The Law of Killing for Biodiversity

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In the United States, Australia, New Zealand, and elsewhere, people kill sentient creatures—by the millions every year—in the crusade to conserve biodiversity.

I explain how laws permit, and in some instances require, killing to save nonhuman species and to keep ecosystems functioning. In Australia, the nation with the worst record of mammalian extinctions, the government has tagged various invaders as "Key Threatening Processes." In 2023, it laid out elaborate plans to rid the nation of as many feral cats as poison and hunters could kill. Similarly, "Predator Free New Zealand 2050" is the New Zealand government's elaborate plan to trap and kill every stoat, weasel, fox, and rat that imperils the nation's largely defenseless flightless bird species. The United States has no overarching plan to get rid of invasive animals that threaten endangered species, but nonetheless sanctions killing barred owls to save northern spotted owls, goats and sheep to save Hawaii's Palila bird, and Burmese pythons to protect numerous Everglades species . . . the list goes on.

I explain how, where, and why these laws exist and function. In some nations, for some species and ecosystems, the moral calculus tilts towards killing for conservation. As in any conversation about biodiversity in the Anthropocene, the answers hinge on fundamental questions: What kind of planet do we want? Who do we want to share it with going forward? How much can we homogenize our surrounding ecosystems and still sustain human life? I advocate that in many cases, governments should continue to kill sentient, non-native creatures to save other creatures that are critical to maintaining the functioning ecosystems that sustain human lives.

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TABLE OF CONTENTS

INTRODUCTION

Law permits or requires us to kill millions of animals annually, in the United States, Australia, New Zealand, and elsewhere. When and why do we kill non-legally protected animals to aid legally protected species or ecosystems?

In New Zealand, children compete to see how many feral cats (and stoats and weasels, etc.) they can shoot and kill in a day.[1] Predator-Free New Zealand, an official government arm, aims to rid the island of millions of introduced "pests" by 2050.[2] New Zealanders bait, trap, poison, and shoot these non-native creatures to protect "New Zealand's environmental capital."[3]

In Australia, several million feral cats roam 99.9 percent of the continent, killing over 1.5 billion native animals annually.[4] Pet cats allowed to roam outdoors kill over 500 million native vertebrate animals each year.[5] An official government "Threat Abatement Plan" seeks an overarching solution to this problem. This plan supports numerous State and Territory plans to poison, trap, and shoot feral cats, foxes, and other predators. *National Geographic* pronounced this "liberation ecology," noting the effort by authorities to poison thousands of rats—referred to as the "ecological grim reaper"—to give multiple species of endangered birds and giant stick insects a fighting chance to endure on Lord Howe Island, off the coast of New South Wales.[6]

And in the United States, between 30 and 80 million free-ranging, unowned cats kill (using conservative estimates) between 1.3 and 4 billion birds, and between 6.3 and 22.3 billion mammals each year.[7] We are more squeamish about killing cats and other sentient[8] creatures in the United States, and we have no overarching law or policy framework for killing invasive species.

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1. Tess McClure, *New Zealand Feral Cat Hunting Competition for Children Prompts Backlash*, GUARDIAN (Apr. 18, 2023, 1:52 AM EDT), https://www.theguardian.com/world/2023/apr/18/new-zealand-feral-cat-hunting-competition-for-children-prompts-backlash; Yan Zhuang, *Should Children Join the Killing in New Zealand's War on Invasive Species?*, N.Y. TIMES (Oct. 3, 2023), https://www.nytimes.com/2023/10/01/world/australia/new-zealand-hunting-invasive-species.html?smid=nytcore-ios-share&referringSource=articleShare.

2. Eleanor Ainge Roy, *No More Rats: New Zealand to Exterminate All Introduced Predators*, GUARDIAN (July 25, 2016, 3:05 AM EDT), https://www.theguardian.com/world/2016/jul/25/no-more-rats-new-zealand-to-exterminate-all-introduced-predators.

3. *Id.*

4. DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, THREAT ABATEMENT PLAN FOR PREDATION BY FERAL CATS 2023, CONSULTATION DRAFT: SEPTEMBER 2023, at 8–10 (2023), https://storage.googleapis.com/files-au-climate/climate-au/p/prj28f46a2682a26dead11c2/public_assets/TAP_Predation-feral%20cats_for%20public%20consultation.pdf.

5. *Id.* at 10.

6. Kennedy Warne, *Rats Invaded Paradise. Here's How Paradise Fought Back*, NAT'L GEOGRAPHIC (Apr. 18, 2023), https://www.nationalgeographic.com/premium/article/rodents-rats-eradicated-tropical-paradise-australia-island?loggedin=true&rnd=1706389512725.

7. Scott R. Loss, Tom Will & Peter P. Marra, *The Impact of Free-Ranging Domestic Cats on Wildlife of the United States*, NATURE COMMC'NS, Jan. 2013, at 1, 4.

8. One could spend many, many pages limning the different ways ethicists and activists define "sentient." Here, we'll stick with Peter Singer's definition of having the "capacity to experience pain and pleasure." PETER SINGER, ANIMAL LIBERATION NOW 7 (2023).

Nonetheless, that does not stop the United States Fish & Wildlife Service from fulfilling the object and purpose of the Endangered Species Act by shooting barred owls to protect northern spotted owls, cowbirds to protect Kirtland's warblers, feral sheep and goats to protect the critically endangered Hawaiian Palila bird, and Burmese pythons to protect the Key Largo Woodrat and Key Largo Cotton Mouth in Southern Florida.

In this article, I examine when and why law permits or requires us to kill to protect. Humans have introduced more than thirty-seven thousand peripatetic species to places they did not inhabit before human exploration and settlement; at least 10 percent of those are harmful to people and the ecosystems that sustain us.[9] Thus in some places, citizens and their governments choose to value wild, native species and the individual, sentient beings that comprise them more than invasive species and the individual, sentient beings that comprise them.

Debates about the ethics of killing for conservation are often posed as a clash of values. Biocentrists place moral value on (and thus feel a human moral responsibility towards) individual sentient creatures, regardless of their species origin. Ecocentrists value variously the whole ecosystem, its species components, its interactions, and the evolutionary process that created all. But when it comes to killing for conservation, it's not easy to discern where naming, describing, and fulfilling one set of ethics begins and ends, as I will explain.

Lawmakers in Australia, New Zealand, the United States, and other countries make a choice: they promote survival of "species"—a concept one step removed from flesh and blood animals—from actual, individual animals. The law chooses to protect the collective over the individual. But it's not that simple: by protecting the collective—the species—we are, in fact, protecting and preserving current individuals and future hypothetical individuals. Does Australia need stray cats, foxes, rabbits, camels, and cane toads by the billions, or will the Australian government annihilate them by disparate (sometimes painful) means to ensure that the continent's magnificent, quirky megafauna crafted by millions of years of evolution will continue to endure? New Zealanders love their weird and wonderful flightless birds that were woefully unprepared for the arrival of rats and stoats; the nation now arms children (and adults) to ensure that not every last one of their endemic birds falls prey to invaders' jaws. In Florida, Governor Ron DeSantis announced the Florida Python Challenge®, where citizens compete for cash prizes for bagging the greatest number of this escaped, slithery predator.[10] United States government

9. IPBES, THE THEMATIC ASSESSMENT REPORT ON INVASIVE ALIEN SPECIES AND THEIR CONTROL 12 (2023).

10. *Trademark: Florida Python Challenge*, FLA. DEP'T OF STATE (Dec. 27, 2024), https://search.sunbiz.org/Inquiry/CorporationSearch/SearchResultDetail?inquirytype=EntityName&directionType=Initial&searchNameOrder=FLORIDAPYTHONCHALLENGE%20T200000000840&aggregateId=trade-t20000000084-e6b7f871-cb45-4aa2-93ac-e13cdfb44836&searchTerm=Florida%20Python%20Challenge&listNameOrder=FLORIDAPYTHONCHALLENGE%20T200000000840.

officials kill barred owls to protect northern spotted owls, cowbirds to protect Least Bell's vireos and Kirtland's warblers, mouflon sheep to protect endangered Hawaiian Palila birds, pigs to protect native Channel Island foxes . . . the list is long. We in the United States are more ambivalent than the Aussies and Kiwis, perhaps because our native fauna mean less to a small percentage of us than they do to citizens in the evolutionarily and geographically isolated Lands Down Under.

Biodiversity law, as in all areas of the law, sometimes requires that we choose between the greater of two goods or the lesser of two evils. What counts as good or evil depends on a society's prevailing values. Biodiversity's values lie in the eye of the beholder. It depends on who gets to speak for nature, and what aspects of nature we prize more, where we prize it, and why. Biologists tell us we can't have both barred owls *and* spotted owls, red foxes *and* brush-tailed bettongs,[11] stoats *and* flightless kiwis.[12] Thus in some locales, the law sides with preserving Earth's gorgeous, intricate diversity, the species endemic to a place, which evolution has shaped over thousands or millions of years to meet an array of circumscribed threats, but has left stranded and ill-equipped to meet the waves of invasions humans have unleashed.

In this article, I explain why, in some places in some situations, we do—and should—kill sentient creatures in the name of preserving biodiversity and sustaining ecosystems.

I take you to places in the United States, Australia, and New Zealand where law requires or permits us to destroy sentient individuals to conserve other sentient individuals, as well as to perpetuate native species into the future, and preserve the ecosystems in which they were and could again be vital cogs.[13] I start by describing "the ecology of invasion of plants and animals," describing the ecological, economic, and aesthetic damage such human-wrought bio invasions cause. I review controversies over such killing, including animal rights and "compassionate conservation" movements that oppose killing for conservation. I then survey the laws, and how those laws are implemented, in Australia, New Zealand, and the United States. I show how the Australian and New Zealand laws are more specific and aggressive in their emphases on rendering their ecosystems non-native "predator free," and explain how United States law does allow and require, albeit more quietly and selectively, the killing of invasive species to protect rare, legally threatened species. I conclude by explaining how biodiversity law can and should make these choices to sometimes, reluctantly, kill for conservation. The choice results in more sentient

11. *Small Mammal House: Brush-Tailed Bettong*, SMITHSONIAN'S NAT'L ZOO & CONSERVATION BIOLOGY INST., https://nationalzoo.si.edu/animals/brush-tailed-bettong (last visited Oct. 1, 2025).

12. Pete McKenzie, *After Decades of Decline, a Feathered Icon Breeds in New Zealand's Capital*, N.Y. TIMES (Dec. 4, 2023), https://www.nytimes.com/2023/12/04/world/australia/kiwi-birds-wellington-new-zealand.html.

13. ALDO LEOPOLD, A SAND COUNTY ALMANAC 193 (1949) ("To keep every cog and wheel is the first precaution of intelligent tinkering.").

creatures than would otherwise exist, and more importantly, the choice tilts towards stewarding functioning ecosystems that support abundant, functioning, sustainable human and nonhuman communities. As much as we may be squeamish about the carnage, by killing feral cats, foxes, cane toads, weasels, rats, and pythons, we maximize individual human health, community health, and ecosystem health, and may ultimately be saving ourselves.

I. INVASIONS

Do we need to engage in all this killing? That depends on how we define "need."

The human footprint treads heavily on the planet—literally. Humans comprise 37.5 percent of all mammalian biomass on Earth, and our livestock adds a whopping 60.5 percent of all mammalian biomass. A mere two percent of the remaining total mammalian biomass on Earth is comprised of other nonhuman mammals and commensal organisms.[14] The International Union for the Conservation of Nature ("IUCN") bleakly highlights that forty-one percent of amphibian, twenty-seven percent of mammal, twenty-one percent of reptile, and twelve percent of bird species are threatened with extinction.[15] The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services ("IPBES")—the Intergovernmental Panel on Climate Change's more obscure and more poorly named analog—predicts that around one million species face impending extinction.[16] That rate is one thousand times what would occur without humans in the picture. The IPBES predicts the extinction rate will soon increase to ten thousand times the background rate due to the increasing demands of ever-expanding human populations.[17] The United Nations projects that the human population will grow from eight billion today to none billion in 2037, peaking at 10.3 billion by mid-2080.[18] However, other demographers predict a peak of ten billion in 2085.[19]

Climate change compounds the already serious threats humans pose to biodiversity by raising temperatures, changing precipitation regimes, acidifying oceans, flooding coastlines, mistiming synchrony between plants and

14. Lior Greenspoon, Eyal Krieger, Ron Sender, Yuval Rosenberg, Yinon M. Bar-On, Uri Moran, Tomer Antman, Shai Meiri, Uri Roll, Elad Noor & Ron Milo, *The Global Biomass of Wild Animals*, PNAS, Feb. 27, 2023, at 1, 4 fig.2; Yinon M. Bar-On, Rob Phillips, & Ron Milo, *The Biomass Distribution on Earth*, 115 PNAS 6506, 6507 (2018).

15. *The IUCN Red List of Threatened Species*, IUCN, https://www.iucnredlist.org (last visited Oct. 1, 2025).

16. *Media Release: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating,'* IPBES (May 5, 2019), https://ipbes.net/news/Media-Release-Global-Assessment.

17. Jurriaan M. De Vos, Lucas N. Joppa, John L. Gittleman, Patrick R. Stephens & Stuart L. Pimm, *Estimating the Background Rate of Species Extinction*, 29 CONSERVATION BIOLOGY 452, 460 (2015).

18. *Global Issues: Population*, U.N., https://www.un.org/en/global-issues/population (last visited Oct. 1, 2025).

19. Dean Spears, *The World's Population May Peak in Your Lifetime. What Happens Next?*, N.Y. TIMES (Sept. 24, 2023), https://www.nytimes.com/interactive/2023/09/18/opinion/human-population-global-growth.html?searchResultPosition=5.

pollinators, and increasing the frequency and intensity of wildfires, just to name a few of its effects. As a result of climate change, much of the legally protected land which shelters a myriad of delicate biodiversity will no longer be habitable, leaving fewer places to which imperiled fauna and flora can migrate.[20] Clearly, we are doing a poor job of safeguarding nonhuman life—and, therefore, human life—on Earth.

In 1958, British ecologist Charles S. Elton wrote one of the first popular press volumes to warn the world of *The Ecology of Invasions by Plants and Animals*.[21] Elton wanted to counsel the world that "[i]t is not just nuclear bombs and wars that threaten us…there are other sorts of explosions, and this book is about ecological explosions."[22] The book is a compendium of case studies where humans introduce (sometimes deliberately, sometimes not) creatures to places from which they had been absent, where the non-native creatures then "outcompete native organisms, parasitize native hosts, change the shape of native landscapes, and otherwise wreak havoc on native ecosystems."[23] Elton catalogues the reasons we should care about these invasions, many of which are arguments that are replicated in current literature. He presents a "religious" argument, that "animals have a right to exist and be left alone, or at any rate they should not be persecuted or made extinct as species," an "aesthetic and intellectual" argument, that "wildlife of all kinds and its surroundings…is interesting, and usually exciting and beautiful as well," and third, a "practical" argument, that "land, crops, forests, water, sea fisheries, disease, and the like ought to be preserved. This third question seems to hang over the whole world so threateningly as rather to take the light out of the other two."[24] To fulfill these religious, intellectual, aesthetic, and, especially, practical goals, Elton advocated conserving native species and warding against invaders, "keeping or putting in the landscape of the greatest possible ecological variety—in the world, in every continent or island, and so far as practicable in every direction."[25]

Invasive species may explode in numbers when no predators exist in their new homes to keep their numbers in check or when indigenous species pose little competition. Often, native individuals have not needed to evolve defenses to protect themselves from invaders: Why waste energy generating adaptations to defend yourself from non-existent threats?[26]

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20. IPBES & IPCC, BIODIVERSITY AND CLIMATE CHANGE WORKSHOP REPORT 16 (2021).

21. *See generally* CHARLES S. ELTON, THE ECOLOGY OF INVASIONS BY PLANTS AND ANIMALS (1958). I situate Elton's work in the development of biologists' concern over biodiversity loss in DAVID TAKACS, THE IDEA OF BIODIVERSITY: PHILOSOPHIES OF PARADISE 22–25 (1996).

22. ELTON, *supra* note 21, at 15.

23. *Id.* at 22.

24. *Id.* at 143–44.

25. *Id.* at 155.

26. For a nice background review on different flavors of invasive species in the U.S., see generally Bradley Varner, *Detailed Discussion of the Ethical Treatment of Invasive Species*, MICH. ST. UNIV. ANIMAL & LEGAL HIST. CTR. (2022), https://www.animallaw.info/article/detailed-discussion-ethical-treatment-invasive-species.

