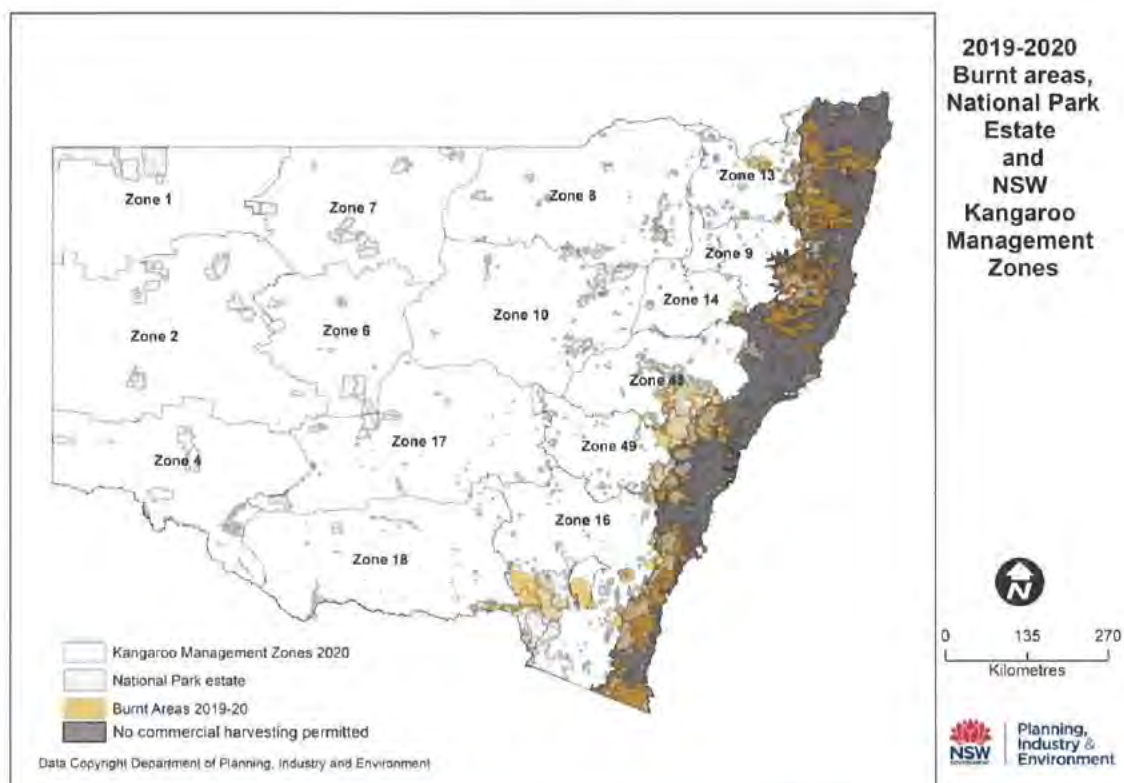
- Brush-tailed rock-wallaby: Drought is a threat for brush-tailed rock-wallabies, and supplementary food and water may be trialled at some sites during periods of food stress caused by severe drought.

Conservation strategies for these species are published on the [DPIE website](#).

(ii) bushfires,

Bushfires during the 2019-20 bushfire season occurred predominantly outside of Kangaroo Management Zones where commercial harvesting occurs. Where Kangaroo Management Zones were impacted by bushfire, the fires mostly occurred in protected areas such as National Parks, and State Forests where commercial harvesting is not permitted (see Map 1).

Tag sales in bushfire affected kangaroo harvest zones were monitored in the aftermath of the fires. Relative to the population size of kangaroos in each fire-affected zone, it was determined that the quantity of tags sold would not impact the viability of populations in fire-affected locations.



Map 1: NSW Kangaroo Management Zones, Burnt Areas and the National Park Estate 2019-2020

Bushfire impacts on threatened macropod species

Fire is considered a critical threat to the viability of several threatened macropod populations. The Saving our Species program identifies the following management actions in relation to the threat of fire:

- Red-legged pademelon: High frequency and intensity fire is a critical threat. Saving our Species is liaising with land managers to encourage avoidance of burning known habitat, and monitoring species response to fire.
- Parma wallaby: High frequency and intense fire are critical threats to the parma wallaby. All priority management areas for the species were significantly burnt in 2019-20 bushfires.

