
From: [REDACTED]
Sent: Tuesday, 21 June 2022 1:44 PM
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Kangaroo Shins for cultural purposes

OFFICIAL

Yuma [REDACTED]

[REDACTED] was going to pick up first instalment of skins while he was on Southside (today I think)

If you have time to meet tomorrow morning to open the discussion for this years cull I am free to meet anytime between 9:30am – 12:00pm

Cheers

[REDACTED]
[REDACTED] | Environment Division
Environment, Planning & Sustainable Development Directorate

Phone: [REDACTED] | Mobile: [REDACTED] | Email: [REDACTED]@act.gov.au

I acknowledge the Ngunnawal People as the Traditional Custodians of this land – and pay my respects to Elders past, present and future, and acknowledge their continuing culture and connection to Country and community and the contribution they and the broader ACT Aboriginal and Torres Strait Islander community make to the ACT and region.

From: [REDACTED]@act.gov.au>

Sent: Tuesday, 21 June 2022 1:32 PM

To: [REDACTED]

Subject: RE: Kangaroo Shins for cultural purposes

OFFICIAL

Hi [REDACTED]

Just following up on below email.

Are you around this week to discuss? Bucher will be on site next week.

Cheers,
[REDACTED]

From [REDACTED]@act.gov.au>

Sent: Tuesday, 24 May 2022 10:35 AM

To: [REDACTED]@act.gov.au>

Cc: [REDACTED]

Subject: Kangaroo Shins for cultural purposes

OFFICIAL

Hi [redacted]

Hope you are well. [redacted] has advised me that the first instillment of skins from last years cull are at Stromlo for cultural use. Apologies for any delays in delivering this but as [redacted] can explain, it has been a much more drawn out process than what we anticipated. Anyway we have all those learnings behind us know so I will set up a calendar invite with you and the KM team to discuss what you would like us to do with the current skins plus your requirements for this year.

Thanks for that and don't hesitate to give me a call with any queries.

Cheers

[redacted] | [redacted]
Resilient Landscapes

Phone: [redacted] | Mobile [redacted]

Email: [redacted]@act.gov.au

Resilient Landscapes | Environment and Planning | ACT Government
Level 1, Dame Pattie Menzies House (North), 16 Challis Street, Dickson, ACT, 2602
GPO Box 158 Canberra ACT 2601 | www.environment.act.gov.au



@EPD_Comms



facebook.com/actgovepd



From: [REDACTED]
Sent: Wednesday, 12 January 2022 9:35 AM
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Request for 20 Kangaroo Skins

OFFICIAL

Hi [REDACTED]

We are aware of an initial request that came through [REDACTED] (on behalf of [REDACTED]). Is the below email following up that request?

We are working on the initial request (received last year during the cull), however the skins will not be available until April.

There have been delays due to covid, we are now working on it as a matter of priority however the tanning process takes some time.

Feel free to give me a call if additional info required.

Cheers,

From: [REDACTED]@act.gov.au>
Sent: Tuesday, 11 January 2022 10:55 AM
To: [REDACTED]
Cc: [REDACTED]@act.gov.au>
Subject: FW: Request for 20 Kangaroo Skins

Hi,
I assume you all know about this? Any update or thoughts? Thanks,

From [REDACTED]@act.gov.au>
Sent: Tuesday, 11 January 2022 9:36 AM
To: [REDACTED]@act.gov.au>
Cc: [REDACTED]@act.gov.au>
Subject: FW: Request for 20 Kangaroo Skins

OFFICIAL

Hi [REDACTED]

Would you be able to please follow up with this matter in [REDACTED] absence.

It would be most appreciated if you could organise to have 20 tanned skins available by the 1st February 2022.

If you have any enquiries in relation to this matter please do not hesitate to contact us.

kind regards

[REDACTED]

From: [REDACTED]
Sent: Thursday, 16 December 2021 10:02 AM
To: [REDACTED] <[\[REDACTED\]@act.gov.au](mailto:[REDACTED]@act.gov.au)>
Cc: [REDACTED] <[\[REDACTED\]@act.gov.au](mailto:[REDACTED]@act.gov.au)>; [REDACTED] <[\[REDACTED\]@act.gov.au](mailto:[REDACTED]@act.gov.au)>
Subject: Request for 20 Kangaroo Skins

OFFICIAL

H [REDACTED]

We are following up with a request for Kangaroo Skins for the Dhawaura Ngunnawal Caring for Country Committee. This action item has been on the agenda since 23 September 2021. It would be most appreciated if you could organise to have 20 tanned skins available by the 1st February 2022. If you have any enquiries in relation to this matter please do not hesitate to contact us.

Your assistance is most appreciated.

Kind Regards

[REDACTED]
[REDACTED]
Environment, Planning & Sustainable Development Directorate | ACT Government
[REDACTED]
[REDACTED]

I acknowledge the Ngunnawal People as the Traditional Custodians of this land – and pay my respects to Elder’s past, present and future, and acknowledge their continuing culture and connection to Country and community.

KANGAROO CARCASS UTILISATION IN THE ACT

A DISCUSSION PAPER

A REPORT TO

ACT ENVIRONMENT, PLANNING AND SUSTAINABLE DEVELOPMENT DIRECTORATE

November 2020

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1. SUMMARY AND KEY FINDINGS

1.1. Purpose and Scope

Eastern Grey Kangaroos (kangaroos) are culled on public land in the Australian Capital Territory (ACT) to reduce grazing pressure on important ecological communities. ACT rural landholders can also cull kangaroos to mitigate damage on their leases. Approximately 15,000 carcasses per year are disposed of by pit burial or left in-situ on farms. This is a waste that neither meets community expectations nor aligns with the ACT's Waste Management Strategy. Therefore, the ACT Government is seeking an alternative strategy, which is culturally, socially, environmentally, and economically sensitive. This paper discusses potential options and suggests alternative management processes.

This paper also re-examines a 2011 study into the feasibility of commercial disposal of culled carcasses and supports the finding that establishing an ACT facility for processing kangaroos in the ACT is not viable. However, we find that in 2020, there is an interstate demand for carcasses and that the administrative and regulatory hurdles are manageable.

1.2. Key findings

1.2.1. *Use opportunities*

Thirteen options were identified for kangaroo carcass utilisation in the ACT region, across both public and privately managed land; some are already in use, some are ready to be implemented now (with some work) and others are developmental and require further research and innovation. Those marked with * below are in use already.

Available for now or continued uptake

- Indigenous food (Dhangarn)
- Cultural use*, leather production and tanning
- Insect food for frass production
- Captive carnivore's food
- Tallow and protein meal
- Baits for pest control*
- Biodegradation where they lie in the field*

Developmental

- Research and teaching aids
- Biomedical
- Ash
- Bioenergy
- Bone carving
- Compost/fertiliser

1.2.2. *Pathway to carcass utilisation – public land*

The following pathway is recommended to reduce waste of kangaroo carcass utilisation from public land in the ACT.

1. Carcasses would be dressed in the field or at an off-site facility if security requirements prevent dressing in the field.
2. Offal, offcuts, and other putrescible waste would be converted by insects to soil conditioner and protein meal.
3. Larger dressed carcasses (> 14 kg, ~n<2,000 per year) would be gifted interstate for processing at human consumption hygiene standards before a proportion were made available as Indigenous food (Dhangarn).
4. Meat, tails and skins would be returned to the ACT Indigenous community as processed product at no charge and at any time during the year. They would re-enter the ACT using the same import pathways used by kangaroo product that is sold by supermarkets and other retailers.
5. Smaller dressed carcasses (< 14kg, ~n<350) would go to carnivore keeping organisations, to centres that are breeding threatened carnivores and some to conservation baiting programs.

1.2.3. *Assumptions*

Assumptions made in proposing the use options in this paper include:

1. Professional shooting contractors paid by the ACT Government will continue to conduct the conservation cull in the Canberra Nature Park, alongside suitably qualified ACT Government employees.
2. In order to avoid any inconsistency in the fundamental conservation-focused goal, the costs associated with kangaroo culling undertaken to meet conservation objectives on public land will not be offset by commercial returns from selling the carcasses of kangaroos that are culled.
3. Rural landholders will continue to be given the option of culling kangaroos to mitigate damage on their leases.
4. Human consumption food safety requirements can be met by licenced interstate commercial harvesters.
5. Operational and security constraints apply to conservation culling on public land.
6. An agreement can be reached between the representatives of the ACT Indigenous community and the commercial kangaroo processors for delivery of packaged kangaroo products for human consumption, and kangaroo skins.

The figure below outlines the utilisation process and includes both currently available uses (solid lines) and developmental uses (dotted lines).

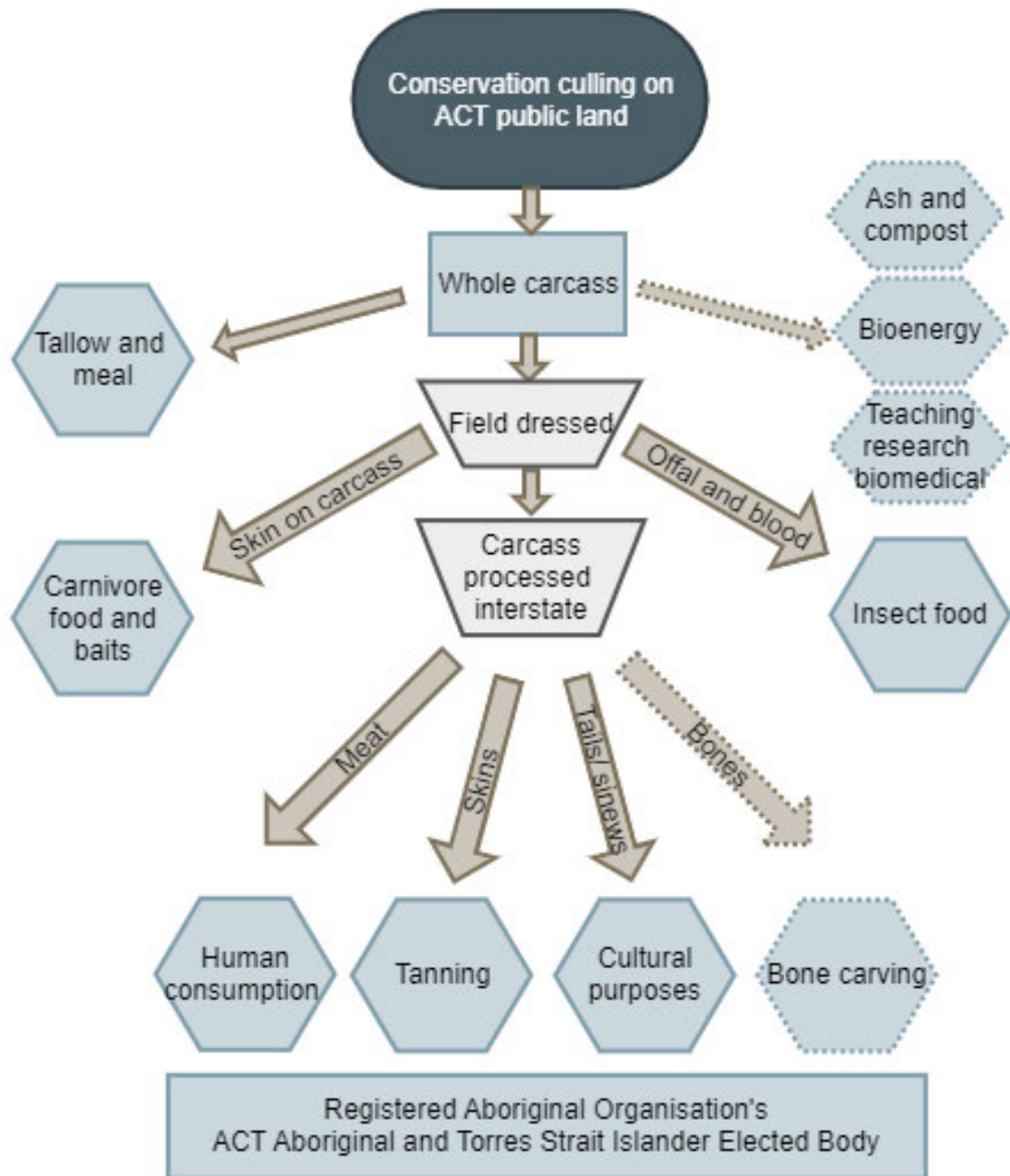


Figure 1. Suggestions for carcass use from conservation reserves. Dotted boxes represent currently unavailable options.

1.2.4. *Pathway to carcass utilisation – rural / private land*

Rural lessees have the option of continuing current arrangements under which they either leave carcasses on the ground, or use them domestically, often as animal food.

This paper also proposes that rural landholders or professional shooters be given the option of selling carcasses to interstate processors under a Wildlife Trade Operation (WTO) approved under the *Environment Protection and Biodiversity Conservation Act 1999*. Therefore, they would be in same position as landholders in surrounding areas of New South Wales (NSW). An ACT WTO would also be required for carcasses from public land culls to be processed interstate to human consumption standards.

Some rural lessees are paying shooters to remove unwanted kangaroos; having commercial shooters do the job at no cost to them would be a saving.