Experts have since tabulated the detrimental effects wrought by invasive alien species. The IBPES concludes that "invasive alien species overwhelmingly undermine good quality of life" through introductions of pathogens, agricultural pests, and destruction of biodiversity.[27] In some parts of the world—as I will describe for Australia and New Zealand—invasive species have had a more pronounced, disastrous effect on native species, as their governments document, and their laws reflect. Globally, the IPBES' 2023 report focuses on invasive alien species as one of the five important "direct drivers of change in nature globally, alongside land- and sea-use change, direct exploitation of organisms, climate change, and pollution."[28] The report notes that humans have introduced more than thirty-seven thousand species to places they did not exist pre-human exploration and settlement. At least 10 percent of those species are harmful to humans and the ecosystems that sustain us. Invasive species have contributed to 60 percent of all known global biodiversity extinctions and are the sole cause of 16 percent of known extinctions.[29] One estimate, which the IPBES puts as "a gross underestimate," puts the cost to humans at $423 million annually.[30]

An earlier review found that for the six hundred and eighty known animal species extinctions, causes could be determined for one-fourth; more than half included invasive species impacts, and for 20 percent, invasive species were the sole cause of extinction. Invasive species were the single most important cause of bird extinctions, and the second most important cause of mammal and fish extinctions.[31] In a 2019 review of the IUCN Red List database, the world's most authoritative compendium of extinction information, of 935 known recent extinctions, alien (that is, introduced, not native to the place) invasive species were the leading cause of both animal and plant extinctions, contributing to one-third of animal extinctions and one-fourth of plant extinctions.[32] Another "conservative" review of the literature revealed that invasive predators are implicated in 58 percent of known modern bird, mammal, and reptile extinctions.[33]

The IPBES notes that invasive species can be controlled—at least on islands. For example, over the past century, 88 percent of efforts to eradicate invasive species on 998 islands have succeeded.[34] Another study found of 911

27. IPBES, *supra* note 9, at 22.

28. *Id.* at 8.

29. *Id.* at 20.

30. *Id.* at 22.

31. Miguel Clavero & Emili García-Berthou, *Invasive Species Are a Leading Cause of Animal Extinctions*, 20 TRENDS ECOLOGY & EVOLUTION 110, 110 (2005).

32. Tim M. Blackburn, Céline Bellard & Anthony Ricciardi, *Alien Versus Native Species as Drivers of Recent Extinctions*, 17 FRONTIERS ECOLOGY & ENV'T. 203, 204 (2019).

33. Tim S. Doherty, Alistair S. Glen, Dale G. Nimmo, Euan G. Ritchie & Chris R. Dickman, *Invasive Predators and Global Biodiversity Loss*, 113 PNAS 11261, 11262 (2016).

34. IPBES, *supra* note 9, at 34.

successful eradications, fewer than 3 percent did not occur on islands.[35] One can view these figures through glass half-empty or half-full lenses: on the one hand, we can eliminate invasive species, so let's do so! On the other hand, we can only eliminate invasive species on islands, as the ocean barrier prevents recolonization, so why focus so much on killing species on the mainland?

II. THE ETHICS OF KILLING FOR CONSERVATION

How much killing do we and should we sanction to slow the homogenization and ecosystem degradation of the natural world?

Killing for conservation is controversial. The laws aimed at curbing the destruction wrought by invasive species reflect ongoing debates between different partisans of what nonhuman beings should receive ethical, and thus legal priority.[36] Here, the ethics of biodiversity conservation exist uneasily alongside the ethics of animal welfare,[37] and one could fill many, many law review articles limning the controversy. I'll briefly summarize the controversy, but I note that lawmakers and public officials in Australia, New Zealand, and the United States have implemented a set of ethics in the law, and that law often takes sides to kill for conservation.

In response to widespread killing to protect biodiversity, a "compassionate conservation" movement merges animal rights perspectives into biodiversity conservation law. Activists in these camps differ on what or whom should be the objects of moral concern, that is, the entities to whom we owe ethical duties. Animalists (also known as animal rights activists or compassionate conservationists) usually hold the biocentric outlook that individual, sentient creatures, who can feel pain and suffering, who possess the ability to avoid suffering, and who exercise various forms of agency, deserve our highest moral consideration. [38] Animal rights proponents/compassionate conservationists denounce "the indiscriminate killing of wild animals." [39] They claim that "[c]onservation has thus far largely excluded animal ethics from its moral universe, a position that requires that we attend to the interests of individual sentient wild animals."[40] These conservationists also believe it is particularly problematic to harm wildlife "for the so-called greater good of biological and ecological collectives" even if it serves important objectives because it

35. Marcelo H. Cassini, *A Review of the Critics of Invasion Biology*, 95 BIOLOGICAL REVS. 1467, 1471 (2020).

36. Arian D. Wallach, Marc Bekoff, Chelsea Batavia, Michael Paul Nelson & Daniel Ramp, *Summoning Compassion to Address the Challenges of Conservation*, 32 CONSERVATION BIOLOGY 1255, 1256 (2018).

37. Parke and Russell propose these shorthand labels. Emily C. Parke & James C. Russell, *Ethical Responsibilities in Invasion Biology*, 2 ECOLOGICAL CITIZEN 17, 17 (2018).

38. MARTHA C. NUSSBAUM, JUSTICE FOR ANIMALS: OUR COLLECTIVE RESPONSIBILITY 56 (2023).

39. Joan E. Schaffner, *Ruminations on Twenty-Five Years of Animal Law*, 25 ANIMAL L. REV. 421, 432 (2019).

40. Wallach et al., *supra* note 36.

necessarily "entails injury, distress, diminished quality of life, and death for wildlife . . . ."[41]

Compassionate conservation advocates decry "instrumentalism, collectivism, and nativism."[42] They argue that we ought not to view animals as mere "instruments" or components of a species or ecosystem, but as individuals, each with intrinsic value and thus the right to be left to live.[43] They disparage "collectivism," meaning ethics and laws that prioritize groups (for example, species) over individuals, the latter being sentient creatures that can experience "suffering and joy." [44] Compassionate conservationists further criticize "nativism," the idea that introduced species are unnatural and "harmful, not because of their ecological effects per se, but because they challenge deep-seated ideologies about how nature should be."[45]

To counter the unethical killing that conservation laws sometimes demand, these conservationists advocate for a "compassionate" approach, one derived from "virtue ethics."[46] A "virtuous person will carefully attend to the capacity of others to experience both joy and pain and make efforts not to inflict intentional and unwarranted suffering as a manifestation of one's compassionate character." [47] Thus, compassionate conservationists believe that they "open [themselves] to the full hurts of the world and the moral landscape [they] navigate." [48] Compassionate conservationists exhort that "conservationists should not forfeit their humanity for the sake of their objectives, no matter how worthy those may be." [49] To pithily sum up this view, a compassionate conservationist quoted in a popular press article proclaims: "'It is actually a profound thing to realize that ecology is a bunch of sentient beings interacting in a landscape,' . . . . 'They are not just eating and fucking machines.'"[50]

Taking the compassionate conservationist view to extremes, Martha Nussbaum argues that a genuinely "wild" nature no longer exists in the Anthropocene era where humans control all of nature, which indicates that it might be ethical to focus "on the life-chances of individual creatures: they ought to have the chance to live flourishing lives."[51] She asserts: "We need above all to convince people that predation is a problem. Too many people grow up excited and enthralled by predation, and this has had a bad effect on our entire culture. It's important to keep pointing out that antelopes were not made to be

41. *Id.*
42. *Id.* at 1261.
43. *Id.* at 1261.
44. *Id.* at 1262.
45. *Id.* at 1263.
46. *Id.* at 1260.
47. *Id.*
48. *Id.* at 1264.
49. *Id.* at 1263.
50. Emma Marris, *When Conservationists Kill Lots (and Lots) of Animals*, ATLANTIC (Sept. 26, 2018), https://www.theatlantic.com/science/archive/2018/09/is-wildlife-conservation-too-cruel/569719.
51. NUSSBAUM, *supra* note 38, at 247.

food, they were made to live antelope lives."[52] Perhaps we should protect prey species from the predators who catch and eat them?

The "naturalistic fallacy" results when we conflate the "is" of nature with the "ought" of humans.[53] For instance, because evolution by natural selection is red in tooth and claw, one might argue that humans should not help other humans in need: doing so would be foolish, unnecessary, and even unethical. Nussbaum and others commit a reverse fallacy: they conflate the "is" of humans with the "ought" of nature. While it is virtuous and simply right to not wantonly kill, sometimes we must make choices, and must discern which lives matter more. Whether one's ethics tilts consequentialist/utilitarian (determining right or wrong by weighing an action's consequences) or anti-consequentialist/virtue ethical (determining right or wrong based on the fundamental virtue of the act), one might still kill for conservation. The question, then, is: which lives do we choose to prioritize in law and policy, given that we must choose? To fail to take action against invasive species is, indeed, to choose. As Australian conservation biologist Katherine Moseby puts it, we should intervene to kill invasive species instead of "sitting back and saying, '[l]et's let everything eat each other and see what is left.'"[54]

One can be a conservation biologist or a biodiversity lawyer and adopt a virtue ethics approach. The question is: act virtuously towards *what or whom*? To what or whom do we have moral obligations? Biodiversity advocates—those who defend killing for conservation—assert that it is not just the (thinking, feeling) individual that must be an object of ethical concern; it is the collective—the population, the species, the ecosystem—that should be objects of moral concern themselves. Callen et al. put the debate succinctly, but not fully correctly: "[t]he essential distinction between 'Compassionate Conservationists' and mainstream conservationists is the former's focus on the welfare of the individual and the latter's focus on conserving species, populations, and habitats. Focusing on the rights of individual animals at the expense of populations may lead to the extinction of many species and populations."[55] One can laud animal rights proponents for attending to the deaths and pain of individuals from "invasive" species whom, through no fault of their own, threaten the panoply of biodiversity. But compassionate conservationists ignore the individual deaths caused by many of these invaders because populations, species, and ecosystems are composed of individuals. Animalists may preach compassion, but their compassion is only for a highly circumscribed group of sentient animals. By restricting their compassion to a small group, they simultaneously condemn

52. *Id.* at 252.

53. Steve Sailer, *Q&A: Steven Pinker of 'Blank Slate*,*'* UNITED PRESS INT'L. (Oct. 30, 2002, 10:20 AM), https://www.upi.com/Odd_News/2002/10/30/QA-Steven-Pinker-of-Blank-Slate/26021035991232.

54. Marris, *supra* note 50.

55. Alex Callen et al., *Envisioning the Future with 'Compassionate Conservation': An Ominous Projection for Native Wildlife and Biodiversity*, BIOLOGICAL CONSERVATION, Jan. 2020, at 1, 8.

many more sentient animals (of many, many different species) to pain and death, and their species to extinction.[56]

Moreover, to focus on preserving species or ecosystems *is* to focus simultaneously on individuals. Species and ecosystems don't exist absent the individuals that comprise them. Thus: which individuals, and the collectives they comprise, do we want to sustain? Is it compassionate to allow the unfettered killing, pain, and suffering of individual, sentient, endemic creatures by predators we have released in the ecosystem?[57] Killing for conservation is not about avoiding harm, pain, or death to sentient creatures; it's about which sentient creatures we want subjected to harm, pain, death, or birth. Even if each individual's sentience informed our values, the approach advocated by compassionate conservationists and allied animal rights activists would still cause harm, pain, suffering, and death of present individuals, not to mention the death of birth for future individuals. We don't save sentient lives by not killing feral cats or foxes or stoats or pythons; if we heed the expertise of biologists, we must choose which lives matter, because we can't have both invaders and native species.[58] And if we want a non-homogenized biological world, one that supports diverse ecosystems, and, perhaps, gives humans a better prospect of survival, then sometimes we must destroy life to protect life.

Conservation biology itself is a value-laden, normative science, as its founders and practitioners proclaim.[59] And biodiversity law is a value-laden, normative enterprise, as it adjudicates choices about who will and should live and who will and should die. It is, as all conservation is, a matter of figuring out which values society ought to adopt and applying those values to practice. Depending on one's answers, it can be virtuous—and compassionate—to conduct one's personal and professional life so that we protect ecosystems, the individuals that comprise them, and the evolutionary process that created and creates them. Great virtue lies in stewardship, caring for life's gorgeously complex interactive web of species and yes, the individuals that comprise them. If biologists are correct, we act ethically by saving more sentient beings by killing: it may be the compassionate thing to do.[60]

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56. *Id.* at 2, 8, 9.

57. Michael Hutchins, Victoria Stevens & Natasha Atkins, *Introduced Species and the Issue of Animal Welfare*, 3 INT'L J. STUDY ANIMAL PROBS. 318, 330 (1982) asks a similar question: "A difficult question for humane organizations contemplating legal or political action against government agencies that want to control introduced animals is: Are we willing to live with the suffering of the many other organisms that are adversely affected by the exotic species?"

58. *Id.* at 319.

59. See DAVID TAKACS, THE IDEA OF BIODIVERSITY (1996), for a book-length exploration of this history and this claim.

60. Christopher Bobier & Benjamin Allen, *The Virtue of Compassion in Compassionate Conservation*, CONSERVATION BIOLOGY, Feb. 2022, at 1, 2; Meera Anna Oommen, Rosie Cooney, Madhuri Ramesh, Michael Archer, Daniel Brockington, Bram Buscher, Robert Fletcher, Daniel J.D. Natusch, Abi T. Vanak, Grahame Webb & Kartik Shanker, *The Fatal Flaws of Compassionate Conservation*, 33 CONSERVATION BIOLOGY 784, 784–86 (2019) ("[C]ompassionate conservation is . . . alarmingly

Of course, we should use non-lethal methods where we can, and the Invasive Species Council, the Australian Government's Threat Abatement Plan, and other official actors call for accelerated research into more humane (albeit effective) alternatives.[61] But waiting for those alternatives is not going to stop the feral cat or stoat problem. If we believe biologists, compassion alone will lead to many endemic extinctions. Once we make these value decisions, and once we figure out what we wish to conserve for present and future generations of humans as well as the rest of the planet's species, then science can help us figure out how to intervene most efficiently, effectively, sustainably, and humanely.

Compassionate conservationists also argue that unintended ecological consequences stem from wantonly killing predators: "Even highly coordinated and intensive eradication programs backfire."[62] True, they can.[63] But the argument that we have screwed up our planet enough already and should learn from our hubris doesn't hold valence for me. In the Anthropocene, where humans are driving the great extinction crisis, we have two choices: (1) either we will increasingly manage our ecosystems so that some species survive in some places, thus maintaining some vestige or ecosystem function for us and for them, or (2) we won't, and we accept that thousands (or millions) of species with whom we share the planet will go extinct. Recognizing that not all invading species are harmful to ecosystems or humans, we could think in terms of "conciliation biology," trying to manage ecosystems for maximum function, sometimes including invader species.[64] Of course, not all invasive species are harmful to ecosystems or to humans. Karrigan Börk writes of "guest species," "naturalized nonnative species which humans have introduced, intentionally or accidently,"[65] and thus benefit us or benefit the ecosystems to which they've found their peripatetic way. Sometimes an ecosystem will accommodate migrants or invaders so that different species can successfully partition an ecosystem niche.[66]

But most of the sentient creatures we kill for conservation are uninvited and unwanted guests that have overstayed their welcome, if they were ever welcome at all. It is beyond doubt that the creatures we are killing are killing the

simplistic . . . [and] the product of blinkered thinking—a failure to understand the interconnected nature of living creatures and a heedless disregard for the current scale of environmental and social problems. Human dimensions apart, this philosophical agenda is counterproductive in the long run because it is predicated on the presumption that the welfare of individual animals should be inviolate, regardless of practical conservation outcomes.").

61. INVASIVE SPECIES COUNCIL, 1080: A WEIGHTY ETHICAL DILEMMA 10 (2020), https://invasives.org.au/wp-content/uploads/2020/11/1080-Weighty-Ethical-Issue.pdf.

62. Arian Wallach & Daniel Ramp, *Let's Give Feral Cats Their Citizenship*, CONVERSATION (July 28, 2015, 4:08 PM EDT), https://theconversation.com/lets-give-feral-cats-their-citizenship-45165.

63. For one infamous example, see *Introduction of Cane Toads*, NAT'L MUSEUM AUSTL. (Sept. 6, 2023), https://www.nma.gov.au/defining-moments/resources/introduction-of-cane-toads.

64. Cassini, *supra* note 35, at 1475.

65. Karrigan Börk, *Guest Species*: *Rethinking Our Approach to Biodiversity in the Anthropocene*, 2018 UTAH L. REV. 169, 174.

66. Cassini, *supra* note 35, at 1469.

prioritized creatures that law has chosen to accompany us into the Anthropocene. A group of compassionate conservationists write: "[a]lthough some introduced populations have contributed to extinctions, these cases represent exceptions rather than the norm."[67] The IPBES and governments of Australia and New Zealand beg to differ on that.[68] Compassionate conservationists offer handpicked examples: coexisting with urban coyotes in the United States, guardian dogs protecting penguins from foxes on an Australian island[69]—that are lovely yet limited, as various authors suggest.[70] They are also problematic: the guardian dogs themselves occasionally kill the penguins they are to protect.[71] As the Australian Invasive Species Council derides them, "In one article breathtaking for its disavowal of evidence, they claim that feral cats have not caused any extinctions and that native animals will adapt to them."[72]

At an Australian workshop, twenty experts with diverse philosophical perspectives agreed on seven principles for managing human–wildlife conflict: (1) modify human practices where possible; (2) justify the need for control; (3) name clear and achievable outcome-based objectives; (4) cause the least harm to animals; (5) consider community values and scientific information; (6) include long-term systematic management; and (7) base control on specifics of the situation.[73] We'll return to these below, but the fourth principle will continue to be one sticking point: Least harm to *which* animals? As for the third principle, I will question whether some of the case studies below actually have "achievable" results.

