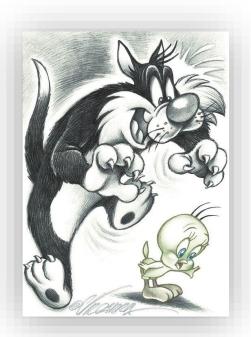
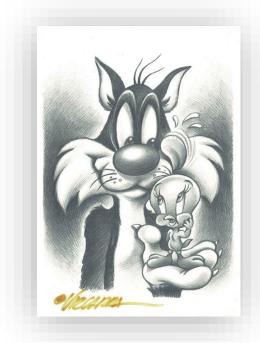
Domestic Cats and International Wildlife Law – Turning a Blind Eye to One of the World's Worst Invasive Alien Species?



Edward and Bonnie Foreman Biodiversity Lecture

1 April 2020





Arie Trouwborst

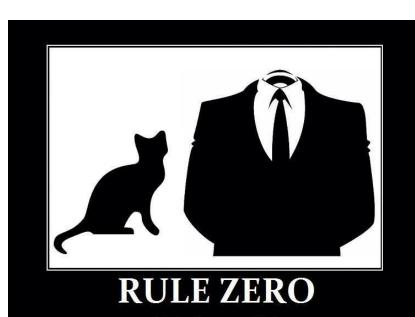
DISCLAIMER

I have never kicked, shot, poisoned, strangled, drowned, suffocated, or otherwise harassed or killed a cat, nor do I harbour the ambition to engage in any of these activities in the future.

- Arie Trouwborst





















Cats in US kill billions of birds, mammals, study finds

29 January 2013

Tuesday.



A domestic cat sits in October 17, 2010 in Manassas, Virginia. Domestic cats in the United States kill up to 3.7 billion birds and as many as 20.7 billion mice, voles and other small mammals each year, biologists estimated on

Domestic cats in the United States kill up to 3.7 billion birds and as many as 20.7 billion mice, voles and other small mammals each year, biologists estimated on Tuesday.

Puss is probably the biggest human-induced killer of these species, outstripping better-known culprits such as habitat loss, agricultural chemicals or ating they said in a study published in the

investigations.

The next step was to get an estimate of the number of cats in the United States.

Loss's team calculated there were around 84 million cats with owners, of which a couple of million are unlikely to have outdoor access or go hunting.

Added to that are between 30 and 80 million "unowned" cats—animals that are wild or freeranging but without an owner and survive on goodwill.

"We estimate that free-ranging domestic cat 1.4 to 3.7 billion birds and 6.9 to 20.7 billion mammals annually," says the study.

"Unowned cats, as opposed to owned pet the majority of this mortality."

The paper says the estimates are much previously thought, and show that cats the single greatest source of anthropor made] mortality for US birds and many

It adds: "Scientifically sound conserv policy intervention [are] needed to re impact."

The study tried to get a fix on the r reptiles and amphibians that are drew a blank.



Cats kill one million birds a day in Australia



Handout photo from The Threatened Species Recovery Hub showing a feral cat in Australia with a dead Galah

Feral and pet cats kill more than one million birds in Australia every day, new research showed Wednesday, with the staggering slaughter driving the decline of many species.

The study, published in the journal Biological Conversation, estimated that wild cats wiped out 316 million every year, while pets killed 61 million

"Everyone knows that cats kill birds but this study

. Woinarski said that while previous research had looked at the impact cats had on Australia's mammals, this was the first nationwide assessment

It found the highest rates of predation were on Australia's islands and in remote arid areas, where the number of birds killed each year could reach 330 per square kilometre.

Feral cats, which number in their millions across the country, are also considered the main culprit behind Australia's high rate of mammal extinction.

They have wiped out entire populations since being introduced by Europeans who settled in the country two centuries ago, with efforts to cull or sterilise them so far failing to slow their march.

The researchers found evidence of cats killing 338 bird types—almost half of Australia's native species, including 71 threatened species such as the spotted quail thrush, the squatter pigeon, and the

"We found that the birds most likely to be killed by cats are medium sized birds, birds that nest and feed on the ground, and birds that occur on islands or in woodlands, grasslands and shrublands," said

"For Australian birds, cate are a le





















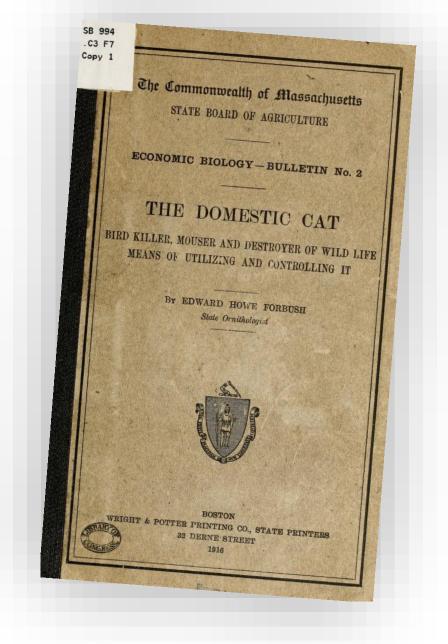




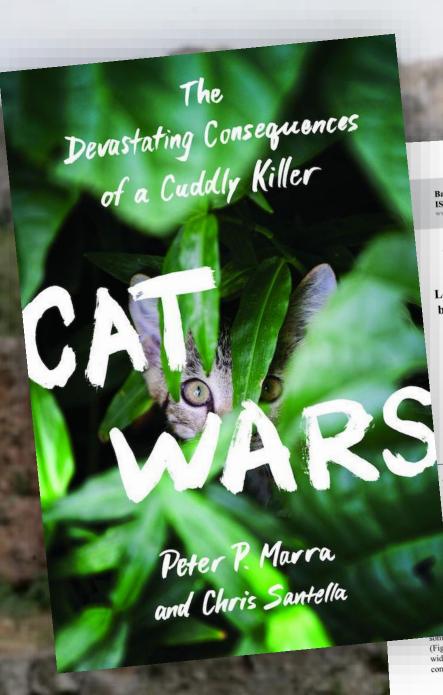
"We now legislate to protect birds, but place no limit on the increase and activities of their most destructive ... enemy. A man is liable to a fine if he kills a bird, but he may with impunity keep any number of cats to kill birds ..."

"The widespread dissemination of cats in the woods and in the open and farming country, and the destruction of birds by them, is a much more important matter than most people suspect, and is not to be lightly put aside."

- Edward Howe Forbush, 1916 (!)







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Felis silvestris catus como predador de murciélagos insulares y cita de depredación sobre el amenazado Pipistrellus madeirensis

Look what the cat dragged in: Felis silvestris catus as predators of insular bats and instance of predation on the endangered Pipistrellus maderensis

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Abstract: This note reports the predation of a threatened Madeira pipistrelle bat by a domestic house cat. This represents the first confirmed record of cat predation upon a Macaronesian bat and adds to an increasing body of evidence suggesting that free-ranging cats pose a strong negative impact to native insular vertebrate populations.

Keywords: bats, domestic cats, non-native species, Madeira pipistrelle, Macaronesia.

received: January 2nd. 2015 accepted: February 7th 2015

e impact of non-native species is one of the most tial forces underpinning the global biodiversity Nogales et al., 2013; Dirzo et al., 2014). Since the ication of the African wildcat Felis silvestris lybica some 9500 years ago, the domestic counterpart F. s. catus (Fig. 1) has become one of the world's most abundant and widespread pets and has established feral populations in both continental and island ecosystems (Driscoll et al., 2007).

