



Evidence to support Position Statement:

Domestic cats and Australian native wildlife populations

Many recent publications have raised concerns about the impacts of domestic cats - cats which live in the vicinity of people - on wildlife populations in Australia. Wildlife protection is an argument often proposed as a reason for mandated cat containment measures such as cat curfews or 24/7 cat containment.

However, it is important to note that there is actually no scientific evidence that domestic cats living in the vicinity of people, impact Australian native wildlife populations. In fact, population studies have not found a measurable effect of domestic cats on native birds and mammals (Barratt 1998, Grayson 2007, Lilith 2010, Maclagan 2018). In addition, there is no evidence that cat restrictions in urban areas benefit native wildlife populations.

An ongoing issue is that impacts of feral cats on wildlife are often wrongly attributed to domestic cats, even though they are two distinct and geographically separate populations with different behaviour and ecology.

The impact of feral cats on native wildlife in natural environments is well-documented. Surprisingly, however, limited research exists on domestic cat wildlife impacts. The impacts (if any) of domestic cats on native wildlife populations is largely unknown. Contrary to popular belief, there is actually no definitive scientific evidence demonstrating viability or conservation impacts at a population level on Australian native wildlife by domestic cats living around people. Despite this lack of evidence, domestic cats in Australia still receive significant blame for negative impacts on native wildlife populations. See: Cat Definitions in Appendix.

Listen to talk by Emeritus Professor Rand presented at the Animal Justice Party conference Sydney 2022. The Myth of Cats and Urban Wildlife:

https://drive.google.com/drive/folders/10iZ-YzP_-7sqUiEgh9AW2SZIFck6WWZ?usp=sharing

Australian research findings:

Australian studies were unable to detect a measurable impact in urban areas of domestic cats on native mammals (Maclagan 2018, Lilith 2010), or birds (Barratt 1998, Grayson 2007), but found that vegetation quality, housing density, distance from bushland and size of bushland were significant factors (summarised below). Other studies demonstrate the positive impact cat predation has by reducing the numbers of rats that predate bird nests (Matthews 1999).

Importantly, the **NSW Wildlife Rehabilitation Government Dashboard (2021)** shows that in 2019-20, **402 threatened species were reportedly rescued as a result of loss of habitat, 290 as a result of collisions with motor vehicles, 127 as a result of dog attacks and 31 because of cat attacks**. Additionally, domestic cats that are obtaining food intentionally or unintentionally from humans predate significantly fewer animals than feral cats, which have to hunt to supply all their nutritional needs (Murphy 2019, Woinarski 2017).

Study 1: Do cat restrictions lead to increased species diversity or abundance of small and medium-sized mammals in remnant urban bushland? City of Armadale WA (Lilith 2010)

This Australian study analysed cat regulations enacted within differing suburbs, to test the hypotheses that the species diversity (measured by the Shannon-Weiner index) and abundance of small and medium-sized mammals should be higher in native bushland within or adjacent to subdivisions where cats are restricted, compared to similar areas where cats are not restricted. There were three different cat regulation regimes at the three different experimental sites and these were compared and assessed for impact on native mammals:

1. no-cat zone (strict prohibition of cat ownership)
2. compulsory bells on cats and night curfew of cats,
3. no cat-related regulations

These different cat regulations were in place for approximately 10 years prior to the study. The researchers also measured structural and floristic features of the vegetation at each site that might influence the species diversity and abundance of small and medium-sized mammals, either independently, or interactively with cat activity.

Findings:

- No significant differences in species diversity were found across the sites and KTBA (known -to-be-alive) statistics for Brushtail Possums and Southern Brown Bandicoots, the two most abundant medium-sized mammals present, were similar across all sites.
- The smaller mardo (*Antechinus flavipes*), which the authors suggested could be regarded as the most susceptible to cat predation of all the native species trapped because of its size, was trapped mostly at an unregulated cat site.
- Total mammals trapped at the unregulated cat sites exceeded those caught at the two sites with restrictions, but these unregulated sites also had significantly denser vegetation.

Conclusion: The authors concluded that pet cats did not negatively impact the species diversity or abundance of small and medium-sized mammals at these sites and that vegetation characteristics are likely more important. In addition, cat related by-laws, including prohibition of cat ownership, had no measurable benefits on wildlife.