As we will see, if we heed biologists, we can maintain functioning ecosystems that flourish and regenerate, support a host of species (keystone and otherwise), and allow evolution to continue its majestic process, allowing a diversity of interrelated, diverse individuals to flourish. These ecosystems will in turn continue to undergird human civilization. Alternatively, we can choose to prioritize feral cats, foxes, and rats, at the expense of ecological continuance. In sum, Hutchins et al. conclude of animal rights activists who oppose killing for conservation, "in adhering to a philosophy that emphasizes a reverence for life, but that ignores the conditions necessary for its survival, they may ultimately be unfaithful to their own ideals."[74]

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67. Wallach et al., *supra* note 36, at 1263.

68. INVASIVE SPECIES COUNCIL, *supra* note 61.

69. Wallach et al., *supra* note 36, at 1259–60 tbl.2.

70. *See, e.g.*, Callen et al., *supra* note 55, at 5.

71. Kristie King, Robert Wallis, Anne Wallis, Amanda Peucker & David Williams, *Successful Protection Against Canid Predation on Little Penguins (Eudyptula Minor) in Australia Using Maremma Guardian Dogs: 'The Warrnambool Method*,*'* 8 INT'L J. ARTS & SCI. 139, 147 (2015).

72. INVASIVE SPECIES COUNCIL, *supra* note 61, at 10 (referring to Wallach & Ramp, *supra* note 62).

73. Sara Dubois et al., *International Consensus Principles for Ethical Wildlife Control*, 31 CONSERVATION BIOLOGY 753, 754 (2017).

74. Hutchins et al., *supra* note 57, at 333.

III. AUSTRALIA

A. OVERVIEW

Australia possesses 5 percent of the world's landmass, but contains 12.5 percent of chordate[75] species,[76] and almost 8 percent of all described animal, plant, and fungal species. Eighty-five percent of Australia's plants, mammals, reptiles, and amphibians are endemic, that is, exist there and nowhere else.[77] The nation contains, as one popular press article put it, a "menagerie of animals with wonderful names and uncertain prospects."[78] Australia has the worst record on mammalian extinctions of any nation, and without fundamental interventions, a bad situation will get worse.[79] Ten percent of the 273 recorded Australian mammals have gone extinct; this represents more than one-third of all known global mammal extinctions.[80] At least ninety total extinctions have occurred, with others unrecorded or undetected, and at least three extinctions have occurred since 2009.[81] Many more species are critically endangered.

In a comprehensive review of threats to Australia's wildlife, Kearney et al. named invasive species as threatening the largest number of endangered species (1,257, or 82 percent of all listed species). Two hundred sixty-seven invasive species (207 plants, 57 animals, 3 pathogens) are listed as affecting Australian legally threatened taxa. The European rabbit (*Oryctolagus cuniculus*) threatens 21 percent (322) of EPBC Act–listed species, with cats and foxes posing a major threat to over one hundred species each.[82] Predation by feral cats and domestic foxes is the leading driver of recorded extinctions.[83] Between 1.4 million and 5.6 million feral cats cover over 99 percent of the Australian continent.[84] Foxes, introduced in Victoria for hunting, have now spread across the continent, roaming most of Australia south of the tropics. As one scholarly paper pithily

75. Chordate means animals with a notochord, that is, all vertebrates and a few other primitive animals.

76. ARTHUR D. CHAPMAN, DEP'T OF THE ENV'T, WATER, HERITAGE & THE ARTS, AUSTL. GOV'T, NUMBER OF LIVING SPECIES IN AUSTRALIA AND THE WORLD 6–8 (2d ed. 2009), https://www.dcceew.gov.au/sites/default/files/env/pages/2ee3f4a1-f130-465b-9c7a-79373680a067/files/nlsaw-2nd-complete.pdf.

77. Stephen G. Kearney et al., *The Threats to Australia's Imperilled Species and Implications for a National Conservation Response*, 25 PAC. CONSERVATION BIOLOGY 231, 231 (2018).

78. Marris, *supra* note 50.

79. For a general overview of the dire situation, see John C. Z. Woinarski, Andrew A. Burbridge & Peter L. Harrison, *Ongoing Unraveling of a Continental Fauna: Decline and Extinction of Australian Mammals Since European Settlement*, 112 PNAS 4531 (2015).

80. *Id.* at 4532.

81. Kearney et al., *supra* note 77, at 232.

82. *Id.* at 232–33.

83. Sarah Legge et al., *Havens for Threatened Australian Mammals: The Contributions of Fenced Areas and Offshore Islands to the Protection of Mammal Species Susceptible to Introduced Predators*, 45 WILDLIFE RSCH. 627, 628 (2018).

84. *Feral Cats*, NAT'L FERAL CAT & FOX MGM'T COORDINATION, https://feralcatandfox.com.au/cats/ (last visited Oct. 1, 2025); *Western Shield*, DEP'T OF BIODIVERSITY, CONSERVATION & ATTRACTIONS, GOV'T OF W. AUSTL., https://www.dbca.wa.gov.au/management/threat-management/invasive-animals/western-shield (last visited Oct. 1, 2025).

concluded: "[m]ost of the Australian land area is now effectively uninhabitable for the extant native species most susceptible to predation by just two introduced species."[85]

B. BARNA MIA: WHAT HAPPENS WHEN YOU KILL THE INVADERS

In the southwest corner of Australia in Dryandra Woodlands National Park, visitors to the Barna Mia Wildlife Experience[86] see sights that used to be commonplace, but now seldom exist outside of fenced preserves or remote islands. On a nocturnal guided walk, I saw brush tailed bettongs (woylies), *Bettongia penicillate*; burrowing bettongs (boodies) *Bettongia lesueur*, Southern brown bandicoots (quendas) *Lsodon obesulus* and Rufous-hair wallabies (mala) *Lagorchestes hirsutus*, species extinct or almost extinct on the mainland of Australia except for at the national park. Because of the threats feral cats, foxes, and other unwanted guests pose, Australia has now established at least twenty-three fenced havens and 101 island havens to preserve some vestige of continental fauna.[87]

The goal at Barna Mia and the other fenced and island preserves in Australia that combine captive breeding with predator proofing is to ensure that offshore islands don't become mere reliquaries of what used to be. Australia faces the danger that areas like Barna Mia end up endangered species prisons, islands of fenced security surrounded by the ever-looming threat of foxes and cats. This is why, when we watched woylies digging at night at our campsite outside the fence, we understood that the program has been extremely successful at "controlling" cats and foxes beyond the fence line.

1. Woylies[88]

Brush-tailed bettongs, or Woylies, once ranged throughout Australia's mainland but now have nearly completely disappeared. Woylies and most of the other species Barna Mia protects normally would be consigned to being Happy Meals for cats and foxes. They mostly fall into a critical weight range of 35 g to 5.5 kg—too big to hide, and too small to fight back.[89] So, for example,

85. Legge et al., *supra* note 83, at 641.

86. *Barna Mia Nocturnal Wildlife Experience*, DEP'T OF BIODIVERSITY, CONSERVATION & ATTRACTIONS, GOV'T OF W. AUSTL., https://exploreparks.dbca.wa.gov.au/site/barna-mia-nocturnal-wildlife-experience (last visited Oct. 1, 2025).

87. Legge et al., *supra* note 83, at 637; Patrick Finnerty & Thomas Newsome, *Islands in the Sky: Could Steep-Sided Hilltops Offer Safe Haven to Our Threatened Species?*, CONVERSATION (Aug. 15, 2024, 9:39 PM EDT), https://theconversation.com/islands-in-the-sky-could-steep-sided-hilltops-offer-safe-haven-to-our-threatened-species-234925#:~:text=By%20our%20count%2C%20there%20are,and%20control%20for%20feral%20predators.

88. Google them. They are adorable.

89. Woinarski et al., *supra* note 79, at 4535.

kangaroos, weighing much more than 5.5 kg are doing just fine in Australia, thank you.[90]

One might prize woylies for their intrinsic value just as one prizes any species. But woylies have "instrumental" value for the ecosystems in which they live(d). Mammals like woylies that dig extensively—known as bioturbation—are necessary to maintain optimal ecosystem function. Woylies are "ecosystem engineers"—by digging for food, they catalyze effectively functioning ecosystem services. Woylies bury seeds and spread fungi, recycle organic matter into the soil and help the soil retain water, thus reducing fire risk and intensity, and providing the material to help plants sprout and regenerate forests.[91] A single woylie can turn over nearly five tons of soil annually.[92] Woylies distribute seeds widely which helps the recruitment of sandalwood (the keystone tree in some forests). Absent woylies, a forest is moribund, with little recruitment of new saplings.[93] As Cyril Kartinyeri, an Aboriginal elder, expressed it, "[t]he yalgiri [woylies] have a purpose on this country. They've got a purpose here, just as every other animal, bird and reptile does, and that's to look after country. So reintroducing these animals is helping to create a healthy country."[94]

The Barna Mia endeavor has been so successful—fifteen thousand woylies now roam—that the sanctuary now exports woylies elsewhere in Australia. Woylies had been eliminated from the Yorke Peninsula of South Australia. They have been exported from Barna Mia and are now reestablished, in part because the government in South Australia, too, has sanctioned destroying the predators who would once again eliminate them.[95]

C. WESTERN SHIELD: WESTERN AUSTRALIA'S PREDATOR KILLING PROGRAM

Western Australia's Parks and Wildlife Service undertakes the "Western Shield" program, billed as "one of the largest wildlife conservation programs

90. Jeremy Berlin, *Australia's Beloved Kangaroos Are Now Controversial Pests*, NAT'L GEOGRAPHIC (Feb. 2019), https://www.nationalgeographic.com/magazine/article/australia-kangaroo-beloved-symbol-becomes-pest?loggedin=true&rnd=1733177097813.

91. Leonie E. Valentine, Katinka X. Ruthrof, Rebecca Fisher, Giles E. St. J. Hardy, Richard J. Hobbs & Patricia A. Fleming, *Bioturbation by Bandicoots Facilitates Seedling Growth by Altering Soil Properties*, 32 FUNCTIONAL ECOLOGY 2138, 2139 (2018); C.M. Ryan, R.J. Hobbs & L.E. Valentine, *Bioturbation by a Reintroduced Digging Mammal Reduces Fuel Loads in an Urban Reserve*, ECOLOGICAL APPLICATIONS, Mar. 2020, at 1, 2; Patricia A. Fleming, Hannah Anderson, Amy S. Prendergast, Michael R. Bretz, Leonie E. Valentine & Giles E. St. J. Hardy, *Is the Loss of Australian Digging Mammals Contributing to a Deterioration in Ecosystem Function?*, 44 MAMMAL REV. 94, 99 (2014); W. SHIELD, GOV'T OF W. AUSTL., ACTIVITIES ON THREATENED SPECIES 53 (2016), https://www.dbca.wa.gov.au/media/2259/download.

92. Mark J. Garkaklis, J.S. Bradley & R.D. Wooller, *Digging and Soil Turnover by a Mycophagous Marsupial*, 56 J. ARID ENV'TS 569, 573 (2003); W. SHIELD, GOV'T OF W. AUSTL., *supra* note 91.

93. Marie T. Murphy, Mark J. Garkaklis & Giles E. St. J. Hardy, *Seed Caching by Woylies Bettongia Penicillata Can Increase Sandalwood Santalum Spicatum Regeneration in Western Australia*, 30 AUSTRAL ECOLOGY 747, 752 (2005); Fleming et al., *supra* note 91, at 104.

94. Graham Readfearn, *Hopes Rewilding Critically Endangered Brush-Tailed Bettongs Will Help Them Bounce Back*, GUARDIAN (June 20, 2023, 12:29 AM EDT), https://www.theguardian.com/australia-news/2023/jun/20/hopes-rewilding-critically-endangered-brush-tailed-bettongs-will-help-them-bounce-back.

95. *Id.*

ever undertaken in Australia."[96] It aims to restore populations of twenty endangered mammals (and four bird and two reptile species) to pre-colonization levels—a daunting task.[97] The primary focus is "management" (a euphemism for "killing") of feral cats and foxes on over 3.7 million hectares (over 9 million acres) of Western Australia land. It includes a large-scale education program for children and property owners, an impressive night tour at Barna Mia (as described above), and most significantly, the widespread use of 1080 poison.

A naturally occurring toxin made from native pea plants comprises 1080's main ingredient, sodium fluoroacetate. Native species have evolved to protect themselves from sodium fluoroacetate, but it is highly poisonous to naïve cats and foxes. The Department of Biodiversity, Conservation, and Attractions (DBCA) constructs baits infused with the toxin, and annually deploys four hundred thousand poisonous dry sausage baits for foxes (Probait®) and six hundred thousand moister versions (Eradicat®) for fussier cats, particularly at times of year when prey items are scarce, and hungry predators are compelled to take the bait. Park managers supplement the baits with active trapping and shooting programs, including incentivizing private citizens to shoot foxes and cats.[98] Over eight months of the year, the government agency conducts extensive aerial drops of the baited sausage, supplemented with ground placement of bait.[99]

Indeed, in every one of a dozen national parks I visited in Western Australia, I saw signs warning of a "1080 poison risk." For example, in Dryandra Woodland National Park (home to the above described Barna Mia), a sign warned that "[d]ried meat or sausage baits containing 1080 POISON are laid in this area to control FOXES and FERAL CATS . . . 1080 is poisonous to humans and will kill cats and dogs. Please leave your pets at home or prevent them from entering the area."

Experts disagree on whether 1080 kills cats and foxes quickly and painlessly, or slowly and painfully, and many of the official sites (and literatures describing its use) where it's being used don't discuss welfare implications. One Australian government report reviews the evidence, says it's difficult to determine, but concludes, "[o]n the available evidence, we conclude that animals poisoned with 1080 are highly likely to suffer pain and distress, but the severity and duration in different species and individuals are variable and poorly understood."[100] As the Invasive Species Council points out, however, "[t]hose who want 1080 immediately banned rarely mention the suffering that is averted by its use. A ban on 1080 without an effective replacement would overall result

96. W. SHIELD, GOV'T OF W. AUSTL., *supra* note 91, at 8.

97. DEP'T OF BIODIVERSITY, CONSERVATION & ATTRACTIONS, GOV'T OF W. AUSTL., *supra* note 84.

98. *Id.*; W. SHIELD, GOV'T OF W. AUSTL., *supra* note 91, at 24, 26.

99. *Western Shield Fox and Feral Cat Baiting Locations*, W. SHIELD, GOV'T OF WESTERN AUSTL., https://www.dbca.wa.gov.au/management/threat-management/western-shield/western-shield-fox-and-feral-cat-baiting-locations (last visited Oct. 1, 2025).

100. INVASIVE SPECIES COUNCIL, *supra* note 61, at 8.

in greater suffering" because of the lives that cats and foxes take, sometimes slowly and painfully.[101]

By hunting and feeding poison sausage to foxes and feral cats, Western Australians not only get back their woylies and other critically endangered species—they maintain soil fertilization in this depleted continent, they regenerate forests, and they help curtail fires that will only get worse in the climate-addled Anthropocene.[102] They kill invasive predators to ensure not just that they have woylies, but that they have any ecosystems at all.

D. ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT (EPBC)

The Environment Protection and Biodiversity Conservation Act of 1999 ("EPBC") is Australia's comprehensive, overarching nature protection law.[103] The EPBC reaches further than the United States' foremost biodiversity law, the Endangered Species Act, extending its legal tentacles beyond listing and protecting species. In addition to focusing on how to protect each threatened species,[104] the EPBC encompasses numerous other mechanisms to more holistically and comprehensively address species loss and ecosystem degradation. Among its many innovations is naming "Key Threatening Processes" ("KTPs"), that is, a phenomenon that "threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community."[105]

Of the twenty-two currently listed KTPs, fourteen implicate invasive alien species, including separate KTPs for rabbits, goats, exotic rats on offshore islands, feral pigs, cane toads, foxes, and feral cats (all of which I've come across

101. INVASIVE SPECIES COUNCIL, *supra* note 61, at 10.

102. Carolyn Gramling, *Australian Fires in 2019–2020 Had Even More Global Reach Than Previously Thought*, SCIENCENEWS (Sept. 15, 2021, 11:29 AM), https://www.sciencenews.org/article/australia-wildfires-climate-change-carbon-dioxide-ocean-algae.

103. *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (Austl.).

104. Of which there are currently around 2000, even more than in the U.S.; 685 are animals. *EPBC Act List of Threatened Fauna*, DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl (last visited Oct. 1, 2025); *EPBC Act List of Threatened Flora*, DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora (last visited Oct. 1, 2025); DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, THE THREATENED SPECIES ACTION PLAN TOWARD ZERO EXTINCTIONS 5 (2022), https://www.dcceew.gov.au/sites/default/files/documents/threatened-species-action-plan-2022-2032.pdf. Note that as of this writing, 108 ecological communities are also threatened with extinction. *EPBC Act List of Threatened Ecological Communities*, DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, https://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl (last visited Oct. 1, 2025).

