



The myth of domestic cats & urban wildlife

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COMMUNITY CAT PROGRAM
Protecting people, cats & wildlife

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Natural born killers: the problem with cats

Australian Geographic, 2013

Staggering Stats: Cats Kill Billions of Animals a Year

Live Science, 2013



3

Keep pet cats indoors, say researchers who found they kill 230m native Australian animals each year

Australia's 3.7m domestic cats wreak environmental havoc and should be contained, authors of new study say



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Australian research based on 4 papers aimed at estimating numbers of prey caught by feral, pet and semi-owned/unowned cats

Topic	Year
How many birds are killed by cats in Australia?	2017
Introduced cats (Felis catus) eating a continental fauna: The number of mammals killed in Australia	2019
How many reptiles are killed by cats in Australia?	2018
Predation by introduced cats Felis catus on Australian frogs: compilation of species records and estimation of numbers killed	2020

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- For each species -birds, mammals, reptiles and frogs – are all based on same previously collected data sets
- For pet cats, data based on 6 publications from 4 studies designed to determine the relative proportion of prey observed to be caught by cats & number caught per cat that preyed
- Were NOT designed to determine proportion of pet cats that caught prey
- Surveys of people responding questionnaires in 1989-1994
- Canberra (collected 1993-4), Hobart (collected 1991) & South Australia (collected 1989)



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What research was used for pet cats? 6 publications, 4 studies

- Barratt x 2 papers CSIRO Wildlife Research, 1997 and 1998
 - Well conducted and written for the design used; peer reviewed
 - Selected homes bordering nature reserves in Canberra & ornithological groups
 - Door knocking & letter box drops
 - Survey data for 135 cats of prey owners observed to be caught in 1993-94
 - Plus collected samples of prey from 138 cats
- Paton – 3 references used - one 2 page publication in Bird Observer 1990, republished in a workshop & conference proceedings but all from same data set
- Data collection - mail out? to ornithological groups in SA collected in 1989 (43 year old data)
- Data collected from 709 people on what pet cats were observed to catch
- Trueman – unpublished honours thesis from Tasmania, not available on line
- Door to door & telephone surveys of what 166 pet cats were observed to catch in 1991
- Woinarski's comment "It was a particularly hard one to interpret, they're (the results) are pretty obscure"

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BIRDS



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How many birds are killed by cats in Australia?

J.C.Z. Woinarski¹*, B.P. Murphy², S.M. Legge³, S.T. Garnett⁴, M.J. Lawes⁵, S. Comer⁶, C.R. Dickman⁷, T.S. Doherty⁸, G. Edwards⁹, A. Nankivell¹⁰, D. Paton¹¹, R. Palmer¹², L.A. Woolley¹³

- Study design **estimated relative proportion of prey observed to be caught by cats**
- **Not designed to determine proportion of cats which predate**
- Multiplied 4.5 birds/year by 3, because owners observe 30% of catch
- Calculated - average cat catches 15.6 birds/year (half more, half less)
- **Multiplied by all 3.88 million pet cats**
- "Pet cats kill 61 million birds per year" (included introduced birds)
- In media, authors then implied this data translates to a population effect

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D. G. Barratt **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

- "House cats appear **primarily opportunistic** in their predatory behaviour. As a result, **locally abundant species, including numerous introduced species, comprise the primary and/or preferred prey** of house cats in suburban environments."
- "The **stable or increasing trends in the abundance of these bird species** (predated by cats) in Canberra over the past decade **suggests that house cats are not having a major impact on these species**"

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Findings:

Barratt - Selected homes bordering nature reserves in Canberra & ornithological groups

- Cats that predated caught **median of 1.2 birds/year and mean of 2.5 birds/birds**
- "**Median numbers** of prey estimated to be caught per year are approximately half the mean values, and are a **better representation** of the average predation by house cats"
- "**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 suburbs."
- "Irrespective of the accuracy of predation estimates, without measurements of the abundance and population dynamics of prey species, the impact of predation by house cats remains uncertain."