1.3. Suggested next steps

Further discussion with stakeholders and consideration of the economic, social and environmental impacts is required to enable choices about uptake of the options that we have identified. Steps include the following:

- Confirm the scale of potential consumption by the Indigenous community
 - If the option of using carcasses for human consumption is deemed acceptable, an offer could be put to representative bodies and the agencies who would be involved in taking up the option.
 - The offer could also request an estimate of the demand for skins and cultural artefacts, whether processed or untanned.
- Confirm the number of carcasses that kangaroo processors could accept per week
 - The cost of processing carcasses for human consumption would be met by the processors interstate in return for retaining some animals without having to pay for them.
 - These arrangements will need to be negotiated and possibly put to tender if they are deemed to warrant pursuit.
 - Field dressing could be undertaken by shooting contractors, or by employees of the processing companies.
 - Costs and incentives will also need to be fully calculated and negotiated with the contractors. The proposed arrangement will involve extra work but there may be a saving on the cost of pit disposal.
- Confirm number and size of carcasses going to uses other than human consumption
 - The offal and offcuts going for conversion by insects to a soil conditioner.
 - Carnivore food for carnivore keeping/ conservation programs.
 - Baits for pest control.
- Confirm interstate movement of carcasses will be permitted just as it is between other jurisdictions
- Prepare a Wildlife Trade Operation application under the *Environment Protection and Biodiversity Conservation Act 1999*
 - ACT could prepare an application for a developmental Wildlife Trade Operation modelled on an interstate plan. Description of trace back capability, surveys and compliance with animal welfare codes would be included in the documentation for lodging with Wildlife Trade Unit of the Department of Agriculture, Water and the Environment.
- Adopt the Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes
- Consider further waste reduction opportunities by improving opportunities for carcass utilisation from rural lands and all conservation culls in ACT

2. BACKGROUND

A conservation cull of Eastern Grey Kangaroos (*Macropus giganteus*; hereafter 'kangaroos') is conducted annually on public lands in the Australian Capital Territory (ACT). The purpose is to control grazing pressure in the endangered ecological communities, the Box-Gum Grassy Woodlands and Natural Temperate Grasslands (ACT Government 2017).

In addition, ACT rural landholders can apply for an authorisation to undertake a damage mitigation cull of kangaroos on rural lands. Both the conservation cull conducted by the ACT Government in the Canberra Nature Park and the damage mitigation cull on rural lands are undertaken in accordance with the Eastern Grey Kangaroo: Controlled Native Species Management Plan (2017) (hereafter EGK CNSMP).

This paper discusses the potential utilisation options for kangaroo carcasses resulting from:

- Conservation culling on public land
- Damage mitigation culling on rural lands in the ACT

2.1. Waste management

The ACT Waste Management (ACT Government 2011a) has four key objectives:

- Less waste generated
- Full resource recovery
- Clean environment
- Carbon-neutral waste sector

Currently most kangaroo carcasses¹ resulting from the conservation cull are disposed of via pit burial. Carcasses from damage mitigation culling on rural land are left in-situ on farms.

Wasting culled animals does not meet community and stakeholder expectations when there are other methods available (Hacker *et al.* 2019; ACIL Allen Consulting 2020).

When organic material breaks down in landfill, methane gas is produced, a more potent greenhouse gas than carbon dioxide (Clean Energy Regulator 2020). Alternative use of kangaroo organic material could provide benefits to the environment, such as for the generation of compost or soil enrichment. Diverting organic material from landfill that can be otherwise utilised is a key part of the ACT Waste Management Strategy, and also the Government's emissions reductions plan identified in the Climate Change Strategy 2019-2025 (ACT Government 2019a).

¹ Throughout this document we use the term carcass with the definition "the body of an animal that has died", instead of the term carcase with the definition "the body of an animal that has been slaughtered for meat (for example, at an abattoir)".

2.2. Ethics and cultural considerations

Some people regard any consumptive use of kangaroos as unethical and distasteful; they may also oppose it on cultural grounds. Others, including many Indigenous Australians, regard consumptive use as appropriate use of a natural resource. While mindful of these perspectives, this paper seeks to support evidence-based policy for kangaroo carcass management based on best animal welfare, environmental, social, cultural, and economic information.

Commercial harvesting is often suggested by stakeholders and the general public as the solution to using carcasses (Hacker *et al.* 2019; Sinclair *et al.* 2019). Notwithstanding that the approximately 165,500 kg of meat taken from Canberra Nature Park in 2018 had a potential wholesale value of \$98,000 (Gordon 2019), ACT Government policy requires not-for-profit use of kangaroos culled from conservation reserves to avoid any inconsistency in the fundamental conservation-focused goals of this program (i.e. commercial harvest is not the reason for culling (ACT Government 2011b)).

Commercial use of carcasses may be possible from private lands, where kangaroos are managed according to the business needs of the rural property. A 2011 analysis of commercial harvesting in the ACT concluded that taking up this option was unlikely to be cost-effective for the ACT (ACT Government 2011b). It found that the relatively small seasonal supply of carcasses in the ACT, approximately 4,000-5,000, from the conservation cull and approximately 11,000 from the damage mitigation cull did not justify the costs of establishing, administering, and monitoring a commercial operation. A harvest management plan would require expanded population estimates, compliance monitoring and reporting. Our discussion paper reviews those findings in Section 7, and also presents a range of alternative options and discusses the merits as part of a waste mitigation strategy, whilst also considering the sensitivities associated with the use of a native animal, the sensitivities associated with culling, operational constraints associated with wildlife management in urban areas, the potential utilisation of this material for Indigenous communities and the humane management of kangaroos in general.

3. METHODS

3.1. Literature review

The documents nominated by the project managers, in Appendix A, and a number of others in the bibliography section of this paper were reviewed to understand:

- The legislative and policy context of kangaroo management in the ACT
- The number of kangaroos culled in the ACT
- The location of kangaroos culled in the ACT
- How kangaroo carcasses are/or could be processed on site and/or moved to potential sites for utilisation
- The responsibility of land managers
- The legislative impediments for carcass utilisation culling/harvesting kangaroos and how this may relate to new ideas, findings, or opportunities
- Implications of, and barriers to, cross-border movement of native animals and trade of native animals

3.2. Internet review

Options and specific companies were explored via extensive research using search engines. Specific sites such as Greenfinder for composting companies and Business Recycling for off-cuts were also examined.

3.3. Consultation with stakeholders

A letter (Box 1) was sent to 150 stakeholders who can be partitioned into the following categories

Commercial kangaroo processors	12
Defence lands managers	3
Government regulators	17
Indigenous representatives and individuals	28
Industry development agencies	3
NRM or similar body	13
Professional shooters	5
Researchers or teachers	26
Retailers	8
Rural landholders	14
Waste managers or users	14
Wildlife carer, zoo, carnivore carer	7

They were invited to complete an on-line survey at (<https://forms.gle/fRb9F9Vs1Sjxzp1S7>) designed to identify options and potential companies or organisations that could use kangaroo carcasses. Specifically, it covered carcass requirement, geographical location, operational status, commercial status, and cost/payment.

Box 1. Email sent to stakeholders informing them of the project and inviting them to complete an on-line survey.

Dear [*insert name here*]

The Biosecurity and Rural Services unit of ACT EPSDD has commissioned us to prepare a discussion paper on options for reducing the waste of kangaroos taken under both parts of the ACT's kangaroo management program

- * conservation culling of kangaroos on public lands and
- * damage mitigation culling on rural lands in the ACT.

Based on our understanding of the vision and expertise of <company> your thoughts and suggestions for potential carcass utilisation options would be a welcome contribution to the consultation process. Here is the email we've been sending out to gain opinions on options.

Some people regard any consumptive use of kangaroos as unethical and distasteful; or they may oppose it on cultural grounds. We are also mindful of the animal welfare, environmental, and economic reasons for the development of sound evidence-based policy for kangaroo management. The project on which we are engaged is part of the ACT Government's commitment to achieving that goal. More information at the links below.

Sincerely
[redacted]
Australian Wildlife Services

A working list of options and suggestions currently under consideration is below. We have put a form at Utilisation Survey <<https://forms.gle/fRb9F9Vs1Sjxzp1S7>> to gather the contributions of key stakeholders. The contribution of [*insert name/company here*] is warmly welcomed together with any other suggestions you might offer.

The form will help us determine the potential demand for carcasses (or parts thereof, e.g. tails, skins, meat, bones, etc.) that could be utilised in the five-month period from March-July annually. It will help an assessment of the capacity for the ACT's kangaroo management programs to meet the supply demands associated with various utilisation options, noting that the volume of supply is likely to be highly variable throughout this time.

The form also enables you to nominate if the proposed utilisation opportunity is commercial (private sector) or non-commercial (NGO, not for profit).

Commercial harvesting is often suggested by the community as the solution to carcass utilisation. This option is not considered appropriate where kangaroos are removed from public land specifically to achieve a conservation benefit. Rather a non-for-profit use for these animals would be preferred to avoid any inconsistency in the fundamental conservation-focused goals of this program.

Commercial use of carcasses may be possible from private lands, where kangaroos are managed according to the business needs of the rural property. However, a 2011 feasibility analysis concluded that commercial harvesting is unlikely to be cost-effective for the ACT. Our discussion paper will summarise the findings of the analysis.

Options and opportunities include:

Indigenous use

1. Skins for ceremonial cloaks
2. Tails for fireside meetings and sinew harvesting
3. Biltong and fresh meat for personal use

Carnivore food

4. Zoo lions, Tasmanian devils, dingoes
5. Domestic animal shelters
6. Baits to protect native species from foxes or dogs

Organic Waste

7. Composting
8. Production of 'frass' from insect larvae (high protein insect meal and soil conditioner)
9. Biodegradation in the field

Commercial human consumption use²

10. Premium quality meat

² Consumption means as food and by craftspersons

11. Biltong and jerky

12. Skins

Education resource

13. Teaching aids

More reading at following download links:

- * Eastern Grey Kangaroo Management Plan
- * ACT Waste Management Strategy
- * National Statement on improving kangaroo management
- * Professional kangaroo population control leads to better animal welfare, conservation outcomes & avoids waste

A summary of the results of the survey can be viewed in Appendix B.

Liaison with ACT's Indigenous community was a priority. [REDACTED] coordinated engagement with the four Registered Aboriginal Organisations (RAO) who have representatives within the ACT Government and conduct surveys and consultation work throughout the ACT. The ACT RAOs are:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

Meetings were also held with the:

- [REDACTED]
- [REDACTED]
- [REDACTED]

Other key stakeholders amongst the 150 individuals and groups contacted follow. They include existing and potential users:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- Carcass end users and/or carcass processors,
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]

-
-
-
-
- Government departments
 - Environment, Planning and Sustainable Development Directorate
 - Kangaroo Management Program, Biodiversity and Conservation Division, NSW Department of Planning, Industry and Environment
 - Wildlife Trade Assessments Office, Department of Agriculture, Water and Environment
 - Department of Defence, Environment and Engineering Branch

Many consultees were concerned that their views might become public and draw them into the controversy associated with kangaroo management generally. These concerns were expressed by 'all sides', including animal carers, processors and landholders and government departments.

4. CURRENT SITUATION

4.1. Kangaroo management across Australia

Unmanaged kangaroos can directly threaten the survival of other biodiversity despite being native (Barton *et al.* 2011; Howland *et al.* 2014; Howland *et al.* 2016). They can have significant financial impacts on landholders by lowering livestock production and damaging sustainability (Barnes & Hill 1992; Viggers & Hearn 2005; New South Wales Farmers 2019; Pahl 2019; Waters *et al.* 2019). High kangaroo populations compromise regenerative agriculture, pasture conservation, revegetation, and stewardship programs.

Responsibility for kangaroo management across Australia varies and is complex. Kangaroos are protected under State and Territory legislation while the Commonwealth controls kangaroo exports and influences welfare. Legislated land classifications and associated custodianship further influence management. For example, management on public land can be park specific. On private lands (and some public land), State Acts and Regulations permit either harvesting for commercial purpose or culling for damage mitigation purpose.

Non-commercial culling leads to millions of carcasses being wasted across Australia by either being left to rot in the field or taken to landfill. Indigenous communities, including those consulted in preparation of this paper, abhor such waste and its cultural implications.

Paradoxically, kangaroos have a wide range of potentially valuable production attributes and are globally unique which should be a comparative advantage (Grigg 2002; Wynn *et al.* 2004; Spiegel & Wynn 2014; Wilson & Edwards 2019; Wilson & Edwards in press). While there is an established commercial kangaroo industry in Australia, it only has a small domestic and international market, when compared to other red meat industries (Boronyak *et al.* 2013; Barnard 2015).

4.2. Kangaroo management in New South Wales

In NSW kangaroos are managed through commercial and damage mitigation processes. The area of the State in which commercial operations are permitted is divided into zones which are monitored and used to allocate and issue harvesting quotas. South East NSW is represented by zone 16 in the NSW Kangaroo Harvesting Management Plan 2017-2021 (Office of Environment and Heritage (NSW) 2017).

The South East NSW Zone surrounds the ACT (Figure 2). The population of (eastern grey) kangaroos in the South East NSW Zone was 1.7 million in 2019. See Table 1 for population figure, quota and harvest for (eastern grey) kangaroos. Data are sourced from NSW Annual Reports and Harvest Quota Reports available from NSW Department of Planning, Industry and Environment (2020).