Study 2: Species richness and community composition of passerine birds in suburban Perth: is predation by pet cats the most important factor? Perth WA (Grayson 2007)

This study was conducted across 57 sites in metropolitan Perth. The researchers investigated factors affecting passerine bird community composition. Bird data were collected at each site, and a questionnaire distributed to surrounding neighbours to determine cat and dog density.

Findings:

- No link was found between cat or dog density and passerine bird species richness (abundance and diversity).
- However, a negative correlation was found between richness of bird species and both housing density and increasing distance from bushland (and decreasing size of bushland).

Conclusion: These findings led the authors to conclude that habitat destruction and degradation were the critical factors affecting richness of bird species, rather than cats or dogs.

Study 3: Do Pet Cats Deserve the Disproportionate Blame for Wildlife Predation Compared to Pet Dogs? NSW, Queensland and Victoria (Franklin 2021)

This Australian study analysed pet cat and dog predation and challenges longstanding assumptions and beliefs about the impacts of pet cats on native wildlife.

Findings:

- Not all pet cats were observed to catch prey which concurs with previous research. Of the pets observed to catch prey, the median numbers of native animals caught per dog or cat over 6 months were actually low (3 native animals per cat that preyed).
- Only a very small minority of cats were prolific hunters countering common claims that all cats are efficient and prolific hunters that kill many animals. This finding also potentially invalidates often-used calculations estimating the number of native animals preyed by pet cats.
- Most prey animals in the study were common native or introduced species suggesting that cats may not be having a significant negative effect on these populations.

Conclusion: The authors stated that, as others have concluded, hunting by domestic dogs and cats appears to be of relatively minor conservation concern compared with issues such as habitat loss and urban development. Therefore,

efforts directed at habitat preservation are likely to be the most effective strategy to protect wildlife, as opposed to pet control regulations.

Study 4: Don't judge habitat on its novelty: Assessing the value of novel habitats for an endangered mammal in a peri-urban landscape. Melbourne Victoria (Maclagan 2018)

Novel ecosystems are increasingly common across the world, particularly in areas heavily impacted by people such as urban and peri-urban landscapes. As a result, interest in their potential contribution to biodiversity conservation is increasing, including their ability to sustain populations of threatened species. Few studies have explored whether novel habitats can support viable populations over time and how they compare to less modified, remnant habitats.

This Australian study investigated the capacity for novel habitats to support an endangered mammal, the southern brown bandicoot (*Isodon obesulus obesulus: Peramelidae*), in a highly-modified landscape near Melbourne. The study compared bandicoot abundance and body condition between five novel sites that were highly modified by human development, and two remnant sites that were bushland reserves, and examined whether novel sites support residency and key demographic processes necessary for bandicoot population persistence.

Findings:

- Bandicoot abundance was higher at novel sites where cats were common, than at remnant sites (cats were uncommon), with the highest abundance at the novel site with the most urbanised surroundings.
- Female body condition was similar between novel and remnant sites. The majority of bandicoots at novel sites were resident, and breeding activity, recruitment of first-year adults, and survival of mature adults were observed at all novel sites.
- It remains unclear how sufficient numbers of bandicoots at novel sites were avoiding predation by invasive red foxes, cats and other predators.
- The results demonstrate the potential significance of novel urbanised habitats for conserving threatened species within heavily-modified landscapes. The quality of habitats should not be judged on their novelty alone. Broadening appreciation of the potential value of novel ecosystems could increase off-reserve species conservation opportunities - a key priority area in modern times.

Conclusion: The authors concluded the study showed novel urbanised habitats (where cats were common) can offer new conservation opportunities for species that have the adaptive capacity to exploit them. Traditional assumptions that human-modified habitats are automatically poorer in quality to remnant bushland habitats – such as the Human Threat Hypothesis - need careful re-examination. The capacity of habitat to support species of concern should be assessed without bias regarding its degree of novelty. As novel ecosystems become increasingly prevalent worldwide and off-reserve conservation becomes more important, conservation approaches should exploit novel conservation opportunities.

Study 5: Domestic cat stomach content analysis study (Brisbane, Qld)

Analysis of the stomach contents of trapped urban stray cats (domestic cats) in the City of Brisbane revealed that the only prey species consumed were introduced black rats (BBC Invasive Times Newsletter).

Study 6: Domestic cat stomach content analysis study (Southern Downs Shire, Qld)

Cats impounded by the Southern Downs Shire (Qld) found predominantly cat food, house mice and carrion (eastern grey kangaroos) and no species of conservation concern in cat stomach and colon samples (Leis 2021).