Paton - Survey of 709 people in SA – one 2 page publication, republished in a workshop & conference; 43 year old data

- Cats caught **average 8 birds/year**

Trueman – unpublished honours thesis from Tasmania = **3.3 birds/year**

Woinarski calculated = average of **4.5 birds/year** observed to be caught by pet cats

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How many birds are killed by cats in Australia?

J.C.Z. Woinarski¹*, B.P. Murphy², S.M. Legge³, S.T. Garnett⁴, M.J. Lawes⁵, S. Comer⁶, C.R. Dickman⁷, T.S. Doherty⁸, G. Edwards⁹, A. Nankivell¹⁰, D. Paton¹¹, R. Palmer¹², L.A. Woolley¹³

- How accurate is this for pet cats?
- Assumed ALL pet cats catch an average of 15.6 birds per year regardless of age of cat, or if contained inside
- Is this a gross overestimation?
- **Does it translate to a population effect?**



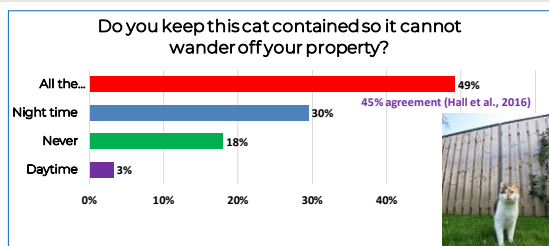
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- How accurate is it to assume all pet cats predate?
- Regardless of inside only or age
- Is there more contemporary data?



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RESULTS - Cat caring behaviours of low SES people enrolling cat in free desexing program



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Study of ALL cats being enrolled in free desexing program (n= 264 cats) – 2022

- Designed to determine proportion of cats that hunted & relative proportion of prey observed to be caught.
- **78% of cats DID NOT hunt or hunted only insects** (4% hunt only insects)
- **22% of cats observed to hunt** (excluding those hunting only insects, slugs, snails)
- **Only 7% of cats were observed to catch birds**



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Legge – Charlie and Bella

- The average per capita toll of a roaming, hunting cat comprises **56 birds/year**
- Using Woinarski's estimate of 30% of birds (Legge's put all prey types together)
- Cat owners should see about 20 birds/year in year out (nearly every second week) brought home or seen dead in garden
- Nearly half the cat owners own 2 cats; therefore, on average these owners of two cats if they go outside, should see 40 birds/year or nearly one a week.
- **Does it pass the “pub test”**
- The estimated annual per capita predation toll shared across all pet cats (including cats confined inside) **31.2 birds**

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Predation and Risk Behaviors of Free-Roaming Owned Cats in Auckland, New Zealand via the Use of Animal-Borne Cameras

Bruce S, Zito S et al; *Frontiers in Veterinary Science* 2019

- Cat-borne video cameras on 37 pet cats for 3 days in Auckland NZ
- 65% outdoor all times, 35% inside at night
- Investigated:
 - Stalking, pursuing, and seizing prey
 - Altercations with other cats
 - Risky behaviours e.g. venturing into roads



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Predation and Risk Behaviors of Free-Roaming Owned Cats in Auckland, New Zealand via the Use of Animal-Borne Cameras

Bruce S, Zito S et al; *Frontiers in Veterinary Science* 2019

- 62% cats (23 cats) engaged in 121 predation events
- 40 events resulted in prey capture
- **Insects – 87%, skinks 13%**
- **No mammals, birds or amphibians captured**
- **One already deceased bird was scavenged**
- 87% of cats engaged in risky behaviour
- Most common risky behaviour was venturing onto road



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What might reality be?

- Based on contemporary cat keeping behaviour, Woinarski paper is likely a 15 times overestimation.
- They assumed that all 3.88 million pet cats predated an average of 15.6 birds a year = 61 million birds caught by pet cats/year
- If only 22% of cats predate and only 7% of pet cats predate birds then it would be 4 million birds predated including introduced species (3.88m cats x 7% predate birds x 15.6 birds/yr = 4.15 million)
- **Or only 1/15th of what they calculated!**
- 73% of birds caught are native – 58% Canberra (Barratt, 1997), 73% in Hobart, (Trueman, 1991), 88% in Adelaide (Paton, 1991).
- 3 million native birds per year caught by pet cats
- BUT how does this translate to a population effect?