NSW South East Kangaroo Management Zone

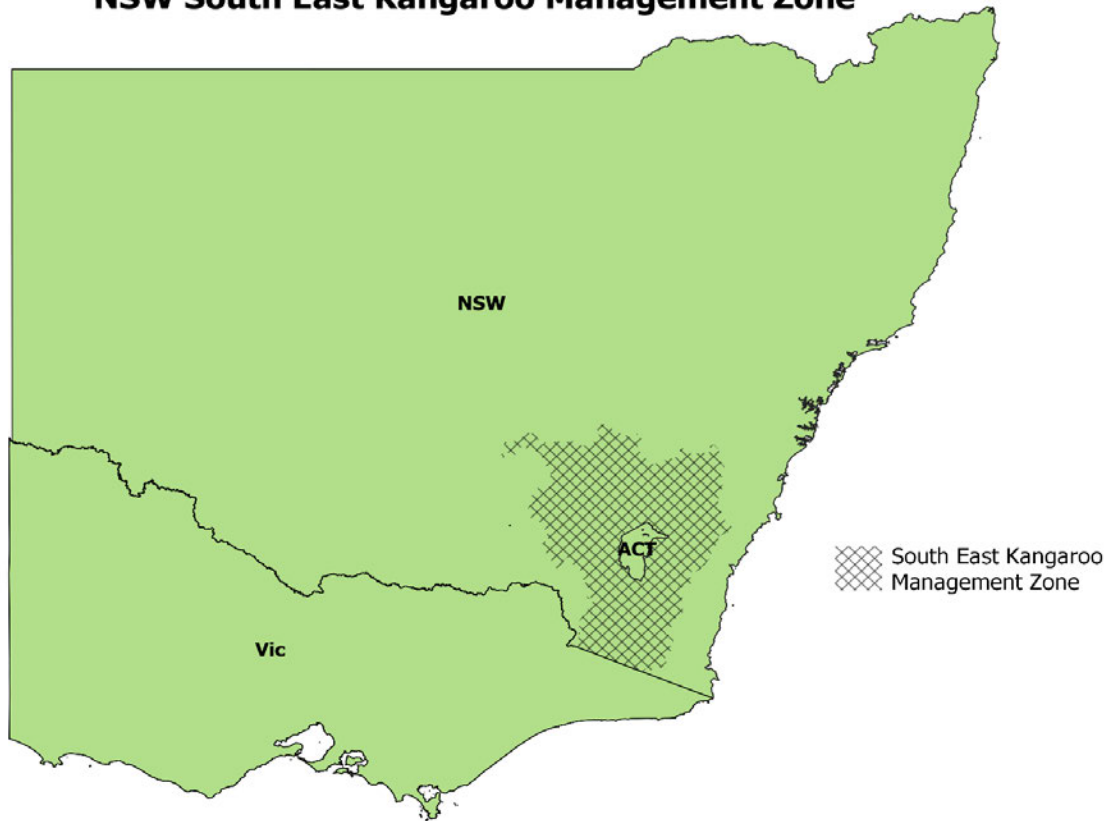


Figure 2. ACT is surrounded by the South East NSW Kangaroo Management Zone.

Table 1. The Eastern Grey Kangaroo population, quota and harvest for the South East NSW kangaroo management zone from 2009 to 2019.

Year	Population	Quota	Harvest
2009*	514969	77245	13442
2010*	656000	98385	43102
2011*	655900	98385	34889
2012	655900	98385	18385
2013	858900	128835	7351
2014	858900	128835	6399
2015	858900	128835	6851
2016	1284300	192645	4291
2017	1284300	192645	5176
2018	1284300	192645	10918
2019	1728200	258210	30977

*South East NSW zone changes between 2007-2011 Kangaroo Management Plan and 2012-2016 Kangaroo Management Plan, due to addition of zones that were previously non-commercial zones. Another change will result from the addition of Bombala to the South East management zone in 2019 (data not shown here). Note: there is a limit to harvest based on size of property.

Kangaroos in NSW are managed through the commercial harvest program and through damage mitigation; with approximately 31,000 harvested under commercial licences in 2019 (NSW Government 2020b). Commercial harvesting takes place close to the ACT. In the South East NSW Kangaroo Management Zone 59,013 kangaroos were reported as culled for damage mitigation purposes from a total of 80,549, authorised to be culled (NSW National Parks and Wildlife Service (NPWS) pers. comm. 2020).

Non-commercial damage mitigation allocation for culling was higher than the commercial harvest in the South East and in the Central Tablelands South harvest management zones in 2019, indicating that notwithstanding the option of commercial use, there is still a substantial reliance on non-commercial culling for kangaroo management. Numbers actually taken by non-commercial cull are likely higher than those reported because returns for animals culled are sometimes not submitted to the local NPWS Area Office (NPWS pers. comm.).

4.3. Kangaroo management in the Australian Capital Territory

In the ACT, kangaroos are culled on selected public land by the ACT Government and on rural lands (mostly private properties) by landholders (or leaseholders). Numbers are also culled on other lands by other land management agencies, for example, on National or Commonwealth land under permits issued by the ACT Government.

The Eastern Grey Kangaroo: Controlled Native Species Management Plan (EGK CNSMP) describes the approach that is adopted to maintain wild populations of kangaroos in the ACT while managing their environmental, economic and social impacts, and ensuring their welfare (ACT Government 2017).

The EGK CNSMP complements the ACT Kangaroo Management Plan (ACT Government 2010a). The goals of kangaroo management in the ACT are to:

- Maintain populations of kangaroos as a significant part of the fauna of the 'bush capital' and a component of the grassy ecosystems of the Territory.
- Manage and minimise the environmental, economic, and social impacts of those kangaroo populations on other biota, grassy ecosystems and primary production.

4.3.1. Public lands

ACT contains large undeveloped, open space which is ideal kangaroo habitat. Some is in the Canberra Nature Park (CNP) (see yellow in Figure 3), managed by the ACT Parks and Conservation, which spans some urban and non-urban designated zones. The CNP, of over 11,000 hectares, is comprised of a series of nature reserves (ACT Nature Reserves) that protect critically endangered ecological communities and threatened species (ACT Government 2019b). Kangaroo densities are kept to prescribed population densities in priority areas.

Kangaroo surveys are conducted in some ACT Nature Reserves and results fed into the Conservation Culling Calculator, an instrument made under the EGK CNSMP, to determine how many kangaroos are to be culled at each reserve. Not all reserves are surveyed so a comparative total population figure is not available. Although not

part of the Canberra Nature Park, the ACT Parks and Conservation Service also manages kangaroos on the Googong Foreshore Reserve in NSW.

ACT Land Use Zones and Conservation Culling Locations

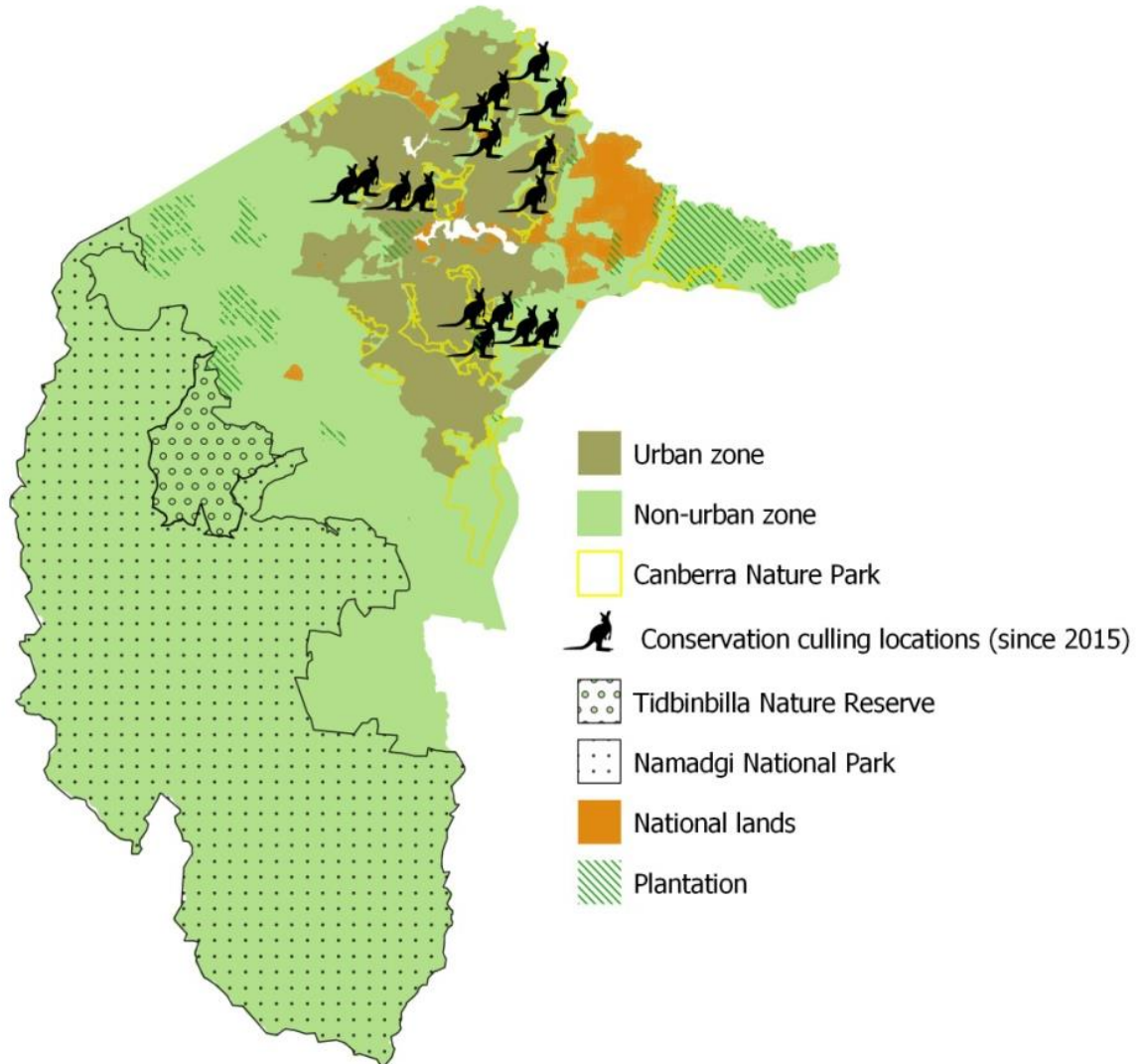


Figure 3. Urban and non-urban lands in the ACT showing Canberra Nature Park, national land, plantations and Tidbinbilla Nature Reserve and Namadgi National Park.

The number of kangaroos culled to achieve conservation objectives in each reserve fluctuates annually according to seasonal conditions and operational resources. The recommended number of kangaroos to be culled in 2019 was 4,076. The average culled between 2009 and 2019 was 2,937 culled and for the last 5 years 2,750. Table 2 shows the proposed numbers of kangaroos to be culled and actual numbers taken over the past 9 to 12 years.

Table 2. Proposed number of kangaroos to be culled and actual numbers culled in Canberra Nature Park (some years include Googong foreshore, see section 4.3.1) (ACT Government 2020a). In 2020 the recommended number to cull was impacted by operational capacity under Covid – 19 social distancing and lockdown.

Year	Proposed number to be culled	Actual number culled
2009		494
2010		1839
2011		2439
2012	2015	1154
2013	1455	1149
2014	1606	1521
2015	2466	1689
2016	1991	1989
2017	2606	2592
2018	3253	3253
2019	4076	4035
2020	1958	1931

4.3.2. National lands and large conservation reserves

National (Commonwealth) land, plantations, and other public land in ACT also contain large kangaroo populations which may be managed under the EGK CNSMP (Figure 3). Kangaroos culled from these lands could be added to the number taken from the CNP to further reduce waste if options are appropriate and available.

Tidbinbilla Nature Reserve and Namadgi National Park contain significant kangaroo populations on grassland valleys that were once pastoral properties (Figure 3). They are not part of the conservation culling program. Tidbinbilla and Namadgi's kangaroo populations are maintained as free-ranging populations without direct management interventions, unless this is required to achieve specific ecological outcomes and to avoid undesirable impacts on the values of the reserves (ACT Government 2010b; ACT Government 2012).

In Namadgi and Tidbinbilla, natural population limitation factors are allowed to operate on populations to aid in managing numbers, in particular, food limits and predation (ACT Government 2010b; ACT Government 2017); see Figure 3 (Map generated from data derived from: ACT Government 2010b; ACT Government 2012; ACT Government 2018b; ACT Government 2019b; ACT Government 2020c; ACT Government 2020b). Kangaroos in these areas may be euthanised if seasonal conditions and food shortages result in starving kangaroos, particularly around areas of high visitor use.

4.3.3. Rural lands

In addition to the conservation cull on public lands, land designated as rural which is incorporated into the non-urban zone in Figure 3 also contain large populations of kangaroos. Authorisations can be made under the EGK CNSMP to cull kangaroos on rural lands for damage mitigation purposes. The maximum number of kangaroos that can be culled on a property is determined by the Rural Culling Calculator under the EGK CNSMP (ACT Government 2017).