Free-ranging cats are generalist and opportunistic predators that tend to proliferate around human populated



Convention on the Conservation of Migratory Species of Wild Animals

TING PARTIES.

NIZING that wild animals in their innumerable placeable part of the earth's natural system which of for the good of mankind:

hat each generation of man holds the resources ire generations and has an obligation to ensure conserved and, where utilized, is used wisely;

- S of the ever-growing value of wild animals ecological, genetic, scientific, aesthetic, educational, social and economic points of
- D particularly with those species of wild across or outside national jurisdictional
- 3 that the States are and must be the ory species of wild animals that live within ational jurisdictional boundaries:
- nt conservation and effective management ild animals require the concerted action tional jurisdictional boundaries of which part of their life cycle;

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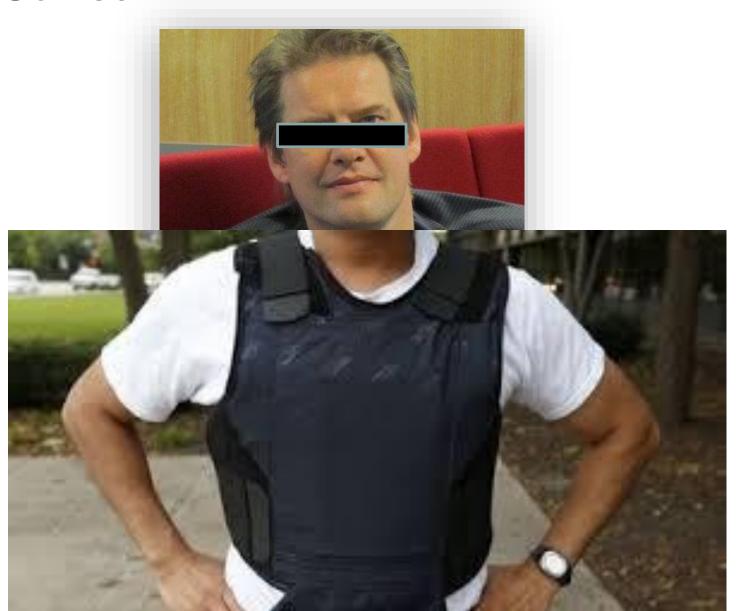
teans the entire population or any te part of the population of any on of wild animals, a significant embers cyclically and predictably onal jurisdictional boundaries:

a migratory species" means the sting on the migratory species long-term distribution and

I be taken as "favourable

- d) "Conservation status" will be taken as "uni if any of the conditions set out in sub-para, this paragraph is not met:
- "Endangered" in relation to a particular species means that the migratory spe danger of extinction throughout all or a portion of its range;
- f) "Range" means all the areas of land or wa migratory species inhabits, stays in ten crosses or overflies at any time on its migration route;
- g) "Habitat" means any area in the range of a n species which contains suitable living condithat species;
- h) "Range State" in relation to a particular mis species means any State (and where appropria other Party referred to under sub-paragraph (ki paragraph) that exercises jurisdiction over any the range of that migratory species, or a Stat vessels of which are engaged outside no jurisdictional limits in taking that migratory sp.
- "Taking" means taking, hunting, fishing, capti harassing, deliberate killing, or attempting to en in any such conduct;
- "AGREEMENT" means an international agreer relating to the conservation of one or more migra species as provided for in Articles IV and V of Convention: and
- (i) "Party" means a State or any regional econor integration organization constituted by sovere States which has competence in respect of the negotiation, conclusion and application international agreements in matters covered by the Convention for which this Convention is in force.
- In matters within their competence, the regional econom integration organizations which are Parties to the Convention shall in their own name exercise the rights and their member States. In such cases the member States or these organizations shall not be entitled to exercise such dights individually.
- Where this Convention provides for a decision to be taken by either a two-thirds majority or a unanimous decision of "the Parties present and votinos" this action.

Han Somsen





Phillipa McCormack





Elvira Martínez Camacho





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ECONOMIC BIOLOGY-BULLETIN No. 2

THE DOMESTIC CAT

BIRD KILLER, MOUSER AND DESTROYER OF WILD LIFE
MEANS OF UTILIZING AND CONTROLLING IT

By EDWARD HOWE FORBUSH

State Ornithologist



BOSTON
WRIGHT & POTTER PRINTING CO., STATE PRINTERS
32 DERNE STREET
1916

PLATE III.



Fig. 1. — A Cat that has been "taught not to been Birds."

After which she killed them "on the sly." The warbler just killed by her is tied under her chin to "cure" the bird-killing habit, but the expedient failed. She still kills birds.

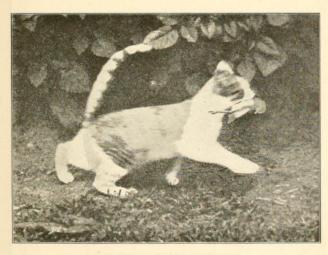


Fig. 2. — Fift-right Birds in one Season.
This well-fed pet cat was known to kill fifty-eight birds in one year, including the young in five nests. (Photograph by Mr. A. C. Dike, first published in "Useful Birds.")

PLATE IV.



SOME ADULT BIRDS BROUGHT IN BY A CAT OR PICKED UP DEAD.

A collection of bird skins in the possession of Miss Cordelia J. Stanwood. Some of these birds were not killed by the cat, but the young birds killed by her were not preserved. See page 36. (Photograph by courtesy of Miss Stanwood)

- Baker, P.J., Molony, S., Stone, E., Cuthill, I.C., & Harris, S. (2008). Cats about town: is predation by free-ranging pet cats (*Felis catus*) likely to affect urban bird populations? *Ibis, 150*, 86-99.
- Balogh, A.L., Ryder, T.B., & Marra, P.P. (2011). Population demography of Gray Catbirds in the suburban matrix: sources, sinks and domestic cats. Journal of Ornithology, 152, 717-726.
- Barratt, D.G. (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*, 25, 475-487.
- Beaumont, M., Barratt, E.M., Gottelli, D., Kitchener, A.C., Daniels, M.J., Pritchard, & J.K., Bruford, M.W. (2001). Genetic diversity and introgression in the Scottish wildcat. *Molecular Ecology, 10*, 319-336.
- Beckerman, A.P., Boots, M., & Gaeston, K.J. (2007). Urban bird declines and the fear of cats. *Animal Conservation*, 10, 320-325.
- Bellard, C., Genovesi, P., & Jeschke, J.M. (2016). Global patterns in threats to vertebrates by biological invasions. *Proceedings of the Royal Society B, 283, 20152454*.
- Beutel, T., Reineking, B., Tiesmeyer, A., Nowak, C., & Heurich, M. (2017). Spatial patterns of co-occurrence of the European wildcat *Felis silvestris silvestris* and domestic cats *Felis silvestris* in the Bavarian Forest National Park. *Wildlife Biology*, wlb.00248.
- Blancher, P.P. (2013). Estimated number of birds killed by house cats (Felis catus) in Canada. Avian Conservation Ecology, 8, 3.
- Bonnaud, E., Medina, F.M., Vidal, E., Nogales, M., Tershy, B., Zavaleta, E., ... Horwath, S.V. (2011). The Diet of Feral Cats on Islands: A Review and a Call for More Studies. *Biological Invasions*, *13*, 581-603.
- Bonnington, C., Gaston, K.J., & Evans, K.L. (2013). Fearing the feline: domestic cats reduce avian fecundity through trait-mediated indirect effects that increase nest predation by other species. *Journal of Applied Ecology, 50*, 15-24.
- Brown, M.A., Cunningham, M.W., Roca, A.L., Troyer, J.L., Johnson, W.E., & O'Brien, S.J. (2008). Genetic characterization of feline leukemia virus from Florida panthers. *Emerging Infectious Diseases*, 14, 252-259.
- Campbell, K.J., Harper, G., Algar, D., Hanson, C.C., Keitt, B.S., & Robinson, S. (2011). Review of feral cat eradications on islands. In Veitch, C.R., Clout, M.N., Towns, D.R. (eds.) Island invasives: eradication and management. Gland & Auckland: IUCN & CBB, 37-46
- Calver, M., Thomas, S., Bradley, S., & McCutcheon, H. (2007). Reducing the rate of predation on wildlife by pet cats: the efficiency and practicality of collar-mounted pounce protectors. *Biological Conservation*, 137, 341-348.
- Calver, M.C., Grayson, J., Lilith, M., & Dickman, C.R. (2011). Applying the precautionary principle to the issue of the impacts by pet cats on urban wildlife. *Biological Conservation, 144*, 1895-1901.
- Calvert, A.M., Bishop, C.A., Elliot, R.D., Krebs, E.A., Kydd, T.M., Machtans, C.S., & Robertson, G.J. (2013). A synthesis of human-related avian mortality in Canada. *Avian Conservation Ecology, 8*, 11.
- Coman, B.J., & Brunner, H. (1972). Food habits of the feral house cat in Victoria. Journal of Wildlife Management, 36, 848-853.
- Conrad, P.A., Miller, M.A., Kreuder, C., James, E.R., Mazet, J., Dabritz, H., ... Grigg, M.E. (2005). Transmission of *Toxoplasma*: clues from the study of sea otters as sentinels of *Toxoplasma gondii* flow into the marine environment. *International Journal for Parasitology, 35*, 1155-1168.
- Cortens, J., & Verbeylen, G. (2007). Verspreiding van en beschermingsmaatregelen voor de eikelmuis (Eliomys quercinus) in Vlaams-Brabant. Mechelen: Natuurpunt Studie.
- Courchamp, F., Chapuis, J.L., & Pascal, M. (2003). Mammal invaders on islands: impact, control and control impact. Biological Review, 78, 347-383.
- Crooks, K.R., & Soulé, M.E. (1999). Mesopredator release and avifaunal extinctions in a fragmented system. Nature, 400, 563-566.