Management involves encouraging land managers to undertake hazard reduction burns in a mosaic pattern that promotes a variety of vegetation structures and to monitor the species response to fire for adaptive management.

- **Brush-tailed rock-wallaby:** Fire regimes that reduce the abundance and diversity of ground foraging resources are a threat for the brush-tailed rock-wallaby. The 2019-20 bushfires impacted heavily on the habitat of the species, leaving few food sources around their rocky habitat. In the aftermath of the fires, supplementary food and water was provided to more than a dozen wallaby colonies across the state. Other management action to protect key habitat during planned and unplanned fire includes fine-scale mapping, preparing long term fire strategies for sites, and annual bush fire risk assessments. Fire events and species' response to fire are monitored.
- **Black-striped wallaby:** The risk of high frequency fires in small reserves is a critical threat to black-striped wallaby with increased pressure to burn in small remnants to control weeds or protect assets. Management involves providing advice to land managers on the species fire regime requirements (e.g. encourage mosaic or patch burning to maintain shelter post-fire).

The conservation strategies for each species are published on the [DPIE website](#).

(iii) land clearing for agriculture, mining and urban development,

Habitat modification due to agriculture

The three largest species of kangaroos have benefited from habitat modification caused by agricultural development, particularly in rangeland regions, where the modification of vegetation communities by clearing for agriculture has favoured the growth of foods preferred by kangaroos such as grasses and forbs (McLeod & Hacker 2019).

Similarly, the proliferation of artificial water points and the control of predation by dingoes and wild dogs has led to an increase in the populations of the larger kangaroo species (McLeod & Hacker 2019).

Impacts of clearing for urban development

The co-occurrence of humans and wildlife in the peri-urban interface can result in both positive and negative human-wildlife interactions.

The main threat to kangaroos from urban development is the loss of habitat and reduced access to resources. However, kangaroos are well suited for surviving within and successfully exploiting the habitat resources within the peri-urban matrix (Coulson 2008). Kangaroos often live on the fringes of urban areas where managed vegetation (such as golf courses, parks and residential lawns) overlap and form ecological corridors with their more natural habitats in National Parks, State Forest or rural grasslands. The combination of managed and natural vegetation provides an ideal habitat mosaic of forage and cover, allowing kangaroos to occur in both grey and green urban spaces.

Additionally, large group sizes of urban kangaroos allow for less investment in vigilance and more time spent on activities such as foraging or mating. These factors have promoted dramatic increases in kangaroo numbers in some urban and peri-urban residential communities, such as the Northern Beaches of Coffs Harbour and Grafton (Coulson, Cripps & Wilson 2014).

Notable key threats to peri-urban kangaroos include:

- *Habitat loss/fragmentation:* Habitat fragmentation as well as the depletion of natural habitats impacts kangaroo gene flow and population numbers.
- *Mortality from road kills:* Increases in human road traffic and larger motorways have increased the potential of kangaroos to be killed or injured in vehicle collisions.

- *Disturbance from dogs:* Dogs and other pets may pose welfare implications to kangaroos. Pet dogs are known to attack and cause stress to kangaroos.
- *Overabundant populations:* Kangaroos in overabundant populations are vulnerable to density-dependent effects such as the prevalence of diseases and reduction in fecundity and body health (Coulson 2007).

Impacts from clearing for mining development

The impacts on kangaroos of clearing for mine development are similar to those of urban development. Development applications undergo stringent environmental assessments and require comprehensive management and mitigation plans. Potential impacts on biodiversity are assessed in detail, with flora and fauna surveys undertaken to identify local plant and animal communities and how the potential impacts of mining can be avoided or minimised.

Mines often establish biodiversity offset sites, where land is set aside near the mine and carefully managed to maintain or restore vegetation and create new habitat for native fauna. As mining is completed, the mined land is rehabilitated and often can be returned to productive land use such as cattle grazing or biodiversity conservation for native plants and animals (NSW Minerals Council 2020).