The number of kangaroos licensed to be culled and reported to be culled has been trending upward since 1997. An average of 7,791 kangaroos were licensed to be culled between 1997 and 2015 (ACT Government 2017), while the average reported culled was 5,109. In 2015, 20,722 kangaroos were licensed to be culled with 11,130 kangaroos reported to be culled (ACT Government 2017). Table 3 shows the number licensed and number reported to be culled over the past 19 years.

Table 3. Number of kangaroos licensed to be culled and actual number of kangaroos culled on ACT rural lands (ACT Government 2017).

Year	Number licensed to be culled	Number reported culled
1997	2966	1443
1998	5291	4011
1999	3638	2593
2000	3514	2961
2001	3316	2419
2002	4178	2921
2003	3745	2493
2004	3812	3218
2005	5170	3162
2006	4424	2151
2007	4178	3384
2008	7212	6193
2009	6967	5746
2010	7179	5367
2011	14,030	9381
2012	10,153	6222
2013	17,638	11,477
2014	19,898	10,808
2015	20,722	11,130

4.3.4. *Culling season*

The conservation cull and the majority of the damage mitigation cull are undertaken during the ACT kangaroo mixed sex shooting season, which runs from March to July annually and is set to avoid the time of year when most females have large dependent young (ACT Government 2017). A small amount of male-only culling is undertaken on some rural properties from August to October. The culling season affects the time frame for when carcasses are available.

4.3.5. *Road deaths*

Car accidents involving kangaroos and steps to avoid them are a considerable public and private cost in the ACT. The cost of these collisions are the direct costs of vehicle damage and the indirect costs of injury and even death. Dunne (2017), conservatively estimated that over \$10 million dollars in insurance claims for collision with kangaroos were made in the ACT in only 15 months. Panel beaters say kangaroo collisions are a major source of their work, despite fences being constructed to stop kangaroos from entering some major arterial roads. Between 2016 and 2019, 13,228 kangaroos involved in vehicle collisions were attended by ACT rangers, which is an annual average of 3307 per year (William Nguyen, pers. comm.) and comparable to the number of kangaroos culled for conservation. Most carcasses are left on the side

of the road or pulled into adjacent bush. To reduce waste, they could be utilised by some of the options identified in this report, if deemed appropriate.

4.3.6. *Operational context for management in Canberra Nature Park*

In addition to the requirement for mixed-sex culling to be undertaken within the ACT culling season (March-July), a number of additional operational constraints affect the availability and potential utilisation options for kangaroo carcasses produced during the annual conservation culling program within Canberra Nature Park. Any new processes introduced to enable carcass utilisation will need to be compatible with these constraints or seek to adjust current processes where a clear benefit of doing so can be demonstrated.

For example, safety requirements require that the reserves and adjacent unleased territory land impacted are formally closed to the public under the *Nature Conservation Act 2017* and the *Trespass on Territory Land Act 1932*; making access to these reserves by the public an offence under these Acts during this time.

To balance the need to deliver the kangaroo management program with the need for the community to have access to these public spaces for recreation, active travel and other uses, the conservation cull is delivered across an approximate 8-week period, usually during late autumn or winter, where reserves are formally closed to the public from early evening to early morning, Sunday to Thursday. This delivery approach further constricts the time over which carcasses are available to potential end users, in order to meet community expectations surrounding unrestricted access to public areas.

Further operational constraints are also introduced in the field in order to achieve the level of program efficiency required to deliver the culling program within this tight window. For example, an average nightly total of 75 animals per shooting team is required to meet program delivery expectations (and budget constraints) in exceptionally complex operational circumstances involving low or no-light shooting in highly urbanised environments. Safe operating zones apply close to residential dwellings. Interference by members of the public both intentional and accidental, causes a safety risk.

To ensure animal welfare standards are met, operations are also often overseen by a veterinarian and a double-checking procedure is followed to ensure strict compliance with the National Code of Practice, including rapid euthanasia of dependent young.

4.3.7. *Current kangaroo carcass disposal*

Most kangaroo carcasses from the ACT Government conservation culling program are disposed of at a waste processing facility. A few carcasses are processed into fox and dog baits for use by the Parks and Conservation Service.

An alternative to pit disposal is highly desirable and has been a major driver for the preparation of this discussion paper. Pit disposal does not align with ACT Government Waste Management Strategy to reduce organic waste to landfill, nor does it meet community and stakeholder expectations.

Carcasses resulting from damage mitigation culling are typically left in-situ on farms or may be used domestically by the landholder.

Kangaroo carcass utilisation must be balanced with a consideration of the sensitivities with the use of a native animal, the sensitivities with culling, the potential utilisation of this material for Indigenous communities and the humane management of kangaroos in general.

Figure 4 shows the origins of kangaroo carcasses in the ACT and their fate. Dashed lines represent unknown values and solid lines represent known values. Numbers are averages for the following years; left in field, 1997-2015; taken to land fill, 2015-2019; rural properties licensed to be culled 1997-2015; and roadkill, 2016-2019; while the conservation reserves figure is the current operational maximum.

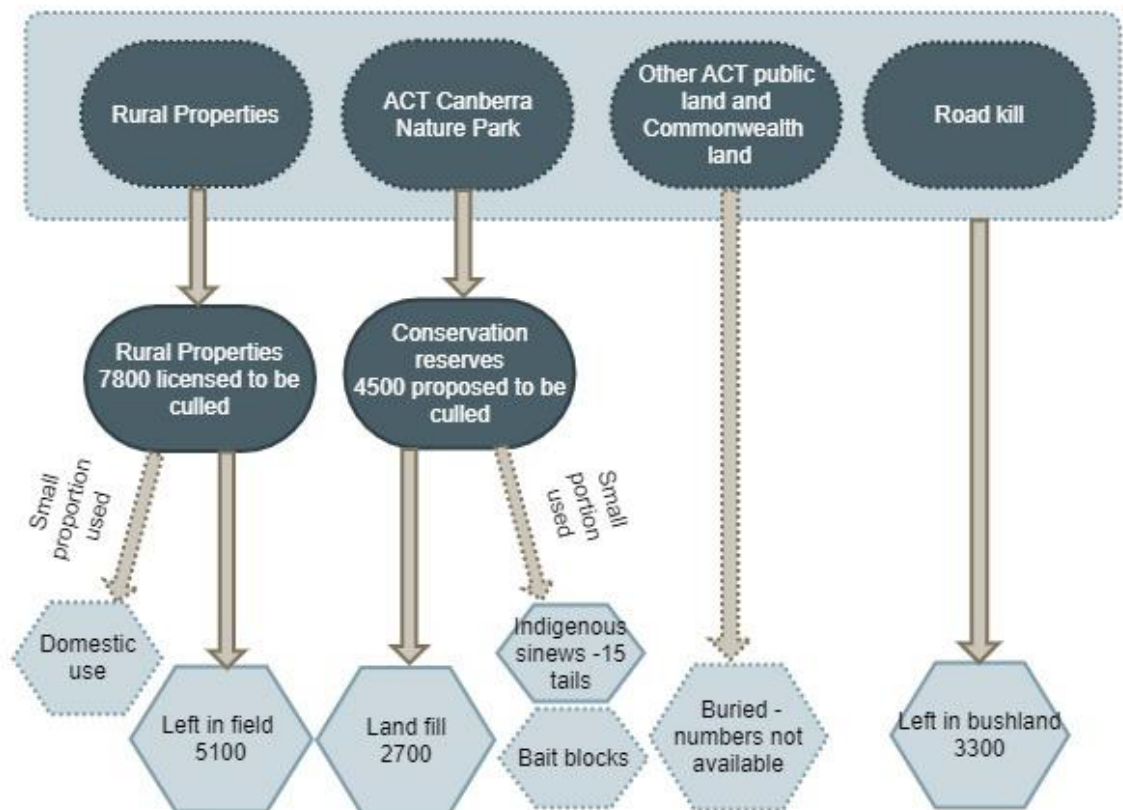


Figure 4. Source and fate of kangaroos culled or killed annually in the ACT. Dashed lines represent unknown values and solid lines represent approximate known values.

5. OPTIONS AND OPPORTUNITIES

5.1. Currently available use options

For each option, Table 4 nominates beneficiaries, if it is already in use, an estimate of the number of carcasses that could be handled over the 8 week period of the cull from the CNP, any policy adjustments and alignments, cost and if it would be shared by government and relevant commercial/non-profit organisations, and infrastructure needed in or near ACT.

Table 4. Options available for managing ACT kangaroo carcasses.

KANGAROO CARCASS UTILISATION IN THE ACT - A DISCUSSION PAPER

Option	Beneficiaries	Already in use?	Use capacity over an 8-week window	Requirements and policy alignment	Costs incurred	Infrastructure in place
Baits for invasive predator management	ACT PCS invasive animal control programs	Yes, to a very limited extent	3600 x 250g blocks Requires quality of bait and amount of fat to a agreed standard	Constrained by limited volume required Consistent with Waste Management Strategy and Pest Animal Management Strategy.	Field dressing Transport Frozen storage	Yes, baits are frozen for use at a later date
Biodegradation in the field (current rural cull option)	Some ecological benefits (see section 5.1.2)	No	Nil	Carcasses or parts thereof cannot be left in public reserves. Concern about nutrient loading of soils Unlikely to be consistent with Waste Management Strategy.	\$ nil	Yes
Food for captive carnivores	Carnivore keeping and breeding organisations	Yes, (from culls in other States)	~700 small, dressed carcasses.	Storage Field dressing License conditions amended Export license / Import license Consistent with conservation objectives of program and Waste Management Strategy	Field dressing Chiller for storage Refrigerated transport to interstate facilities	Yes
Compost /fertiliser	Composting company	No	Depends on a available green waste and space at the time.	Capacity unknown License conditions amended Export/import license may be required Transport to composting facilities Consistent with Waste Management Strategy	Transport to composting facility	Yes
Dhangarn (food) for human consumption	Indigenous community – organisations supporting cultural maintenance	No	Approximately ~ 2000 large carcasses to the carcass processors interstate.	Game meat food safety standards and authority are needed in the ACT Shooters would need to field dress carcasses inside time constraint Processors would negotiate quantity of meat and skins to be returned all year round to Indigenous community to cover their costs. (See legislative and policy requirements in Section 7.3) Consistent with Waste Management Strategy	Field dressing Interstate processors would maintain and meet costs of carcass receiving facility	Yes, processors would supply chillers
Indigenous cultural use	Indigenous community and training programs	No	Approximately ~ 2000 large carcasses to the carcass processors interstate	Skins and tails would be supplied by processor as required all year round	Options would be implemented alongside Dhangarn (see in table above)	Yes, processors would supply chillers

KANGAROO CARCASS UTILISATION IN THE ACT - A DISCUSSION PAPER

Insect food for frass production	Frass producers	No	24 tonne offal, innards, meat and hide (over 8 weeks)	License conditions amended Need to experiment to take bone If bone not suitable for frass production, carcasses dressed (on-site or off site) Consistent with Waste Management Strategy	Transport to facilities Carcass dressing	Yes, offal and discarded body parts would be collected from field dressing
Pit burial	Nil	Yes	All carcasses	Not consistent with ACT Waste Management Strategy	\$6 per carcass for disposal Transport costs from site to waste facility.	Yes
Tallow and protein meal	Animal meat rendering plants	No (yes for other species)	Can take 4000 tonnes (over 8 weeks) if it were available	License conditions amended Carcasses dressed Potentially require minimum amount Consistent with Waste Management Strategy	\$ nil if by-products collected by processor	Yes

The carcass use options identified in this study as being available for immediate uptake or continued use are presented in alphabetical order below. Further investigation is required for some options and discussion with recipients willing to accept carcasses.

5.1.1. *Baits for invasive predator management*

Currently a small number of kangaroo carcasses are used to produce meat baits for use in wild dog and fox control programs. There are some issues with the quality of baits produced. Under the current process, baits are processed in field and it is difficult to get a good consistent size and cut of meat that is suitable for a bait. If carcasses were processed at a facility rather than on site, better quality baits could be achieved. Carcasses for baits could be processed at a site within Canberra or they could be processed at a NSW facility. The advantage of sending them to a site in NSW is that the rest of the carcass can be used for something else (which would be limited in the ACT). The baits would be sent to the ACT Government for use in feral animal control programs (operational and non-commercial) which require approximately 3,600 x 250g bait blocks per year for dog and fox baiting.

5.1.2. *Biodegradation in the field*

Kangaroo carcasses can be left to biodegrade in the field, thereby playing a role in supporting biodiversity and in plant and soil processes. However, the effect of carcasses on biodiversity and soil processes is complex and depends on the surrounding environment, as exotic species can confound potential benefits. Barton *et al.* (2013) found that plant colonisation on kangaroo carcasses depended on whether the carcass was added to native-dominated or exotic-dominated grassland.

Biodegradation in the field currently occurs on rural properties but is deemed unacceptable by some landholders and in the conservation reserves. Some landholders attribute carcasses to fox attraction and see issue with the culling period aligning with lambing season, while there are health risks and aesthetic concerns associated with leaving thousands of rotting carcasses in public places. Some landholders have suggested extending the culling season; however, there are implications with this as the culling season was implemented to avoid the culling of female kangaroos with large dependent young.