105. *Key Threatening Processes Under the EPBC Act*, DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T (Oct. 10, 2021), https://www.dcceew.gov.au/environment/biodiversity/threatened/key-threatening-processes.

in Australian National Parks).[106] Oddly, KTPs are not listed as "Matters of National Environmental Significance" (another EPBC innovation) and do not automatically trigger ministerial actions under the EPBC.[107] KTPs do raise awareness of given environmental problems, and if the relevant Minister believes a Threat Abatement Plan is "a feasible, effective and efficient way of abating the process," then they must put one into effect, which provides a blueprint to guide the nation's response to the threat.[108]

In 2020, the government commissioned a report on its performance under the EPBC Act. The result was scathing. Among the report's many criticisms were the ad hoc, uncoordinated responses to threats such as invasive species, the lack of coordination between commonwealth (that is, national) and state governments (especially on invasive species), the lack of updated Threat Abatement Plans, and the lack of mandatory action once threats were identified, which were especially grave given that "[a] recent assessment of historical extinctions during the mid-19th or early 20th century concluded that of 13 species assessed, 11 are believed to have gone extinct primarily due to the predation of feral cats and European red foxes."[109]

In response, the Government admitted its lousy performance, acknowledging that the EPBC is "ineffective" and "inefficient," ignores traditional knowledge, insufficiently bases decisions on good data, and is hobbled by weak compliance and enforcement."[110] The "Nature Positive" plan ("Better for the Environment. Better for Business") pledged major reforms, including more proactive plans to curb the effects of invasive species.[111] Two major plans ensued. The Government's Threatened Species Action Plan 2022-2023, "Towards Zero Extinctions," is grounded in the vision that "Australia's unique biodiversity is part of our national identity. Our plants and animals are central to the cultural identity of First Nations people, who have managed the Australian environment for over 65 thousand years and continue to shape the landscape through their stewardship. Our biodiversity is fundamental to the

106. *Listed Key Threatening Processes*, DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, http://www.environment.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl (last visited Oct. 1, 2025).

107. *Frequently Asked Questions: Key Threatening Processes and Threat Abatement Plans*, DEP'T OF AGRIC., WATER & THE ENV'T, AUSTL. GOV'T 1, https://www.dcceew.gov.au/sites/default/files/env/pages/10a10e3d-e677-4c5a-ba9a-00bfd70d8db2/files/faq-ktp-tap.pdf (last visited Oct. 1, 2025); GRAEME SAMUEL, INDEPENDENT REVIEW OF THE EPBC ACT—FINAL REPORT 128 (2020).

108. DEP'T OF AGRIC., WATER & THE ENV'T, AUSTL. GOV'T, *supra* note 107, at 2.

109. SAMUEL, *supra* note 107, at 128.

110. DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, NATURE POSITIVE PLAN: BETTER FOR THE ENVIRONMENT, BETTER FOR BUSINESS 1 (2022), https://www.dcceew.gov.au/sites/default/files/documents/nature-positive-plan.pdf ("[A]n alarming but consistent story. A story of environmental degradation, loss and inaction; of businesses frustrated by slow bureaucratic structures and an Act focused on processes rather than outcomes. A story of opaque data and decisions, poor enforcement and the exclusion of First Nations people from involvement in decision-making.").

111. *Id.* at 13.

health of our environment, economy and community."[112] Note the differences to the prelude to the United States Endangered Species Act, where we read nothing about "national" and "cultural" identity per se. The Vision gives us insight into why Australia prioritizes bettongs, numbats, and bilbies over feral cats, foxes, and cane toads. The plan has four objectives: the risk of extinction is reduced for all priority species; the condition is improved for all priority places; new extinctions of plants and animals are prevented; at least 30 percent of Australia's land mass is protected and conserved.[113]

To fulfill those objectives, three named targets focus on invasive species, two honing on cats and foxes: "Target 8: Feral cats and foxes are managed across all important habitats for susceptible priority species using best practice methods. Target 9: Feral cats and foxes are managed in all priority places where they are a key threat to condition, using best practice methods for the location."[114] Noting that "[a]cross Australia, feral cats and European red foxes kill native wildlife for food and threaten more than 120 nationally listed threatened species with extinction, and through impacting the balance of fauna species, can degrade the condition of threatened ecological communities," the report asserts that "[r]educing the impact of these invasive predators will support the recovery of at least 38 priority species and many more nationally listed threatened species in priority places and across the landscape."[115] The Plan calls upon the National Feral Cat and Fox Coordinator[116] and Feral Cat Taskforce (a government advisory board convened since 2015) [117] to coordinate a comprehensive response.[118]

E. FERAL CAT THREAT ABATEMENT PLAN

In September 2023, the Government backed up its Threatened Species Plan with a draft Threat Abatement Plan ("TAP") aimed at getting rid of as many feral cats as possible, with a five-year price tag of $60 million AUD (around $40 million USD).[119] This builds on three previous feral cat TAPs, as well as a formal Parliamentary inquiry on "Tackling the Feral Cat Pandemic: A Plan to Save

112. DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, 2022–2032 THREATENED SPECIES ACTION PLAN: TOWARDS ZERO EXTINCTIONS 4 (2022), https://www.dcceew.gov.au/sites/default/files/documents/threatened-species-action-plan-2022-2032.pdf.

113. *Id.* at 2.

114. *Id.* at 3.

115. *Id.* at 23.

116. *National Feral Cat and Fox Management Coordinator*, CTR. FOR INVASIVE SPECIES SOLS., https://invasives.com.au/research/national-feral-cat-and-fox-management-coordinator/#:~:text=Gillian%20Basnett,-National%20Feral%20Cat&text=She%20has%20a%20background%20in,and%20management%2C%20and%20fire%20ecology (last visited Oct. 1, 2025).

117. *Feral Cat Taskforce,* DEP'T OF CLIMATE CHANGE, ENERGY, ENV'T & WATER, AUSTL. GOV'T (Feb. 13, 2025), https://www.dcceew.gov.au/environment/invasive-species/feral-animals-australia/feral-cats/feral-cat-taskforce.

118. DEP'T OF CLIMATE CHANGE, ENERGY, ENV'T & WATER, AUSTL. GOV'T, *supra* note 112, at 23.

119. DEP'T OF CLIMATE CHANGE, ENERGY, ENV'T & WATER, AUSTL. GOV'T, *supra* note 4, at 82.

Australia's Wildlife."[120] The TAP's thirty-year goal is to "[t]o reduce the impacts of cats sufficiently to ensure the long-term viability of all affected native species."[121] The government notes that between 1.4 and 5.6 million cats (first introduced in 1788) now blanket 99.9 percent of the continent.[122] The report decries the fact that Australian feral cats kill more than 1.5 billion native mammals, birds, reptiles and frogs, and 1.1 billion invertebrates each year.[123] A recent global study also identifies 2,084 species that cats eat, at least 16.65 percent of which are of IUCN-listed conservation concern.[124] In addition to the "main impact" (that is, species threats) that cats cause, the report notes that they also compete with native species for food, disrupt ecological services, and are vectors for disease in native species as well as livestock and people.[125] Almost as an afterthought (one sentence!), the TAP notes that cat-dependent pathogens such as toxoplasmosis cost Australia $6 billion AUD annually due to human and livestock disease transmission.[126]

The plan acknowledges that "[c]ats have a complex relationship with people, with a status varying from treasured pets to environmental scourge,"[127] and thus "abating" the threat may provoke controversy. I'd nominate this acknowledgement for the Biodiversity Law understatement of the year. The Government certainly is serious about the threat: The plan proposes nine objectives, sixty-eight actions, and many performance standards to measure success. Among the most controversial are likely to be the proposals to "[r]efine the use of existing tools, and develop new tools," including finding more effective ways to kill cats.[128] The Government also plans to research effective alternatives to 1080 such as the, "Felixer." This device shoots a toxin onto cats as they pass by; the cat then licks their fur while grooming, and the toxin thus takes effect.[129] Conservation biologists describe more potential tools like toxic implants and toxic collars in "the war on feral cats," but many of these are less well tested, more expensive, and less practicable than 1080 sausages (or massive

120. PARLIAMENT OF THE COMMONWEALTH OF AUSTL., TACKLING THE FERAL CAT PANDEMIC: A PLAN TO SAVE AUSTRALIA'S WILDLIFE 1 (2020), https://www.aph.gov.au/Parliamentary_Business/Committees/House/Former_Committees/Environment_and_Energy/Feralanddomesticcats/Report.

121. DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, *supra* note 4, at 22.

122. *Id.* at 8–9.

123. *Id.* at 10.

124. Christopher A. Lepcyzk, Jean E. Fantle-Lepczyk, Kylee D. Dunham, Elsa Bonnaud, Jocelyn Lindner, Tim S. Doherty & John C. Z. Woinarski, *A Global Synthesis and Assessment of Free-Ranging Domestic Cat Diet*, NATURE COMMC'NS, Dec. 12, 2023, at 1, 3 tbl.1.

125. DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, *supra* note 4, at 4.

126. *Id.* at 14.

127. *Id.* at 7.

128. *Id.* at 23, 42–45.

129. *See id.* at 43, 98 tbl.24. For a demonstration of Felixer, see Centre for Invasive Species Solutions, *Felixer Grooming Traps*, YOUTUBE (Jul. 6, 2023), https://www.youtube.com/watch?v=ZImte8bju3w.

shooting[130] campaigns).[131] The Plan also discusses Aboriginal tracking and killing of feral cats, immunocontraception, genetic engineering, and other somewhat more expensive and less practicable alternatives. There's even the "Mata Hari Judas" technique, where managers induce estrus in a captive female cat, who lures hapless, horny males, whom managers can then kill.[132]

The plan pussyfoots a bit around the problem of beloved pet cats. You know cat people; maybe you are one. But how should they manage the fact that Australia's 5.3 million[133] pet cats who roam outside kill 500 million native vertebrate animals annually?[134] In "We Need to Worry About Bella and Charlie: the Impacts of Pet Cats on Australian Wildlife," (Bella and Charlie the two most common cat names in Australia[135]) Sarah Legge et al. compile information on 66 studies of domestic cat predation and find that "the toll of native animals killed per square kilometre by pet cats in residential areas is still much higher than the toll per square kilometre by feral cats."[136] It's potentially easier to solve predation by pet cats than by feral cats, and to improve pet welfare by keeping cats indoors at the same time. That's the topic for another law review article, as no one is planning to kill Australians' (or your) pet cat to protect biodiversity. The TAP does have plans for how to reduce the biodiversity carnage pet cats cause, in part through education programs, bans on outdoor cats, and expanding the number of communities that simply forbid cat ownership.[137]

Obviously, cats are not the only invasive predator Australian law is attempting to control. In Victoria, the government pays people to kill foxes; "applicants must submit an entire fox scalp including both ears, the skin surrounding both eyes and the nose . . . fox scalps can be air dried, frozen or fresh."[138] The plan also calls for maintaining and expanding cat-free fenced and island havens.[139] The government has a Threat Abatement Plan "to reduce the impact of exotic rodents on islands of less than 100,000 hectares," which includes lots of baiting, trapping, and killing the threatening creatures using

130. DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, *supra* note 4, at 42–43.

131. Katherine Moseby & John Read, *The War on Feral Cats Will Need Many Different Weapons*, CONVERSATION (Jul. 23, 2015, 12:26 AM EDT), https://theconversation.com/the-war-on-feral-cats-will-need-many-different-weapons-44979.

132. DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, *supra* note 4, at 47.

133. *Id.* at 9.

134. *Id.* at 10.

135. Sarah Legge, John C. Z. Woinarski, Chris R. Dickman, Brett P. Murphy, Leigh-Ann Woolley & Mike C. Calver, *We Need to Worry About Bella and Charlie: The Impacts of Pet Cats on Australian Wildlife*, 47 WILDLIFE RSCH. 523, 524 (2020).

136. *Id.* at 523.

137. DEP'T OF CLIMATE CHANGE, ENERGY, THE ENV'T & WATER, AUSTL. GOV'T, *supra* note 4, at 77.

138. *Bounty Terms and Conditions*, AGRIC. VICT. (Feb. 3, 2025), https://agriculture.vic.gov.au/biosecurity/pest-animals/victorian-fox-and-wild-dog-bounty/bounty-terms-and-conditions.

139. Legge et. al., *supra* note 83, at 640.

Pestoff® 20R, which is highly palatable to both rats and mice.[140] For example, on lovely Lord Howe Island, the "Protecting Paradise Project"—more prosaically known as the "Rodent Eradication Project"—attempted successfully thus far to reverse the dire threats to the island's native biodiversity. It bills itself as "[t]he largest populated island to undertake a full scale eradication of all rodents."[141] A rapturous *National Geographic* article describes "liberation ecology" and the benefits of ridding the island of rats, resulting in an "ecological renaissance," that is, "restored ecological integrity, the recovery of threatened species, a story to attract environmentally minded tourists, and the permanent removal of a disease-carrying, garden-raiding, fruit-ravaging, house-infesting pest. Islanders could look forward to throwing away their traps and never having to dispose of a dead rodent again."[142]

Cane toads, too, are an invasive scourge in Australia. Queensland sugar cane farmers released them in 1935 to control pest beetles whose larvae eat cane roots, and from there the toads hopped throughout the warm, moist areas of the continent (numbering as many as two thousand per hectare) and spreading about ten kilometers annually.[143] They consume a wide variety of food items including individuals of protected species, they outcompete native species for food and shelter, and they are toxic to predators like endangered Northern Quolls who try to eat them.[144] Listed as a Key Threatening Process in 2005, the Government pursued a Threat Abatement Plan, with funding to research methods of broad biological control, perhaps via a viral vector to kill as many cane toads as possible in the most efficient way.[145] The TAP was followed years later by a formal Parliamentary hearing, "Cane Toads on the March," urging an updated TAP and creation of pockets of surviving predator populations including those of the Northern Quoll and other priority species (formally listed as goannas, skinks, and snakes), as it's difficult to bait and remove populations

140. DEP'T OF ENV'T, WATER, HERITAGE & ARTS, AUSTL. GOV'T, THREAT ABATEMENT PLAN TO REDUCE THE IMPACTS OF EXOTIC RODENTS ON ISLANDS OF LESS THAN 100,000 HECTARES 1 (2009), https://www.dcceew.gov.au/sites/default/files/documents/exotic-rodents.pdf; DEP'T OF ENV'T, WATER, HERITAGE & ARTS, AUSTL GOV'T, BACKGROUND DOCUMENT FOR THE THREAT ABATEMENT PLAN TO REDUCE THE IMPACTS OF EXOTIC RODENTS ON BIODIVERSITY ON AUSTRALIAN OFFSHORE ISLANDS OF LESS THAN 100,000 HECTARES 12 (2009), https://www.dcceew.gov.au/sites/default/files/documents/exotic-rodents-background.pdf.

141. LORD HOWE ISLAND RODENT ERADICATION PROJECT, https://lhirodenteradicationproject.org (last visited Oct. 1, 2025).

142. Kennedy Warne, *Rats Invaded Paradise. Here's How Paradise Fought Back*, NAT'L GEOGRAPHIC (Apr. 18, 2023), https://www.nationalgeographic.com/premium/article/rodents-rats-eradicated-tropical-paradise-australia-island?loggedin=true&rnd=1706389512725.

143. *The Biological Effects, Including Lethal Toxic Ingestion, Caused by Cane Toads (Bufo Marinus)*, DEP'T CLIMATE CHANGE, ENERGY, ENV'T & WATER, AUSTL. GOV'T (Oct. 10, 2021), https://www.dcceew.gov.au/environment/biodiversity/threatened/key-threatening-processes/biological-effects-cane-toads.

144. *Id.*

145. DEP'T OF SUSTAINABILITY, ENV'T, WATER, POPULATION & COMMUNITIES, AUSTL. GOV'T, THREAT ABATEMENT PLAN FOR THE BIOLOGICAL EFFECTS, INCLUDING LETHAL TOXIC INJECTION, CAUSED BY CANE TOADS 1, 8 (2011), https://www.dcceew.gov.au/sites/default/files/documents/tap-cane-toads.pdf.

effectively.[146] Compassionate conservationists who tout non-lethal means of controlling threats to native biodiversity cite one example of cane toad control. To quote one article, "[c]ute but dim quolls have been taught to stop eating toxic toads,"[147] by distributing toad meat sausages injected with a nausea-inducing toxins to teach quolls to avoid nasty cane toads via taste aversion.[148] Nonetheless, cane toad aversion training for Northern Quolls is an expensive, time-consuming maneuver.

F. CONCLUDING THOUGHTS ON AUSTRALIA

If we listen to biologists—and I do, and we more often should—we understand that if Australians want feral cats (for example, follow the compassionate conservation proposal, "to give feral cats their citizenship,")[149] they won't have woylies or boodies or bilbies or rufous hare-wallabies, all of which are extinct or nearly so on the mainland. By feeding poison sausage to foxes and feral cats, Australians help restore populations of fungus-eating woylies, who churn up the soil, making nutrients available for the entire ecosystem. This also helps curtail fires (which killed nearly three billion mammals, reptiles, birds and frogs in 2019–2020), which will only get worse in the climate-addled Anthropocene.[150] In Dryandra Woodlands National Park and all over the nation, Australians can't reduce the situation to a simple choice of arbitrarily choosing one form of vertebrate life over another. They must choose feral cats everywhere versus functioning ecosystems that are not just an abstraction but necessary for healthy ecological (and thus human) communities, and which themselves nurture a menagerie of diverse, sentient creatures.

I accept the wisdom of the experts: Without thorough, persistent, relentless control of cats and foxes (and in other areas of the country, rats, rabbits, cane toads, deer, goats, and more, all of which I've seen in the bush while traveling around Australia), many of Australia's iconic, endemic species will be gone, or relegated to island shrines of what used to be. And, what often goes

146. PARLIAMENT OF THE COMMONWEALTH OF AUSTL., CANE TOADS ON THE MARCH 41 (2019), https://parlinfo.aph.gov.au/parlInfo/download/committees/reportrep/024249/toc_pdf/Canetoadsonthemarch.pdf;fileType=application%2Fpdf; *Cane Toads on the March*, AUSTL. GOV'T (May 2020), https://www.agriculture.gov.au/sites/default/files/documents/government-response-cane-toads-on-the-march-may-2020.pdf.