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How many birds caught by cats in highly modified environments? Stray cat estimates

- Effects of stray cats are extrapolated from just 5 studies
- 3 were from rubbish dumps in small rural towns
- Another explicitly stated they only analysed stool samples that contained evidence of wildlife remains and **excluded those that appeared to be fed cat food** in periurban bushland (Dandenong Valley Regional Park)
- 8 parks in Greater Melbourne – **BUT only if stool had feathers, hair, bones**
- Stray cats catch 61.5 birds per year
- Assumed all 0.7 million stray/owned cats living in highly modified environments predated similarly to those samples analysed.
- Results are in no way representative of stray cats, the vast majority (>99%) are fed intentionally by humans (unpublished data from Australian Community Cat Program)

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Conclusion

- Evidence appears **quite flawed** for number of birds killed by pet and stray cats from papers Woinarski x 3, Murphy (Threatened Species Hub)
- **No population effect investigated BUT implied in media**

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What evidence do we have of a population effect?



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Association between cats & passerine birds

- 57 sites across metropolitan Perth
- Investigated factors effecting passerine bird community composition (eg. magpies)
- No link between cat density and passerine bird species richness (number & species diversity)
- Decreasing bird population with increasing housing density, and with increasing distance from bushland
- Habitat destruction and degradation were the critical factors, not cats



Grayson J, Calver M, Lymbery A. 2007.



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Barratt Predation by house cats in Canberra. II. 485 1998

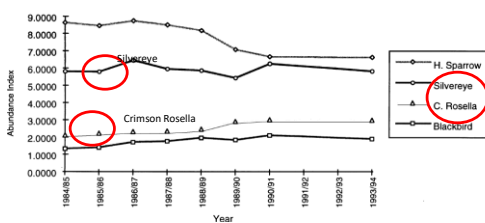


Fig. 5. Temporal trends in abundance of preferred bird prey species of house cats (house sparrows and blackbirds), and the two most commonly taken native bird species (silvereyes and crimson rosellas).

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Barratt Predation by house cats in Canberra. II. 485 1998

“It is perhaps not surprising that **wildlife populations in established suburban areas do not appear to be threatened by predation from house cats.**”

“Species that breed in suburban environments have either **persisted through the disturbances associated with the establishment of the suburb, including the introduction of cats, or have invaded the suburban environment** as habitat quality and diversity have increased with suburb age, irrespective of predation by cats.”

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Bird nests: Sydney bushland

- Predation of bird eggs & nests in 24 forest patches through Sydney metropolitan region
- Avian predators attacked all patches
- Black rats attacked nests in 10 areas
- Ring tail possums and antechinus others
- No nests attacked by cats
- Reduced nest predation associated with higher cat activity

Matthews, 1999



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Received: 24 September 2021 | Accepted: 31 March 2022
DOI: 10.1111/1365-2656.13700

Journal of Animal Ecology

Habitat provision is a major driver of native bird communities in restored urban forests

Elizabeth Elliot Noe¹ | John Innes² | Andrew D. Barnes³ | Chaitanya Joshi⁴
Bruce D. Clarkson⁵

- Investigated **diversity and abundance of birds** in urban forests
- Hypothesized that native bird biodiversity would be positively affected by amount & quality of native forest and negatively affected by rats, possums and cats
- Avian species richness increased when composition most similar to undisturbed forests



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Habitat provision is a major driver of native bird communities in restored urban forests *Journal of Animal Ecology*

- Contrary to prediction, **invasive mammals (cats, rats, possums) had no significant effect on native bird species richness and abundance**
- Hypothesized that avian species remaining in urban forests and cities cope with predation
- However, habitat restoration important!



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No association between cats & birds in urban forests

- Similar findings in 2 other studies from NZ:
- Abundance of 4 native bird species modelled (grey warbler, fantail, silvereye and tomtit) **did not differ** between landscapes with & without pest control (Ruffell & Didham 2017).
- Relative abundances of these 4 species did not increase significantly following pest control (Innes 2004)



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Birds



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What about wildlife?