Impacts of clearing on threatened macropod species

Habitat loss and fragmentation are considered a threat to a number of threatened macropod species. The Saving our Species program identifies the following actions to manage the threat of land clearing:

- **Yellow-footed rock-wallaby:** The yellow-footed rock-wallaby faces uncertain future land management practices, and management involves working to negotiate for the species' protection at properties adjacent to the yellow-footed rock-wallaby site.
- **Red-legged pademelon:** Intensive forestry and broadscale land clearing currently threaten the red-legged pademelon. Management involves working collaboratively to maintain corridor vegetation during logging, and habitat connectivity between reserved areas through covenants with landholders. Revegetation projects are in place to restore habitat following clearing.
- **Parma wallaby:** Loss and fragmentation of habitat through clearing and forestry practices is a critical threat for the parma wallaby. Management involves working collaboratively to maintain corridor vegetation during logging, and habitat connectivity between reserved areas through covenants with landholders that encourage sustainable grazing and fire management.
- **Black-striped wallaby:** Habitat fragmentation through clearing is a critical threat for black-striped wallaby. Management involves working with land holders to protect habitat adjacent to pastoral areas, particularly existing occupied remnants, riparian strips and stepping stones.

The conservation strategies for each species are published on the [DPIE website](#).

(iv) the growing prevalence of exclusion fencing which restricts and disrupts the movement of kangaroos,

Fencing has been widely implemented in NSW since the first half of the 20th century to control livestock and continues to be used in various forms. More recently some landholders have adopted more robust fences referred to as total grazing pressure fences. In addition to controlling livestock these also provide greater control of unmanaged herbivores including goats and kangaroos. Exclusion fencing is a relatively new type of infrastructure that is higher than regular fences, has tighter mesh spacing and often includes an apron to prevent animals (such as introduced pests and unmanaged herbivores) from going over, through or digging under the fence.

Exclusion fencing performs the function of:

- Separating agricultural or pastoral lands from pest animals (for example wild dogs, foxes and feral pigs) and managing grazing pressure from unmanaged herbivores; and
- Separating at-risk wildlife from key threatening processes such as predation by pest animals, and competition from feral herbivores.

More robust fences such as total grazing pressure fences and exclusion fences are an important tool to help land managers control grazing pressure and provide public benefits, including:

- Improved biodiversity outcomes through herbivore control resulting in increased retention of groundcover and improved habitat quality.
- Improvements to other environmental services through better landscape condition
- Improvements to regional socio-economic performance through better pastoral productivity and resilience to drought conditions.
- Improved regional biosecurity through increased capacity to contain emergency disease outbreaks and better control of the spread of potential vectors or other pests (Western LLS 2018).

The importance of fencing as a tool for conservation and improving biodiversity on both public and private lands is well recognised (NESP 2019). The NSW Government's *Reintroduction of Locally Extinct Mammals* project is reintroducing at least 13 mammal species presumed extinct into NSW national parks, including the Bridled nail-tail wallaby. Fenced enclosures provide protection from introduced predators such as feral cats and foxes while intensive and ongoing pest control efforts outside the enclosures will help with longer-term plans to release these mammals into the wider parks.

The NSW Biodiversity Conservation Trust (BCT) acknowledge that fencing is an important tool for managing biodiversity values on private land through protecting native vegetation by excluding or strategically managing livestock or overabundant feral herbivores and kangaroos (BCT 2020). The BCT provide fencing guidelines for their conservation areas. *Essential conservation fencing infrastructure: Guidelines, standards and cost benchmarks*. In addition to fencing guidelines, they provide landholders with guidelines for managing kangaroos. *Managing Overabundant Kangaroo Guidelines: For private land conservation agreements | June 2020*.

(d) current government policies and programs for kangaroo management, including:

(i) the method used for setting quotas for kangaroo culling,

Commercial harvesting

The [NSW Commercial Kangaroo Harvest Management Plan 2017–21: 2021 Quota Report](#) details the current method used for setting quotas for commercial kangaroo harvesting based on

harvesting a proportion of the estimated population. Commercial harvesting quotas account for fluctuations in kangaroo populations.

Non-commercial culling

Non-commercial licences are granted to help landholders manage the impacts of kangaroos while maintaining ecologically viable kangaroo populations. For these licences, maximum cull limits are set according to property size for the four species subject to commercial harvesting (eastern grey, western grey, red and wallaroo) in each kangaroo management zone. These are revised each year using the latest kangaroo population survey data and published on the [DPIE website](#). Applications to harm other macropod species, such as wallabies, are assessed on a case-by-case basis.