Little is known about the long-term effects of carcass decomposition on ecosystems. Repeated vehicle collisions along high risk stretches of road, or after culling or control operations can lead to the concentrated 'piling up' or burial of carcasses. However local research led by the Australian National University (ANU) has made several important discoveries about kangaroo carcasses and their role in supporting biodiversity and plant and soil processes (Barton *et al.* 2016; Barton *et al.* 2019b). This research includes two important findings:

1. carcasses support a unique and species rich community of insects that provide a valuable ecosystem service and
2. localised nutrient inputs under a carcass generates a strong and long-lasting ecological hotspot for plant establishment.

These two findings mean that kangaroo carcasses contribute to natural soil, plant, and insect heterogeneity in the landscape. In this sense, carcasses are like coarse woody debris, isolated trees, and small water holes (McIntyre *et al.* 2015; Philip Barton, pers. comm.). Careful management of large animal carcasses is important to

maintain critical biodiversity and ecological processes in grassy eucalypt woodlands and other ecosystems. While carcasses from conservation cull are currently not left in the field, research could be conducted to determine if there would be benefits of leaving some carcasses without causing a problem in public places.

5.1.3. *Captive carnivore's food*

Whole kangaroo carcasses or butchered meat could be made available for carnivores in zoos, threatened species breeding facilities, domestic animal rescue or impoundment facilities. Recipients include large carnivores such as lions and tigers, dingoes and [REDACTED]

Local carnivore keeping organisations could use 6 carcasses initially and additional carcasses could be used at 4-6 weekly intervals. Local organisations are limited by their storage capacity.



An interstate breeding facility for native carnivores, (operational, non-commercial), located in NSW is interested in obtaining carcasses from the ACT. The conservation breeding program breeds [REDACTED] (Figure 5) and indicated that they could use approximately 700 small carcasses over an 8-week period. There would be some coordination required to field dress carcasses and have them cooled before they are picked up

Figure 5. Conservation breeding program uses kangaroo carcasses to feed a mainland captive breeding population of Tasmanian devils.

5.1.4. *Compost / fertiliser*

Kangaroo carcasses could be composted or be used to produce blood and bone-based fertiliser. A local composting company can take donated whole carcasses. The amount depends on the available green waste and land space they have at the time. This option could be used if it were not possible to distribute carcasses elsewhere.

Most compost generators in the ACT do not allow the use of meat. We were in contact with an individual, who indicated that he could take carcasses for compost soon, so we recommend keeping an open dialogue for when this site is operating. There was also an interesting suggestion from a local composting company which included the government running their own compost facility.

Turning the kangaroo carcasses into foliar fertiliser could occur through the process of hydrolysis. This is achieved through maceration and the addition of water, carbohydrate and inoculant. The product is fermented in large containers then applied to crops, or landscape as an organic form of nitrogen with additional nutrient. Research and tests using pigs supplied by ACT Parks and Conservation Services were completed and proven safe and practical by Dr Sara Beavis, Fenner School ANU. ANU also completed a trial using the process for feral carp processing for the National Carp Control Program. This work was also overseen by Dr Beavis (Howieson *et al.* 2019). This project requires staff training but only minimal

management after set-up. The Qld Government (2020) provides details and instructions on how to compost pig carcasses (www.daf.qld.gov.au/business-priorities/agriculture/animals/pigs/managing-environmental-impacts/pig-carcass-composting).

5.1.5. *Dhangarn (food) and cultural use*

Kangaroos once played a significant role in the sustenance of Indigenous Australians, and in ceremonies and cultural activities. The Indigenous community in the ACT region have indicated that they would like to make greater use of kangaroo products as Dhangarn (food in Ngunnawal language) and for cultural purposes, thereby continuing past practice and complementing traditional plant use as food and fibre. See Ngunnawal Plant Use Figure 6 below.

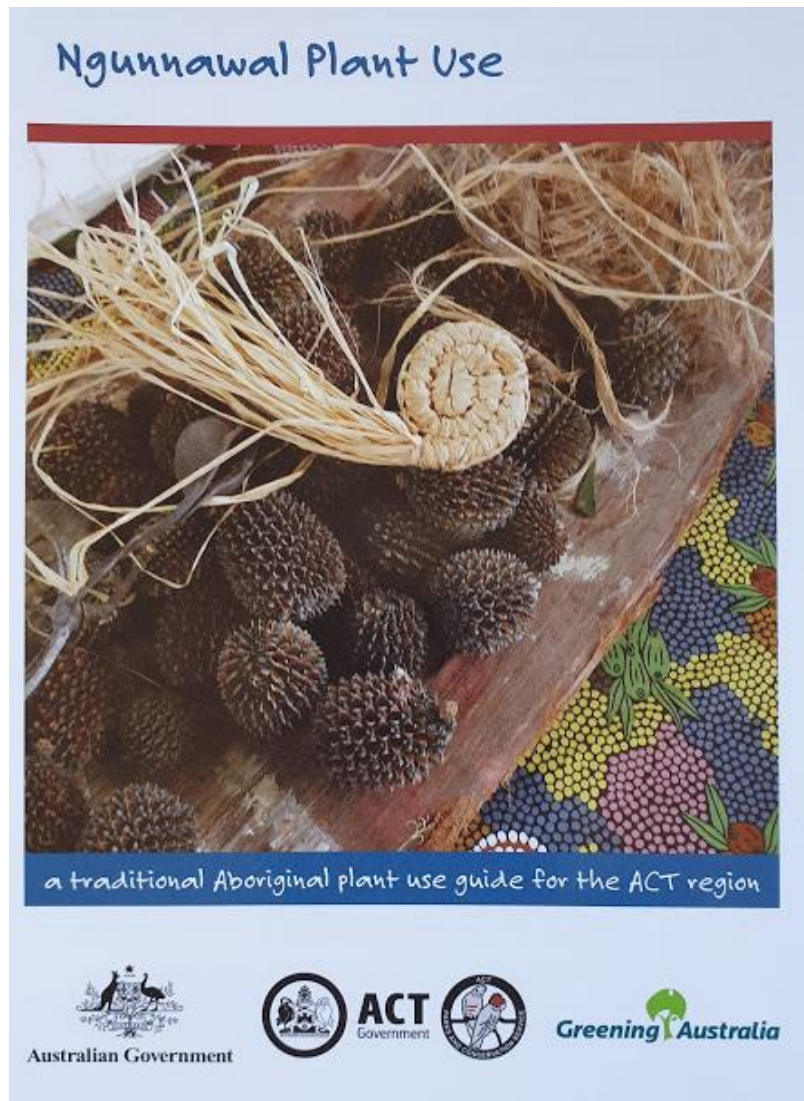


Figure 6. Cover of book describing extensive use of plants in the ACT region by the Ngunnawal community.

The suggested uses are:

- Meat and tails for fresh consumption (see 5.1.6 for processing requirements for human consumption)
- Fresh meat for drying as biltong or jerky
- Skins for tanning and preparation of ceremonial cloaks (Figure 7)
- Art – teeth, claws and any other parts of the carcasses could be made available for art (Figure 8)
- Sinews – Tails are taken for the extraction of sinews (for example, 15 were used in the 2020 conservation cull).
- Bone carving – while there were no bone carvers identified to use kangaroo bone from carcasses. This option may be reconsidered in the future but would not likely use many carcasses. It could be undertaken as part of Indigenous activities.

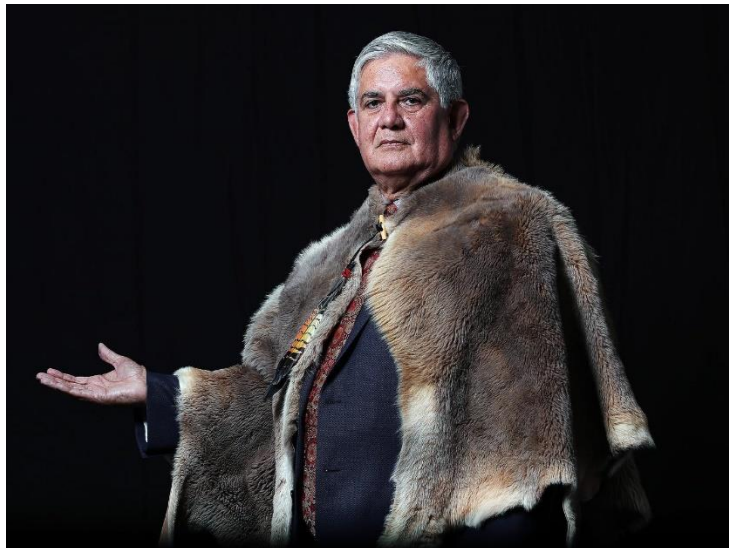


Figure 7. Hon Ken Wyatt AM, MP, Minister for Indigenous Australians wearing a booka, a symbol of Aboriginal leadership made of four kangaroo skins. Picture Gary Ramage.



Figure 8. Kangaroo tooth necklace with kangaroo toe by artist Maree Clarke, licenced to AIATSIS.

Ngunnawal Bush Healing Farm

Some of the proposed cultural activities could be undertaken at 'Miowera', a 368-hectare property 35 km from Canberra's Central Business District, which operates now as the Ngunnawal Bush Healing Farm, and is administered by Canberra Health Services within the ACT Government Department of Health (Figure 9).

The Ngunnawal Bush Healing Facility addresses the need for a culturally based alcohol and drug rehabilitation centre for members of Aboriginal and Torres Strait Islander communities. The objective of the centre is to establish and manage an Aboriginal and Torres Strait Islander rehabilitation 'health farm' as a strong cultural base to:

- Rehabilitate and strengthen Aboriginal and Torres Strait Islander young people and their families who are 'at risk'
- Foster self-determination amongst Aboriginal and Torres Strait Islander people, especially young people, by linking them with work, education, training, health, and well-being programs
- Sustain Ngunnawal identity, spirituality, and culture, especially for Aboriginal and Torres Strait Islander children and young people.



Figure 9. Miowera – the Ngunnawal Bush Healing Farm.

Indigenous detainees of ACT Corrective Services

Representatives at the [REDACTED] have indicated that meat and skins from the conservation cull could be donated to the [REDACTED] for consumption (meat) and for tanning (skins). Preliminary positive discussions have been held with the [REDACTED] at the [REDACTED]. Further proposals are needed with the Commissioner of the Centre and to determine the quantities that could be used.

Yarning Centre – Jerrabomberra Wetlands

Representatives from the [REDACTED] have indicated that kangaroo products could be part of a reinvigorated [REDACTED] project hosted at the Jerrabomberra Wetlands in partnership with the Woodlands and Wetlands Trust and ACT Parks and Conservation Service. It would continue the range of activities which began in 2019 through a structured program that would enable participants to work on country as well as undertake a range of cultural learning and mentoring initiatives and more formalised certified training (through Canberra Institute of Technology (CIT) for example).

The [REDACTED] supports former inmates of the [REDACTED] get back into the workplace and with starting Indigenous businesses. In 2019 the project had been supported by the [REDACTED], ACT Parks and Conservation Service, [REDACTED], [REDACTED], [REDACTED], Traditional Owners, [REDACTED] and [REDACTED] of Canberra Burley Griffin. Again, further work is required to determine the number of carcasses that could be utilised.

5.1.6. Commercial human consumption and pet food

Kangaroo carcasses can be processed for human consumption and sold domestically or exported. Bones can be used by broth makers. Carcasses can also be processed as pet food, although standards (and facilities) of most are the same as for human consumption. Bones may also be fed to pets.

For human consumption, and for pet food production, carcasses would need to be processed to national (and in some cases international) health and production standards. Sanitation and quality control standards would need to be met to enable processing of carcasses for human consumption.

After shooting, the kangaroo needs to be hung, bled and field dressed without undue delay. Field depots (or chillers, which are transportable and can be placed where needed) are used for holding game carcasses under refrigeration until transported to a game processing establishment.

Kangaroos would need to be taken in compliance with Quality Assurance (QA) programs to ensure a hygienic product. Facilities need to be licensed and audited by meat hygiene regulators. Hazard Analysis and Critical Control Points (HACCP) based food safety programs inclusive of microbial monitoring which comply with the Australian Standard for the Hygienic Production of Game Meat for Human Consumption are required (Food Regulation Standing Committee 2007). They conform to a uniform national standard compatible with processing standards to other meat products but with additional requirements covering game such as:

- Carcasses must be reduced to a deep muscle temp of 7 °C within 24 hours of slaughter and held at that temperature until processing
- Harvest vehicles are to be at required standard, with all surfaces washable and with hand wash and knife sanitation facilities available etc.
- Carcasses be processed within 14 days of slaughter

Only the larger carcasses from the ACT could pass to interstate licensed dealers for processing. Smaller carcasses would be used for carnivore food and other options. NSW processors must not accept carcasses weighing less than 14 kg, from which

the heart liver, lungs, tail, forearms (below elbow) and feet (below tarsals/fibula joint) have been removed, or less than 15 kg, from which any of the above listed body parts are still attached, or where an entire carcass weighs less than 20 kg (NSW Government 2020a).

It is our understanding that current contracted shooters could be readily trained to meet these Quality Assurance requirements. Issues of timing do arise for field dressing carcasses from the conservation cull. Speed is needed without impacting on operational efficiency of the program or creating additional risks to staff or to community safety.