- Two studies (UK, France) showing birds killed by cats less healthy than birds killed by cars or flying into windows
- Used splenic mass and body condition/muscle mass
- **Concluded that cats are opportunist hunters & tend to remove sick, old, fallen out of nest**
- **Would not contribute to next breeding season**

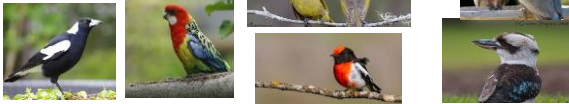


Baker PJ, et al *Ibis* 2008;150:86-99.27.
Møller AP, Erritzæe J. *Oecologia* 2000.

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Average life of birds...

- Average life of most free-living Australian bird species of size predated by cats is 2-4 years
- If 3 years, 33% die every year
- Infectious diseases (bacterial, parasitic, viral etc), trauma (birds, cars, windows, cats, dogs), neoplasia, inflammatory etc
- Keeps breeding stock healthy & uses best genes
- Survival of fittest



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Royal Society for the Protection of Birds - UK

"Despite the large numbers of birds killed, there is no scientific evidence that predation by cats in gardens is having any impact on bird populations U.K.-wide.

It is likely that most of the birds killed by cats would have died anyway from other causes before the next breeding season, so cats are unlikely to have a major impact on populations."



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Introduced cats (*Felis catus*) eating a continental fauna: The number of mammals killed in Australia

B.P. Murphy, L.A. Woolley, H.M. Geyle, S.M. Legge, R. Palmer, C.R. Dickman, J. Augusteyn, S.C. Brown, S. Comer, T.S. Doherty, C. Eager, G. Edwards, D.A. Fordham, D. Harley, P.J. McDonald, H. McGregor, K.E. Moseby, C. Myers, J. Read, J. Riley, D. Stokeld, G.J. Trewella, J.M. Turpin, J.C.Z. Wotnarski

- Based on same studies as birds – designed to determine relative proportion of prey observed to be caught by pet and stray cats (from 1990's)
- Not designed to determine proportion of cats which predate
- Observed 8.6 mammals/year; multiplied by 5 – only observed catch 20%
- Calculated – cats caught 46 mammals/year
- Multiplied by all 3.88 million pet cats (regardless of inside only)
- Most 98% mammals (Barratt) caught by pet cats were introduced rats, mice and rabbits
- Franklin 2021 – 97% of mammals caught by pet cats were mice, rats, rabbits

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Is there evidence for a population effect on native mammals in urban areas?



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Urban cats and urban wildlife

- Perth study – investigated number & diversity of native mammals across 3 bushland sites (Lillith 2010)
- Compared 3 areas which for >10 years either:
 1. Banned cats (strict prohibition of cat ownership)
 2. Required cats inside overnight and to wear a bell
 3. No regulations regarding cats



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Species diversity in 3 bushland sites Lillith MC, et al. *Biology* 2010;16:162-172.

- Numbers of most abundant medium-sized mammals were similar across all sites - brushtail possums and southern brown bandicoots



- Smaller mardo *Antechinus flavipes* - highly susceptible to cat predation - mostly at an unregulated cat site.
- Total mammals caught at unregulated site exceeded other sites but vegetation denser
- Concluded: pet cats are not major influence on the species diversity or abundance of small and medium-sized mammals and vegetation characteristics are likely more important.

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Melbourne Bandicoots

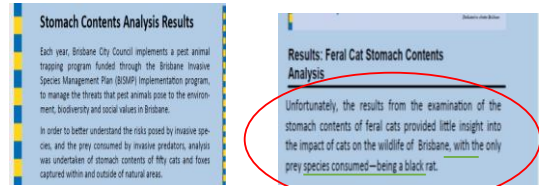
- Southern brown bandicoot abundance was higher in peri-urban areas compared with nature reserves
- Highest at sites with most urbanized surroundings - cats also prevalent
- Lower abundance in nature reserves where cats largely absent



MacLagan, 2018

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Brisbane City Council study...