When assessing licence applications, NPWS aims to authorise harm to the smallest number of animals possible to mitigate impacts of kangaroos. The number authorised does not exceed the set maximum limits per licence.

To help ensure ecologically viable kangaroo populations for all species and zones, monthly reviews of commercial and non-commercial licences are undertaken. If changes to the maximum limits for non-commercial licences are announced following review, they apply to new licences granted after the date of the announcement. To facilitate this regular review and adjustment, licences are typically granted for a maximum of three months.

In some circumstances, cull limits for licences are assessed on a case-by-case basis, rather than applying a maximum limit based on property size. Such cases include:

- species and zones with significant decreases in kangaroo population
- species not included in the commercial Kangaroo Management Program
- smaller properties (up to 20 hectares)
- bushfire-affected properties.

In these cases, licences will only be granted where the landholder provides evidence of kangaroo-related damage and licences are subject to significantly lower cull limits.

(ii) the management of licences to cull kangaroos,

Commercial Kangaroo Harvesting

The Kangaroo Management Program Team (KMP Team) in the Department of Planning, Industry and Environment (the Department) is responsible for the issuance and management of licences to harvest kangaroos for commercial purposes in NSW.

Only people who are licensed by the Department with a kangaroo harvester licence granted under the BC Act may harvest kangaroos and sell the carcasses. Kangaroos must be harvested in accordance with licence conditions and the National code of practice for the humane shooting of kangaroos and wallabies for commercial purposes.

An individual must satisfy the following requirements for the Department to grant a Kangaroo Harvester Licence:

- a valid driver's licence (or other identification)
- a valid firearms licence
- successful completion in the last 5 years of the accreditation course (AMPG306 Use Firearms to Harvest Wild Game) for kangaroo harvesters provided by a Registered Training Organisation
- successful completion of the Statement of Attainment 900-81367V01 – Game Harvester

Harvesters must obtain written consent each calendar year from a landholder or authorised delegate of the landholder. The completed landholder consent form must be submitted to the KMP Team for assessment. No harvesting can occur on a property until this consent is received and approved by the KMP Team.

Each kangaroo carcass must be tagged with a tag purchased from the Department. Carcasses without tags cannot be possessed or sold.

Licensed commercial harvesters apply for tags for specific kangaroo species in specific kangaroo management zones. Tags can be used on any property within that zone with the landholder's consent and approval by the KMP Team to harvest kangaroos for commercial purposes. Tags must be used within the Commercial Tag Advice start and expiry dates. Tags are typically valid for 4 months from the date of purchase. Unused tags must be returned to the Department and are recorded and then destroyed.

Within zones, the quota is usually allocated on a 'first in, first served' basis, however in some circumstances the maximum quantity of tags that can be purchased is limited. The quantity of tags available to a harvester is dependent on the species, the available quota and the number of hectares available to the harvester within the commercial kangaroo management zone (as determined by the size of the properties within that zone for which the harvester has obtained landholder consent).

Non-Commercial Licences

If kangaroos are damaging property, posing risks to safety, or causing economic hardship, NPWS tries to help the landholder solve their problem without harming kangaroos. If lethal control is necessary, NPWS recommends landholders provide consent to licensed commercial harvesters to operate on their property, as this reduces the administrative burden on landholders, and supports local industry by using trained and skilled professionals.. If non-lethal controls and commercial harvesting aren't enough to manage the impacts, the landholder can apply to their local NPWS office for a non-commercial licence to harm kangaroos.

Detailed information on non-commercial licences to harm kangaroos is on the [DPIE website](#).

(iii) temporary drought relief policies and programs,

Non-commercial culling

On 8 August 2018, the NSW Government approved new non-commercial licence conditions to assist landholders manage the impact of kangaroos during the drought. These changes aimed to reduce the administrative burden on landholders, while maintaining animal welfare standards and ecologically viable kangaroo populations. The changes included:

- carcass tags (known as drop tags) no longer required
- ecologically viable limits on the number of kangaroos that may be culled, based on property size
- ability for previous and current licence holders to apply for licences over the phone
- shooter details are registered by the landholder and provided to the NPWS after culling operations, rather than with the licence application
- carcasses may be used by landholders or registered shooters for non-commercial purposes
- Local Land Services now assist landholders by facilitating connections with licensed harvesters and experienced volunteer recreational shooters.