147. Joshua Rapp Learn, *Cute but Dim Quolls Have Been Taught to Stop Eating Toxic Toads*, NEW SCIENTIST (Apr. 27, 2018), https://www.newscientist.com/article/2167508-cute-but-dim-quolls-have-been-taught-to-stop-eating-toxic-toads.

148. Rohan Wilson, John Kanowski & Alexandra James, *Innovative Approach Required as Cane Toads Arrive in the Kimberly*, AUSTL. WILDLIFE CONSERVANCY (Dec. 4, 2019), https://www.australianwildlife.org/news-and-resources/wildlife-matters/innovative-approach-required-as-cane-toads-arrive-in-the?srsltid=AfmBOoq3InAkt1v4B9hfCq-mJ73ePiTqLAN8ZiO5kdMSLLvKlJUGcMbZ. For a video, see Qldaah, *Queensland Quolls Training Northern Territory Quolls to Avoid Cane Toads*, YOUTUBE (May 21, 2017), https://www.youtube.com/watch?v=OqXcnZhm0qM.

149. Wallach & Ramp, *supra* note 62.

150. *New WWF Report: 3 Billion Animals Impacted by Australia's Bushfire Crisis*, WORLD WILDLIFE FUND: AUSTL. (Jul. 27, 2020), https://wwf.org.au/news/2020/3-billion-animals-impacted-by-australia-bushfire-crisis.

unmentioned, the ecosystems they support and engineer will also degrade, causing further extinctions, and fewer individuals of many, many species.

As noted above, Australian experts derived seven principles for managing human–wildlife conflict. Two principles, namely principles (3) to name clear and achievable outcome-based objectives; and (4) to cause the least harm to animals[151] —remain sticking points. I am convinced that without lethal approaches, killing lots and lots (and lots) of sentient creatures, little hope remains for many of Australia's iconic creatures, the individuals that comprise them, and the ecosystems they support. When we advocate "least harm to animals," the question will remain: Which animals? Doing nothing causes a great deal of harm to a great number of animals, of many different species, with the hidden additional costs that impairing ecosystems further harms many more individuals of many different species now and in the future.

The problem is: How is this "achievable," that is, sustainable? Budgets shrink, priorities realign, attention wanes. The woylies and numbats of Dryandra Woodlands still lack effective defenses against cats and foxes. And given the millions of cats and foxes that roam just about every other square inch of the continent, a bottomless reservoir outside the protected confines of the reserve houses predators just waiting to re-colonize. You *can* keep the rats off Lord Howe Island (as long as no one imports new invaders). But continental Australia is about the same size as the continental United States, and it's difficult to imagine, short of total elimination, how one would prevent the reservoir of undesirable species from recolonizing. One bloodless possibility looms in gene drives: you could inoculate cats (or rats, or whomever) with a gene for infertility that doesn't render the host infertile, but gets passed down to offspring, eventually eliminating a species if it spreads successfully. The inventor of the technology fears, "Do we want a world in which countries and organizations routinely and unilaterally alter shared ecosystems regardless of the consequences to others?"[152] My answer is: well, it's too late for that. Is genetic technology the future for invasive species control in Australia and elsewhere? That's a potential, albeit very expensive, solution to a daunting problem.

Right now, it's unfathomable to visualize total elimination of millions of feral cats or foxes. Still, Australia has set up fenced preserves and invasive-free islands as breeding grounds for its precious endemic species. And one can see woylies and numbats outside the fenced-in parameters of Barna Mia. At least for the moment, some of Australia's official, legal, lethal "Threat Abatement Process" plans are working to some extent. And what is clear is that Australians have certainly made the choice, inscribed in law and policy, to kill for conservation.

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151. Dubois et al., *supra* note 73.

152. Emma Marris, *Process of Elimination*, WIRED (Feb. 28, 2018, 6:00 AM), https://www.wired.com/story/crispr-eradicate-invasive-species.

III. NEW ZEALAND

A. OVERVIEW

A New York Times article's title asks: "Should Children Join the Killing in New Zealand's War on Invasive Species?"[153] "The event, a hunting competition on New Zealand's South Island, was a family affair. A helicopter dropped candy for a 'lolly scramble.' Nearby, younger children ran through an obstacle course carrying dead rabbits or ducks, while older children raced with a 50-pound boar on their shoulders." The article suggests that in this rural locale, children helping to protect native species through killing invasive predators normally provokes scant controversy: "In parts of New Zealand, children are brought into the conservation campaign from a young age, with some schools teaching students about the necessity of eradicating pest animals and even how to trap and kill them. Competitions to hunt invasive species are part of the fabric of rural communities and have long been used as school fund-raisers." The article features a photo of a half dozen protesters with brandishing signs with the phrase "killing is not conserving," but for the most part, rural communities have little debate.[154] For instance, local retiree Peter Johnstone remarked that pest animals "do a huge amount of damage, and people in the cities don't see that, because they don't live that," and when "[p]eople say, '[w]hat you're doing is cruel.' No, what they're doing is cruel."[155]

A contest earlier in 2023, where children under fourteen were to compete to see who could kill the most feral cats (for a prize of about $150 USD, with elimination as a consequence if a child killed someone's microchipped pet[156]) was cancelled (at least the cat-killing contest was—the rest of the contest went on) after international outcry from stories in the *New York Times* and *The Guardian*.[157] In 2022, more than 250 children and about 650 adults entered, killing 427 animals (mostly possums, hares, and rabbits).[158] One community member commented of the cats, "[w]e take the side of the kiwi and the kākāpo and the kea and every other species that's in danger because of these pricks."[159]

153. Yan Zhuang, *Should Children Join the Killing in New Zealand's War on Invasive Species?*, N. Y. TIMES (Oct. 5, 2023), https://www.nytimes.com/2023/10/01/world/australia/new-zealand-hunting-invasive-species.html?smid=nytcore-ios-share&referringSource=articleShare.

154. *Id.*

155. *Id.*

156. *See* McLure, *supra* note 1.

157. *Id.*; Yan Zhuang, *Contest for Children to Hunt Feral Cats Is Scrapped in New Zealand*, N. Y. TIMES (Apr. 19, 2023), https://www.nytimes.com/2023/04/19/world/australia/new-zealand-cat-hunt.html. For the organization's webpage, see *The North Canterbury Hunting Competition*, FACEBOOK, https://www.facebook.com/theNorthCanterburyHuntingCompetition (last visited Oct. 1, 2025).

158. *See* McLure, *supra* note 1.

159. Charlotte Graham-McLay, *Chaos at New Zealand Feral Cat Hunting Contest as Video of Children Chanting with Dead Animals Emerges*, GUARDIAN (Jun. 28, 2023, 3:02 EDT), https://www.theguardian.com/world/2023/jun/28/chaos-at-new-zealand-feral-cat-hunting-contest-as-video-of-children-chanting-with-dead-animals-emerges.

Another South Island town celebrates Easter with The Great Easter Bunny Hunt, centered around hunting rabbits.[160]

The government recognizes that children have to be taught that compassion means killing:

> The 30-year time frame of PF2050 [Predator Free 2050] means that we need to invest in understanding how to scaffold children's empathy and compassion for the environment while introducing the idea of predator control at the right age so that as they grow, the schoolkids of today become active contributors tomorrow.[161]

Predator Free New Zealand notes that they recruit children into this movement because "[f]ocusing on our young people helps sustain the momentum into the future, with schoolchildren becoming the leaders of tomorrow."[162] Primary and secondary schools are generally keen to teach their students about protecting native species through killing invasive predators, and have fomented a steady increase in backyard trapping around the country in the past five years.[163] Eighty-five million years ago, the islands of New Zealand split off from the Gondwana supercontinent.[164] In that epoch of isolation, evolution worked its magic: strange flightless birds are to New Zealand as cute small marsupials are to Australia. They're weird, they're wonderful, they're crafted by millions of years of evolution to the challenges of a harsh environment, and they are sitting ducks (and sitting kiwis and kākāpō), ill-equipped to hide from, escape from, or fight carnivorous predators that did not exist before European settlers arrived with their commensal organisms.[165] Various endemic bats, amphibians, reptiles (google "Tuatara"), carnivorous snails and plants (80% endemic, 30% endangered) also fall prey to the invaders—four thousand species in all are vulnerable now to extinction, and many (including sixty species of birds) already have disappeared.[166] A recent estimate puts 74 percent of New Zealand's native land birds and 84 percent of

160. Elle Hunt, *New Zealand Town Where Easter Is All About Wiping Out Bunnies*, GUARDIAN (Apr. 4, 2021, 11:51 PM EDT), https://www.theguardian.com/environment/2021/apr/05/new-zealand-easter-bunny-hunt-pest.

161. DEP'T OF CONSERVATION, N.Z. GOV'T, TOWARDS A PREDATOR FREE NEW ZEALAND: PREDATOR FREE 2050 STRATEGY 23 (2020), https://www.doc.govt.nz/globalassets/documents/conservation/threats-and-impacts/pf2050/pf2050-towards-predator-freedom-strategy.pdf.

162. DEP'T OF CONSERVATION, N.Z. GOV'T, PREDATOR FREE 2050 5–YEAR ACTION PLAN, 2020–2025, at 20 (2020).

163. DEP'T OF CONSERVATION, N.Z. GOV'T, PREDATOR FREE 2050 5–YEAR PROGRESS REPORT 64 (2021), https://www.doc.govt.nz/globalassets/documents/conservation/threats-and-impacts/pf2050/pf2050-5-year-progress-report.pdf.

164. Eileen McSaveney & Simon Nathan, *Story: Geology—Overview*, TE ARA: THE ENCYC. OF N. Z. (Jun. 12, 2006), https://teara.govt.nz/en/geology-overview.

165. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 161, at 11.

166. *About Predator Free 2050*, PREDATOR FREE N.Z., https://predatorfreenz.org/about-us/predator-free-2050/predator-free-2050-vision (last visited Oct. 1, 2025); *Predator Free 2050*, DEP'T OF CONSERVATION, N.Z. GOV'T, https://www.doc.govt.nz/predator-free-2050 (last visited Oct. 1, 2025); DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 161, at 11.

native reptile species at risk of extinction.[167] The government claims that invasive predators kill twenty-five million birds annually.[168]

B. PREDATOR FREE NEW ZEALAND

New Zealand's current, official biodiversity conservation plans are described in "Te Mano o Te Taiao/Aotearoa New Zealand Biodiversity Strategy 2020."[169] The Strategy notes that since humans arrived on the islands, seventy-nine known extinctions have occurred due to habitat changes and, especially, the introduction of mammalian predators.[170] To counter the threat that ferrets, weasels, stoats, possums, and rats pose, the government names short-term and long-term goals. For 2025, they declare that introduced predators will have been suppressed across one million hectares of mainland and will have been eradicated from all uninhabited offshore islands. By 2030, these predators will have been eradicated from one city or town, one inhabited island, and ten thousand hectares of rural production land, and the government will have made progress eradicating them from ten large mainland sites. For the ultimate goal, by 2050, "Aotearoa New Zealand is free from ferrets, weasels, stoats, possums and rats."[171]

In 2016, Prime Minister John Key announced the intention to free New Zealand of invasive predators by 2050.[172] The government decided that random, uncoordinated traps and bait stations were insufficient; more was needed for "coordinated, progressive nationwide eradication."[173] Announcing "Predator Free New Zealand," the Prime Minister noted that "Rats, possums and stoats kill 25 million of our native birds every year, and prey on other native species such as lizards and, along with the rest of our environment, we must do more to protect them," and that the cost of invasive predators to the nation was $3.3 billion NZD (about $2 billion USD). The Prime Minister acknowledged that the goal was highly ambitious, but "we know we can do it because we have shown time and again what can be achieved when New Zealanders come together with the ambition, willpower and wherewithal to make things happen."[174]

The government established Predator Free New Zealand 2050 to achieve this goal and fulfill this "moonshot"[175] ambition. A recent progress report proclaims that "[o]ur native species are a part of our national and cultural

167. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 163, at 14.

168. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 161, at 11.

169. N.Z. GOV'T, TE MANA O TE TAIAO: AOTEAROA NEW ZEALAND BIODIVERSITY STRATEGY 2020, at 14 (2020), https://www.doc.govt.nz/globalassets/documents/conservation/biodiversity/anzbs-2020.pdf.

170. *Id.* at 17.

171. *Id.* at 53.

172. Press Release, N.Z. Gov't, New Zealand to Be Predator Free by 2050 (July 26, 2016), https://www.beehive.govt.nz/release/new-zealand-be-predator-free-2050.

173. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 161, at 11.

174. Press Release, N.Z. Gov't, *supra* note 172.

175. Alexandra Palmer & Laura McLauchlan, *Landing Among the Stars: Risks and Benefits of Predator Free 2050 and Other Ambitious Conservation Targets*, BIOLOGICAL CONSERVATION, July 4, 2023, at 1, 1.

identity . . . and while this has been quoted often it's worth repeating, a predator free New Zealand is 'crazy,' but it could also be our moonshot."[176] The Conservation Minister's Foreward declares that the nation's unique biodiversity is "part of our Kiwi identity."[177] Even the nickname for New Zealanders comes from a unique, threatened, endemic flightless "native bird so beloved by New Zealanders that its name has long been a shorthand for them"[178] Laying out its vision for a predator free New Zealand by 2050, the government proclaims: "Imagine an Aotearoa New Zealand where our native species are safe from extinction and thriving alongside us. We all want our unique species of birds, frogs, lizards and plants to flourish."[179]

The Government-sponsored movement, Predator Free New Zealand 2050, has aimed "to connect and energize all New Zealanders towards a predator free Aotearoa New Zealand to enable our native species to thrive."[180] In 2018, the government allocated over $80 million "to suppress predators in priority ecosystems, protect and increase biodiversity on offshore islands, and develop more effective and efficient methods to control predators. . . . It is built around three key phases: mobilise—innovate—accelerate" as a fundamental component of their formal National Biodiversity Strategy.[181] The goal: "shift from predator control to eradication," that is, kill the creatures that do the most damage such as stoats, ferrets, weasels, rats and possums by 2050.[182] The organization of the Predator Free New Zealand program is a bit baroque. Predator Free 2050 is the official Department of Conservation government agency providing scientific advice and propelling the movement to rid New Zealand of invasive mammalian predators.[183] The Predator Free NZ Charitable Trust is an independent charity that supports the goals of the movement.[184] Predator Free 2050 Ltd. is a government-owned charity that supports the scientific underpinnings and large-scale trial projects to ensure the success of the movement.[185] Numerous other organizations—like WWF[186] and local organizations (for example, Save the Kiwi[187])—support locals implementing the projects. It takes more than a village to save a kiwi.

176. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 163, at 6.

177. N. Z. GOV'T, *supra* note 169, at 4.

178. Pete McKenzie, *After Decades of Decline, a Feathered Icon Breeds in New Zealand's Capital*, N.Y. TIMES (Dec. 5, 2023), https://www.nytimes.com/2023/12/04/world/australia/kiwi-birds-wellington-new-zealand.html.

179. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 166.

180. *Predator Free New Zealand Trust*, PREDATOR FREE N.Z., https://predatorfreenz.org/about-us/predator-free-new-zealand-trust (last visited Oct. 1, 2025).

181. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 161, at 7.

182. *Id.* at 37.

183. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 166.

184. PREDATOR FREE N.Z., *supra* note 166.

185. *About Predator Free 2050 Limited*, PREDATOR FREE 2050, https://pf2050.co.nz/predator-free-2050-limited/ (last visited Oct. 1, 2025).

186. WORLD WILDLIFE FUND–N.Z., https://wwf.org.nz (last visited Oct. 1, 2025).

187. SAVE THE KIWI, https://savethekiwi.nz (last visited Oct. 1, 2025).

On Predator Free New Zealand's website, you can peruse a detailed map of everyone in the country, government and private, doing "predator control work."[188] Predator Free New Zealand offers advice and equipment for anyone seeking to rid the country of non-native species, maintains an apprentice program "to grow the number of experienced animal predator control specialists around the country," advocates for government policies, and funds community projects to rid the nation of rats, stoats, ferrets, possums and weasels.[189] They sponsor trap.nz, which allows you to download information on what, when, and where you've trapped with an app and shares how many of each species have been killed this year.[190] In 2024, app users reported killing over seven hundred thousand rats, possums, hedgehogs, stoats, and weasels.[191]

Need ideas for the holidays? The "Christmas Shopping Woes? Sorted" website leads one to "The Ultimate Predator Free Gift Guide," where you can "put together a kit with chew cards,[192] tracking tunnels, rat, stoat, and possum traps, and lures."[193] Predator Free New Zealand's most recent progress report says they have spent $300 million NZD (with local governments, NGOs, and foundations adding more).[194]

Killing for conservation is not just an elite idea of the former colonizers in New Zealand. It is widely supported by large swathes of the population (who at the same time express the desire for better cruelty-free interventions).[195] For example, 84 percent of the capital's residents support "ridding the city of rats, stoats, and weasels."[196] A recent *New York Times* article proclaimed that for the first time in more than a century, Wellington has seen the first kiwis (that is, the

188. *National Map*, PREDATOR FREE N.Z., https://predatorfreenz.org/about-us/national-map (last visited Oct. 1, 2025).

