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About Me

- Cat Initiatives Analyst, Best Friends Animal Society
 - Analyze/apply science and public policy related to community cat issues

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About Me

- Vox Felina (blog)
 - www.voxfelina.com
 - Facebook
 - Twitter





Overview

- Tonight's presentation
 - The need for mythbusting
 - Public policy perspective
 - Mythbusting various claims
 - Summary
 - Q&A





The need for mythbusting



The Need for Mythbusting

- Legitimate policy discussions begin with facts
 - Much of what we read in the mainstream media is
 - Misleading
 - Factually incorrect



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The Need for Mythbusting

- Legitimate policy discussions begin with facts
 - Much of the science being reported is
 - Badly flawed
 - Produced by individuals and organizations openly opposed to TNR
 - Hardly the objective "search for truth" one might imagine
 - (Also: often funded with our tax dollars)



The Need for Mythbusting

- · Minimize conflict for individuals and organization conducting or supporting TNR
 - Supporting TNR does **not** put you at odds with
 - Wildlife conservation
 - Public health
 - Etc.



The Need for Mythbusting

· Minimize conflict for individuals and organization conducting or supporting TNR



The Need for Mythbusting

- Advocates need to be able to respond thoughtfully to TNR opposition
 - Ordinance changes
 - Media accounts
 - Etc.





Big picture: TNR as public policy

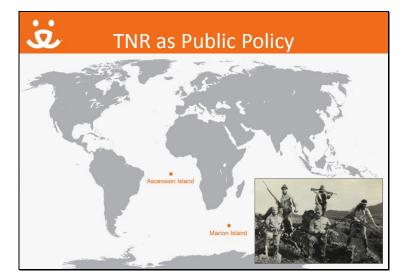


- Sound public policy must reflect sound science
 - There are only **two** approaches known to reduce the population of community cats
 - Intensive TNR efforts
 - Targeted (zip codes, neighborhoods, colonies, etc.)
 - Shelter-based return-to-field

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TNR as Public Policy

- Sound public policy must reflect sound science
 - There are only **two** approaches known to reduce the population of community cats
 - Intensive eradication efforts, such as those used on small oceanic islands
 - Poisons
 - Introduced disease (e.g., panleukopenia)
 - Lethal trapping
 - Hunting



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- Examples
 - Marion Island
 - 115 square miles, sub-Antarctic Indian Ocean, barren, uninhabited
 - 19 years to exterminate approximately 2,200 cats
 - · Methods: feline distemper, poisoning, hunting and trapping, and dogs^{1,2}
 - Bester, M. N. et al. A review of the successful eradication of feral cats from sub-Antarctic Marion Island, Southern Indian Ocean. South African Journal of Wildlife Research 32, 65–73 (2002).
 Bloomer, J. P. & Bester, M. N. Control of feral cats on sub-Antarctic Marion Island, Indian Ocean. Biological Conservation 60, 211–219 (1992).



TNR as Public Policy

- Examples
 - Marion Island





TNR as Public Policy

- Examples
 - Ascension Island
 - South Atlantic Ocean, sparsely populated
 - About 34 square miles in size
 - Roughly the size of Miami, FL



- Examples
 - Ascension Island
 - Four-year restoration project
 - "...including eradication effort [resulting in the deaths of 635 cats] and monitoring of cats and seabirds"³
 - Taxpayers: nearly \$1.3M (in 2013 dollars)

^{3.} Ratcliffe, N. et al. The eradication of feral cats from Ascension Island and its subsequent recolonization by seabirds. *Oryx* 44, 20–29 (2009).



Options and Feasibility

- What about the "traditional" approach?
 - Complaint-driven impoundment typically resulting in death
 - Not stabilizing or reducing the population of community cats



Options and Feasibility

- "Low-level ad hoc culling of feral cats"
 - Ineffective at reducing their numbers
 - And might actually lead to their increase⁴



 Lazenby, B. T., Mooney, N. J. & Dickman, C. R. Effects of low-level culling of feral cats in open populations: a case study from the forests of southern Tasmania. Wildlife Research 41, 407–420 (2014).



