





The myth of domestic cats & urban wildlife

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COMMUNITY CAT PROGRAM
Protecting people, cats & wildlife

1



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



5

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

How many **birds** are killed by cats in Australia?

J.C.Z. Woinarski, B.P. Murphy, S.M. Legge, S.T. Garnett, M.J. Lawes, S. Comer, C.R. Dickman, T.S. Doherty, G. Edwards, A. Nunkinell, D. Paton, R. Palmer, L.A. Woolley

Biological Conservation

2017

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

B.P. Murphy, L.A. Woolley, H.M. Gyle, 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. McGrath, K.E. Mosley, C. Myers, J. Read, J. Riley, D. Sheld, G.J. Trowell, J.M. Turpin, J.C.Z. Woinarski

2019

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. Nunkinell, J. L. Read, D. Sheld

WILDLIFE RESEARCH

2018

Predation by introduced cats *Felis catus* on Australian **frogs**: compilation of species records and estimation of numbers killed

J. C. Z. Woinarski, S. M. Legge, L. A. Woolley, R. Palmer, C. R. Dickman, J. Augusteyn, T. S. Doherty, G. Edwards, H. Gyle, H. McGregor, J. Riley, J. Turpin, B. P. Murphy

2020

6



- 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)



7

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"

8

BIRDS




9

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**

11

15



Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/bioco


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J.C.Z. Woinarski^{a,*}, B.P. Murphy^a, S.M. Legge^b, S.T. Garnett^a, M.J. Lawes^a, S. Comer^a, C.R. Dickman^a, T.S. Doherty^a, G. Edwards^a, A. Nankivell^a, D. Paton^a, R. Palmer^a, L.A. Woolley^a

^aCSIRO

- 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

16



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^aCSIRO

- 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?



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**"

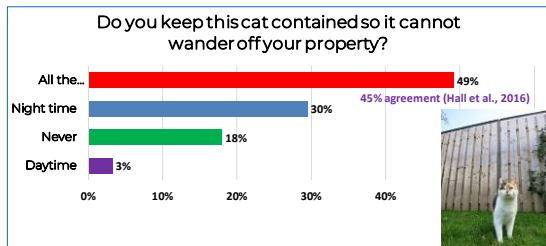
17

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



21

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



22

Study also of cats being enrolled in free desexing program (n= 264 cats)

- Excluding those that only hunt insects, snails, slugs, 22% hunt
- 23% sometimes, 1% yes, often
- **78% DO NOT hunt or hunt only insects** (4% hunt only insects)
- Of the 22% of cats observed to hunt (excluding those that hunt only insects), **only 7% were observed to catch birds**



25

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



28

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



29

What might reality be?

- Based on contemporary cat keeping behaviour, Woinarski paper is nearly 100 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 cats that predate, predate birds then it would be only 940,000 birds predated including introduced species ($61m \times .22 \times .07 = 940,000$)
- **99% less, or only 1% of what they calculated!**
- 73% of birds caught are native – 58% Canberra (Barratt, 1997), 73% in Hobart, (Trueman, 1991), 88% in Adelaide (Paton, 1991).
- 686,000 native birds per year caught by pet cats
- BUT how does this translate to a population effect?

30

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/unowned 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)

32

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

35

What evidence do we have of a population effect?



36

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.



37

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

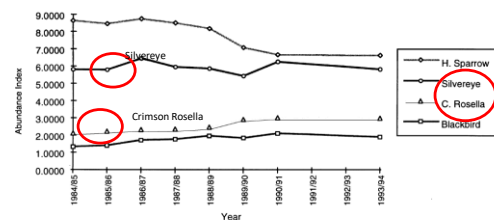


Fig. 5. Temporal trends in abundance of preferred bird prey species of house cats (house sparrows and blackbirds), and the two most commonly taken native bird species (silvereyes and crimson rosellas).

38

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.”

39

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



40

Received: 24 September 2021 | Accepted: 21 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 Joshi
Bruce D. Clarkson⁴

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



41

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!



42

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)



43

Birds



44

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**

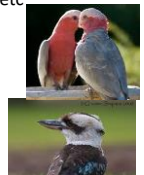
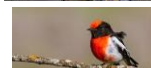


Baker PJ, et al Ibis 2008;150:86-99.27.
Møller AP, Erritzøe J. Oecologia 2000.

46

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**



47

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."



48

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. McGregg, K.E. Moseby, C. Myers, J. Read, J. Riley, D. Stokeld, G.J. Trewella, J.M. Turpin, J.C.Z. Wolnarski

- 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

50

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



51

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



52

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 marmoset *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**.

53

Melbourne Bandicoots

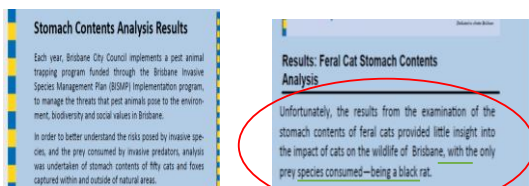
- Southern brown bandicoot abundance was higher in peri-urban areas compared with nature reserves
- **Highest at sites with most urbanized surroundings - cats also prevalent**
- Lower abundance in nature reserves where cats largely absent



MacLagan, 2018

54

Brisbane City Council study...