Collectively, these findings from Australian research studies contrast with the well-documented adverse effects of feral cats on native wildlife populations in undisturbed natural environments.



Inaccurate estimates of domestic cat impacts on Australian native wildlife populations

Highly publicised impacts of domestic cats on birds (Woinarski 2017), mammals (Murphy 2019), reptiles (Woinarski 2018) and amphibians (Woinarski 2020) are based on extrapolating the findings from stomach and faecal samples of feral cats and surveys of pet cat hunting behaviour. This has resulted in highly inaccurate conclusions regarding implied population effects of domestic cats in urban areas.

Flawed data collection and calculations

For example, the effects of stray cats are extrapolated from just 5 studies, 3 of which were from rubbish dumps in small rural towns, and the other two explicitly stated they only analysed stool samples that contained evidence of wildlife remains and excluded those that had evidence of cat food. The authors then calculated that all 0.7 million unowned cats living in highly modified environments (stray cats) predated similarly to those samples analysed. Clearly these results are in no way representative of urban stray cats, the vast majority (>99.9%) are fed intentionally by humans (unpublished data from Australian Community Cat Program 2022).

Similarly, the effects of pet cats were extrapolated from 25 to 30-year-old studies of cats that were observed to predate and the authors then assumed that all 3.88 million pet cats predated similarly. For example, the authors estimated that every pet cat, regardless of whether it was contained inside or never seen to predate, killed 15.6 birds a year. This has resulted in a gross overestimation of pet cat predation, given that many pet cats are confined solely inside, and not all cats predate, particularly older cats.

Other confounding factors

In compounding these errors, the authors then imply this data translates to a population effect. For birds, for example, this is erroneous, because birds killed by cats in urban areas are significantly less healthy than birds killed by cars or flying into windows (Baker 2008, Møller & Erritzøe 2000), leading these authors to conclude that cat predation in urban areas represents a compensatory rather than an additive form of mortality. In other words, cat predation does not cause a secular change in the overall mortality of bird populations.

Therefore, the inherent biases, inaccuracies, and limitations of the study design of these highly quoted studies by Woinarski and Murphy mean that there can be little to no confidence in the implied population effects. In contrast, actual Australian population studies have not found a measurable effect of domestic cats on urban wildlife.

Furthermore, as concluded by Barratt (1998), estimates of predation by house cats, particularly extrapolated estimates, should be treated with caution. Predation estimates alone do not prove that prey populations are detrimentally affected, especially in highly disturbed and modified environments such as urban areas.

False blame directed at domestic cats

False blame for wildlife impacts directed at domestic cats is harmful because it contributes to the implementation of ineffective domestic cat management strategies and can be used as a justification for lethal approaches to domestic cats. This perpetuates the unnecessary and pointless killing of many healthy cats and kittens under the ineffective *Trap, adopt or kill* model, which causes devastating psychological damage to staff involved and community cat carers (Rolf 2005, Whiting 2011, Scotney 2023). It does not reduce the overall number of wandering cats overtime as the population quickly replenishes to original levels due to the high cat reproductive rate, immigration of new cats into the area and increased survival of juveniles (Lazenby 2015, Miller 2014, Boone 2019, NSW Animal Seizures – Pound Data Reports).

Australian shelter staff are often required to repeatedly kill large numbers of healthy cats and kittens, resulting in a significant human cost. Many workers directly involved with the euthanasia of healthy animals develop post-traumatic stress, which is associated with depression, substance abuse, high blood pressure, burnout, sleeplessness



and increased risk of suicide (Australian Veterinary Association 2022, Baran 2009, Reeve 2005, Rohlf 2005, Rollin 2011, Tiesman 2015, Whiting 2011).

Two quotes from shelter staff support research showing that killing healthy and treatable animals can result in severe mental health damage and increases the risk for suicide.