Standard conditions for non-commercial licences to harm kangaroos are on the [DPIE website](#).

(e) current government policies and programs in regard to 'in pouch' and 'at foot joeys' given the high infant mortality rate of joeys and the unrecorded deaths of orphaned young where females are killed,

Current government policies for dealing with 'in pouch' and 'at foot' joeys are outlined in the national codes of practice for commercial and non-commercial humane shooting of kangaroos and wallabies.

Under the [commercial code](#) (AgriFutures Australia, 2020), if female kangaroos or wallabies are shot, then any dependent young must be euthanased to prevent suffering. The code outlines detailed requirements for the euthanasia of dependent young and includes standard operating procedures (SOPs) for the euthanasia of pouch young and dealing with dependent young-at-foot.

Under the [non-commercial code](#) (DAWE, 2008), shooters are required to avoid shooting female kangaroos or wallabies where it is obvious that they have pouch young or dependent young at foot except in special circumstances (i.e. the female kangaroo or wallaby is sick or injured or needs to be killed for management and/or ecological reasons). Once a female kangaroo or wallaby has been killed then its pouch must be thoroughly examined, and any pouch young must be euthanised in accordance with methods outlined in the code. Any dependent young at foot must be shot as soon as possible to avoid dispersal.

(f) regulatory and compliance mechanisms to ensure that commercial and non-commercial killing of kangaroos and other macropods is undertaken according to the Biodiversity Conservation Act 2016 and other relevant regulations and codes,

Kangaroos, wallaroos and wallabies are protected in New South Wales by the BC Act. Under the Act, it is illegal to 'harm' (defined as kill, injure or capture) a kangaroo or 'attempt to harm' (including hunt, pursue or use anything for the purpose of harming) a kangaroo without a licence.

Regulation and compliance of animal welfare in NSW

The NSW Government is committed to safeguarding animal welfare and providing the strongest possible regulatory framework to prevent cruelty and support good animal welfare outcomes.

The *Prevention of Cruelty to Animals Act 1979* (POCTA) is the primary piece of legislation that provides for animal welfare in NSW. POCTA applies to all animals regardless of tenure or whether they are being harvested or culled.

POCTA provides a defence against a cruelty offence for hunting, shooting, snaring, trapping, catching or capturing an animal, or destroying an animal, or preparing the animal for destruction, for the purpose of producing food for human consumption, if it is done in a manner that inflicted no unnecessary pain upon the animal (POCTA section 24(b)).

POCTA is enforced by the RSPCA NSW, the Animal Welfare League NSW and the NSW Police.

Regulatory and compliance mechanisms for commercial harvesting

The commercial kangaroo management program uses quotas, tags and robust licence conditions to regulate the commercial harvesting of kangaroos. Harvester licence conditions address aspects such as firearms licence and accreditation requirements, compliance with the National Code of Practice, tags, minimum weights, storage and sale of carcasses, and record keeping.

Harvesters are required to submit monthly returns detailing their harvest including the species, gender, weights and where they were harvested. This data is analysed and reported regularly. Monthly Allocation and Harvest (take) reports are published on the [DPIE website](#).

Compliance with the National Code

As a condition of their licence under the BC Act, all commercial kangaroo harvesters must comply with the National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes. The code outlines procedures and animal welfare standards for the humane harvesting of kangaroos and wallabies.

The Code is a national document intended to guide regulation of humane harvesting practices for the commercial kangaroo industry in Australia. The 2020 Code sets an expected standard for the commercial industry that is backed by evidence-based policy and reinforces the commitment of all parties to the welfare of kangaroos and wallabies. Input into the development of the revised Code was sought from kangaroo harvesters, firearms experts, animal welfare scientists with expertise in humane killing and state kangaroo management agencies in addition to the project reference group. Widespread public consultation was also conducted to determine levels of understanding of and support for the draft revised code.