Brisbane City Council:
Invasive Species Times
Issue 4 2015-16

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Study of prey analysis of domestic cats (Leis 2021) Southern Downs Shire, Qld (2-3 hrs drive Brisbane)

- Investigated stomach and colon samples from cats killed in pound
- Predominantly **cat food, house mice and carrion** (eastern grey kangaroos) and **no species of conservation concern in cat**



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How many reptiles are killed by cats in Australia?

J. C. Z. Woinarski, B. P. Murphy, R. Palmer, S. M. Legge, C. R. Dickman, T. S. Doherty, G. Edwards, A. Nankivell, J. L. Read, D. Stokeld

- Owners observed an average **3 reptiles/year** but only see 22% of catch so extrapolated to 13.6/yr = 63 million/year
- **Woinarski:** "However, much of the interpretation of these result are constrained by shortcomings in evidence: our study did not seek to assess whether predation by cats is leading to chronic ongoing depletion in the 'standing crop' of Australian reptiles."
- **Barratt:** "Vertebrate species that successfully invade suburban environments are likely to be mobile and widespread, while species in surrounding habitats may be relatively immobile and patchily distributed."



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Who is the culprit?



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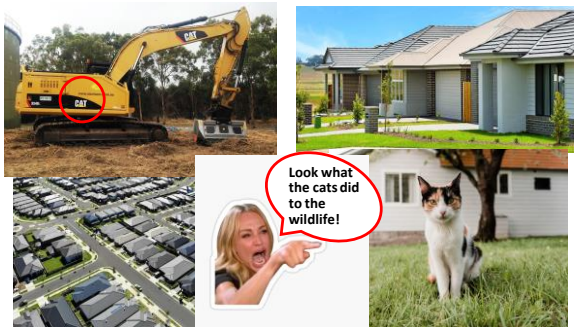
NSW Wildlife Rehabilitation dashboard - 2019-20

- **Threatened species – reasons for rescue**
- **402** loss of suitable environment
- **290** collisions with motor vehicles
- **127** dog attacks
- **31** cat attacks



<https://www.environment.nsw.gov.au/topics/animals-and-plants/nativeanimals/rehabilitating-native-animals/wildlife-rehabilitation-reporting/wildlife-rehabilitation-data>

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More than 100 Tasmanian devils killed on a 25km stretch of road in state's north-west



- Locals say 114 Tasmanian devils have been killed on Woolnorth Road since January 2021
- The area is home to a population that is free of facial tumour disease

Mayor William said "council will back an 80km/hr dusk to dawn speed limit but this was for the state government." State and local governments have formed a "working group" to tackle the issue, but appear determined not to mandate or enforce lower speed limits which might be unpopular with some locals and companies (using the road)

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Domestic dogs are a bigger problem than cats for our native wildlife

Dogs only behind motor vehicles as cause of wildlife injuries and deaths.

A recent study by a University of Tasmania Masters student has found that dogs may be a more serious problem than cats for native wildlife in some circumstances.

- Study of injured native animals brought to veterinary facilities in Tasmania and Victoria.
- Majority of wildlife injuries and deaths were attributed to **motor vehicles (76%, 1,256)**, with the next highest for **dogs (14%, 238)** followed by cats at **9% (152)**



Holderness-Roddam B. The Effects of Domestic Dogs (Canis familiaris) as a Disturbance Agent on the Natural Environment. Hobart, TAS: University of Tasmania (2011).

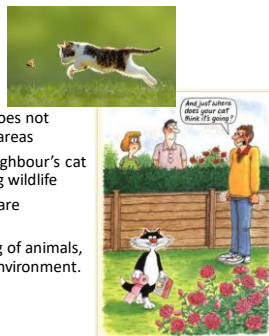
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What is the solution?

- Yes, cats do predate wildlife, even if does not negatively effect population in urban areas
- People do have a right not to have neighbour's cat on their property - soiling & disturbing wildlife
- What is most aligned with a One Welfare approach?
- To balance and optimise the wellbeing of animals, people and their physical and social environment.