“The effect on mental health is a very real problem, and veterinarians were the most affected – it was terrible to see the impact on them” (senior shelter staff member)

“I have seen so many people’s lives damaged by having to kill a never-ending stream of kittens and cats” (senior shelter veterinarian)

False blame for wildlife impacts directed at domestic cats can also promote the use of inhumane killing methods; be used as a justification for cruelty towards cats, increasing pain and suffering. This blame is also be used as an argument for mandatory cat containment which is not an effective strategy for reducing wandering and stray cats, and has many negative consequences. See Position Statement on Cat Containment <https://petwelfare.org.au/our-position-statements/>

Recommendations

To reduce any potential impacts of domestic cats on native wildlife in Australia, strategies must reduce the number of wandering domestic cats (fewer wandering cats means less potential wildlife predation). The Australian Pet Welfare Foundation recommends implementation of evidence-based and cost-effective strategies including Community Cat Programs and Bed-time feeding, instead of ineffective and costly *Trap, adopt or kill* or mandated cat containment. Community Cat Programs and Bed-time feeding will significantly reduce the number of wandering cats and associated issues including nuisance complaints, cat impoundments and costs, euthanasia and mental health impacts on staff and community residents caring for cats, and potential native wildlife predation particularly of threatened and endangered species.

1. Community Cat Programs

Community Cat Programs are based on high-intensity free desexing and microchipping of cats micro-targeted to locations of high cat complaints and impoundments (which are typically the low socioeconomic areas). These proactive and humane programs are scientifically proven in Australia and internationally to significantly reduce the number of wandering cats and associated issues.

Recent Australian data demonstrate that community cat programs are cost-effective and result in a 30-50% decrease in council pound cat intake, more than a 60% - 80% reduction in cat euthanasia and a 30-50% decrease in cat nuisance complaints over 1 to 3 years, with these parameters reflecting the decrease in the surrounding wandering cat population (APWF 2022, Banyule City Council 2020, Cotterell 2021, Spehar & Wolf 2019, Levy 2014, Swarbrick 2018).

City of Banyule (Melbourne Victoria)

In the third year after implementing a high-intensity free desexing program (a community cat program) targeted to where cat-related calls and impoundments were occurring in Banyule (Cotterell 2021, Banyule 2020):

- impoundments decreased by 61%
- euthanasia decreased by 74%
- cat-related calls decreased by 64% (from 11 to 4 cat calls/1000 residents)

Since 2013, Banyule has spent \$60,000 on its free desexing program and saved \$397,500 on cat impoundment costs alone.



Community Cat Programs are non-lethal, which Australian research shows the majority of the community support (Rand 2019) and importantly, they do not cause psychological damage to staff or community residents associated with euthanasia of healthy cats and kittens, because they are based on desexing rather than euthanasia.

Community Cat Programs increase adoptions

Community Cat Programs are very effective at getting desexed kittens adopted and getting cat semi-owners to take full official ownership of the stray cat they are feeding. This increases responsible pet ownership rates and prevents a significant number of unwanted kittens being born. In addition, community cat programs facilitate higher return to owner rates (reclaim rates) due to increased numbers of microchipped cats.

Of critical importance, research shows that the majority of cats admitted into shelters and pounds were born in the preceding 6-12 months, emphasising the need to desex cats to reduce shelter and pound admissions (and subsequent euthanasia of healthy cats and kittens). Please refer to the APWF Info sheet: How to implement a Community Cat Program 11 steps. <https://petwelfare.org.au/wp-content/uploads/2022/05/APWF-Community-Cat-Program-Fact-Sheet.pdf>

2. Bed-time feeding

Bed-time feeding of cats is recommended as a highly effective way to assist cat owners at minimal to no additional cost to keep owned pet cats safely inside at night and prevent potential wildlife predation. This strategy involves feeding cats their evening meal inside and closing windows, screens and doors before the evening meal is fed, to prevent the cat from leaving the dwelling after it has eaten that night. Night-time is when native animals of conservation concern that may be vulnerable to cat predation are most active (most are nocturnal mammals). Bed-time feeding should be widely promoted to raise awareness among cat owners to increase cat containment at night. However, containment should not be made mandatory as this has many negative consequences including preventing a resolution to the wandering and stray cat issue. Please refer to the APWF Infographic: Bed-time feeding.

3. Native wildlife habitat preservation

Given that the NSW Government Dashboard (2021) shows that in 2019-20, **402 threatened species were rescued as a result of loss of habitat, compared to only 31 because of cat attacks**, governments should focus on habitat preservation and the prevention of any further land clearing for human use such as urban development or agriculture, to best protect native wildlife. Habitat loss is recognised as the primary threat to native wildlife in Australia (Australia State of the Environment Report 2021). It is therefore imperative that areas of native wildlife habitat have regulatory protection from future land clearing.