- Crowley, S.L., Cecchetti, M., & McDonald, R.A. (2019). Hunting behaviour in domestic cats: an exploratory study of risk and responsibility among cat owners. *People and Nature*, 1, 18-30.
- Doherty, T.S., Glen, A.S., Nimmo, D.G., Ritchie, E.G., & Dickman, C.R. (2016). Invasive predators and global biodiversity loss. PNAS USA, 113, 11261-11265.
- Dubey, J.P. (2002). A review of toxoplasmosis in wild birds. *Veterinary Parasitology, 106*, 121-153.
- Fancourt, B.A. (2015). Making a killing: photographic evidence of predation of a Tasmanian pademelon (*Thylogale billardierii*) by a feral cat (*Felis catus*). *Australian Mammalogy*, 37, 120-124.
- Frank, A.S.K., Johnson, C.N., Potts, J.M., Fisher, A., Lawes, M., Woinarski, J.C.Z., ... Legge, S. (2014). Experimental evidence that feral cats cause local extirpation of small mammals in Australia's tropical savannas. *Journal of Applied Ecology, 51*, 1486-1493.
- George, W.G. (1974). Domestic cats as predators and factors in winter shortages of raptor prey. Wilson Bulletin, 86, 384-396.
- Gerhold, R.W., & Jessup, D.A. (2013). Zoonotic diseases associated with free-roaming cats. Zoonoses Public Health, 60, 189-195.
- Hall, C.M., Fontaine, J.B., Bryant, K.A., & Calver, M.C. (2015). Assessing the effectiveness of the Birdsbesafe® anti-predation collar cover in reducing predation on wildlife by pet cats in Western Australia. *Applied Animal Behaviour Science*, 173, 40-51.
- Hartley, W.J., & Dubey, J.P. (1991). Fatal toxoplasmosis in some native Australian birds. *Journal of Veterinary Diagnostic Investigation*, 3, 167-169.
- Hubbard, A.L., McOris, S., Jones, T.W., Boid, R., Scott, R., & Easterbee, N. (1992). Is survival of European wildcats *Felis silvestris* in Britain threatened by interbreeding with domestic cats? *Biological Conservation*, *61*, 203-208.
- Jessup, D.A. (2004). The welfare of feral cats and wildlife. Journal of the American Veterinary Medical Association, 225, 1377-1383.
- Kays, R.W., & DeWan, A.A. (2004). Ecological impact of inside/outside house cats around a suburban nature preserve. *Animal Conservation*, 7, 273-283.
- Kittie, A.M., & Watson, A.C. (2014). Rusty-spotted cat in Sri Lanka: observations of an arid zone population. *Cat News*, 40, 17-19.
- Knol, W. (2015). Verwilderde huiskatten: effecten op de natuur in Nederland. KNJV report nr. 15-01. Amersfoort: Koninklijke Nederlandse Jagersvereniging.
- Krauze-Gryz, D., Zmihorski, M., & Gryz, J. (2017). Annual variation in prey composition of domestic cats in rural and urban environment. *Urban Ecosystems*, 20, 945-952.
- Krauze-Gryz, D., Gryz, J., & Żmihorski, M. (2019). Cats kill millions of vertebrates in Polish farmland annually. *Global Ecology and Conservation, 17*, e00516.
- Legge, S., Murphy, B.P., McGregor, H., Winarski, J.C.Z., Augusteyn, J., Ballard, G., ... Zewe, F. (2017). Enumerating a continental-scale threat: how many feral cats are in Australia? *Biological Conservation*, 206, 293-303.
- Li, B., Belasen A., Pafilis P., Bednekoff P., & Foufopoulos, J. (2014). Effects of feral cats on the volution of anti-predator behaviours in island reptiles: insights from an ancient introduction. *Proceedings of the Royal Society B, 281*, 20140339.
- Lilith, 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*, 176-189.
- Longcore, T., Rich, C., & Sullivan, L.M. (2009). Critical assessment of claims regarding management of feral cats by trap-neuter-return. *Conservation Biology*, 23, 887-894.
- Loss, S.R., & Marra, P.P. (2017). Population impacts of free-ranging domestic cats on mainland vertebrates. *Frontiers in Ecology and the Environment, 15*, 502-509.
- Loss, S.R., & Marra, P.P. (2018). Merchants of doubt in the free-ranging cat conflict. *Conservation Biology, 32*, 265-266.