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Predation

- Rank priorities to focus resources
- Identify specific urban/peri-urban locations with species of conservation concern
- Target locations for intensive species-specific protection



Cats		Dogs	
Threatened species rescued NSW 19-20		Threatened species rescued NSW 19-20	
2019/20	2019/20	2019/20	2019/20
Grey-headed Flying-fox 6	Grey-headed Flying-fox 46	Grey-headed Flying-fox 46	Koala 68
Squirrel Glider 2	Squirrel Glider 5	Squirrel Glider 5	Rose-crowned Fruit-Dove 0
Eastern Long-eared Bat 9	Rose-crowned Fruit-Dove 0	Rose-crowned Fruit-Dove 0	Rosenberg's Goanna 1
Brush-tailed Phascogale 1	Little Bent-winged Bat 2		

NSW Wildlife Rehabilitation Dashboard
<https://www.environment.nsw.gov.au/topics/animals-and-plants/native-animals>

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Predation

- Small nocturnal mammals (sugar gliders, bats) – night time containment of cats & dogs
- Promote bed-time feeding for cats
- Large nocturnal mammals (koalas) & stone curlews - night time containment of dogs
- Birds, small reptiles – assist cat owners to keep cats on property or exclusion fencing



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Results: Attitudes Towards Confinement

	Agree/Strongly agree	Neutral	Disagree/Strongly disagree
Dogs should be confined inside the house at night	54%	21%	24%
Cats should be confined inside the house at night	89%	6%	5%
Dogs should be confined to their owner's property whenever unsupervised	98%	1%	1%
Cats should be confined to their owner's property whenever unsupervised	71%	15%	14%

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Typical fencing on rental properties is inadequate for effective cat containment



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What can we do? Promote bed-time feeding for cats

Feed at night to keep your cat safe indoors

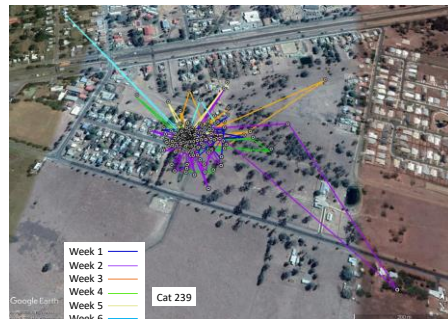
MORNING
 Feed your cat half its daily food in the morning, inside the home.

REMOVE FOOD
 Don't feed more than can be eaten in 10-15 minutes. Remove uneaten food to be most effective and prevent obesity.

LOCK UP
 Close windows, screens and doors before the evening meal is fed to prevent your cat from leaving the house after eating.

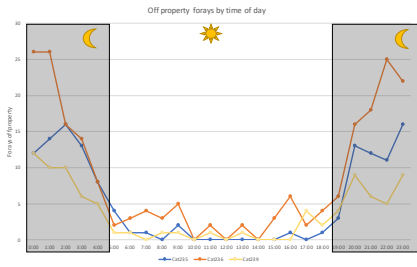
NIGHT
 Feed the second meal inside at bed time when you lock up the house for the night.

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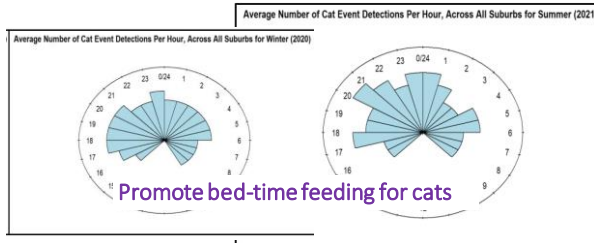
95% home range 0.2 - 0.4 hectare

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Cat detections with camera traps over 24 hrs in summer & winter in 3 suburbs in Ipswich, Qld



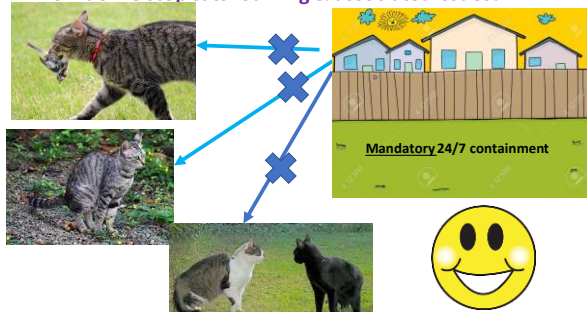
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What about mandated 24/7 containment?