- Sound public policy must reflect sound science
 - Eradication efforts are unlikely to attract much support anywhere in the U.S.
 - Horrendous methods employed
 - Astronomical expense
 - The only feasible option, then, is TNR

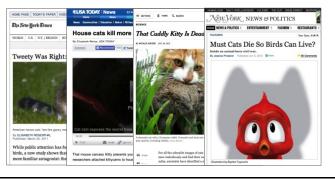


Mythbusting: Getting past the hype



Mythbusting

• Alleged wildlife impacts





- Alleged wildlife impacts
 - A brief history
 - "The cat, of all animals, is in some respects the most intimate companion of man... Nevertheless, it leads a dual existence...





- · Alleged wildlife impacts
 - A brief history
 - "'The fireside sphinx,' the pet of the children, the admired habitué of the drawing-room or the salon by day, may become at night a wild animal... No animal that it can reach and master is safe from its ravenous clutches."
 - Forbush, Edward Howe. (1916). The Domestic Cat: Bird Killer, Mouser and Destroyer of Wild Life; Means of Utilizing and Controlling It. Wright and Potter Printing Company.



Mythbusting

- · Alleged wildlife impacts
 - A brief history
 - The "Wisconsin Study"
 - "birds killed annually by freeranging cats in rural Wisconsin... 7.8–219 million"⁶



 Coleman, John S., & Temple, Stanley A. (1995). How Many Birds Do Cats Kill? Wildlife Control Technology, 44.



- · Alleged wildlife impacts
 - Grossly inflated estimates in three easy steps
 - Inflated estimates of outdoor cats
 - Various factors involved
 - » For example: ignore surveys showing that two thirds of pet cats are indoor only
 - Inflated predation estimates
 - Various factors involved
 - » For example: overestimate number of successful hunters
 - Errors compounded via multiplication

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Mythbusting

- Alleged wildlife impacts
 - A closer look at one highprofile paper
 - Cited in about 60 academic papers
 - Picked up by 38 news outlets



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Mythbusting

- Alleged wildlife impacts
 - 1.3–4.0 billion bird deaths per year attributed to domestic cats in the U.S.⁷



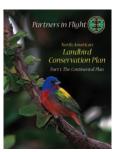
7. Loss, S. R., Will, T. & Marra, P. P. The impact of free-ranging domestic cats on wildlife of the United States. *Nature Communications* 4 (2013).



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Mythbusting

- Alleged wildlife impacts
 - Reality check
 - Partners in Flight Population
 Estimates Database: total number of landbirds in North America is about 4.7 billion⁸

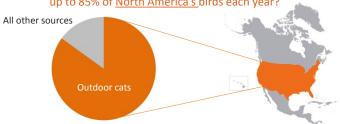


 Rich, T. D. et al. Partners in Flight North American Landbird Conservation Plan. (Cornell Lab of Ornithology, Ithaca, NY, 2004).

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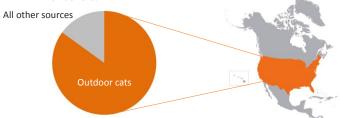
Mythbusting

- Alleged wildlife impacts
 - Reality check
 - How can free-roaming cats in the U.S. <u>alone</u> be killing up to 85% of <u>North America's</u> birds each year?



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- Alleged wildlife impacts
 - Reality check
 - Were this even close to accurate, there would be no birds left!





- · Alleged wildlife impacts
 - Reality check
 - 2014 State of the Birds report
 - "Habitat loss is by far the Greatest cause of bird population declines"⁹

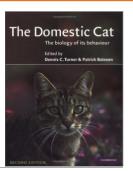


9. North American Bird Conservation Initiative, U.S. Committee. *The State of the Birds 2014 Report.* (U.S. Department of Interior, Washington, D.C., 2014).