4. Targeted protection of threatened and endangered wildlife

Local governments are encouraged to use citizen science backed by wildlife cameras (camera trapping) to identify locations where wildlife of conservation concern are present. Local governments should target these areas with resources such as barrier or exclusion fencing, and/or assist cat owners with constructing cat-proof fencing. Local governments should also educate both dog and cat owners to contain their pets inside the house at night, given that most threatened species, which may potentially be preyed on by dogs and cats, are nocturnal. For cats, this can be achieved with minimal to low cost using bed-time feeding.

Additionally, the NSW Government Dashboard (2021) shows that in 2019-20, **290 threatened species** were rescued as a result of **collisions with motor vehicles**, therefore governments should also focus efforts on road safety measures to prevent native wildlife road accidents, particularly in areas of threatened and endangered species.

Importantly, **127 threatened species** were rescued as a result of **as a result of dog attacks. Most of these species were nocturnal**, so in urban and peri-urban areas where these species are located, dog owners should be encouraged to **confine their dogs at night**.

In conclusion, there is no scientific evidence that domestic cats living in the vicinity of people impact Australian native wildlife populations. However, to reduce any potential predation of native wildlife by domestic cats, strategies must effectively reduce the number of wandering cats. Mandated cat containment and the traditional *Trap, adopt or kill* approach are not effective strategies for reducing the number of wandering cats and therefore will not protect native wildlife. In contrast, evidence-based Community Cat Programs and Bed-time feeding will significantly reduce wandering cats and potential wildlife predation, and should be combined with habitat preservation, road safety measures and targeted protection of threatened and endangered wildlife.

Appendix

Appendix 1 Cat definitions

The definitions utilised by Australia’s leading national welfare agency, the **Royal Society for Prevention of Cruelty to Animals (RSPCA)** and used by the Commonwealth Government and some state governments is recommended, **with cats categorized based on how and where they live.**

Please refer to the APWF Position Statement on Cat definitions in Australia

Feral cats live and reproduce in the wild (e.g., forests, woodlands, grasslands, deserts) do not live in the vicinity of where people live and survive by hunting or scavenging; none of their needs are fulfilled by humans. Feral cats have no dependence on humans (neither direct nor indirect) and are not fed intentionally or unintentionally (such as via food waste bins) by humans. **Feral cats are not a source of nuisance complaints from people living in cities and towns.**

Domestic cats are **owned, semi-owned** (fed intentionally by humans), and **unowned** (obtain food from humans unintentionally) living in the vicinity of where people live, in and around cities, towns, and buildings on rural properties. Domestic cats have some dependence on humans (direct or indirect). Because domestic cats live around where people live or frequent, their behaviour may result in nuisance complaints to council animal management officers.

1. RSPCA Knowledgebase. Research Reports - Identifying Best Practice Domestic Cat Management in Australia. Available online: <https://kb.rspca.org.au/downloads/research-reports/> (accessed on 20 May 2023).
2. Commonwealth of Australia. Threat Abatement Plan for Predation by Feral Cats. Available online: <https://www.dccew.gov.au/environment/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats> (accessed on 16 May 2023).
3. Victoria State Government. Invasive Plants and Animals - Feral Cat Declaration. Available online: <https://www.environment.vic.gov.au/invasive-plants-and-animals/feral-cats> (accessed on 10 December 2022).

References

1. Australia State of the Environment Reports 2021: <https://soe.environment.gov.au/>
2. Australian Pet Welfare Foundation (APWF) Submission No 141 to House Standing Committee on the Environment and Energy, Parliament of Australia, Inquiry into the problem of feral and domestic cats in Australia (2020).
3. Australian Pet Welfare Foundation (APWF) 2022 Mid-year report: Community Cat Program. Available at: <https://petwelfare.org.au/>
4. Australian Veterinary Association 2022 – 2023 Federal Pre-Budget Submission: <https://www.ava.com.au/siteassets/advocacy/ava-national-election-platform-2022.pdf>