- Loss, S.R., Will, T., & Marra, P.P. (2013). The impact of free-ranging domestic cats on wildlife of the United States. *Nature Communications, 4*, 1396.
- Loss, S.R., Will, T., & Marra, P.P. (2015). Direct mortality of birds from anthropogenic causes. Annual Review of Ecology, Evolution, and Systematics, 46, 99-120.
- Loss, S.R., Will, T., Longcore, T., & Marra, P.P. (2018). Responding to misinformation and criticisms regarding United States cat predation estimates. *Biological Invasions*, 20, 3385-3396.
- Lowe, S., Browne, M., Boudjelas, S., & De Poorter, M. (2000). 100 of the world's worst invasive alien species: a selection from the Global Invasive Species Database. Auckland: Invasive Species Specialist Group.
- Loyd, K.A.T., Hernandez, S.M., Carroll, J.P., Abernathy, K.J., & Marshall, G.J. (2013). Quantifying free-roaming domestic cat predation using animal-borne video cameras. *Biological Conservation*, 160, 183-189.
- Macdonald, D.W., Yamaguchi, N., Kitchener, A.C., Daniels, M., Kilshaw, K., & Driscoll, C. (2010). Reversing cryptic extinction: the history, present, and future of the Scottish wildcat. In Macdonald, D.W., & Loveridge, A.J. (eds.) *Biology and conservation of wild felids*. Oxford: Oxford University Press, 471-491.
- Mahlaba, T.A.M., Monadjem, A., McCleery, R., & Belmain, S.R. (2017). Domestic cats and dogs create a landscape of fear for pest rodents around rural homesteads. PLOS One, 12, e0171593.
- Marlow, N.J., Thomas, N.D., Williams, A.A.E., Macmahon, B., Lawson, J., Hitchen, Y., Angus, J., & Berry, O. (2015). Cats (*Felis catus*) are more abundant and are the dominant predator of woylies (*Bettongia penicillata*) after sustained fox (*Vulpes vulpes*) control. *Australian Journal of Zoology, 63*, 18-27.
- Marra, P., & Santella, C. (2016). Cat wars: the devastating consequences of a cuddly killer. Princeton and Oxford: Princeton University Press.
- May, S.A., & Norton, T.W. (1996). Influence of fragmentation and disturbance on the potential impact of feral predators on native fauna in Australian forest ecosystems. *Wildlife Research*, 23, 387-400.
- McGregor, H.W., Legge, S., Jones, M.E., & Johnson, C.N. (2016). Extraterritorial hunting expeditions to intense fire scars by feral cats. *Scientific Reports*, *6*, 22559.
- McRuer, D.L., Gray, L.C., Horne, L., & Clark, E.E. (2017). Free-roaming cat interactions with wildlife admitted to a wildlife hospital. *Journal of Wildlife Management, 81*, 163-173.
- Medina, F.M., Bonnaud, E., Vidal, E., Tershy, B.R., Zavaleta, E.S., Donlan, C.J., ... Nogales, M. (2011). A global review of the impacts of invasive cats on island endangered vertebrates. *Global Change Biology*, *17*, 3503-3510.
- Merson, S.D., Dollar, L.J., Tan, C.K.W., & Macdonald, D.W. (2019). Effects of habitat alteration and disturbance by humans and exotic species on fosa *Cryptoprocta ferox* occupancy in Madagascar's deciduous forests. *Oryx*, published online 21 May 2019.
- Nelson, S.H., Evans, A.D., & Bradbury, R.B. (2005). The efficacy of collar-mounted devices in reducing the rate of predation of wildlife by domestic cats. *Applied Animal Behaviour Science*, *94*, 273-285.
- Nogales, M., Vidal, E., Medina, F.M., Bonnaud, E., Tershy, B.R., Campbell, K.J., & Zavaleta, E.S. (2013). Feral cats and biodiversity conservation: the urgent prioritization of island management. *BioScience*, *63*, 804-810.
- Op de Hoek, T., Schrama, M., & Smit, C. (2013). Verwilderde katten op Schiermonnikoog. De Levende Natuur, 114, 4-8.
- Oppel, S., Beaven, B.M., Bolton, M., Vickery, J., & Bodey, T.W. (2010). Eradication of invasive mammals on islands inhabited by humans and domestic animals. *Conservation Biology*, 25, 232-240.



- Pavisse, R., Vangeluwe, D., & Clergeau, P. (2019). Domestic cat predation on garden birds: an analysis from European ringing programmes. *Ardea, 107*, 103-109.
- Pierpaoli, M., Birò, Z.S., Hermann, M., Hupe, K., Fernandes, M., Ragni, B., Szemethy, L., & Randi, E. (2003). Genetic distinction of wildcat (*Felis silvestris*) populations in Europe, and hybridization with domestic cats in Hungary. *Molecular Ecology, 12*, 2585-2598.
- Preisser, E.L., Bolnick, D.I., & Benard, M.F. (2005). Scared to death? The effects of intimidation and consumption in predator-prey interactions. *Ecology, 86*, 501-509.
- Rasambainarivo, F., Farris, Z.J., Andrianalizah, H., & Parker, P.G. (2017). Interactions between carnivores in Madagascar and the risk of disease transmission. *EcoHealth, 14*, 691-703.
- Ratcliffe, N., Bell, M., Pelembe, T., Boyle, D., Benjamin, R., White, R., ... Sanders, S. (2010). The eradication of feral cats from Ascension Island and its subsequent recolonization by seabirds. *Oryx*, *44*, 20-29.
- Rouco, C., De Torre-Ceijas, R., Martín-Collado, D., & Byrom, A.E. (2017). New Zealand shouldn't ignore feral cats. *BioScience*, 67, 686.
- Russell, J.C., Innes, J.G., Brown, P.H., & Byrom, A.E. (2015). Predator-free New Zealand: conservation country. *BioScience*, *65*, 520-525.
- Silva-Rodríguez, E.A., & Sieving, K.E. (2011). Influence of care of domestic carnivores on their predation on vertebrates. Conservation Biology, 25, 808-815.
- Sims, V., Evans, K.L., Newson, S.E., Tratalos, J.A., & Gaston, K.J. (2008). Avian assemblage structure and domestic cat densities in urban environments. *Diversity and Distributions, 14*, 387-399.
- Smith, S.B., McKay, J.E., Richardson, J.K., Shipley, A.A., & Murphy, M.T. (2016). Demography of a ground nesting bird in an urban system: are populations self-sustaining? *Urban Ecosystems*, 19, 577-598.
- Stokeld, D., Fisher, A., Gentles, T., Hill, B.M., Woinarski, J.C.Z., Young, S., & Gillespie, G.R. (2018). Rapid increase of Australian tropical savanna reptile abundance following exclusion of feral cats. *Biological Conservation*, 225, 213-221.
- Thomas, R.L., Fellowes, M.D.E., & Baker, P.J. (2012). Spatio-temporal variation in predation by urban domestic cats (*Felis catus*) and the acceptability of possible management actions in the UK. *PLOS One*, 7, e49369.
- Towns, D.R., West, C.J., & Broome, K.G. (2012). Purposes, outcomes and challenges of eradicating invasive mammals from New Zealand islands: an historical perspective. *Wildlife Research*, 40, 94-107.
- Van Heezik, Y., Smyth, A., Adams, A., & Gordon, J. (2010). Do domestic cats impose an unsustainable harvest on urban bird populations? *Biological Conservation, 143*, 121-130.
- Wilson, S.K., Okunlola, I.A., & Novak, J.A. (2015). Birds be safe: can a novel cat collar reduce avian mortality by domestic cats (*Felis catus*)? *Global Ecology and Conservation*, 3, 359-366.
- Woinarski, J.C.Z., Burbidge, A.A., & Harrison, P.L. (2015). Ongoing unraveling of a continental fauna: decline and extinction of Australian mammals since European settlement. *PNAS*, 112, 4531-4540.
- Woinarski, J.C.Z., Murphy, B.P., Legge, S.M., Garnett, S.T., Lawes, M.J., Comer, S., ... Woolley, L.A. (2017). How many birds are killed by cats in Australia? *Biological Conservation*, 214, 76-87.
- Woinarski, J.C.Z., Murphy, B.P., Palmer, R., Legge, S.M., Dickman, C.R., Doherty, T.S., ... Stokeld, D. (2018). How many reptiles are killed by cats in Australia? *Wildlife Research, 45*, 247-266.
- Woods, M., McDonald, R.A., & Harris, S. (2003). Predation of wildlife by domestic cats *Felis catus* in Great Britain. *Mammal Review, 33*, 174-188.
- Work, T.M., Massey, J.G., Rideout, B.A., Gardiner, C.H., Ledig, D.B., Kwok, O.C.H., & Dubey, J.P. (2000). Fatal toxoplasmosis in free-ranging endangered 'Alala' from Hawaii. *Journal of Wildlife Diseases*, 36, 205-212.