Compliance monitoring and enforcement

Compliance monitoring of licensees and industry activity is performed continuously by regional compliance and regulation officers (compliance officers) in DPIE. Compliance officers exercise powers and regulatory mechanisms granted under the BC Act, with the aim of ensuring kangaroo populations in NSW remain ecologically viable and the methods of harvesting kangaroos for commercial use are humane. They work collaboratively with NSW Food Authority, NSW Police and Game Licencing officers from Department of Primary Industries each of which have their own legislative responsibilities.

Compliance officers inspect carcasses, harvesters' vehicles, equipment and paperwork, chiller premises and processors for compliance with licence conditions. They follow up and investigate reports of possible non-compliance, including those reported by the public, and where appropriate, action an appropriate regulatory response in accordance with the [OEH Compliance Policy](#). A range of enforcement measures are used including warning letters, penalty infringement notices, licence suspensions and prosecution.

Inspections of chiller premises and processing premises are undertaken in accordance with the New South Wales Commercial Kangaroo Harvest Management Plan 2017-2021. Targets under the Management Plan are to inspect processing plants three times per year, and chillers once per year to monitor compliance with tagging and humane harvest requirements.

Food Safety

For the kangaroo meat industry, the NSW Government Food Authority licenses kangaroo harvesters and processors in NSW, and those facilities must be able to show traceability of product throughout the supply chain, from harvest to the plate. The Food Authority regularly inspects game meat processing facilities, field depots and harvesters. The Authority's audit and inspection program ensures that kangaroo harvesters, chillers and processors comply with the food safety requirements set out in the specific food safety program that each business is required to have.

The minimum inspection frequency for food safety compliance varies for different types of facilities. Harvesters are inspected once every three years, chillers are inspected biennially, processors are inspected once per year, and export processors are inspected once every six months.

The Food Authority requires all harvesting and processing facilities to consistently meet food safety standards. Additional inspections and appropriate enforcement actions are taken in response to any breach and the Food Authority follows up these results to ensure identified defects have been rectified. The NSW kangaroo industry has a good compliance record, with very few inspections returning unacceptable results from the Food Authority.

Furthermore, the Australian Government Health Department has only one recorded incident of a food borne illness incident involving kangaroo meat, based on data collected Australia-wide between 2001 – 2019. This one incident affected seven people in the Northern Territory and did not involve commercially harvested product.

Regulatory and compliance mechanisms for non-commercial culling

Standard non-commercial licence conditions include the following requirements to facilitate regulation and compliance:

- Licensee to keep a register of all shooters operating under their licence and produce these records to NPWS on request and within seven days of licence expiry
- Shooters to comply with the [National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Non-commercial Purposes](#)
- Licensees to provide the issuing NPWS office with accurate and up to date records of all animals harmed under their licence on request and within seven days of licence expiry
- The licensee to provide reasonable access to the licensed property for inspection by NPWS
- It is the licence holder's responsibility to ensure they are familiar with any other statutory or regulatory provisions relevant to this licence such as local council requirements, the *NSW Firearms Act 1996* and *Prevention of Cruelty to Animals Act 1979*.

Licence variations, extensions or new licences may not be granted unless record sheets have been provided.

Several government agencies are responsible for responding to non-compliance with licences to harm kangaroos or non-licensed harm:

- NPWS investigates breaches of the BC Act harm offences and non-compliance with non-commercial licences
- DPIE Biodiversity, Conservation and Science Directorate compliance staff and the Kangaroo Management Program investigate breaches of BC Act harm offences and non-compliance with commercial harvester and dealer licences
- NSW Police Force investigates breaches of *NSW Firearms Act 1996*, firearm safety laws and non-compliance with firearm licences. Police officers also have powers to enforce the BC Act and POCTA Act.
- RSPCA, NSW Police Force or Animal Welfare League investigate breaches of the POCTA Act.

It is important that the agencies listed above are aware of reported incidents and are able to coordinate any investigation or enforcement actions. To support this, NPWS local area offices maintain records of reported incidents and action taken and refer information about reported incidents according to the responsibilities listed above. For guidance on determining whether to undertake an investigation, investigation procedures and determining an appropriate enforcement response, NPWS officers refer to the OEH Compliance Policy and the NPWS Law Enforcement and Compliance Manual.

The DPIE Special Investigations Unit are also notified of alleged serious offences, so they can lead the investigation, where appropriate.