189. *Our Mission*, PREDATOR FREE N.Z., https://predatorfreenz.org/about-us/predator-free-new-zealand-trust/our-mission (last visited Oct. 1, 2025); PREDATOR FREE N.Z., *supra* note 166.

190. TRAP.NZ, https://trap.nz (last visited Oct. 1, 2025); DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 163, at 73.

191. TRAP.NZ, *supra* note 190; DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 163, at 73.

192. From Predator Free NZ email: "Pest Detector Chew Cards are detection devices specifically designed to detect small pests such as rodents and possums. The cards contain a non-toxic edible lure that encourages them to nibble the cards leaving their teeth marks behind. The bite marks help you to identify what type of rodent it is and set up traps in the right area." *Shop*, PREDATOR FREE N.Z., https://shop.predatorfreenz.org/products/kiwicare-predator-free-discovery-chew-card-pack (last visited Oct. 1, 2025); *Predator Free Gift Guide 2023*, PREDATOR FREE N.Z., https://predatorfreenz.org/stories/predator-free-gift-guide-2023/?utm_source=PFNZ+Trust+Newsletter&utm_campaign=5b694da625-EMAIL_CAMPAIGN_2023_10_25_10_30_COPY_01&utm_medium=email&utm_term=0_-dd9874a04f-%5BLIST_EMAIL_ID%5D&mc_cid=5b694da625&mc_eid=89f4cb8384 (last visited Oct. 1, 2025).

193. *Predator Free Gift Guide 2023*, *supra* note 192.

194. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 163, at 10.

195. Lucy Dickie & Fabien Medvecky, *The Attitudes of Young Adults Towards Mammalian Predator Control and Predator Free 2050 in Aotearoa New Zealand*, 30 AUSTRALASIAN J. ENV'T MGMT. 170, 182 (2023).

196. *Wellingtonians Overwhelmingly Support a Predator Free Capital*, PREDATOR FREE WELLINGTON (July 5, 2017), https://www.pfw.org.nz/our-project/news/wellingtonians-overwhelmingly-support-a-predator-free-capital/#:~:text=84%%20of%20Wellingtonians%20supportive%20of%20ridding%20the%20city%20of%20rats%2C%20stoats%2C%20weasels%20and%20possums.

birds) hatched in the wild thanks to captive breeding and release, and local citizens placing more than five thousand predator traps.[197] A local school joined in by setting traps outside its classrooms as well.[198] "Now, teachers give lessons in math with the rats and stoats they catch, while the students feed the corpses to the eels that live in a local stream."[199] "The faces of the predator free movement" unites artists and businesses, golfers and gardeners, young people, retirees, hunters, and vegans—"Do you think retirement means putting your feet up with a good book and a cup of tea? Not for these guys."[200] In virtually every park I visited during 2.5 months in New Zealand in 2024-2025, large displays explained the Predator Free NZ programs active in the region. When hiking, you can hear the difference in birdsong where government and citizens have successfully eliminated predators.

Both the government's Biodiversity Strategy and various Predator Free documents are remarkable for the way they incorporate Māori ideas and cosmologies. They depict a serious investment in full partnership, continuing the nation's global leadership in co-governance of nature through legal personhood for the natural world.[201] Predator-Free New Zealand builds on the ongoing project to make reparations to the Māori for depredations wrought from colonization to the present day by presenting "an opportunity to strengthen the partnership between Māori and government."[202] It incorporates Māori concepts of care for creation as part of the ineffable bond that all New Zealanders have with their land and biodiversity. For when "Māori exercise their rangatiratanga—their authority and sovereignty—Predator Free 2050 gains the potent force that is kaitiakitanga, the custodianship that nurtures the welfare of the land, and by natural extension, the people."[203] Here, though, custodianship and care require a massive amount of killing.

The official plan does avoid one obstacle the Australian government is now confronting: "Feral felines are not included in official eradication plans because 'it's too politically difficult' considering the attachment that residents feel toward pet cats, said Grant Norbury, a wildlife ecologist with Manaaki Whenua-Landcare Research, an environment and biodiversity institute in New

197. McKenzie, *supra* note 12.

198. *Id.*

199. *Id.*

200. Allison Hess, *The Faces of the Predator Free Movement*, PREDATOR FREE N.Z. (Nov. 1, 2023), https://predatorfreenz.org/stories/predator-free-movement-faces/?utm_source=PFNZ+Trust+Newsletter&utm_campaign=85842519dc-EMAIL_CAMPAIGN_2023_11_07_10_01&utm_medium=email&utm_term=0_-85842519dc-%5BLIST_EMAIL_ID%5D&mc_cid=85842519dc&mc_eid=89f4cb8384.

201. I elaborate on New Zealand's rights of nature movement, which devolves guardianship for rivers and ecosystems to local Māori, in David Takacs, *We Are the River*, 2021 U. ILL. L. REV. 545.

202. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 161, at 20.

203. *Id.*

Zealand."[204] Kiwis have pet cats, in fact, the highest rate of pet cats in the world,[205] and those cats also kill over one million endemic birds annually.[206]

As noted in Part III, Australia, experts convened to name seven principles for managing human–wildlife conflict. Principles (3) and (4) name clear and achievable outcome-based objectives, but principle (4) which causes the least harm to animals might be the most problematic.[207] The New Zealand government has certainly named outcome-based objectives: "Predator Free" means…predator free, with interim targets. But can the nation achieve this goal, while causing the least harm to animals? Their plans have extensive details of what they *will* accomplish, including multi-page "logic maps" that include "how" and "why," with "milestones" to be accomplished by given dates.[208]

New Zealand hosted seventy million brushtail possums in the 1980s, same as the sheep population.[209] Fur traders first brought them from Australia to New Zealand for fur trade in 1837, and now they might again be part of an invasive species fur trade.[210] Brushtail possums eat keas and other birds. Possums also devour native trees, further competing with native species and "significantly impact the ability of our native forests to sequester carbon." They also are the chief carrier of bovine tuberculosis in the nation.[211] Predator Free New Zealand posts a "[p]ossum sweet flour recipe" to lure possums into backyard traps, albeit with the proviso to "[s]mear on tree trunks but ***not*** on bait stations or traps, as the flour will go mouldy."[212] They advocate creating a "possum nightclub" (you can watch the video)[213] to attract the maximum number of possums during breeding season to more efficiently trap them in large numbers; if successful, you can "[e]njoy watching the bush bounce back and hear the birdlife

204. Zhuang, *supra* note 157.

205. *Cat Facts and Control Tips*, PREDATOR FREE N.Z., https://predatorfreenz.org/toolkits/know-your-target-predators/cat (last visited Oct. 1, 2025).

206. Findlay Buchanan, *New Zealand's Cats Are Decimating Native Wildlife—Should They Be Treated as Pests?*, GUARDIAN (Apr. 6, 2022, 21:28 EDT), https://www.theguardian.com/world/2022/apr/07/new-zealands-cats-are-decimating-native-wildlife-should-they-be-treated-as-pests.

207. Dubois et al., *supra* note 73.

208. DEP'T OF CONSERVATION, N.Z. GOV'T, HE MĀHERE RAUTAKI WHAKAKORE KONIHI PREDATOR FREE 2050 5-YEAR ACTION PLAN 17 (2020).

209. Kate Guthrie, *Possums and More Possums—Is a Fur Trade the Answer?*, PREDATOR FREE N.Z. (July 22, 2016), https://predatorfreenz.org/research/possums-and-more-possums-is-a-fur-trade-the-answer; Ruby Fenwick, *7 Surprising Facts You Should Know About Possums*, PREDATOR FREE N.Z. (June 6, 2023), https://predatorfreenz.org/stories/things-you-should-know/7-surprising-facts-you-should-know-about-possums/#:~:text=At%20one%20point%2C%20possums%20in%20New%20Zealand%20rivaled%20the%20sheep%20population.&text=Brought%20into%20New%20Zealand%20to,the%201980s%2C%20same%20as%20sheep.

210. Guthrie, *supra* note 209; Fenwick, *supra* note 209.

211. Fenwick, *supra* note 209.

212. *Possum Sweet Flour Recipe*, PREDATOR FREE N.Z., https://predatorfreenz.org/toolkits/trapping-baiting-toolkit/trap-bait-and-equipment-tips/how-to-choose-the-right-trap/possum-sweet-flour-paste-recipe (last visited Oct. 1, 2025).

213. Predator Free NZ Trust, *Predator Control Tips & Tricks: Possum Nightclubs*, YOUTUBE (July 12, 2022), https://www.youtube.com/watch?time_continue=3&v=YNkWqcjKnpc&embeds_referring_euri=https%3A%2F%2Fpredatorfreenz.org%2F&source_ve_path=Mjg2NjY&feature=emb_logo.

humming!"[214] Many conservation sites and everyday gift shops I visited have possum fur mittens and hats in their gift shops, including explanations for how your purchase of dead-possum-derived garments helps save native wildlife.

As of 2020, 117 of New Zealand's roughly 600 islands were now predator free.[215] The 2025 plan has goals such as eliminating all predators from the country's offshore islands, developing a science solution capable of eliminating at least one of the predators, and maintaining at least 2.4 million acres predator-free.[216] They are working on genome mapping, thermal sensing, and AI-tools for more precise and sustainable interventions.[217] Because possums don't like rain and don't like swimming, Predator Free NZ has found that once you eliminate possums from one side of a river via trapping, hunting, and 1080 baiting, they won't cross back from the other side.[218] Also, this "means possum shooting is quite successful the first couple of dry nights after a spell of rain" and they believe they can gradually expand possum-free areas without recolonization.[219] New Zealand's three main islands are each much smaller than the island of Australia, and clearly the government experts believe these goals are achievable.

However, are these goals achievable with the least amount of animal suffering? As in Australia, it depends on which animals' suffering we name. Total elimination of predators paradoxically could result in less predator suffering than ongoing extermination causes. Once the problem is solved (that is, the nation is predator free), predators would experience no more perpetual pain and suffering from trapping and baiting and killing, and native species would experience no more pain and death from invasive predators.[220]

For now, a broad swathe of Kiwis (the people, not the bird, although they'd likely agree) have made the choice to swap the lives of rats, stoats, and weasels for the chance to save their indigenous biological patrimony.

IV. UNITED STATES

A. OVERVIEW

Over six thousand five hundred alien species have taken up residence in the United States. According to the United State Department of Interior, some of these now-unwelcome plants and animals cause over $100 billion damage annually.[221]

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214. Cam Speedy, *Give Your Birdlife a Boost and Create a Possum Nightclub*, PREDATOR FREE N.Z. (Mar. 12, 2024), https://predatorfreenz.org/stories/things-you-should-know/possum-nightclub.

215. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 161, at 7.

216. *Id.* at 25.

217. DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 208, at 32.

218. Fenwick, *supra* note 209; DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 163, at 39.

219. Fenwick, *supra* note 209; DEP'T OF CONSERVATION, N.Z. GOV'T, *supra* note 163, at 39.

220. Palmer & McLauchlan, *supra* note 175, at 4.

221. U.S. DEP'T OF INTERIOR, INVASIVE SPECIES STRATEGIC PLAN 2021–2025, at 4 (2021).

The United States government does sanction killing for biodiversity conservation, but the story is—or, rather, stories are—less straightforward and less publicly known than they are in Australia or New Zealand. We have no overarching law or policy directives permitting or requiring killing sentient creatures to protect others in the name of biodiversity conservation. While invasive species certainly do threaten rare species in the United States, it's not as straightforward as "if we don't kill all the cats, we'll have no native endemic mammals," or "if we don't kill all the weasels, we'll have no more native endemic birds." Furthermore, definitions of "invasive" are sometimes more complicated than in Australia and New Zealand. The "invaders" may be domestic, with native species such as ravens, cowbirds, or barred owls increasing in population as humans shaped the landscape, assisting their spread in the process. Moreover, Americans don't quite view their biodiversity as cherished, distinctive national patrimony in the way Australians or New Zealanders do. And our animal rights movement is more vocal and litigious than similar movements Down Under. Nonetheless, although the United States has not hitched the Endangered Species Act to an overarching plan to control invasive species that threaten indigenous species, for some legally threatened species in some places in the United States, government entities have opted to kill to conserve.

The United States does have laws that control invasive species, but little in the way of controlling those invaders to protect biodiversity per se. The Lacey Act prohibits the sale, possession, or otherwise of any fish or wildlife sold or possessed in violation of any United States or tribal law.[222] The Lacey Act also prohibits importing wildlife specifically listed as injurious under the Act including: "such other species of wild mammals, wild birds, fish (including mollusks and crustacea), amphibians, reptiles, brown tree snakes, or the offspring or eggs of any of the foregoing which the Secretary of the Interior may prescribe by regulation to be injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States . . . ."[223] Factors that the Secretary considers in determining whether a species is injurious includes the species' "[i]mpact to endangered and threatened species and their habitats."[224] The 1990 Nonindigenous Aquatic Nuisance Prevention and Control Act,[225] the National Invasive Species Act of 1996,[226] and the 2010 Asian Carp Prevention and Control Act[227] (an amendment

222. 16 U.S.C. § 3372(a).

223. 18 U.S.C. § 42(a)(1).

224. Injurious Wildlife Species; Listing Three Anaconda Species and One Python Species as Injurious Reptiles, 80 Fed. Reg. 12702, 12712 (Mar. 10, 2015) (codified at 50 C.F.R. pt. 16).

225. 16 U.S.C. §§ 4701–51.

226. National Invasive Species Act of 1996, Pub. L. No. 104–332, 110 Stat. 4073 (codified as amended in scattered sections of 16 U.S.C.).

227. Asian Carp Prevention and Control Act, Pub. L. No. 111–307, 124 Stat. 3282 (2010) (codified as amended at 18 U.S.C. § 42).

to the Lacey Act and a saga that deserves its own law review articles) all aim to impede aquatic nuisance species that damage commercial shipping and fishing interests.

The current version of the United States Invasive Species Strategy complies with the mandate of the 2019 John C. Dingell Conservation, Management, and Recreation Act, which requires the Secretary of Interior to "develop a strategic plan [that will] achieve, to the maximum extent practicable, a substantive annual net reduction of invasive species populations or infested acreage on land or water managed by the Secretary."[228] This is the first Department of Interior-wide strategic invasive species plan,[229] designed as an "overarching strategic framework for action."[230] The Plan names general principles, and acknowledges the need to collaborate across government agencies and with local, state, and tribal authorities. It provides a chart that conveys the billions of dollars of damage done by various species, but only once generally refers to the Endangered Species Act,[231] and once specifically to it.[232] It says little about "killing," and says nothing further about the need to kill invasive species to protect threatened species under the Act's mandate.

Presidents Clinton's Executive Order 13122 names the various threats portended by invasive species and sets up an Invasive Species Council, but it does not name threats to endangered biodiversity specifically.[233] President Obama issued his own Executive Order (presumably invasive species only perturb Democratic presidents), with some updated language on climate change but no direct references to endangered biodiversity.[234] The Invasive Species Council's 2024 Work Plan mentions nothing about endangered species or biodiversity.[235]

While the United States has no overarching legal strategy or pinpoint vision to control endangered species, the Wildlife Service, an "obscure"[236] division of the United States Department of Agriculture, "provides wildlife damage management assistance to protect agriculture, natural resources, property and

228. John C. Dingell, Jr., Conservation, Management, and Recreation Act, Pub. L. No. 116–9, § 7001, 133 Stat. 580, 781 (2019) (codified as amended at 16 U.S.C. § 666c–1).

229. U.S. DEP'T OF INTERIOR, *supra* note 221, at ii.

230. *Id.* at 37.

231. *Id.* at 4 ("[Invasive species] can drive native species onto the Endangered Species List, resulting in associated regulatory costs.").

232. The chart refers to one invasive species, cheatgrass, causing "[r]egulatory impact from wildfire destruction of habitat for an Endangered Species Act-candidate-species." *Id.* at 5 tbl.1.

233. Exec. Order No. 13,112, 3 C.F.R. 159 (2000).

234. Exec. Order. No. 13,751, 3 C.F.R. 630 (2017).

235. U.S. DEP'T OF INTERIOR, NATIONAL INVASIVE SPECIES COUNCIL ANNUAL WORK PLAN FY 2024 (2023).

236. Oliver Milman, *'A Barbaric Federal Program': U.S. Killed 1.75m Animals Last Year—or 200 Per Hour*, GUARDIAN (March 25, 2022, 4:00 AM EDT), https://www.theguardian.com/world/2022/mar/25/us-government-wildlife-services-animals-deaths.

health and safety."[237] The Service killed more than 1.75 million animals in 2021, starting with over a million European Starlings, but also nearly one hundred fifty thousand feral swine, and more. The Wildlife Service balances dueling and contradictory policy goals: they are charged with helping to protect endangered species, yet they also remove endangered species (for example, wolves) to meet other policy goals, often at the behest of the farm and ranching lobby. The Wildlife Service also partners with the United States Fish and Wildlife Service ("USFWS") to kill invasive creatures that pose threats to ESA-listed endangered species.[238] But, some activists decry that the FWS targets native species (coyotes, wolves, beavers), with the Center for Biological Diversity saying, "It's stomach-turning to see this barbaric federal program wiping out hundreds of thousands of native animals."[239]

B. THE ENDANGERED SPECIES ACT

Australia has its hopping marsupials and coordinated, nationwide laws and policies to protect them by killing millions of feral cats, foxes, and other introduced species. New Zealand has its flightless birds and coordinated, nationwide laws and policies to protect them by killing weasels, rats, possums, and more. The United States protects its 1,684 domestic species (of which 698 are animals) in atomized and disconnected ways under the Endangered Species Act ("ESA").[240] We list no threatened habitats[241] or ecosystems, and name no Key Threatening Processes. The law requires that the USFWS ask: What does *this* species need, divorced from other species' needs?