There are currently no facilities for processing to human consumption standard in the ACT, hence the need to process dressed carcasses interstate.

5.1.7. Insect food for frass production

A local frass producer (operational, commercial) has indicated that they could take kangaroo carcasses culled in the ACT from the conservation cull. Donated offal, innards, meat and hides would be fed to insects to produce frass, a high nutrient soil conditioner (Figure 10).

The Company could take 3 tonne per week. If offal, innards, meat and hides weighed 15 kg, they could potentially use 1,600 carcasses over the 8 weeks of the conservation cull.

The Company has also suggested that it may be able to use bones but would need to experiment first. If bone can be used successfully, they may be able to take the whole carcass, therefore reducing the need for processing.

If the option is adopted of enabling human consumption of kangaroos from the conservation cull by Indigenous community and retrieval of skins for cultural and employment purposes, the frass producer would take delivery only of offal and other putrescible material derived from field processing. The field dressed carcasses, minus offal and blood would be chilled before processing by commercial kangaroo processors for skin removal and boning out.



Figure 10. An ACT company which uses insects to turn putrescible waste into a nutrient rich soil additive.

5.1.8. Skins and hides

There are no processing facilities within the ACT available to skin or tan kangaroo hides. Some carcasses could be hand skinned and the product tanned as a craft product (Figure 11). Other skins could come from the interstate processors on separation at their facilities.

Kangaroo leather has very high strength for weight ratio and has been used for a wide variety of purposes, including top of the range football boots.



Figure 11. Tanned kangaroo skin which retails for \$150.

5.1.9. Tallow and protein meal

Carcasses of animals may be rendered to convert waste into a stable usable material. Tallow may be used for products such as soap. Protein meals provide protein and amino acids in stock food diets and can be used as organic fertiliser.

An animal meat rendering plant, NSW, have expressed interest in processing donated whole carcasses, or bones and skins for tallow and protein meal. They can take 500 tonnes per week (4,000 tonnes over 8-week period) which means they could take all culled carcasses. The rendering arm of their business recycles meat and poultry by-products from abattoirs, retail butchers and meat processors, into high-grade protein meals and tallows. Drivers collect the fat and bone waste from various locations and deposit them to relevant plants.

5.2. Prospective opportunities

The following are prospective opportunities for carcass utilisation which are not currently available in or near to the ACT.

5.2.1. Ash

Biosolids from other waste streams are cofired with diesel in a hearth furnace to produce an ash - a high calcium, phosphorus, and micro-nutrient soil improver. The ACT waste management strategy states that the ACT currently generates 38,000 wet tonnes of biosolids a year from ACTEW's Lower Molonglo Water Quality Control Centre (LMWQCC). We investigated the opportunity to process carcasses with biosolids from the LMWQCC. However, the LMWQCC is not designed to accept external waste and their licence does not allow for the treatment of external waste. ACTEW's Strategic Review of Sewage Treatment Services includes options for managing biosolids and provides an opportunity to transition to a more sustainable integrated solution for the management of biosolids in the ACT. Future work could include working with ACTEW to incorporate carcasses into their sustainable integrated solutions.

5.2.2. Bioenergy

Waste from carcasses can be used to produce biogas for electricity and heat generation. The Goulburn Biogas Project consists of Southern Meats, a Goulburn abattoir, and ReNu Energy, a Queensland power producer, to treat the abattoirs effluent and organic waste in a covered anaerobic lagoon to generate biogas for electricity production. The waste is converted into bioenergy that then powers the abattoir. The project supplies approximately 4,000 MWh of energy annually, representing over 50 % of the abattoirs power consumption. The plant generates a reduction in the overall carbon footprint of the abattoir, by approximately 18,000 tonnes CO₂e/annum, equivalent to 4,000 cars driven for a year. Increasing numbers of abattoirs, dairies and piggeries are using these systems in Australia. While there are no known current facilities in the ACT operating in this capacity, the LMWQCC has indicated that as an alternative, that biosolids could be processed with other waste streams which would increase the energy yield from a bioenergy facility. While this option is currently not possible, we recommend that future analysis of carcass use further explore this option. The carcasses could be fed into a new ACT developed project, or potentially feed into the Queanbeyan Palerang City Council's (NSW) new wastewater treatment plan which may have anaerobic digestion.

5.2.3. *Biomedical high value products*

Kangaroo may be used for biomedical research; examples include as transplants of kangaroo derived ligaments and the use of kangaroo pericardiums, for use in the manufacture of heart valves.

Tendon transplants

Kangaroo derived ligaments are being used to address growing demand for reconstructive ligament material following injury (IMCRC 2019). While still in the research phase, kangaroo resource material is required by research companies. A supplier in the South East NSW zone is establishing a sterile room in order to provide tails to the research facility (Robert Gallina, pers. comm.). The tendons will come from kangaroo tails from kangaroos harvested under the NSW commercial kangaroo management program. The tails will go into a separate sterile room and frozen. The remainder of the kangaroos will be processed for human consumption (70 %) or pet food (30 %). Most will be exported however there is still strong demand from the domestic market.

Heart valves

Research has also examined the kangaroo pericardium, which has been identified as the preferred candidate material for use in the manufacture of the leaflets of percutaneous heart valves (Meng *et al.* 2019). To date, the Therapeutic Goods Administration has not approved use because kangaroos are wild, causing issues with traceback identification (Michael Bennett, pers. comm.). While the ACT contains mostly wild populations, it also contains several effectively captive populations that could be further investigated to source biomedical specimens which require traceback identification. While there are no current investigators examining sources, the ACT captive populations could be flagged for need in the future.

5.2.4. *Research resource/teaching aid*

Carcasses (or parts thereof) can be used as an aid to teach tertiary students' subjects such as anatomy, physiology, disease, forensic analysis and genetics, or could be included in research projects.

Research Schools such as the Research School of Biology, Fenner School of Environment and Society and John Curtin School of Medical Research (ANU), the Institute of Applied Ecology (University of Canberra) and the Science Department (CIT) were contacted to determine if kangaroo carcasses (or parts thereof) can be used as an aid to teach tertiary students courses such as anatomy, physiology, disease and genetics. There are no known legal impediments unless the carcasses are to be used under a commercial teaching operation. In this instance, a licence would be required under the Nature Conservation Act. Carcasses would need to be used immediately or kept frozen. Most tertiary education complexes have large freezers which could accommodate a few carcasses; however, ability to take in would depend on need and the size of the facility and number required. Ethics approval would need to be obtained by the facility, even if the carcasses are obtained opportunistically. Currently, teaching and research institutions have their courses or projects already prepared; therefore, it is not surprising that institutions are unable to accept carcasses without a period of planning and developing. We

recommend an open dialogue between EPSDD and the institutions to further support the potential for carcass use as an educational resource, should they be required.

6. SUGGESTED STEPS TO ACHIEVING BETTER UTILISATION AND WASTE REDUCTION

The processes set out in the following paragraphs and presented diagrammatically in Figure 12 and Figure 13 are suggestions for utilising kangaroos and thereby minimising waste, based on review of the options outlined in Section 5.

6.1. Conservation cull on public land

For the purposes of this analysis it is assumed that the ACT Government continues to engage professional shooting contractors to conduct the conservation cull alongside suitably qualified agency staff, and that these costs are **not** offset by commercial returns from kangaroos culled. This section also assumes the conservation culling program continues to result in carcasses being made available over an 8-week period, consistent with balancing conservation management obligations with public access to nature reserves.

Figure 12 shows an overview of the suggested process. The carcasses could be field dressed onsite in the ACT Nature Reserve or transported offsite intact to a location where offal and offcuts could be collected. Choice of this dressing site will vary with location, proximity to storage and processing facility and security concerns.

The offal and offcuts could be passed to a company which manages putrescible waste using insects that convert waste to a soil conditioner.

Smaller carcasses could be delivered locally for carnivore food to carnivore keeping organisations

Others could be picked up or stored for interstate use as carnivore food. Conservation breeding programs can take 700 small carcasses over the 8-week period.. Storage may be required at the cost/organisation of breeding programs.

Other small carcasses could be used as a source of meat baits for ACT predator control (approximately 3600 x 250g blocks in 8 weeks) to protect species at conservation risk.

Larger carcasses, estimated at 2,000 in an average year, could pass to interstate processors. Field operations and carcass dressing would need to be modified to meet human consumption standards so that they could be received by interstate processor(s). A Wildlife Trade Operation (WTO) or Wildlife Trade Management Plan (WTMP) would need to be prepared. Existing population surveys undertaken annually in Canberra Nature Park would likely address this requirement as part of a wildlife plan.

No payment would be made by the processors for receiving the carcasses. Instead, they could return a proportion of the meat at human consumption standards from their processing facilities to the ACT Indigenous community. Under proposals in this discussion paper, carcasses would be available from interstate processors free of charge for the ACT Indigenous community under an exchange for carcasses delivered from the conservation cull. Some could be further processed by

Indigenous participants to jerky, where relevant food safety standards were met. Skins and tails could also be returned for Indigenous use.

If the above process proves to be successful, the ACT Government could further negotiate with interstate processors to supply kangaroo meat to organisations serving vulnerable people.

The numbers of kangaroos passing into the interstate processing chain and the number returning without charge would need to be negotiated. Preliminary discussion with processing companies indicates that meat from half the number of carcasses taken, say 12,000 kg, could be gifted to the Indigenous communities.

Through this proposed process Indigenous Canberrans receive kangaroo meat at human consumption standards, plus skins and other cultural artefacts at no cost to themselves nor financial reward to the ACT Government from the conservation cull. Kangaroo products, including skins, could be supplied to the Indigenous community any time during the year, just as they are already available from supermarket shelves, and not just during the ACT's kangaroo culling season.

The full costs and implementation of field dressing may be offset by savings on the current disposal fee of \$6 per carcass; however, this would need to be fully costed.

6.2. Rural cull

Rural lessees have the option of continuing current arrangements under which they either leave carcasses on the ground or use them domestically, often as animal food. The EGK CNSMP does allow for the use of carcasses for damage mitigation purposes with approval from the ACT Government (see description page 57 "(A)ny future proposals for the utilisation of carcasses resulting from culling programs in the ACT will be considered by the government on a **case-by-case** basis"); however, they cannot be sold so it is unlikely that landholders will apply for approval under current conditions.

This paper proposes that rural landholders or their professional shooters be given the option of selling carcasses to interstate operations and processing facilities. They would have to comply with interstate hygiene and other requirements. See more detail in sections 5.1.6 and 7.3.

Some rural lessees are paying shooters to remove unwanted kangaroos; and thus, having commercial shooters do the job at no cost to them would be a saving. Landholders have complained that they pay up to \$1,000 per night for professional shooters to cull kangaroos on their properties with no guarantee of the number of kangaroos to be culled. Others say they pay \$30 for each kangaroo killed.

Figure 13 shows the options available for carcass use from the damage mitigation cull. The implications and requirements for adoption of this option are discussed below.

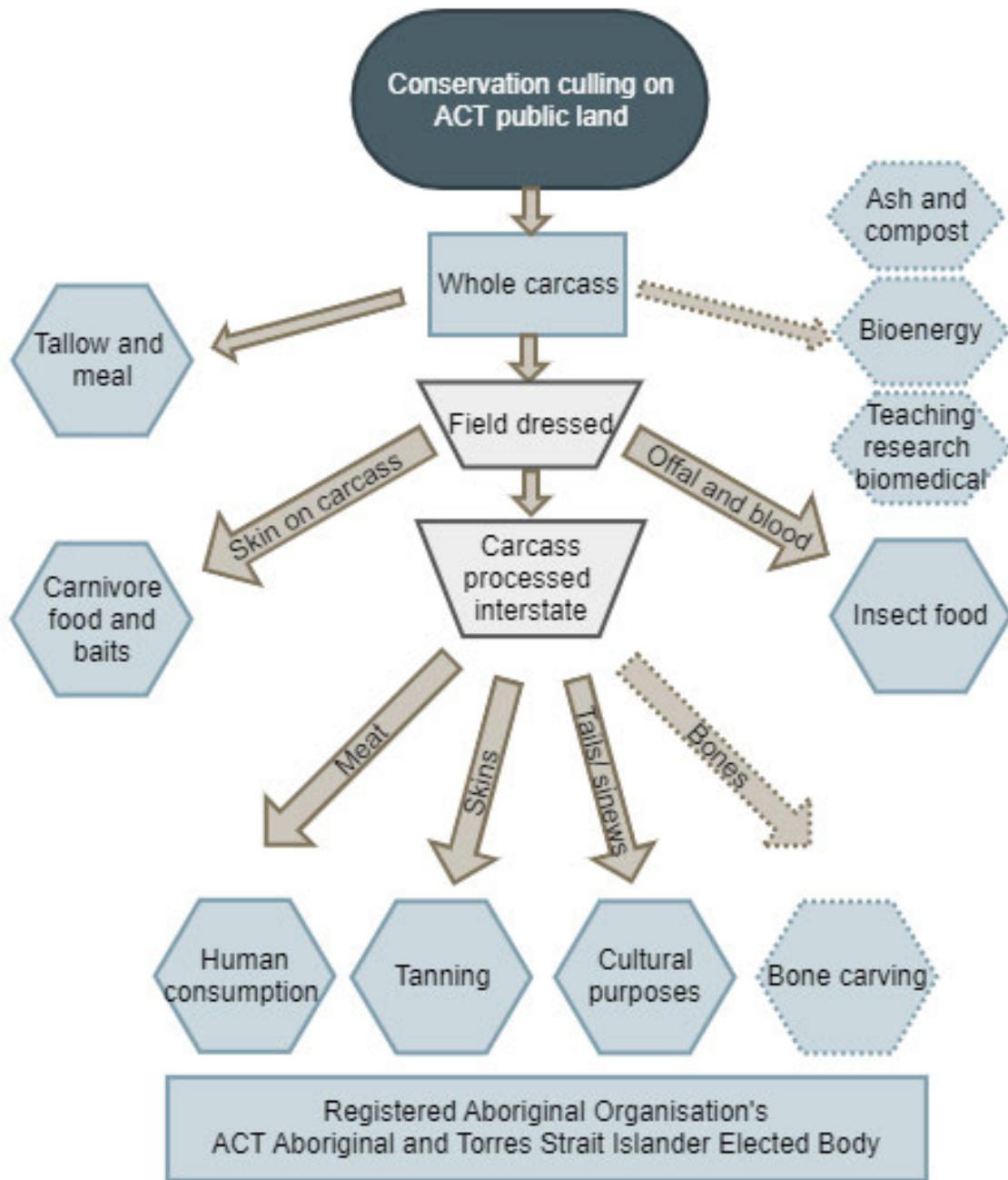


Figure 12 (repeat of Fig 1). Suggestions for carcass use from conservation reserves. Dotted boxes represent currently unavailable options.