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How do we stop cats roaming & associated issues?



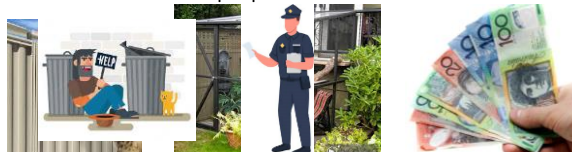
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Have we got it right?

3%-9% of adult Australians feed an average of 1.5 cats they do not perceive they own – more in low SES areas
 90% say the cat helps them through "tough times"
 Most semi-owned cats are not desexed
 City of 100,000 = 4,500 cats producing 11,000 kittens/yr
 Mandated containment is a barrier to adoption

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- On average, 20% of Australian households (2.4 people) live on < \$650/week, percent higher in disadvantaged suburbs
- One in 3 Australians live in rental properties
- Containment systems \$700-\$2000 plus
- Mandating 24/7 containment criminalises cat ownership for low income owners & people with "door-dasher" cats



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Does mandatory containment work?

Yarra-Ranges-Council-data (Mandated 24/7 containment-in-2014)¶

Measure¶	2012/13¶	2016/17¶	Difference¶	%-Change¶
Resident-population¶	149,026¶	152,246¶	+3,220¶	^2.2%¶
Cat-Nuisance-complaints¶	237¶	576¶	+339¶	^143-%¶
Cats-impounded¶	440¶	738¶	+298¶	^68-%¶
Cats-euthanased-¶	232¶	273¶	+41¶	^18-%¶

Casey Council data (Mandated 24/7 containment in 1999)

Measure	1998	2019/2020	Difference	% Change
Resident population	156,128	364,600	208,472	^134%
Cats impounded	264	1047	783	^296%

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Stop the kittens!

50%-70% born in previous 6 months
Targeted free desexing programs

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Banyule data after a 3 year desexing program targeted to 3 lowest SOE suburbs (Banyule baseline 2015-17) vs Vic (2018-19)

	Intake	Banyule intake per 1000 residents	Euthanased	Banyule euthanasia per 1000 residents
Baseline av. 2015-2017	386	3	92	0.7
2017-18	274	61% decrease	66	74% decrease
2018-19	217		41	
2019-2020	152	1.2	33	0.2
VIC	46,655	7		2

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Protecting species of conservation concern should be first priority

- Do it with **data and science!**
- **Protect the species most at risk from cat predation** by night time containment using bed-time feeding
- In locations where **reptiles (small lizards/skinks), birds, amphibians of conservation concern**, assist owners with cats with cat proof fencing or erect boundary fencing
- Prioritise **resources for gathering data on locations of conservation concern** – citizen science backed with camera trap data
- **Prioritise containment efforts** (for both cats & dogs) to **locations of species of conservation concern**
- **All other areas, promote** night-time feeding and containment on property to keep cats and wildlife safe

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What are the solutions?

- **Strongly encourage inside containment of cats at night, and where possible, contained to the owner's property during the day** in a comfortable environment which meets the cats physical and mental needs.
- **Do not support mandated night curfews or 24-hour curfews** because it leads to increased impoundments of cats, increased euthanasia, increased nuisance complaints and increased costs for local governments, and it is not an effective strategy to reduce wandering cats and associated issues, and for some cats and some owners, containment is not achievable.
- **Strongly support high intensity free/subsidized desexing programs** targeted and microtargeted to locations of high cat impoundments/admissions or cat-related calls
- **Local and state laws which allow flexibility for AMOs to assess situation** - is the cat really causing a nuisance or endangering wildlife of conservation concern?

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Urgent need for research to help with targeting to protect species of concern



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