Free-ranging domestic cats – impacts on wildlife

Pet cats – farm cats – stray cats – feral cats

Impacts:

- Predation
- Disturbance
- Competition
- Disease
- Hybridization
- Combinations







Predation – some annual estimates

	Mammals	Birds	Reptiles	Amphibians
Canada		100-350 million		
United States	6-22 b illion	1.3-4 b illion	260-920 million	95-300 million
Australia		170-500 million	270-1000 million	
Poland	500-670 million	100-170 million		
Netherlands		± 35 million		



[&]quot;large numbers of cats inevitably kill large numbers of wild animals" (Crowley e.a. 2019)

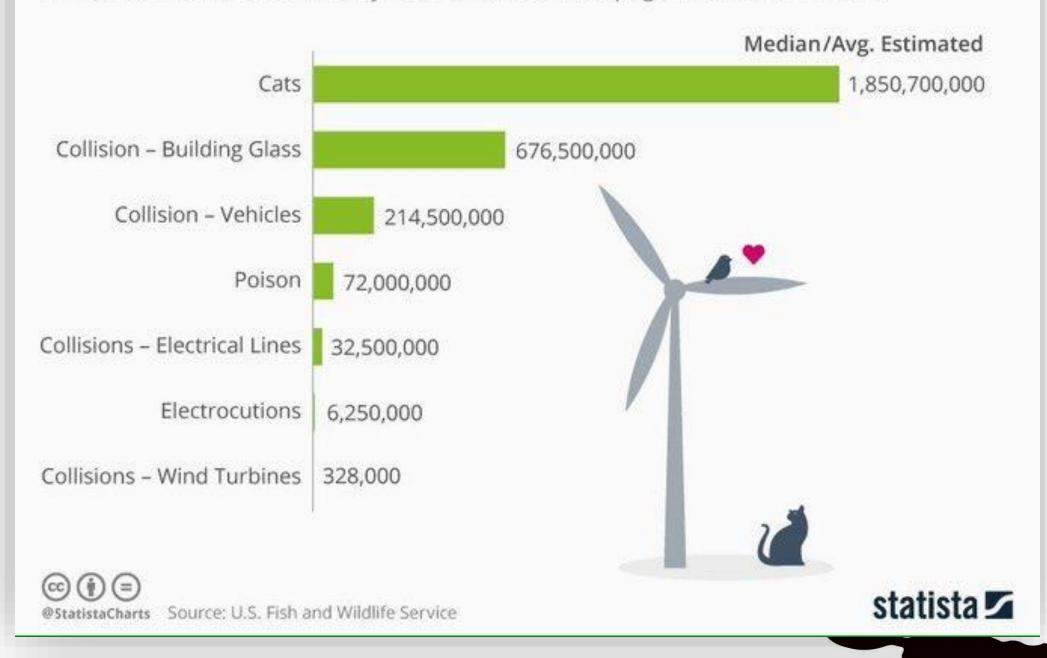
Predation – in perspective

Direct anthropogenic mortality of birds in the US (Loss e.a. 2015):

Source	Annual bird mortality	
Wind turbine collisions	Hundreds of thousands	
Power line electrocutions	Millions	
Communication tower collisions	Millions	
Power line collisions	Tens of millions	
Automobile collisions	Hundreds of millions	
Building collisions	Hundreds of millions	
Predation by domestic cats	Billions	

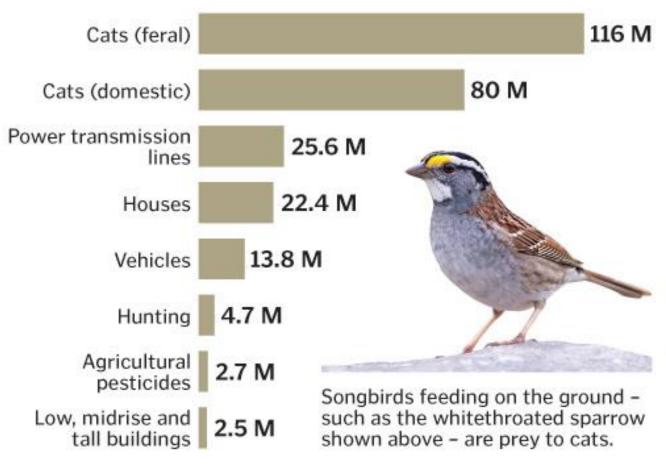


Annual estimated bird mortality from selected anthropogenic causes in the U.S.



Bird deaths in Canada

The top causes of bird deaths in Canada each year, with estimated annual death toll, in millions:



Source: Environment Canada

DENNIS LEUNG/OTTAWA CITIZEN



Kays, R. et al. (2020). The small home ranges and large ecological impacts of pet cats. Animal Conservation, doi:10.1111/acv.12563

https://www.youtube.com/watch?time_continue=35 &v=SYJATBgQIY0&feature=emb_logo

Cats kill up to 10 times more wildlife than natural predators — so keep indoors

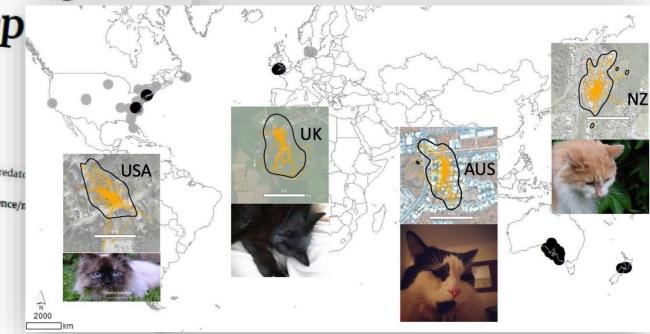
Domestic cats kill millions of birds and other mammals every year.

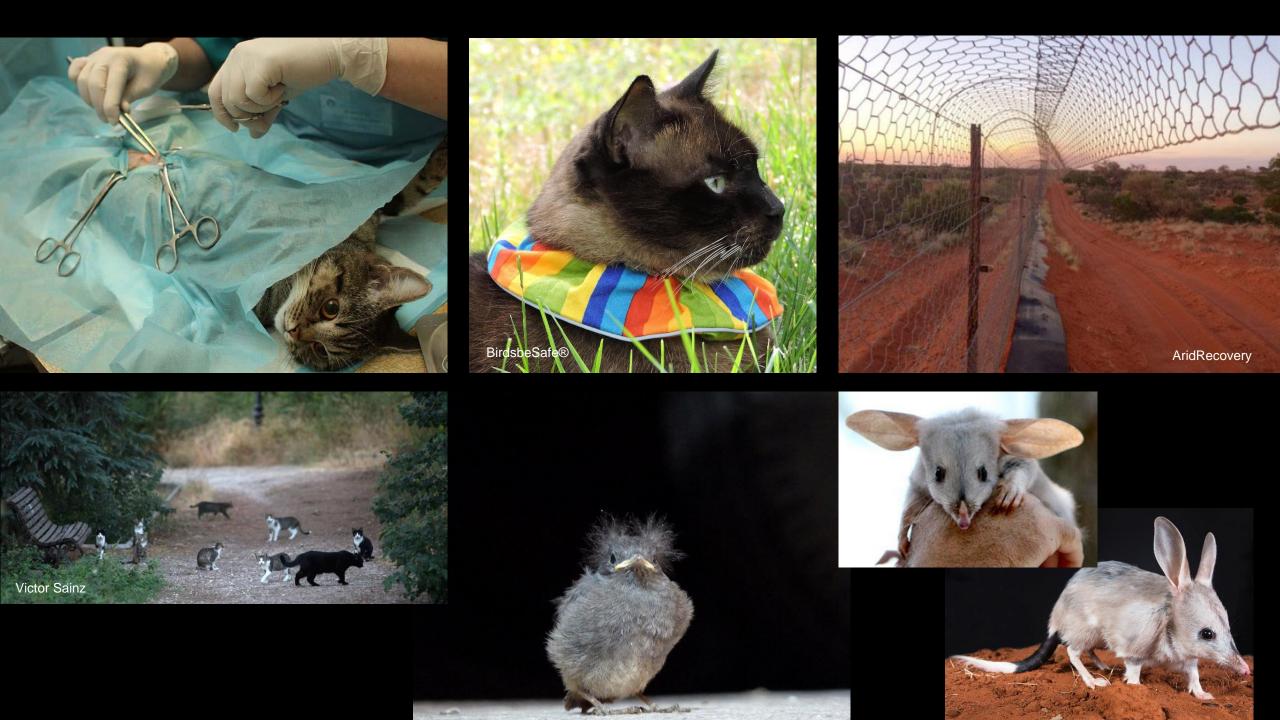
by Tibi Puiu (https://www.zmescience.com/author/tibipuiu/)