(g) the impact of commercial and non-commercial killing of kangaroos and other macropods, including the difficulty of establishing numbers killed by landholders since the removal of the requirement for drop tags

Within the commercial kangaroo management zones, the total percentage of population, killed (including commercial harvest and non-commercial culls) remains well within ecologically viable limits.

Species	Percentage of estimated kangaroo population killed under commercial and non-commercial licences	
	2019	2020
Common Wallaroo	8%	3%
Western Grey Kangaroo	7%	3%
Eastern Grey Kangaroo	8%	5%
Red Kangaroo	8%	4%
Total	8%	4%

Table 1: Kangaroos culled or harvested within commercial kangaroo management zones as a percent of their estimated population.

The removal of the drop tag system for non-commercial licences has not had an impact on the reliability of establishing numbers harmed. Under the drop tag system, occurrences where authorised cull limits were exceeded were only likely to be detected through self-reporting, eye-witness accounts, or site inspections revealing a larger number of carcasses than what was authorised. In practise, drop tags were rarely fixed to carcasses or were lost or degraded due to exposure to the elements thereby rendering them undecipherable, decreasing their effectiveness. Issuing paper tags for licenses processed over the phone and email is burdensome and causes delays, which may result in increased and protracted impacts on landholders.

Under the conditions of a landholder's licence to harm kangaroos, licensees must report the number of each species harmed to NPWS within seven days of their licence expiring. This requirement did not change when the requirement for drop tags was removed.

In addition to the impacts on kangaroo populations, commercial harvesting and non-commercial culling had positive socio-economic benefits for landholders and rural communities. In 2019, commercial harvesting of kangaroos provided direct income for around 500 harvesters and indirect financial benefits for an estimated 2,988 landholders (DPIE 2020). Non-commercial culling of kangaroos supports primary producers impacted by drought, fires and floods, which were particularly prevalent between 2016-2021.

Reducing density of large kangaroo populations through harvesting, culling or both, supports the viability of pastoral enterprises and integrity of sensitive rangeland environments. Total grazing pressure by excessive kangaroo populations in conservation reserves has been linked to reduced complexity of vegetation and soil nutrients, and increased soil density (Mills et al. 2021). A managed reduction in kangaroo populations also supports animal welfare objectives by reducing the total number of kangaroos that would otherwise starve in a resource scarce landscape.

- (h) current and alternative measures to provide an incentive for and accelerate public and private conservation of kangaroos and other macropods.

Saving our Species

Saving our Species is the NSW flagship for threatened species conservation with simple objectives; to secure threatened species in the wild for 100 years and control key threats facing threatened plants and animals. It is driven by long-term commitment, rigorous science, and by working in partnership with governments, conservation organisations, Aboriginal communities, businesses, private landholders and the community. Saving our Species fulfils a legislated commitment made by the NSW Government under the *Biodiversity Conservation Act 2016* to address biodiversity decline.

Species profiles, conservation strategies and annual report cards are made available for the following threatened macropod species on the [DPIE website](#).

- Parma wallaby (*Macropus parma*)
- Red-legged pademelon (*Thylogale stigmatica*)
- Black-striped wallaby (*Macropus dorsalis*)
- Brush-tailed rock-wallaby (*Petrogale penicillate*)
- Yellow-footed rock-wallaby (*Petrogale xanthopus*)
- Bridled Nailtail Wallaby (*Onychogalea fraenata*)

Biodiversity Conservation Trust

The NSW Government's Biodiversity Conservation Trust (BCT) aims to incentivise private landholders to participate in biodiversity conservation on their properties. Landowners in priority investment areas or with conservation assets on their property (including threatened species habitat) may be eligible to enter a range of voluntary agreements to conserve biodiversity and support productive environments. More information about private land conservation in NSW is available on the [BCT website](#).

Local Land Services Natural Resource Management programs

Local Land Services deliver a range of natural resource management programs which have conservation objectives across NSW. Various programs which are funded by a mix of NSW Government and Australian Government funding are delivered in priority areas determined by priorities identified in regional natural resource plans. Some programs target specific threatened species while others focus on habitat protection activities which benefit a range of native flora and fauna. Further information about LLS programs can be found on the [LLS website](#).

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