United States law falls way short in fulfilling the ESA's stated commitment to protecting species. The ESA is clear about the criteria to use when adding species to garner the Act's protections.[242] It is specific as it prescribes and proscribes what the government must and must not do, that is, forbidding any agency "to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical."[243] Ditto for its prohibition that

237. *Wildlife Damage Operational Activities*, U.S. DEP'T OF AGRIC. (Mar. 14, 2024), https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/operational-activities.

238. *Operational Activities: Invasive Species*, U.S. DEP'T OF AGRIC. (Mar. 23, 2024), https://www.aphis.usda.gov/operational-wildlife-activities/invasive; *see, e.g.*, *Operational Activities: Starlings and Blackbirds*, U.S. DEP'T OF AGRIC. (Apr. 8, 2024), https://www.aphis.usda.gov/operational-wildlife-activities/starlings-blackbirds (explaining that Wildlife Services works with USFWS to regulate and control starlings, an invasive species, using lethal and non-lethal methods).

239. Milman, *supra* note 236.

240. U.S. FISH & WILDLIFE SERV., ENV'T CONSERVATION ONLINE SYS., LISTED SPECIES SUMMARY (BOXSCORE) (2025), https://ecos.fws.gov/ecp/report/boxscore.

241. The ESA does require the DOI to establish "critical habitat" for listed species, but doesn't maintain a taxonomy of endangered habitats themselves. Endangered Species Act § 4(a)(3), 16 U.S.C. § 1533.

242. Endangered Species Act of 1973 § 4(a)(1), 16 U.S.C. § 1533.

243. *Id.* § 7(a)(2).

you or "any person . . . take any such [listed] species within the United States or the territorial sea of the United States."[244]

But the Act seems determined to keep species on life support indefinitely. The ESA has no provisions that explicitly task the government with protecting the ecosystems that support the Act's listed species. The ESA's most glaring weakness lies in its lack of clarity and specificity on recovery plans. Recovery of a species to full health is the hole in the ESA doughnut when it should be the sweet ingredient at the center. Section 4(f), preparation and implementation of a recovery plan, remains ambiguous, largely optional, and opaque regarding time constraints on implementing the plan.[245] The USFWS has long asserted that recovery plans are not mandates which require the Agency to adhere to the plan's terms. At least one federal court has agreed that even once prepared, the plans remain "non-binding" on the government.[246] The government can and sometimes does drag its feet indefinitely. Nothing requires the government to review any plans it has made to see if species are doing what we might want them to do. For that matter, nothing requires the government to fund the recommendations of any recovery plan: they can be filed away and ignored. The ESA's clear statutory provisions keep species on life support, but don't mandate we ever disconnect the life support.[247] Nonetheless, sometimes the USFWS does prepare a recovery plan and does carry out the plan's suggestions. Sometimes that requires killing to conserve the listed species.

C. PALILA

The Palila is the most famous—at least for ESA legal groupies—example of court-mandated killing for conservation in the United States. Palilas are small honeyeaters whose range used to extend broadly on Oahu, Maui, and the Big Island of Hawai'i, but now barely extends to a small patch of Mauna Kea on Hawai'i, in less than 5 percent of their historical range.[248] The IUCN lists the Palila as "critically endangered," estimating only between eight hundred and one thousand two hundred persisting, with numbers still declining.[249] Palilas live

244. *Id.* § 9(a)(1)(B).

245. *See* Federico Cheever, *Recovery Planning, the Courts and the Endangered Species Act*, 16 NAT. RESOURCES & ENV'T 106, 108 (2001); Patrick A. Parenteau, *Rearranging the Deck Chairs: Endangered Species Act Reforms in an Era of Mass Extinction*, 22 WM. & MARY ENV'T L. & POL'Y REV. 227, 254, 264 (1998); Eric Helmy, *Teeth for a Paper Tiger: Redressing the Deficiencies of the Recovery Provisions of the Endangered Species Act*, 30 ENV'T L. 843, 854 (2000).

246. Friends of Blackwater v. Salazar, 691 F.3d 428, 433 (D.C. Cir. 2012).

247. Federico Cheever's lament on this remains a touchstone, as relevant today as it was in 1996. Federico Cheever, *The Road to Recovery: A New Way of Thinking About the Endangered Species Act*, 23 ECOLOGY L.Q. 1, 4 (1996) ("To date, [the ESA] has done relatively little to bring species back from the brink of extinction and ensure their continued survival.").

248. Paul C. Banko, Steven C. Hess, Paul G. Scowcroft, Chris Farmer, James D. Jacobi, Robert M. Stephens, Richard J. Camp, David L. Leonard Jr., Kevin W. Brinck, J.O. Juvik & S.P. Juvik, *Evaluating the Long-Term Management of Introduced Ungulates to Protect the Palila, an Endangered Bird, and Its Critical Habitat in Sub-Alpine Forest of Mauna Kea, Hawai'i*, 46 ARCTIC, ANTARCTIC, & ALPINE RSCH. 871, 872 (2014).

249. *Palila*, IUCN RED LIST (July 20, 2023), https://www.iucnredlist.org/species/22720742/222477278.

only at altitudes between two thousand and three thousand meters (the range of designated critical habitat under the ESA), they lay few eggs, take a long time to raise their young, and don't attempt to reproduce during drought years, which are increasingly common due, in part, to climate change. Introduced insects, unregulated ATV use, feral cats,[250] and fungal infections are just some of the threats Palilas face.[251]

More crucially, Palilas eat, sleep, mate, and rear their young in the Māmane trees that cling to Mauna Kea's hillsides.[252] Māmane trees take twenty-five years before Palilas will consider them for feeding and nesting. Unfortunately for the Palila, Western explorers introduced herbivorous goats and sheep for locals to consume and for sailors to resupply ships in the late 18th century, with dire results for native biota.[253] Those ungulate visitors from foreign shores were and are hungry for Māmane, who hitherto had evolved no protective spines or thorns, because they did not need to shield themselves from hitherto nonexistent grazers.[254]

Biologists who have studied the ecosystem say that without complete removal of the invasive ungulates, the Palila will not recover.[255] Courts have consistently agreed with that assessment. In a series of cases, courts have grappled with the question of whether the ESA requires that the goats and sheep not be stocked, and, more aggressively, whether they must be removed (read "shot") to protect the Palila.

Officials have held dueling allegiances in battles over killing for conservation. As early as the 1930s, Hawaiian game managers began shooting almost fifty thousand goats and sheep to protect the damaged ecosystems.[256] In the 1950s, as hunting grew in popularity, they reversed course and hybridized feral sheep and goat populations to improve the quality for hunting (currently many of the ungulates are these hybridized animals), and ungulate numbers rebounded, to the Palila's continued detriment.[257]

In each of six federal legal proceedings, plaintiffs have sued the Hawaiian Department of Land and Natural Resources ("DLNR") for unauthorized "take" of the Palila under the ESA's § 9 prohibition. DLNR continues to be caught between the exigencies of the ESA (and the courts that enforce it) and the desires

250. Joanna C. Zeigler, *Palila, People, and Politics: Perfect Facts, Law, and Lawsuits with Imperfect Results*, 37 U. HAW. L. REV. 245, 252 (2015).

251. IUCN RED LIST, *supra* note 249.

252. *See* Oliver A. Houck, *More Unfinished Stories: Lucas, Atlanta Coalition, and Palila/Sweet Home*, 75 U. COLO. L. REV. 331, 403 (2004) ("The [māmane] trees were the Palila's entire world, their seeds, pods, and flowers its food, their screen of the mountain mists its water, their twigs and leaves its nests, their branches its roosts and nest sites.").

253. Banko et al., *supra* note 248, at 872; DEP'T OF LAND & NAT. RES., HAWAI'I'S STATE ACTION PLAN 7-36 (2015); Zeigler, *supra* note 250.

254. DEP'T OF LAND & NAT. RES., *supra* note 253.

255. Banko et al., *supra* note 248, at 885.

256. DEP'T OF LAND & NAT. RES., *supra* note 253, at 7-37.

257. Zeigler, *supra* note 250.

of local people who wish to continue to hunt the ungulates.[258] Oddly, the Palila has remained the named plaintiff in all of its cases, a rarity in ESA litigation; in fact, one lawyer representing the species brought a stuffed specimen into court (which the judge permitted and inspected) to literally "represent" the plaintiff.[259]

In 1979, the District Court of Hawaii (*Palila I*) ordered the DLNR to eradicate two hundred to three hundred feral sheep and five hundred fifty feral goats, holding that the state's management of the ungulates, including those in the Palila's designated critical habitat, constituted a "take" under ESA § 9.[260] The Court found that total removal was feasible "through the manipulation of hunting seasons and bag limits and by humane killing of any remaining animals" and decried "inevitable hunter pressure to increase the feral sheep herd as long as any sheep remain in the forest, defendants' demonstrated susceptibility to that pressure, and the destructive effect on the forest of even a small number of sheep and goats due to their tendency to browse in flocks and denude an area totally."[261] The Ninth Circuit Court of Appeals affirmed.[262] In 1988, the Ninth Circuit affirmed a second injunction issued by the District Court of Hawaii,[263] which had found that the habitat degradation caused by mouflon sheet constituted an impermissible take, and that arguments that a reduced number of ungulates no longer harm the Palila are "disingenuous" and "may provide an amusing mathematical exercise but it is not a feature of the Endangered Species Act."[264] The Court ordered the DLNR to eradicate the mouflon sheep population on Mauna Kea.[265]

Between 1987 and 1998, DLNR shot from helicopters 1,959 feral and hybrid sheep, 26 goats, and 2098 mouflon sheep.[266] In 1998, the DLNR entered into an agreement to enforce the 1988 order, including eliminating ungulate hunting bag limits, and conducting semi-annual aerial shootings.[267] By 1999, the mouflon sheep population had decreased to just over three hundred, and hunters (backed by the Governor and Congresswoman) argued that DLNR no longer needed to eradicate the ungulate populations on Mauna Kea's slopes. [268] The District Court rejected the argument, noting that "mouflon sheep can always be reintroduced on Mauna Kea," whereas "Palila once extinct are gone forever," and required the state to continue to attempt to eradicate the ungulates, while acknowledging the difficulty of the endeavor.[269]

258. *Id.* at 246–47.
259. *Id.* at 256.
260. *See* Palila v. Haw. Dep't of Land & Nat. Res., 471 F. Supp. 985, 995 (D. Haw. 1979).
261. *See id.* at 990–91.
262. Palila v. Haw. Dep't of Land & Nat. Res., 639 F.2d 495, 498 (9th Cir. 1981).
263. Palila v. Haw. Dep't of Land & Nat. Res., 649 F. Supp. 1070, 1082 (D. Haw. 1986).
264. Palila v. Haw. Dep't of Land & Nat. Res., 73 F. Supp. 1181, 1187–88 (D. Haw. 1999).
265. *Id.* at 1187.
266. *Id.* at 1183.
267. *Id.* at 1185.
268. *Id.* at 1184–85.
269. *Id.* at 1187–89.

A 2013 court case ruled that a County of Hawaii ordinance banning aerial hunting would not preclude DLNR or any individual from attempting to comply with the 1998 ruling requiring mouflon eradication.[270] A 2014 review noted that despite killing nearly eighteen thousand animals over thirty-two years, the ungulates still posed threats to the Palila.[271] That report chastises lax attention by the government to removing the threat, in part due to opposition from hunters: It's not objections to killing for conservation, it's a lobby that wants to continue to kill for sport, and finds a sympathetic, conflicted ear in the Hawaiian government's DLNR, tasked with complying with the mandate to kill the sheep and goats.[272]

After much back and forth and foot dragging from DLNR, in 2015 Hawaii published its State Wildlife Action Plan ("SWAP"), which details conservation actions DNLR planned to implement,[273] including maintaining populations of feral ungulates for hunting purposes in areas other than the Mauna Kea. Trying to satisfy both law and hunters, the DLNR acknowledges a "dual mandate," that is "often conflicting."[274] The DLNR stated that its goal is to eliminate ungulates in habitat "necessary to sustain and conserve native wildlife" and to "[manage] game programs" in other areas nonessential for sustaining native wildlife.[275] The SWAP acknowledges feral ungulates as the first threat to the Palila,[276] and recognizes the limitations of its lethal removal strategy, stating that "control of animal populations is difficult and expensive, given the high rates of reproduction, the ability of these animals to hide and move, and limitations on access."[277] It states that the uncontrolled populations of feral sheep-mouflon hybrids threaten the ecological landscape of the high elevations on Mauna Loa, but that "recent fencing and ungulate control conducted by DLNR have reduced this threat on Mauna Kea."[278]

In 2023, the DLNR continued to conduct aerial hunting of feral ungulates on Mauna Kea[279] and conducted hunts in January, February, April, June, and September, specifically acknowledging the hunts are to comply with the federal court orders. The notices also allow for the public to salvage the remaining carcasses after the completion of each aerial shooting. [280] Also in 2023, the

270. Palila v. Haw. Dep't of Land & Nat. Res., No. 78-00030, 2013 U.S. Dist. LEXIS 50477, at *5. (D. Haw. Apr. 8, 2013).

271. Banko et al., *supra* note 248, at 884.

272. *Id.* at 872; Zeigler, *supra* note 250, at 247.

273. DEP'T OF LAND & NAT. RES., *supra* note 253.

274. *Id.* at 4-4.

275. *Id.*

276. *Id.* at 7-36.

277. *Id.* at 4-5.

278. *Id.* at 6-85.

279. Endangered and Threatened Wildlife and Plants; Endangered Status for 49 Species from the Hawaiian Islands, 81 Fed. Reg. 67786, 67789 (Sept. 30, 2016) (to be codified at 50 C.F.R. pt. 17).

280. *See* STATE OF HAW. DEPT. OF LAND & NAT. RES., NOTICE OF ANIMAL CONTROL ACTIVITIES AND TEMPORARY CLOSURE OF MAUNA KEA FOREST RESERVE, MAUNA KEA ICE AGE NATURAL AREA RESERVE,

Hawaii state legislature signed Senate Resolution 41 to request the Department of Agriculture to "convene a Feral Mammal Working Group" to "find, solicit, and distribute grants for the control of feral game mammals."[281] The Resolution was signed upon finding that feral ungulates jeopardize native species, feral goats are "adept climbers," climbing to "inaccessible areas" where endangered species live, and where mouflon sheep "graze on native vegetation . . . which serve as the habitat and the main food source for the Palila."[282]

The goats and sheep are there in the first place so that hunters may shoot them: some of the animal rights arguments that stoke disagreements over killing for conservation elsewhere are less germane on Mauna Kea. Some ungulate supporters are Native Hawaiians who wish to continue to hunt, making the Palila's plight culturally fraught.[283] Unlike in New Zealand or Australia, here hunters want to continue to hunt the ungulates who are (indirectly) threatening the listed species, so there is debate over whose lives matter that are not simply ethical debates over one kind of sentient creature versus another.[284] After many decades, Hawaiian officials and private citizens are still killing ungulates both for sport and to comply with court orders to protect the Palila. In District Court Judge King's memoir, he notes that despite his rulings, "the state dragged its feet, for the simple reason that hunters have more political power than birds do."[285]

As in other cases, it's not simply sheep lives versus endangered species lives. The ESA's single-minded focus on species gives those who would support flourishing ecosystems the strongest tool available. Experts suggest that an entire forest can be regenerated if the non-native ungulates are removed, with benefits including greater soil moisture and water retention throughout the ecosystem, and thus less fire threat.[286] Killing for conservation here means not just saving the Palila, but a vast number of non-invasive-ungulate lives that

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PALILA MITIGATION LANDS AND KAOHE GAME MANAGEMENT AREA (May 2023), https://dlnr.hawaii.gov/recreation/files/2023/05/LN-Mauna-Kea-Closure-6-27-23.pdf; STATE OF HAW. DEPT. OF LAND & NAT. RES., NOTICE OF ANIMAL CONTROL ACTIVITIES AND TEMPORARY CLOSURE OF MAUNA KEA FOREST RESERVE, MAUNA KEA ICE AGE NATURAL AREA RESERVE, PALILA MITIGATION LANDS AND KAOHE GAME MANAGEMENT AREA (Mar. 2023), https://dlnr.hawaii.gov/recreation/files/2023/04/LN-Mauna-Kea-Closure-4-25-23.pdf; STATE OF HAW. DEPT. OF LAND & NAT. RES., NOTICE OF ANIMAL CONTROL ACTIVITIES AND TEMPORARY CLOSURE OF MAUNA KEA FOREST RESERVE, MAUNA KEA ICE AGE NATURAL AREA RESERVE, PALILA MITIGATION LANDS AND KAOHE GAME MANAGEMENT AREA (Dec. 2023), https://dlnr.hawaii.gov/recreation/files/2022/12/LN-Mauna-Kea-Closure-1-31-23.pdf; STATE OF HAW. DEPT. OF LAND & NAT. RES., NOTICE OF ANIMAL CONTROL ACTIVITIES AND TEMPORARY CLOSURE OF MAUNA KEA FOREST RESERVE, MAUNA KEA ICE AGE NATURAL AREA RESERVE, PALILA MITIGATION LANDS AND KAOHE GAME MANAGEMENT AREA (Sept. 2022), https://dlnr.hawaii.gov/recreation/files/2022/09/LN-Mauna-Kea-Closure-10-25-22-copy.pdf.