Mythbusting

- · Alleged wildlife impacts
 - Reality check
 - Review of more than 80 predation studies
 - "There are few, if any studies apart from island ones, that actually demonstrate that cats have reduced bird populations."¹⁰



10. Fitzgerald, B.M. and D.C. Turner, Hunting Behaviour of domestic cats and their impact on prey populations, in The Domestic Cat: The biology of its behaviour, D.C. Turner and P.P.G. Bateson, Editors. 2000, Cambridge University Press. p. 151–175.



Mythbusting

- · Alleged wildlife impacts
 - Reality check
 - Birds killed by cats are, on average, significantly less healthy than birds killed through non-predatory events (e.g., collisions with windows or cars)¹¹

11. Møller, A.P. and J. Erritzøe, Predation against birds with low immunocompetence. *Oecologia*, 2000. 122(4): p. 500–504.



- · Alleged wildlife impacts
 - Reality check
 - Royal Society for the Protection of Birds (UK)
 - "...there is no scientific evidence that predation by cats in gardens is having any impact on bird populations UK-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."12
 - » (Approximately 90% of cats have outdoor access)
 - 12. Royal Society for the Protection of Birds. Are cats causing bird declines? 2015.



Mythbusting

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- · Alleged wildlife impacts
 - Reality check





- · Alleged wildlife impacts
 - Reality check
 - "Cats aren't as bad as biologists thought." ¹³
 - Just 5 bird kills were observed over the course of 2,000 hours of video-recordings. $^{\rm 14}$
 - Paluska, M. Kitty cameras show Athens cats on the prowl. (2012).
 Loyd, K. A. T., Hernandez, S. M., Carroll, J. P., Abernathy, K. J. & Marshall, G. J. Quantifying free-roaming domestic cat predation using animal-borne video cameras. Biological Conservation 160, 183–189 (2013).



Mythbusting

- · Alleged wildlife impacts
 - Sub-lethal impacts
 - "The brief presence of a domestic cat at avian nest sites reduces subsequent provisioning rates and induces lethal... effects."¹⁵



 Bonnington, C., Gaston, K.J., and Evans, K.L., "Fearing the feline: domestic cats reduce avian fecundity through trait-mediated indirect effects that increase nest predation by other species." *Journal of Applied Ecology*. 2013. 50(1): p. 15– 24.



- · Alleged wildlife impacts
 - Sub-lethal impacts
 - Reality check
 - No live cats used
 - » One taxidermy mount of a domestic cat and one "replica... a black and white stuffed cuddly toy cat"

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- · Alleged wildlife impacts
 - Sub-lethal impacts
 - · Reality check
 - Ignores "urban winners"
 - » "...individuals from urban populations [are] less fearful of humans than their rural ancestors...
 - » Such reduced fearfulness among urban birds may have as a consequence that they are less disturbed by humans and their domesticated animals (mainly cats and dogs)." 16
 - 16. Møller, A.P., "Interspecific variation in fear responses predicts urbanization in birds." *Behavioral Ecology*. 2010. 21(2): p. 365–371.



Mythbusting

Rabies





Mythbusting

- Rabies
 - "TNVR programs are not effective methods for reducing public health concerns or for controlling feral cat populations"¹⁷

		Secure and real reals		
RIGINAL ARTICLE				
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D. Rosbing', D. Salvaco', J. J.	Bastari, M. Sev	is 1, to State*, G. Fernands* and C. S. Rapprocht*		
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17. Roebling, A. D., Johnson, D., Blanton, J. D., Levin, M., Slate, D., Fenwick, G., & Rupprecht, C. E. (2013). Rabies Prevention and Management of Cats in the Context of Trap-Neuter-Vaccinate-Release Programmes. *Zoonoses and Public Health*, 61(4), 290–296.



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- Rabies
 - Reality check
 - "The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention."
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- Rabies
 - (This was no accident)





Mythbusting

- Rabies
 - Reality check
 - Of the 49 U.S. rabies cases reported in humans since 1995, 10 were the result of dog bites that occurred outside of the country; the remainder: wildlife or unknown origins¹⁸
 - Since 1960, only two cases of human rabies in the U.S. have been attributed to cats¹⁹
 - 18. "Human Rabies." Centers for Disease Control and Prevention. 2012.
 19. "Recovery of a Patient from Clinical Rabies California," 2011." Morbidity and Mortality Weekly Report. Center for Disease Control and Prevention. 2012. 61(4): p. 61–64.