5. Baker, P.J.; Molony, S.E.; Stone, E.; Cuthill, I.C.; Harris, S. Cats about town: is predation by free-ranging pet cats *Felis catus* likely to affect urban bird populations? *IBIS* 2008, 150, 89-96.
6. Banyule City Council, Submission No 141 to House Standing Committee on the Environment and Energy, Parliament of Australia, Inquiry into the problem of feral and domestic cats in Australia (2020).
7. Baran BE, Allen JA, Rogelberg SG, Spitzmüller C, Digiacommo NA, Webb JB, Carter NT, Clark OL, Teeter LA, Walker AG (2009) Euthanasia-related strain and coping strategies in animal shelter employees. *J Am Vet Med Assoc.* 1;235(1):83-8.
8. Barratt DG (1998) Predation by house cats, *Felis catus* (L.), in Canberra, Australia. II. Factors affecting the amount of prey caught and estimates of the impact on wildlife, *Wildlife Research*, 1998, 25, 475–487.
9. Boone JD, Miller PS, Briggs JR, Benka VAW, Lawler DF, Slater M, Levy JK and Zawistowski S (2019) A Long-Term Lens: Cumulative Impacts of Free-Roaming Cat Management Strategy and Intensity on Preventable Cat Mortalities. *Front. Vet. Sci.* 6:238. doi: 10.3389/fvets.2019.00238
10. Cotterell J, Rand J; Ahmadabadi Z; (2021) Outcomes Associated With A Community Cat Program Based On High-Intensity Sterilization Of Owned And Semi-Owned Cats In Target Areas. WSAVA Global Community Congress.
11. Franklin M, Rand J, Marston L and Morton J (2021) Do Pet Cats Deserve the Disproportionate Blame for Wildlife Predation Compared to Pet Dogs? *Front. Vet. Sci.* 8:731689. doi: 10.3389/fvets.2021.731689.
12. Grayson J., Calver M. and Lymbery A. (2007) “Species richness and community composition of passerine birds in suburban Perth: is predation by pet cats the most important factor?” In *Pest or Guest: The Zoology of Overabundance*, Lunney D., Eby P., Hutchings P., Burgin S., Eds, Royal Zoological Society of New South Wales: Mossman, NSW, Australia, pp. 195-207.
13. Lancaster E, Rand J, Collecott S, Paterson M. Problems Associated with the Microchip Data of Stray Dogs and Cats Entering RSPCA Queensland Shelters. *Animals (Basel)*. 2015 May 13;5(2):332-48.10.
14. Lazenby B.T., Mooney N.J. and Dickman C.R. (2015) “Effects of low-level culling of feral cats in open populations: a case study from the forests of southern Tasmania”, *Wildlife Research*, 41(5), 407.
15. Leis L (2021) What effect does diet have on body condition of unowned cats in the Southern Downs Region, Queensland? A thesis submitted In partial fulfillment of the requirements for the degree of Bachelor of Science (Honours) Submitted: November 2021.
16. Levy, J.K.; Gale DW.; Gale LA. (2003) Evaluation of the effect of a long-term trap-neuter-return and adoption program on a free-roaming cat population *J Am Vet Med Assoc* 222:42–46.
17. Levy JK, Isaza NM, Scott KC (2014) Effect of high-impact targeted trap-neuter-return and adoption of community cats on cat intake to a shelter, *The Veterinary Journal*, Volume 201, Issue 3, Pages 269- 274.
18. Lilit M, Calver M, Styles I, Garkaklis M (2006) Protecting wildlife from predation by owned domestic cats: Application of a precautionary approach to the acceptability of proposed cat regulations *Austral Ecology* 31 (2), 176-189.
19. Maclagan S.J., Coates T. and Ritchie E.G. (2018) “Don't judge habitat on its novelty: Assessing the value of novel habitats for an endangered mammal in a peri-urban landscape”, *Biological Conservation*, 223, 11-18, DOI: 10.1016/j.biocon.2018.04.022. 29.
20. Matthews A., Dickman C.R. and Major R.E. (1999) “The influence of fragment size and edge on nest predation in urban bushland”, *Ecography*, 22(4), 349-356.
21. Miller, P.S., Boone, J.D., Briggs, J.R., Lawler, D.F., Levy, J.K., Nutter, F.B., Slater, M. and Zawistowski, S. (2014) “Simulating free-roaming cat population management options in open demographic environments”, *PLoS ONE*, 9, e113553.
22. Møller, A., Erritzøe, J. Predation against birds with low immunocompetence. *Oecologia* 122, 500–504 (2000). <https://doi.org/10.1007/s004420050972>.
23. Murphy BP, Woolley L, Geyle H, Legge S, Palmer R, Dickman CR, Augusteyn J, Brown S, Comer S, Doherty TS, Eager C, Edwards G, Fordham DA, Harley D, McDonald PJ, McGregor H, Moseby KE Myers C, Read J, Riley J, Stokeld D, Trewella GJ, Turpin JM, Woinarski JCZ (2019) Introduced cats (*Felis catus*) eating a continental fauna: The number of mammals killed in Australia. *Biological Conservation* 237 28–40.