March 13, 2020 (https://www.zmescience.com/ecology/animals-ecology/cats-kill-up-10-times-more-wildlife-than-natural-predate

in Animals (https://www.zmescience.com/category/ecology/animals-ecology/), News (https://www.zmescience.com/category/science/i









What's (international) law got to do with it?

Facts + Law (interpretation) = Conclusion

> Dozens of international legal instruments of relevance

Rules concerning:

- Invasive alien species
- Site protection
- Species protection









Invasive alien species law

- Convention on Biological Diversity (CBD, 1992), Art. 8(h)
- Bonn Convention on Migratory Species (CMS, 1979), Art. III(4)(c) & V(5)(e)
- African-Eurasian Migratory Waterbirds Agreement (AEWA, 1995), Annex 3, par. 2.5 & 4.3.10
- Agreement on the Conservation of Albatrosses and Petrels (ACAP, 2001), Annex 2, par. 1.4.2
- Central American Biodiversity and Wilderness Convention (1992), Art. 24
- (Revised) African Convention on Nature Conservation (2003), Art. IX(2)(h)
- Protocol on Protected Areas and Wildlife in the Eastern African Region (1985), Art. 7
- Protocol on Protected Areas and Biodiversity in the Mediterranean (1995),
 Art. 13
- Bern Convention on European Wildlife Conservation (1979), Art. 11(2)(b)
- EU Habitats Directive (1992), Art. 22(b)
- ...



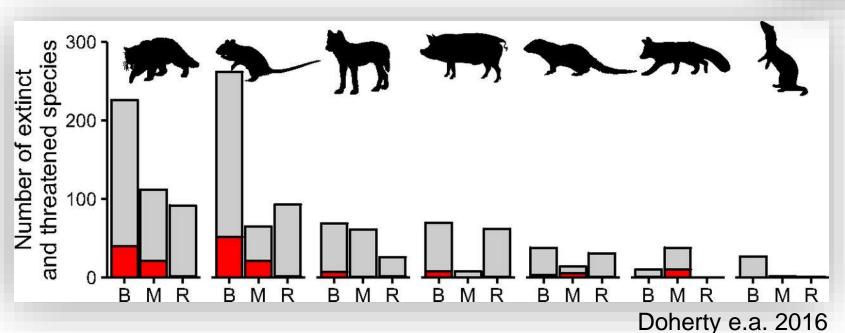


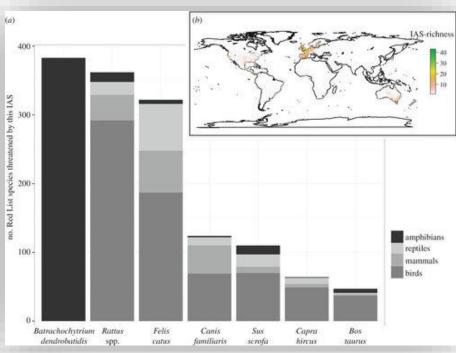


Invasive alien species law

"Each Contracting Party shall, as far as possible and as appropriate ... [p]revent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species"

- CBD, Art. 8(h)





Bellard e.a. 2016



Area protection law

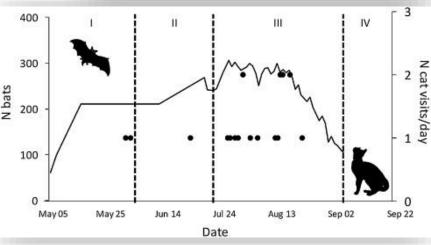
"Each Party shall identify those sites within its own area of jurisdiction which are important for the conservation status, including the shelter and protection, of bats. It shall, taking into account as necessary economic and social considerations, protect such sites from damage or disturbance."

 Agreement on the Conservation of Bats in Europe (EUROBATS), Art. III(2)

- Ramsar Wetlands Convention (1971)
- UNESCO World Heritage Convention (1972)
- EU Birds Directive (1979)
- EU Habitats Directive (1992)

• ...





Ancillotto e.a. 2019

Species protection law

- CMS Appendix I
- ACAP Annex 1
- AEWA Annex 3, Table 1, Column A
- EUROBATS Annex 1
- Australia-China Agreement for the Protection of Migratory Birds and their Environment (1986) Annex
- Convention on Nature Protection and Wild-Life Preservation in the Western Hemisphere (1940) Annex
- Mexico-United States Convention on Migratory Birds and Game Mammals (1936) Art. IV migratory birds
- Protocol on Protected Areas and Wildlife in the Wider Caribbean Region (1990) Annex II
- African Convention on Nature Conservation (1968) Annex
- Protocol on Protected Areas and Wildlife in the Eastern African Region (1985) Annex II
- Gulf Cooperation Council Convention on Wildlife and their Natural Habitats (2001) Appendix II
- Protocol on Protected Areas and Biodiversity in the Mediterranean (1995) Annex II
- Bern Convention Appendix II
- EU Habitats Directive Annex IV
- EU Birds Directive all bird species native to EU member states

• ..



Species protection law

"Member States shall take the requisite measures to establish a general system of protection for all species [of naturally occurring birds in the wild state in the European territory of the Member States], prohibiting in particular:

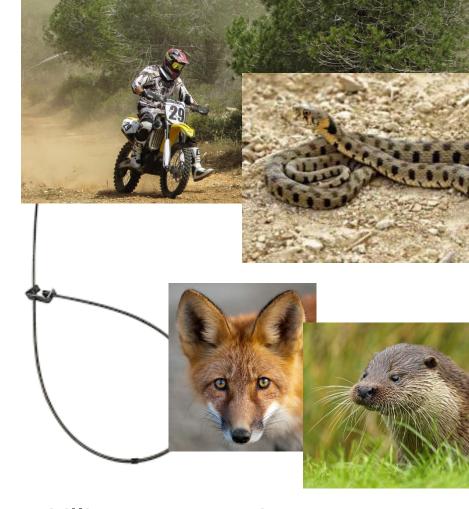
- (a) deliberate killing or capture by any method;
- (b) deliberate destruction of, or damage to, their nests and eggs ...;
- (c) taking their eggs in the wild ...;
- (d) deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant ..."
- EU Birds Directive, Art. 5



Species protection law – interpretation

EU Court of Justice:

- 412/85 (1984) Commission v Germany
- C-103/00 (2002) Commission v Greece
- C-221/04 (2006) Commission v Spain
- C-183/05 (2007) Commission v Ireland
- C-340/10 (2012) Commission v Cyprus
- C-504/14 (2016) Commission v Greece



"deliberate": "the author of the act intended the capture or killing ... or, at the very least, accepted the possibility of such capture or killing" (C-221/04)

"unwanted but accepted side-effect" (European Commission, 2007 guidance doc.)