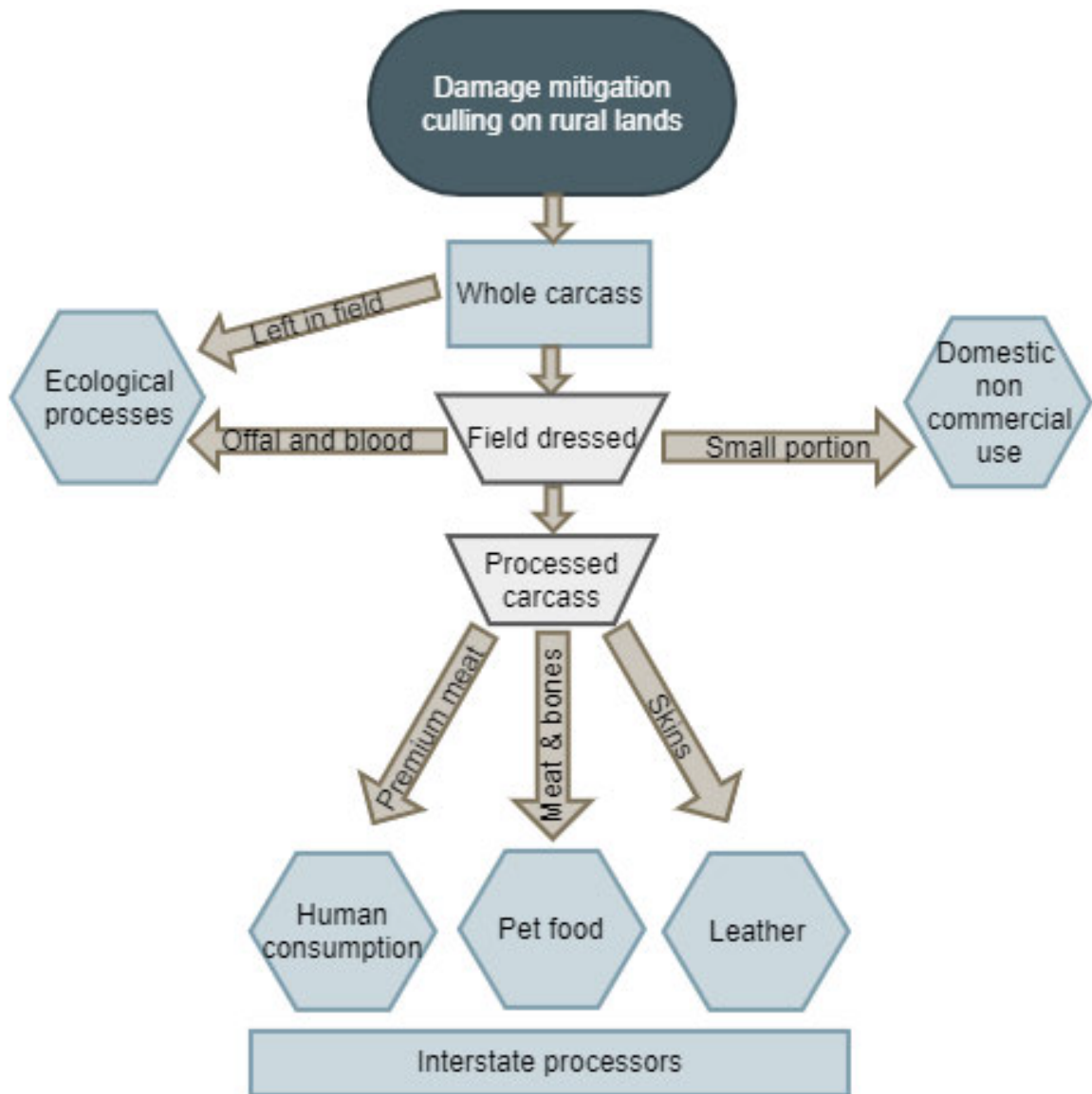


Figure 13. Options for carcass use from rural leases.

7. REVIEW OF THE 2011 FEASIBILITY STUDY INTO THE COMMERCIAL DISPOSAL OF KANGAROO CARCASSES

7.1. A Summary of the 2011 Feasibility Study into the Commercial Disposal of Culled Kangaroo Carcasses

A requirement of the task which we undertook was to review the 2011 Feasibility Study into the Commercial Disposal of Culled Kangaroo Carcasses in the ACT.

In 2010 the ACT Government commissioned a feasibility study into the commercial disposal of culled kangaroo carcasses in the ACT. The study explored two options:

1. ACT to process and market carcasses
2. ACT to supply carcasses to NSW processing and marketing

Under the first option, the ACT would establish its own kangaroo industry. The 2011 study defined two subcategories of the first option:

- 1a the product is consumed entirely within the ACT or
- 1b the product is exported interstate and/or overseas

Option 1 was not considered feasible for following reasons:

- There are no pet food processing plants, human consumption processing plants or tanneries in the ACT
- Building processing plants would be expensive
- ACT would need to accept kangaroos from NSW in order to be economically viable
- An ACT plant with a regional role, would need to have industry standards that align with NSW
- Products destined for export would need to come from a program or plan approved under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth; EPBC Act)

Under Option 2, the ACT would make its carcasses available to the regional NSW kangaroo industry; in effect the ACT would be incorporated into the South East NSW Kangaroo Management Zone. This was considered the most attractive option; however, three key issues were highlighted.

The first was that NSW licences for commercial harvest are provided for kangaroos harvested on private land. ACT kangaroos are culled on public land for conservation purposes and would not be accepted in NSW.

The second was that products destined for export would need to come from a program or plan approved under the EPBC Act.

The third issue was that demand for kangaroo carcasses was weak, prices were low and importing ACT carcasses would make the situation worse. Interstate permits would not be given to protect the capacity of other state's commercial kangaroo management programs.

In conclusion, the 2011 study found that given the significant start-up costs of an industry in the ACT and the existence of large processing operations elsewhere, a

commercial kangaroo harvesting operation (through either option) would not be pursued in the ACT in the foreseeable future. In addition, the costs of administering and monitoring a commercial operation are likely to be significant and a disproportionate response. Commercial disposal of 2,000 culled carcasses would not be cost effective and would remain so even if the ~4,000 kangaroos culled on rural properties annually were included.

7.2. Are the 2011 findings still relevant in 2020?

Our review of the 2011 Feasibility Study follows.

7.2.1. Option 1 – Establish processing facility in the ACT

In 2020 there are still no pet food processing plants, human consumption processing plants or operating tanneries in the ACT for any animal let alone kangaroos.

A large continuous throughput of kangaroos would be needed to make a processing facility economically viable. Animals from ACT would only be available during the culling season and animals from the conservation cull would not be available for sale due to policy constraints.

Even if kangaroos were available to be imported into the ACT from the South East NSW region, at current prices and numbers available, it would be unlikely to provide a positive return on investment, be profitable and justify the establishment and operating costs.

Our review leads us to conclude that the finding of the 2011 review remains valid - establishing an ACT processing facility in 2020 is not economically justifiable.

During discussion on kangaroo use options at a meeting of Dhawura Ngunnawal Committee, Ngunnawal elders indicated that they thought a further feasibility study should be conducted. Elders seemed attracted to the idea that Ngunnawal could own and operate a processing plant in the ACT.

7.2.2. Option 2 – Supplying interstate kangaroo processors

On the other hand, changes to the industry and further consideration of interstate and national policy and legislation, suggests that the second option of supplying interstate processors would be a viable option. We have reviewed the three main concerns in the 2011 study and a potential way forward has been identified.

The 2011 report concluded that kangaroos taken on conservation lands could not be processed commercially (Issue 1).

In NSW, under the NSW Commercial Kangaroo Harvest Plan, kangaroo carcasses must be taken on private land. NSW kangaroos cannot be accepted into the commercial industry chain if they came from conservation culling or damage mitigation licences.

However, each Australian jurisdiction is responsible for managing its own populations of kangaroos and South Australia and Western Australia do allow harvesting on public lands. NSW does not determine the conditions for other States. NSW processors can (and frequently do) accept carcasses from commercial harvesters licensed by equivalent authorities from other States.

Therefore, if ACT carcasses meet the licensing conditions of the ACT, they should be accepted by interstate processors whether they came from ACT public lands or not.

The 2011 feasibility report also stated that domestic demand is so low (Issue 3) that kangaroo products would need to be exported (Issue 2).

In 2020, interstate kangaroo processors in Figure 14 say they could utilise all the kangaroo carcasses produced in the ACT. This result is surprising as the damage mitigation cull in NSW is greater than that of the commercial take. Some believe that the situation is drought related, while others believe it is the small price harvesters are paid. Either way, kangaroo processors have unmet demand; with one processor indicating that they are currently getting 200 carcasses per week but would like 2,000.



Figure 14. Kangaroo processing companies interested in obtaining ACT kangaroo carcasses for commercial consumption.

There has been interest from a processor in Dubbo to obtain kangaroo carcasses for the domestic pet food market. Globally the pet food market is a significant economic opportunity for wildlife products, with pet owners increasing the amount that they spend on their pets, and increasingly looking for differentiated quality products. Additionally, specifically branded raw wildlife meat that is sourced from conservation culling, may gain a premium in the marketplace.

7.3. Alignment with national plans and codes

7.3.1. Wildlife Trade Operation or Wildlife Trade Management Plan

For kangaroos taken in the ACT to be processed interstate by kangaroo processors that are licensed to export, the ACT would also need to be in a position for ACT kangaroo management to be approved under the EPBC Act. Section 303FO of the EPBC Act, ensures that kangaroo products cannot not be exported without an approved Wildlife Trade Operation (WTO) or a Wildlife Trade Management Plan (WTMP).

There are different types of WTOs one of which, developmental operations, might suit the ACT. The others include market testing operations, small-scale operations, provisional operations or existing stocks operations. Approval is for a maximum of three years. The WTO might convert to a WTMP if the ACT decided it wanted to proceed with commercial use. WTMP generally cover large-scale breeding or cultivation programs and are developed by the state or territory government agency responsible for managing the species. They may be approved for up to five years.

The 2011 feasibility report concluded that complying with EPBC Act requirements would be an expensive and administratively complex process. Our assessment is that it would be less so. The ACT could begin with a WTO and use an interstate document as a model. The industry could be asked to contribute to its preparation in order to gain access to kangaroos from rural leases. An approved WTO would also enable our proposal that kangaroos from the conservation cull be available for human consumption by the Indigenous community.

The WTO could follow the example of the Victorian Government's Kangaroo Pet Food Trial. Another model is the approval issued in 2020 to a Tasmanian processing company to export Bennett's wallabies (*Macropus rufogriseus*) and Tasmanian Pademelon (*Thylogale billardierii*) from Tasmania (Lenah Game Meats 2020). The WTO enables wallaby export until May 2023. The scale of wallaby harvesting, and culling is large and supports a stand-alone industry. Of 600,000 taken each year, 25,000 are used commercially for human consumption as meat, skins and fur (fibre). Most are consumed domestically.

Trace back and hygiene

The WTO would need to indicate a capacity for tracing carcasses using tags and ensure compliance capability.

Participants may need a licence to sell under the Nature Conservation Act, or alternatively, selling could be a condition in a revised version of the EGK CNSMP.

Harvesting would also need to meet the appropriate standards for the product being derived (for example, the Australian Standard for Hygienic Production of Game Meat for Human Consumption (Food Regulation Standing Committee 2007) or the Standard for the Hygienic Production of Pet Meat (Primary Industries Ministerial Council 2009)). See section 5.1.6 for detail.