24. NSW Wildlife Rehabilitation Government Dashboard 2021: <https://www.environment.nsw.gov.au/topics/animals-and-plants/native-animals/rehabilitating-nativeanimals/wildlife-rehabilitation-reporting/wildlife-rehabilitation-data>
25. NSW Animal Seizures – Pound Data Reports: <https://www.olg.nsw.gov.au/public/dogs-cats/responsiblepetownership/pound-and-dog-attack-statistics/>
26. Rand J, Fisher G, Lamb K and Hayward A (2019) Public Opinions on Strategies for Managing Stray Cats and Predictors of Opposition to Trap-Neuter and Return in Brisbane, Australia. *Front. Vet. Sci.* 5:290
27. Reeve, C. L., Rogelberg, S. G., Spitzmüller, C, & DiGiacomo, N. (2005). The Caring-Killing Paradox: Euthanasia Related Strain among Animal-Shelter Workers. *Journal of Applied Social Psychology*, 35(1), 119-143.
28. Rohlf V, Bennett PC (2005). Perpetration-induced traumatic stress in persons who euthanize nonhuman animals in surgeries, animal shelters, and laboratories. *Soc Anim*, 13: 201-19. 37.
29. Rollin, Bernard. (2011). Euthanasia, Moral Stress, and Chronic Illness in Veterinary Medicine. *The Veterinary clinics of North America. Small animal practice.* 41. 651-9.
30. RSPCA Australia (2018) Identifying Best Practice Domestic Cat Management in Australia. 62. RSPCA Australia Annual Statistics: <https://www.rspca.org.au/what-we-do/our-rolecaringanimals/annual-statistics>
31. Scotney, R.; Rand, J.; Rohlf, V.; Hayward, A.; Bennett, P. The Impact of Lethal, Enforcement-Centred Cat Management on Human Wellbeing: Exploring Lived Experiences of Cat Carers Affected by Cat Culling at the Port of Newcastle. *Animals* 2023, 13, 271. <https://doi.org/10.3390/ani13020271>
32. Spehar, D.D.; Wolf, P.J. (2019) Integrated return-to-field and targeted trap-neuter-vaccinate-return programs result in reductions of feline intake and euthanasia at six municipal animal shelters. *Front. Vet. Sci.* 6, 77.
33. Swarbrick, H.; Rand, J. Application of a protocol based on trap-neuter-return (TNR) to manage unowned urban cats on an Australian university campus. *Animals* 2018, 8, 77.
34. Tan K, Rand J, Morton J. (2017) Trap-neuter-return activities in urban stray cat colonies in Australia. *Animals* 7:46-67.
35. Tiesman, H.M.; Konda, S.; Hartley, D.; Chaumont Menendez, C.; Ridenour, M.; Hendricks, S. (2015) Suicide in US workplaces, 2003–2010: A comparison with non-workplace suicides. *Am. J. Prev. Med.* 48, 674–682. 32
36. Whiting TL, Marion CR. Perpetration-induced traumatic stress - A risk for veterinarians involved in the destruction of healthy animals. *Can Vet J.* 2011;52(7):794-796.
37. Woinarski, J.C.Z.; Murphy, B.P.; Legge, S.M.; Garnetta, S.T.; Lawes, M.J.; Comer, S.; Dickman, C.R.; Doherty, T.S.; Edwards, G.; Nankivell, A. (2017) How many birds are killed by cats in Australia? *Biological Invasions* 214, 76-87, [doi:10.1016/j.biocon.2017.08.006](https://doi.org/10.1016/j.biocon.2017.08.006).
38. Woinarski JCZ, B. P. Murphy, R. Palmer, S. M. Legge, C. R. Dickman, T. S. Doherty, G. Edward, Nankivell, J. L. Read, D. Stokeld (2018) How many reptiles are killed by cats in Australia? *Wildlife Research*, 45(3):247- 266. <https://doi.org/10.1071/WR17160>
39. Woinarski J. C. Z., Legge S. M., Woolley L. A., Palmer R., Dickman C. R., Augusteyn J., Doherty T.S., Edwards G., Geyle H., McGregor H., Riley J., Turpin J., Murphy B. P. (2020) Predation by introduced cats *Felis catus* on Australian frogs: compilation of species records and estimation on numbers killed. *Wildlife Research* 47, 580-588.