Conclusions

EU Birds & Habitats Directives:

- "Regarding (owned) pet and farm cats, the Nature Directives require EU Member States to ensure that letting cats roam free outdoors is forbidden and effectively prevented."
- "Regarding (unowned) stray and feral cats, these must be removed or controlled when they pose a threat to protected species and/or sites."

International law:

"Many national authorities around the world are currently required, under international law, to adopt and implement policies aimed at preventing, reducing or eliminating the biodiversity impacts of free-ranging domestic cats, in particular by (a) removing feral and other unowned cats from the landscape to the greatest extent possible and (b) restricting the outdoor access of owned cats."

Widespread non-compliance

Why?

□ Feasibility

☐ Scientific uncertainty

☐ Cats' own interests

☐ Cat owners' interests

> Political inconvenience

Explanations, not justifications



https://doi.org/10.1093/jel/eqz035

A. Trouwborst, P. McCormack & E. Martínez Camacho, 'Domestic cats and their impacts on biodiversity – a blind spot in the application of nature conservation law' (2020) People & Nature https://doi.org/10.1002/pan3.10073

DOI: 10.1002/ban3.10073

RESEARCH ARTICLE



Domestic cats and their impacts on biodiversity: A blind spot in the application of nature conservation law

Arie Trouwborst¹ | Phillipa C. McCormack² | Elvira Martínez Camacho⁵

Journal of Environmental Law, 2019, 0, 1-25 doi: 10.1093/jel/egz035 Original article



Domestic Cats (Felis catus) and European Nature Conservation Law—Applying the EU Birds and Habitats Directives to a Significant but Neglected Threat to Wildlife

Arie Trouwborst* and Han Somsen**

ABSTRACT

Free-ranging domestic cats (Felis catus) impact biodiversity through predation, disturbance, competition, disease and hybridisation. Scientific knowledge regarding these impacts has recently increased. This article interprets the European Union (EU) Birds and Habitats Directives (Nature Directives) in light of this knowledge. The outcome indicates that various obligations in the Directives, particularly concerning Natura 2000 sites and the generic protection of birds and other species, have significant implications for the management of free-ranging domestic cats. Regarding (unowned) stray and feral cats, these must be removed or controlled when they pose a threat to protected species and/or sites. Regarding (owned) pet and farm cats, the Nature Directives require EU Member States to ensure that letting cats roam free outdoors is forbidden and effectively prevented. Current practice across the EU does not yet conform to these requirements. Whereas the article identifies and assesses various factors that may explain this compliance gap, legally valid justifications appear absent.

KEYWORDS: EU Birds Directive, EU Habitats Directive, Natura 2000, domestic cat (Felis catus), biodiversity, invasive alien species

1. INTRODUCTION

"The widespread dissemination of cats in the woods and in the open or farming country, and the destruction of birds by them, is a much more important matter than most people suspect, and is not to be lightly put aside', observed Edward Howe Forbush more than a century ago.1 Only in the last fifteen years, however, have the sheer magnitude and variety of the impacts exercised by domestic cats (Felis catus) on birds and other wildlife been brought into sharp focus, through a series of

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- ** Department of Public Law and Governance, Tilburg University, Tilburg, The Netherland
- 1 Edward H Forbush, The Domestic Cat: Bird Killer, Mouser and Destroyer of Wild Life, Means of Utilizing and Controlling It (Wright & Potter Printing Co. 1916) 29.

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This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/4.0/), which permits non-commercial re-use, distribution, and reproduction in ic cats Felis catus, from owned pets to feral cats, impact bio dation, fear effects, competition, disease and hybridization, regarding these impacts has recently increased, making it role of nature conservation legislation in this connection. We sard to the obligations of governments around the world

verview of current knowledge, based on a literature review in which domestic cats impact wildlife; the resulting effects ations and ecosystems; and available strategies for ads. In light of this knowledge, using standard legal research n identify and interpret relevant legal instruments, with a emational wildlife treaties. Lastly, we identify and assess ence the implementation of relevant obligations

s analysis indicate that numerous legal obligations of releg domestic cats already apply under global treaties such as Biological Diversity, Convention on Migratory Species and ention, and a range of regional legal instruments for biodi-Of particular significance are obligations concerning (a) invaprotected areas and (c) protected species.

rities around the world are currently required, under inter ot and implement policies aimed at preventing, reducing or versity impacts of free-ranging domestic cats, in particular and other unowned cats from the landscape to the greatest b) restricting the outdoor access of owned cats.

uence or impair the application of these obligations include sibility, scientific uncertainty, the interests of cat owners and ests of domestic cats themselves. Even if such factors may to why many authorities have hitherto failed to take effective e threats posed by free-ranging domestic cats, from a legal

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Response

- Peers
- Press
- Public
- Politics
- NGOs





Peers

"Legally speaking, this is simply correct. This is a valid interpretation of EU law. In theory, the authorities should enforce the law against cat owners just as they have to against poachers, or people driving a car through a breeding colony, disturbing birds."

 Hans Vedder (Professor of EU law at Groningen University) in Algemeen Dagblad, 27 November 2019

JEAN-BAPTISTE, **VICTIME OU BOURREAU?**

Concours de plaidoiries sur l'interdiction des chats d'extérieur



A l'occasion de l'inauguration de sa nouvelle SALLE DE PLAIDOIRIES, la FACULTÉ DE DROIT organise un PROCÈS FICTIF où s'affronteront deux équipes formées d'étudiant-e-s ainsi que de membres du personnel académique et scientifique.

LE 27 AVRIL 2020 à 16h

Rue du Marais, 109 • 3° étage (escalier en colimaçon)

RENSEIGNEMENTS Facebook/Concours de plaidoiries de la Faculté de droit de l'USLB

SÉANCE D'INFORMATION le 11 février 2020 à 16h30 à la Salle du Conseil





Rue du Marais, 109 (3º étage) 1000 Bruxelles





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Jagdinstinkt habe 367 Tierarten an den









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Domestic Cats (Felis catus) and European Nature Conservation Law—Applying the EU Birds and Habitats Directives to a Significant but Neglected Threat to Wildlife

Journal of Environmental Law | LAW

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Psychiatry, Psychology and Law Law

2019-07-09



Reasons behind the rising rate of involuntary admissions under the Mental Health Act (1983): Service use and cost impact

International Journal of Law and Psychiatry | LAW

2019-12-16



The Democratic Case for a Written Constitution

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2019-05-22



Married Women's Wills: Probate, Property, and Piety in Later Medieval England

Law and History Review | LAW HISTORY

2019-02-11



Right-to-Carry Laws and Violent Crime: A Comprehensive Assessment Using Panel Data and a

Readers respond

- □ "What an idiot you are, man. You really have nothing sensible to say? You did all those expensive studies, and then start whining that all cats must stay inside? Did you fall from the crib onto your head as a child? Do something useful with your life, you retard."
 - Email, 27 November 2019 (translated from Dutch)
- ☐ "Hey, RETARDED IDIOT. Stop your drivelling about cats. This could end badly."
 - Email, 27 November 2019 (translated from Dutch)
- ☐ "Is this what we call a professor nowadays, someone who prefers to defend vermin? I call such people cat haters and [dumm Studierte unerfahrene Frischärsche]."
 - Email, 3 December 2019 (partly translated from German)



Readers respond (continued)

- ☐ "It is better to kill a thousand scientists, than to cause harm to a cat!"
 - Email, 4 December 2019
- ☐ "Whoever kills a cat deserves to die. His wife, daughter and all relatives have no right to live anymore."
 - Email, 4 December 2019
- ☐ "F[***] your Mother . DEAD for your Familiy !!!!"
 - Email, 4 December 2019
- ☐ "Wer Katzen gefährdet, hat kein Lebensrecht!"
 - Email, 5 December 2019
- ☐ "i hope you really die from a form of sick cancer. krankes pervers stück scheisse"
 - Email, 5 December 2019

Politics



"The statements by the scientists not to allow cats outdoors without control, are absolute nonsense. We should not make this bigger than it is."