Mythbusting

- Rabies
 - Reality check
 - This year alone (through Aug): 26 deaths due to lightning strikes in U.S.²⁰

20. *U.S. Lightning Deaths in 2015*. National Oceanic and Atmospheric Administration, National Weather Service.



- Rabies
 - Reality check
 - Rabies cases in 2013: 247 cats, 89 dogs (CDC report)
 - The lowest figure reported for cats since 1991
 - "...all 441 cats that were up-to-date or that had previously been vaccinated but were not up-to-date were negative for rabies"²¹
 - 21. Dyer, J. L. et al. Rabies surveillance in the United States during 2013. *Journal of the American Veterinary Medical Association* 245, 1111–1123 (2014).



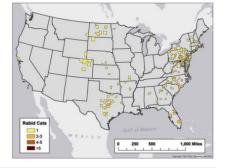
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Mythbusting

- Rabies
 - Reality check
 - "Hot spots"



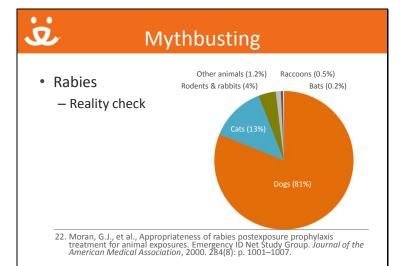
21. Dyer, J. L. et al. Rabies surveillance in the United States during 2013. *Journal of the American Veterinary Medical Association* 245, 1111–1123 (2014).



- Rabies
 - Reality check
 - Only one study has investigated human exposures nationally
 - Dogs were six times more likely than cats to send a person to the emergency room for post exposure treatment²²
 - Moran, G.J., et al., Appropriateness of rabies postexposure prophylaxis treatment for animal exposures. Emergency ID Net Study Group. *Journal of the American Medical Association*, 2000. 284(8): p. 1001–1007.

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- Toxoplasmosis
 - "Felines, including domestic cats, are the definitive hosts of *T. gondii*, and the organism can only complete its sexual cycle within feline hosts."²⁴

^{24.} Torrey, E.F. and R.H. Yolken, Toxoplasma oocysts as a public health problem. *Trends in parasitology*, 2013.



- Toxoplasmosis
 - Reality check
 - Consumption of undercooked or raw meat is a risk
 - Hand washing is an easy prevention measure
 - Cats typically shed oocysts only once in their lifetime (if at all)
 - Hand washing is an easy prevention measure



Mythbusting

- Toxoplasmosis
 - "...mentally ill individuals were more likely to have been breastfed..."²³



23. Torrey, E.F., Yolken, R.H., 1995. Could Schizophrenia Be a Viral Zoonosis Transmitted From House Cats? *Schizophrenia Bulletin*. 21(2), 167–171.



- Toxoplasmosis
 - Reality check
 - Links between *T. gondii* infection and mental illness, memory loss, etc. little more than correlation
 - Correlation is not the same as causation



- Toxoplasmosis
 - Reality check
 - Links between *T. gondii* infection and mental illness, memory loss, etc. little more than correlation
 - Correlation ≠ causation



Mythbusting

- Toxoplasmosis
 - Reality check
 - Links between *T. gondii* infection and mental illness, memory loss, etc. little more than correlation
 - Example: mid-1990s NutraSweet scare
 - » "These scientists noticed that there was an alarming rise in brain tumor rates about three or four years after NutraSweet was introduced in the market..."