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

55

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**



56

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."



57

Who is the culprit?



59

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>

61



63

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)

66

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).

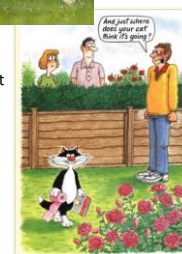
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69

What is the solution?

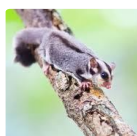
- Yes, cats do predate wildlife, even if does not negatively effect population in urban areas
- People do have a right not to have neighbour's cat on their property - soiling & disturbing wildlife
- What is most aligned with a One Welfare approach?
- To balance and optimise the wellbeing of animals,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



70



71



Predation

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



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

Cats
Threatened species rescued NSW 19-20

| 2019/20 | |
|-------------------------|---|
| Grey-headed Flying-fox | 6 |
| Squirrel Glider | 2 |
| Eastern Long-eared Bat | 9 |
| Brush-tailed Phascogale | 1 |
| Little Bent-winged Bat | 2 |

Dogs
Threatened species rescued NSW 19-20

| 2019/20 | |
|-------------------------|----|
| Grey-headed Flying-fox | 46 |
| Koala | 68 |
| Squirrel Glider | 5 |
| Rose-crowned Fruit-Dove | 0 |
| Rosenberg's Goanna | 1 |

72



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**



73

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% |

74



Typical fencing on rental properties is inadequate for effective cat containment

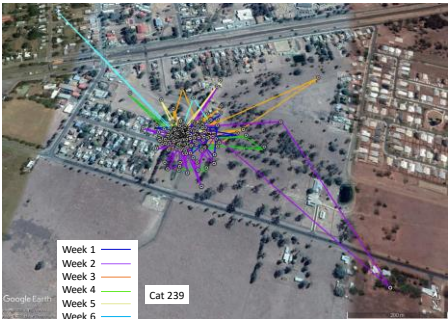


75

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

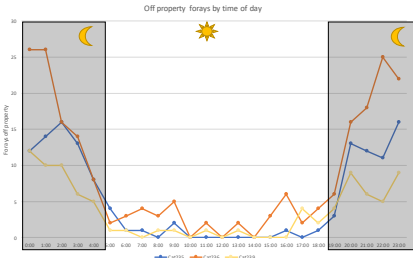


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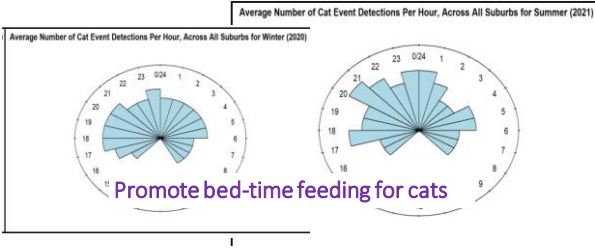
95% home range 0.2 - 0.4 hectare

77



79

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



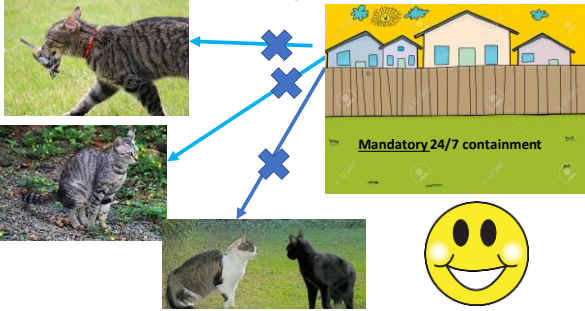
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What about mandated 24/7 containment?



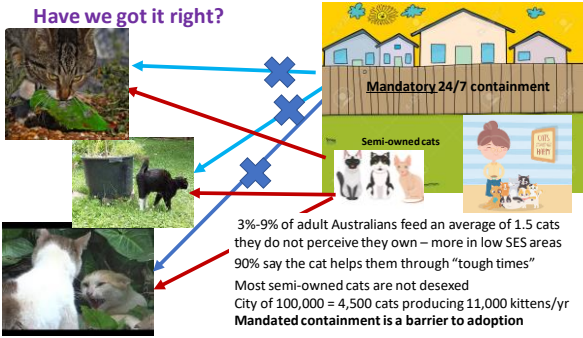
81

How do we stop cats roaming & associated issues?



82

Have we got it right?



83

- 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



84

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% |

85



Stop the kittens!

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

86

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 |

87

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

92



95

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?

96

IT'S NOT JUST THE ANIMALS

"I have seen so many people's lives damaged by having to kill a never ending stream of kittens and cats"

"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"

104

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



105

IT'S TIME!

Let's manage cats scientifically & humanely
To decrease cats and costs, and impact on
people and wildlife.

COMMUNITY CAT PROGRAM
Protecting people, cats & wildlife

107