- Dutch MP Maurits von Martels (CDA) (translated)



"This is of course complete nonsense. Europe has nothing to say about our pets."

- Dutch MP Arne Weverling (VVD) (translated)





"At the moment we are working hard to take measures to promote the recovery and conservation of nature in the Netherlands. Keeping cats indoors is not a part of these measures."

 Dutch Minister of Environment Carola Schouten (translated)



"The Commission is a strong defender of free movement rights – including of cats. We categorically deny that the Commission will oblige cats to be held on a leash at all times."

 Enrico Brivio, European Commission spokesperson (DG ENV) "As far as I am concerned all cats can go outside whenever they please, and let us securely lock up the lunatic pseudo-scientists who make up this kind of nonsense."

– Dutch MP Geert Wilders (PVV) (translated)





Parliamentary written questions (D66)



Tweede Kamer der Staten-Generaal

Vergaderjaar 2019-2020

Vragen gesteld door de leden der Kamer

2020Z01151

Vragen van de leden Groothuizen en De Groot (beiden D66) aan de Ministers van Landbouw, Natuur en Voedselkwaliteit en van Justitie en Veiligheid over rechtswetenschappelijk onderzoek naar de Habitatrichtlijn en

Vraag 1

Heeft u het rechtswetenschappelijke onderzoek «Domestic cats (Felis catus) and European nature conservation law» bestudeerd?1

Vraag 2

Hoeveel dieren (in duizendtallen) zijn er de afgelopen drie jaren in Nederland door katten gedood en welke diersoorten betreft dat?

Welke impact heeft dat op de (wild)stand van die diersoorten in de natuur en is er reden tot zorg? Zo nee, waarom niet? Zo ja, wat gaat u hieraan doen?

Beschouwt u de kat als inheems in de zin van de Richtlijn 92/43/EEG (Habitatrichtlijn)? Zo ja, waarom? Zo nee, waarom niet?

Op welke manier heeft u in de praktijk uitvoering gegeven aan artikel 22, sub b, en artikel 12, vierde lid, van de Habitatrichtlijn? Kunt u daarbij in het bijzonder bij beide artikelen ingaan op de uitwerking daarvan met betrekking tot katten? Vindt u een dergelijke uitvoering voldoende? Zo ja, waarom?

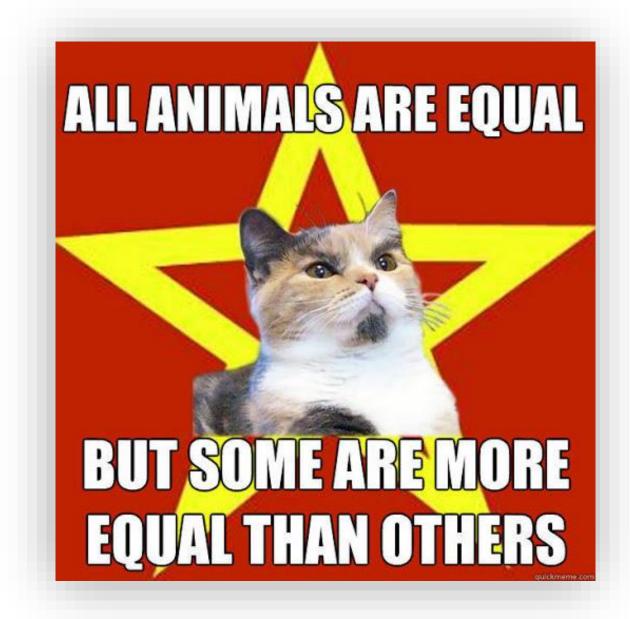
Hoe legt u de term «opzettelijk» uit, gebruikt in artikel 12, eerste lid van de Habitatrichtlijn, en in artikel 5 van de Vogelrichtlijn?



kv-tk-2020Z01151

¹ Journal of Environmental Law, 27 november 2019, «Domestic Cats (Felis catus) and European Nature Conservation Law – Applying the EU Birds and Habitats Directives to a Significant but Neglected Threat to Wildlife» (https://academic.oup.com/jel/advance-article/doi/10.1093/jel/

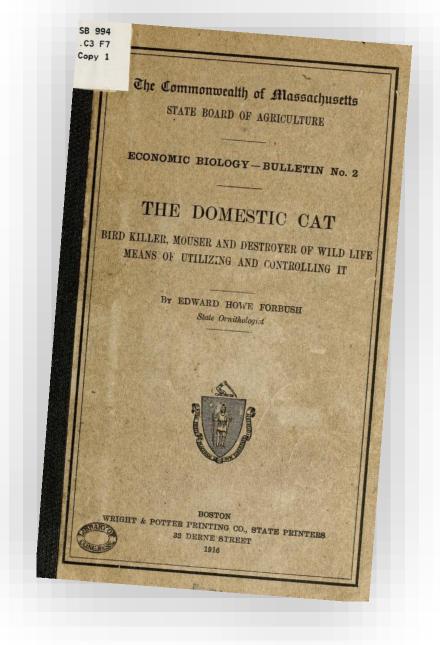
NGOs





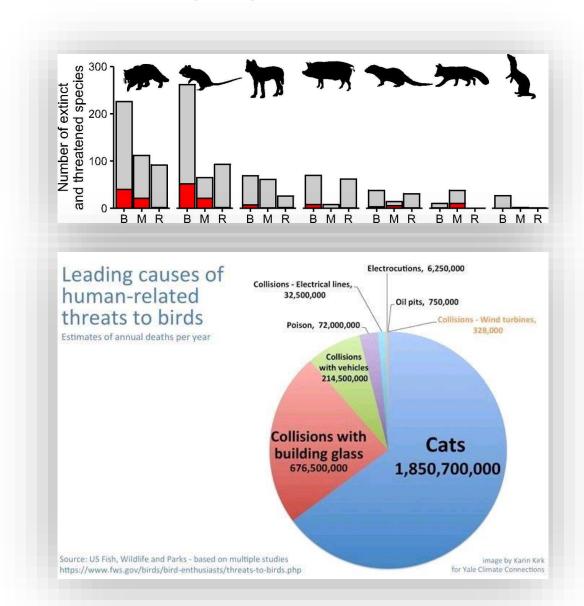
"Questions regarding the value or inutility of the domestic cat, and problems connected with limiting its more or less unwelcome outdoor activities, are causing much dissension. The discussion has reached an acute stage. Medical men, game protectors and bird lovers call on legislators to enact restrictive laws. Then ardent cat lovers rouse themselves for combat. In the excitement of partisanship many loose and ill-considered statements are made."

- Edward H. Forbush (1916)





Low-hanging fruit





Thank you!