- Toxoplasmosis
 - Reality check
 - Links between T. gondii infection and mental illness, memory loss, etc. little more than correlation
 - Example: mid-1990s NutraSweet scare
 - » NutraSweet consumption was going up at the same time brain tumor rates were — but a lot of other things were on the rise, too
 - Cable TV
 - Sony Walkmen
 - Tom Cruise's career



- Toxoplasmosis
 - Reality check
 - Links between *T. gondii* infection and mental illness, memory loss, etc. little more than correlation



- Example: mid-1990s NutraSweet scare
 - » "When Ronald Reagan took office in 1981, government spending increased just as dramatically as brain tumor rates...
 - » The correlation between government over-spending and brain cancer is just as solid as the link between NutraSweet and brain cancer."²⁵

25. Seife, C., Proofiness: The Dark Arts of Mathematical Deception. 2010: Viking Adult.



Mythbusting

- Toxoplasmosis
 - Reality check
 - Toxoplasmosis is a legitimate public health concern
 - However, "epidemiological studies often disagree on important risk factors for infection and disease, making health recommendations difficult to uniformly advocate"

 Miller, N. J. Toxoplasma gondii diversity: From seroprevalence in multiple host species to genotypic analysis of field isolates. Doctor of Philosophy, University of Pennsylvania, (2013).



Mythbusting

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 Miller, N. J. Toxoplasma gondii diversity: From seroprevalence in multiple host species to genotypic analysis of field isolates. Doctor of Philosophy, University of Pennsylvania, (2013).



- Toxoplasmosis
 - Reality check
 - Data from the large-scale National Health and Nutrition Examination Survey reveal significant decreases among people 12–49 years of age born in the U.S.²⁷

- 1988-1994: 14.1% - 1999-2004: 9.0% - 2009-2010: 6.6%

27. Krueger, W., Hilborn, E., Converse, R. & Wade, T. Drinking water source and human *Toxoplasma gondii* infection in the United States: a cross-sectional analysis of NHANES data. *BMC Public Health* 14, 711 (2014).



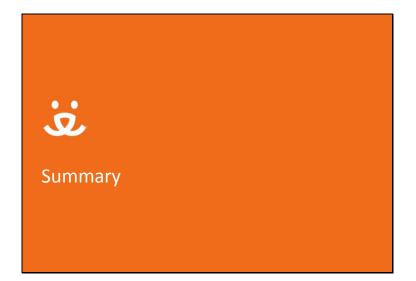
Mythbusting

- Toxoplasmosis
 - Reality check
 - Data from the large-scale National Health and Nutrition Examination Survey reveal significant decreases among people 12-49 years of age born in the U.S.²⁷
 - Over this same period (1988–2010), the popularity of TNR increased dramatically²⁸
 - » Raises doubts that community cats pose a serious threat
 - Krueger, W., Hilborn, E., Converse, R. & Wade, T. Drinking water source and human *Toxoplasma gondii* infection in the United States: a cross-sectional analysis of NHANES data. *BMC Public Health* 14, 711 (2014).
 Holtz, E. *Trap-Neuter-Return Ordinances and Policies in the United States: The Future of Animal Control*. (Alley Cat Allies, Bethesda, MD, 2013).



- Toxoplasmosis
 - Reality check
 - "Unmanaged feral cats" are 4.8 times more likely to be exposed to T. gondii than managed colony cats
 - And 11.8 times more likely to shed oocysts in their feces²⁹
 - Feeding community cats would seem to be an effective measure for reducing the likelihood of T. gondii exposure in cats
 - » And, by extension, in humans

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29. VanWormer, E., et al., Toxoplasma gondii, Source to Sea: Higher Contribution	1 01
Domestic Felids to Terrestrial Parasite Loading Despite Lower Infection	
Dravelance Feetlewith 2012, p. 1. 12	





- · A careful review of the science
 - Sensational headlines driven largely by flawed science
 - Often by researchers with a clear agenda
 - (And reported by a media driven too much by sensationalism)
 - Few of the studies stand up to scrutiny
 - Flawed study design
 - Invalid results and conclusions



- Remember: this is a public policy issue
 - What would we have if the pseudoscience and sensational claims were taken seriously?
 - Restrictions and/or prohibitions on TNR
 - The irony of it all
 - The very risks opponents about which opponents claim to be concerned actually **increase**, not decrease
 - More unvaccinated, unsterilized cats
 - More predation
 - Etc.