Animal welfare

While the ACT has adopted the National Code for the Humane Shooting of Kangaroos and Wallabies for **Non-Commercial** Purposes (The Non-Commercial Code; NRMMC 2008b) as an approved code under the Animal Welfare Act (Section 22), the ACT would also need to adopt the National Code for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes (The Commercial Code; NRMMC 2008a) for kangaroos to be sold or traded. The differences should not be a problem as the ACT already goes further than the specifications in either code by requiring shooters to pass a shooter proficiency test (which includes marksmanship, species identification, and knowledge of the Code) every 2 years. We note that the RSPCA is advocating for a single national code. A revision of the commercial code was completed in November 2020 by an AgriFutures Australia Project Reference Group.

Population Surveys

Another cost of obtaining a WTMP/WTO where carcasses from outside of the conservation cull are to be included would be additional population surveys and reporting. While surveys are an integral part of the authorisations for the conservation cull within Canberra Nature Park, rural lands are not currently surveyed. However, they could be surveyed along with the NSW South East

Kangaroo Management Zone by adding about 75-80 km of transect lines to existing NSW helicopter surveys. The approximate cost would be \$3,500-4,000 for 2,400 square km of the ACT which would deliver a precision level of 40 %. A survey with a standard level of precision of 20 % would require about 300-320 km of on-transect effort and cost approximately \$9,500-10,000.

The ACT has commissioned NSW Department of Primary Industries to conduct an aerial survey of deer which may include kangaroos. This could serve as an initial survey for the application.

7.3.2. Cross border permits

For cross border trade a permit would be required to export from ACT and to import interstate. If both jurisdictions want the transaction to proceed there should be no difficulty. The precedents are in place for all other States and Territories and kangaroo products are routinely imported into the ACT.

Should difficulties arise in obtaining these permits support could come by referring to the NSW Cross Border Commissioner and the ACT-NSW Cross-Border Agreement. On 9 December 2016 the NSW Premier and ACT Chief Minister signed the ACT-NSW Memorandum of Understanding for Regional Collaboration 2016-19 (ACT Government & NSW Government 2016), which aims to enable cooperative leadership and management of strategic growth issues throughout the ACT-South East NSW region and recognise the cross-border relationships in service delivery, economic development and resource management.

7.4. Integrating kangaroo use with other rural enterprises

The commercial use of kangaroo carcasses from the ACT may encourage rural landholders to manage their kangaroos sustainably as part of their production systems. Graziers are expected to carry a legacy population of kangaroos on behalf of the wider society and most readily do so. If they were able to receive some benefit from their carcasses, they will be more likely to accept a higher kangaroo population on their land.

7.4.1. Raising the value of kangaroos

Increasing value of kangaroos taken from rural leases would encourage landholders to regard kangaroos as assets rather than liabilities. They would be encouraged to integrate kangaroos into their other pastoral activities and diversify their enterprises, create employment, enhance rural economic resilience, and improve animal welfare.

Kangaroo products have marketing and product advantages. The opportunity was reviewed by (Wilson & Edwards in press); kangaroo meat and skins are an environmentally friendly product, and a healthy source of red meat with animal welfare production advantages. Kangaroos have less physical impact on the environment compared to sheep, goats and cattle providing there are not too many of them. Cattle produce more methane than kangaroos - up to 145 times per head. Kangaroo meat is low emission and could generate carbon credits.

Mobile game processing units would enable products to be processed fresher, higher quality and price received. The NSW Food Authority has granted a licence for purpose-built mobile processing unit on farms in the beef industry. The technology consists of the processing unit, a truck carrying a portable cold room

and holding facilities for the offal, hides and other waste, and another carrying portable yards.

7.4.2. Industry development - Regional Development Australia ACT

Delivering these opportunities could be helped by Regional Development Australia (RDA) ACT which aims to provide a focused, high quality investment attraction and facilitation service. RDA covers food service value-add, recycling, renewable energy and tourism/hospitality and work closely with the Office of the ACT Commissioner for International Investment, Austrade and the NSW Government in bringing businesses to Canberra and the broader Capital Region.

Members of the Dhawura Ngunnawal Committee commented during consultation that they would support further examination of kangaroo industry development as an employment opportunity for their community.

8. CONCLUSION

Disposing of approximately 15,000 carcasses per year by pit burial or leaving them in-situ on farms is a waste that neither meets community expectations nor aligns with the ACT's Waste Management Strategy.

This study found seven options available for better utilisation of kangaroo carcasses generated from kangaroo management on public land. These include;

- Potential for carcasses to be fed into existing interstate commercial operating processes, with returns in the form of meat, skins and other products for use by local Indigenous groups
- Continued manufacture of baits for invasive predator control
- Continued direct provision of parts of carcasses such as skins and tails to the ACT's Indigenous community for cultural use.
- Potential for carcasses to be supplied to the carnivore keeping organisations, or interstate carnivore conservation projects
- Potential for carcasses to be provided to local organic waste recycling industries for composting or production of fertilisers

Re-examination of the 2011 review suggests that in 2020 it would be possible for kangaroo carcasses from the ACT rural lands to be absorbed into interstate processors as a means of reducing waste. Such innovation would require changes to current regulations and operational delivery of kangaroo management programs in the ACT. The changes appear not be excessive but nevertheless need to be estimated and compared to the goal of reducing waste.

Our proposal is that carcasses generated over an 8-week window from the conservation cull on the Canberra Nature Park would proceed in different directions depending on the number, size of carcasses, and the operational capacity of various possible recipients in any given year.

The larger carcasses from public lands would be put to the highest value human use. The balance of smaller carcasses would go to carnivore food for conservation programs and production of soil ameliorates and protein feed.

To avoid compromising the conservation goals of culling programs on conservation land, carcasses would be gifted for processing at human consumption standards. A proportion of meat and skins would be returned to Indigenous communities in the ACT without charge for cultural use and human consumption. These proportions are yet to be determined. If these suggestions are accepted in principle, more data is needed about numbers, costs, logistics and regulatory requirements to inform comparisons and decisions.

9. NEXT STEPS BY ACT GOVERNMENT

9.1. Determine demand by Indigenous community for kangaroo meat for human consumption

The Indigenous community has not indicated the size of their needs nor confirmation of the location of destination. The Covid - 19 pandemic has shut down some opportunities such as the Yarning Centre at Jerrabomberra Wetlands and Miowera – the Ngunnawal Bush Healing Farm.

If it is deemed acceptable to adopt the option of using carcasses from the conservation cull for human consumption by gifting them to ACT Indigenous community, then a formal offer should be put to representative bodies and the Government agencies who would be involved in taking up the option.

9.2. Confirm availability of cross border permits

If NSW, and possibly SA and Qld jurisdictions acquire ACT kangaroos, they would need to establish permitting procedures for the movement of animals into their States for processing. This should not be a problem; it happens readily across other State borders.

Kangaroo products returning to the ACT would be no different to those currently entering as processed kangaroo products for retail sale.

9.3. Prepare a Wildlife Trade Operation application to EPBC Act

ACT could prepare an application for a developmental WTO modelled on an interstate plan. Description of trace back capability, surveys and compliance with animal welfare codes would be included in the documentation for lodging with Wildlife Trade Unit of the Department of Agriculture, Water and the Environment.

9.4. Adopt the Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes

ACT would adopt the Code of Humane Shooting of Kangaroos and Wallabies for Commercial Purposes, so that ACT could provide carcasses to interstate processors for subsequent Indigenous use. ACT already sets more rigorous standards of shooter proficiency and protection of pouch young from inadvertent risk by operating a limited culling season, and through mandatory biannual shooter proficiency assessments.

9.5. Determine types of licenses needed for kangaroo chillers and processes for maintaining hygiene standards

Carcasses entering human consumption production chain would also need to meet game meat production standards. See section 5.1.6 for detail. Confirmation is needed for any new licensing processes.

9.6. Consider further waste reduction by expanding proposals to other culls

Waste could be further reduced if other carcasses culled in the ACT were considered for use, for example those from National land and public lands leased for other purposes such as plantations and golf courses. Combining carcasses from larger culls may make more options viable (for example, a large collection of carcasses could produce bioenergy) and contribute to the ACT meeting its zero-waste target.

Further discussions could identify how kangaroo carcasses produced by road accidents could pass through an option identified in this report.

9.7. Improve existing bait manufacture

Existing bait manufacture is small-scale, and ACT based. Review the potential scope for opportunities for expansion.

9.8. Continue liaison with local Indigenous communities

Respond to suggestion from Dhawura Ngunnawal Committee that the Indigenous community is interested in establishing a kangaroo processing enterprise as an employment development opportunity.

9.9. Continue discussions with organic waste management facilities

Discuss logistic required and numbers and type of carcasses and the offal to be taken for frass production or other organic systems.

9.10. Continue discussions with local and interstate carnivore conservation programs

Confirm logistics of storage and transport of small carcasses for carnivore food.

10. ACKNOWLEDGEMENTS

We appreciate the engagement of all the consultees and in particular with Ngunnawal Elders, and the Dhawura Ngunnawal Committee.

Parks and Conservation Service, Licensing and Compliance Unit was also most helpful. EPSDD, Conservation and Research and Biosecurity and Rural services staff provided valuable commentary on the draft.

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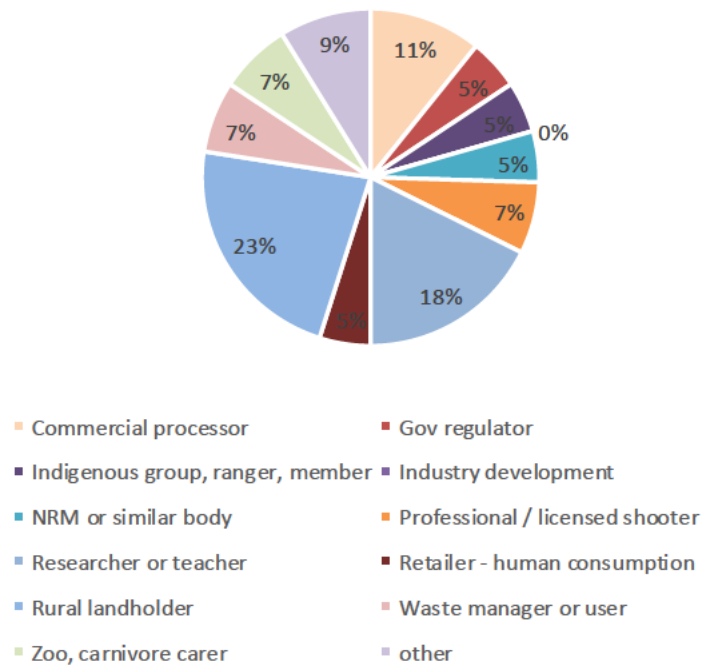
12. APPENDICES

A. Documents supplied by EPSDD for review

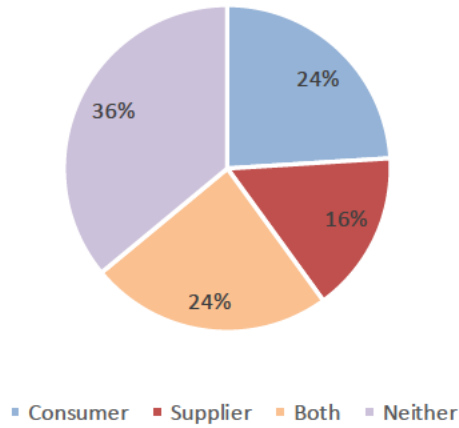
Eastern Grey Kangaroo Controlled Native Species Management Plan (2017)
 Kangaroo Management Plan (2010)
 Results of 2019 conservation cull community opinion poll
 Result of 2019 survey of ACT Rural Landholders' attitudes on kangaroo management
 2011 Commercial culling feasibility report

B. On-line survey - responses by percentages

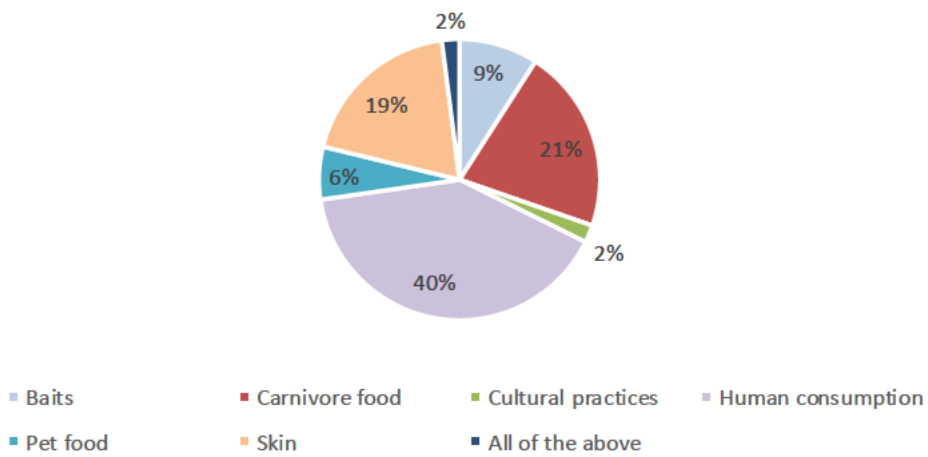
Percentage of respondents by classification



Percentage who were suppliers, consumers, both or neither



Percentage of types of carcass end users required



Carcass component responsee required