281. S. Res. 41, 32nd Leg., Reg. Sess. (Haw. 2023).

282. *Id.*

283. Zeigler, *supra* note 250, at 246.

284. As I've been citing all along, Joanna Zeigler's article does the most comprehensive treatment of these skirmishes. For hunters' perspective, see *id.* at 281–85.

285. *Id.* at 280–81 (quoting SAMUEL P. KING, JUDGE SAM KING: A MEMOIR 69 (2013)).

286. *Id.* at 253.

could thrive now and in the future if the Hawaiian government and citizens took the exigencies of the ESA (and the courts that enforce them) seriously.

D. NORTHERN SPOTTED OWLS

As described by the Ninth Circuit Court of Appeals, "This case is a tale of two owls."[287] If the Palila is the most famous species caught in the crosshairs of government officials, conservationists, and the courts, the northern spotted owl (*Strix occidentalis caurina*) ("NSO") has proven the most difficult politically.[288]

The FWS asserts that the NSO's habitat has declined by as much as 88 percent since settlers arrived in the Pacific Northwest in the early 1800s.[289] The owls created great havoc when environmental groups sued to compel the FWS to list the species under the ESA. The FWS listed the owl as "threatened" but did not establish critical habitat for the species, on the grounds that it was not "determinable."[290] The court pooh-poohed this assertion and ordered the FWS to fulfill its ESA-mandated obligation.[291] Originally gazette at 7 million acres, the owl's legally designated habitat has ebbed and flowed depending on presidential preferences and court cases. Most recently, the FWS has reversed the previous Administration's exclusion of millions of acres,[292] and has noted that upgrading the species' status from "threatened" to "endangered" is "warranted but precluded" and will continue to "balance essential protections for the owl with critical economic activity provided by the timber industry in the Pacific Northwest and northern California."[293]

Listing the species and delineating its habitat resulted in a 90 percent drop in logging on federal land in the owl's habitat, and thus major economic upheavals in small towns in the Pacific Northwest, resulting in a "Northwest Forest Plan," which the United States Forest Service describes as a "landscape

287. Friends of Animals v. U.S. Fish & Wildlife Serv., 28 F.4th 19, 23 (9th Cir. 2022).

288. Court cases involving NSO are many, including the vitally important *Babbitt v. Sweet Home Chapter of Cmtys. for a Great Or.*, whose impacts extend beyond the NSO in finding that "harm" in the ESA can include indirect harm (for example, from habitat destruction). 515 U.S. 687, 702, 708 (1995). For one comprehensive view of the NSO imbroglio, see generally WILLIAM DIETRICH, THE FINAL FOREST: BIG TREES, FORKS, AND THE PACIFIC NORTHWEST (2011).

289. U.S. FISH & WILDLIFE SERV., REVISED RECOVERY PLAN FOR THE NORTHERN SPOTTED OWL app. B, at B-1 (2011), https://fws.gov/sites/default/files/documents/NSO_RevisedRP_2011.pdf; Isabelle Groc, *Shooting Owls to Save Other Owls*, NAT'L GEOGRAPHIC (July 18, 2014), https://www.nationalgeographic.com/science/article/140717-spotted-owls-barred-shooting-logging-endangered-species-science.

290. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Northern Spotted Owl, 55 Fed. Reg. 26114, 26125 (June 26, 1990) (to be codified at 50 C.F.R. pt. 17); N. Spotted Owl v. Lujan, 758 F. Supp. 621, 623 (W.D. Wash. 1991); U.S. FISH & WILDLIFE SERV., *supra* note 289.

291. *N. Spotted Owl*, 758 F. Supp. at 623, 629–30.

292. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Northern Spotted Owl, 86 Fed. Reg. 62606, 62606 (Nov. 10, 2021) (to be codified at 50 C.F.R. pt. 17).

293. Press Release, U.S. Fish & Wildlife Serv., Northern Spotted Owl's Threatened Status to Remain Unchanged (Dec. 14, 2020), https://www.fws.gov/press-release/2020-12/northern-spotted-owls-threatened-status-remain-unchanged; Endangered and Threatened Wildlife and Plants; 12-Month Finding for the Northern Spotted Owl, 85 Fed. Reg. 81144, 81144–46, 81152 (Dec. 15, 2020) (to be codified at 50 C.F.R. pt. 17).

approach to federal land management designed to protect threatened and endangered species while also contributing to social and economic sustainability in the region. It is intended to provide an [sic] management approach that is scientifically credible, socially responsible, and legally sound."[294] As one article expresses it, "No threatened animal has done more to change how we use land."[295]

Now that the threat from logging has been constrained (although certainly not eliminated), the FWS notes that "[t]he primary threat to the survival of the northern spotted owl is competition from the aggressive and invasive barred owl."[296] Barred owls had previously been confined to the eastern United States, barred from crossing the continent by lack of tree cover. As settlers committed genocide against Native Americans, and therefore ended burnings that maintained the treeless prairie ecosystem, the newcomers planted trees. Gradually, starting in the early 1900s, barred owls made their way west across these new tree "bridges" or "steppingstones," with farms and grain silos attracting rodents, that is, easy prey for the owls.[297] Barred owls reached Washington in 1965, Oregon in 1974, and California in 1981.[298] They have expanded rapidly into the NSO's range. Barred owls are the bullies of the United States owl world, chasing NSOs out of their territories.[299] Barred owls are bigger and meaner than NSOs, live in a broader variety of habitats, occupy less acreage per territory, mate more frequently and produce more offspring than NSOs, eat a broader diet, and hunt at more expanded hours (that is, daytimes) than NSOs.[300] As if that were not enough, as "the new bully on the block," barred owls may chase NSOs out of their nests, and even chow down on them for dinner.[301]

FWS' 2011 Recovery Plan for the NSO noted that "the threat from barred owls is extremely pressing and complex."[302] Barred owls now inhabit all areas currently and historically occupied by NSOs, and "barred owls compete with

294. REG'L ECOSYSTEM OFF., U.S. FOREST SERV., NORTHWEST FOREST PLAN, https://www.fs.usda.gov/r6/reo/overview.php (last visited Oct. 1, 2025).

295. Craig Welch, *The Spotted Owl's New Nemesis*, SMITHSONIAN MAG. (Jan. 2009), https://www.smithsonianmag.com/science-nature/the-spotted-owls-new-nemesis-131610387.

296. Press Release, U.S. Fish & Wildlife Serv., *supra* note 293.

297. *Spotted Owl and Barred Owl*, NAT'L PARK SERV., https://www.nps.gov/redw/learn/nature/spotted-owl-and-barred-owl.htm (last updated Nov. 24, 2017); Groc, *supra*, note 289. Between 1999 and 2018 alone, tree cover in the prairies expanded by 44 million acres. Carson Vaughan, *A 'Green Glacier' Is Dismantling the Great Plains*, N.Y. TIMES (Dec. 7, 2023), https://www.nytimes.com/2023/12/07/opinion/prairie-great-plains-trees.html.

298. Elizabeth G. Kelly, Eric D. Forsman & Robert G. Anthony, *Are Barred Owls Displacing Spotted Owls?* 105 CONDOR 45, 46 (2003).

299. *Id.* at 51; Groc, *supra* note 289.

300. Allison Frost, *Saving Endangered Spotted Owls Means Killing Some Barred Owls,* OPB (July 30, 2021, 11:48 AM), https://www.opb.org/article/2021/07/30/saving-endangered-spotted-owls-means-killing-some-barred-owls; NAT'L PARK SERV., *supra* note 297.

301. Welch, *supra* note 295.

302. U.S. FISH & WILDLIFE SERV., *supra* note 289, at I-8.

spotted owls for nesting sites, roosting sites, and food, and possibly predate spotted owls,"[303] but there remained "substantial information gaps" in understanding the species' interactions. The Recovery Plan asked that the USFWS

> [d]esign and implement large-scale control experiments to assess the effects of barred owl removal on spotted owl site occupancy, reproduction, and survival. . . . Given the rapidity and severity of the increasing threat from barred owls, barred owl removal should be initiated as soon as possible in the form of well-designed removal experiments."[304]

The USFWS did conduct various lethal experiments to remove the barred owl from the NSO's range. FWS issued "Enhancement of Survival" permits, which authorized § 9 "take 'for scientific purposes or to enhance the propagation or survival of the affected species'" as long as the actions were "reasonably expected to provide a net conservation benefit."[305] FWS granted "Safe Harbor Agreements," to private landowners on whose property the culling experiments would occur; these incentivized private conservation stewardship, which meant landowners were allowed to harvest timber in non-NSO areas while allowing USFWS to manage barred owls.[306] Friends of Animals sued, alleging that experimental culling of the barred owl constitutes illegal take under § 9 of the ESA because the culling practices incidentally harm the NSO. The court, however, ruled in favor of the USFWS, holding that experimental culling of the barred owl for educational purposes to improve NSO conservation resulted in a "net conservation benefit" to the NSO.[307]

In one experiment, "barred owls detected in treatment areas were removed using 12-gauge shotguns," which resulted in a "strong, positive effect on [] survival" of NSOs.[308] Indeed, the results of this experiment shows that removing barred owls slowed the decline of NSOs—an annual 0.2 percent population decline where barred owls were removed versus 12.1 percent decline where barred owls persisted.[309] Similar experiments (that is, barred owl killings) have shown similar successes in promoting NSO range expansion and survival.[310] The authors note that, like in Australian predator control described above, "[b]road-scale management of barred owls, including lethal removal,

303. *Id.* at III-62.

304. *Id.* at III-65.

305. Friends of Animals v. U.S. Fish & Wildlife Serv., 28 F.4th 19, 25–26 (9th Cir. 2022) (citing Endangered Species Act, 16 U.S.C. § 1539(a)(1)(A); Permits for Threatened Species, 50 C.F.R. § 17.32(c)(2) (2021)).

306. *Id.*

307. *Id.* at 30.

308. J. David Wiens et al., *Invader Removal Triggers Competitive Release in a Threatened Avian Predator*, PNAS, July 19, 2021, at 1, 3.

309. *Id.* at 5.

310. Endangered and Threatened Wildlife and Plants; California Spotted Owl; Endangered Status for the Coastal-Southern California Distinct Population Segment and Threatened Status With Section 4(d) Rule for the Sierra Nevada Distinct Population Segment, 88 Fed. Reg. 11600, 11619 (proposed Feb. 23, 2023) (to be codified at 50 C.F.R. pt. 17).

would require a long-term resource commitment, as any lapse in management could allow barred owls to quickly recolonize and erode conservation gains."[311]

As one participant in the barred owl removal study said,

> [w]e had to really go to extraordinary lengths to get stakeholders involved, to make sure that we were looking at all the ethical challenges on doing something like that. And we didn't do it lightly. And we took our time to make sure we had a lot of stakeholders, including animal rights folks and bird conservation groups involved in the review of this, before we initiated the project.[312]

As a forester who participated in the barred owl removal study said,

> like all ethical dilemmas, it's usually a tradeoff of conflicting rights and conflicting values. And in this case, if the decision is having to cull some barred owls every year, as you said, it probably is a long-term and maybe a regular maintenance project, in order to keep another species from going extinct. It's the lesser of two evils from my perspective. And it's sort of a Sophie's Choice, if you will, of what we're facing. . . . I'll add one more ethical aspect to this that made it a little easier, if you will, to justify this project and this program. This is not spotted owls versus barred owls, it's barred owls versus everything else, or versus the ecosystem.[313]

As a top-level predator, the barred owl is changing the dynamics of an entire ecosystem. Shooting barred owls preserves more than just a relatively unsuccessful rival species of owl.

The USFWS hired an ethicist, William Lynn, to assemble stakeholders to discuss whether to kill for conservation. Obviously, this isn't the first time the NSO has flown into ethically challenging territory, that is, do we protect this one species (and the ecosystem it inhabits) at the expense of the lives and livelihoods of those who depend on the timber industry? Lynn assembled a Barred Owl Stakeholder Group; representing disparate interests, they did find they shared a "reverence for life." They agreed that because "[b]ecause barred owls are living beings, aware and self-aware, compassion and the avoidance of suffering are crucial values to their management. This means that any and all management activity should pass tests of both scientific and ethical rigor."[314] The committee decided that "[l]ethal removal experiments are tentatively justified, but they should be limited and humane, with a defined protocol that minimizes harm and suffering. Further, removal should be undertaken by professional sharp- shooters under the supervision of the USFWS, and avoid the taking of adults during breeding season."[315]

311. Wiens et al., *supra* note 308, at 7.

312. Frost, *supra* note 300.

313. *Id.*

314. William S. Lynn, *Bringing Ethics to Wild Lives: Shaping Public Policy for Barred and Northern Spotted Owls*, 26 SOC'Y & ANIMALS 217, 229 (2018).

315. *Id.* It seems counterintuitive to avoid killing during breeding season (given that biodiversity advocates don't want them breeding), but perhaps this view aims to stop the inhumane slow starvation of orphans.

Lynn noted, "[c]urrently, there are no regulations in the United States that vigorously protect the well-being of individual wild animals in field experiments."[316] He also wrote that "many in the Barred Owl Stakeholder Group believed that the USFWS should take a strong leadership role in developing ethical guidelines for field experiments that explicitly take into account the well-being of individual wild animals."[317] Nevertheless, given that humans destroyed the NSO's habitat and (accidentally) helped the barred owl migrate westward, Lynn concluded that it was acceptable to kill the barred owls, as long as the killing was "humane."[318] He notes, "It is our responsibility to try as best as we can to make up for the harm we have done in the past."[319] However, he balked at supporting a region-wide war on barred owls.[320] Lynn called the killing of barred owls a "sad good."[321] Other animal rights activists noted that the Barred Owl Stakeholder Group didn't actually include any barred owls, but if it had, we might bet that they would have strenuously objected to the decision. From the barred owls' point of view, the killing was what coauthor Marc Bekoff called a "sad bad" (of course, the stakeholder group also included no northern spotted owls, either).[322]

Friends of Animals' legal director notes that "'[k]illing barred owls is just not a morally acceptable approach to ecosystem management,' . . . . 'It is really micromanaging animals and habitats.'"[323] Well, the latter is certainly true: each imperiled species faces its own distinctive set of threats, and in the Anthropocene, managers will increasingly be micromanaging those threats. Biologists acknowledge that, "'You could shoot barred owls until you're blue in the face,' . . . . 'But unless you're willing to do it forever, it's just not going to work.'"[324] Even if we can't sustainably kill imperturbable barred owls everywhere eternally, as one wildlife biologist (employed to kill the barred owls) notes,[325] perhaps killing barred owls now gives NSOs time to adapt to the new threat, sprung upon the species suddenly through human interference.

To some forest biologists, the decision to kill for conservation signifies the volatility to come for endangered species in an increasingly erratic world. As climate chaos disrupts migration patterns, wind, rainfall, vegetation, and river flows, unexpected conflicts will arise between species, confounding efforts to halt or slow extinctions. If the NSO is any guide, such conflicts could come on

316. Mark Bekoff & Jessica Pierce, THE ANIMALS' AGENDA: FREEDOM, COMPASSION, AND COEXISTENCE IN THE HUMAN AGE 153 (2017), *as reprinted in* Mark Bekoff & Jessica Pierce, *Owl Versus Owl*, SIERRA CLUB (June 10, 2017), https://www.sierraclub.org/sierra/owl-versus-owl.

317. *Id.* at 152–53.

318. *Id.* at 153.

319. Groc, *supra* note 289.

320. *Id.*

321. Bekoff & Pierce, *supra* note 312.

322. *Id.*

323. Groc, *supra* note 289.

324. Welch, *supra* note 295.

325. Groc, *supra* note 289.

quickly, upend the way we save rare plants and animals, and create pressure to act before the science is clear. For spotted owls, "we kind of put the blinders on and tried to only manage habitat, hoping things wouldn't get worse," (biologist) Forsman said. "But over time the barred owl's influence became impossible to ignore."

Thus currently, the FWS continues to shoot barred owls to give northern spotted owls (and other sentient and non-sentient species in the Pacific Northwest) a chance to endure. In 2024, the USFWS has threaded the needle between the interests of conservationists versus those of animal welfare activists. Believing that "[l]ethal removal of barred owls from identified management areas is the only population reduction method proven to work in reducing barred owl populations and improving spotted owl populations," the Service now officially allows "trained professionals" (and not the general public) to cull barred owls where they overlap with the range of Northern Spotted Owls.[326]

E. BURMESE PYTHONS

Burmese pythons and boa constrictors first slithered their way into the Everglades and surrounding areas of South Florida in the mid-20th Century. They were imported as pets from South and Southeast Asia, and were subsequently dumped by their owners. Since 1979, python enthusiasts have introduced over three hundred thousand into the United States. They are one of the four largest snakes in the world, with adults exceeding twenty-three feet and tipping the scales at over one hundred kilograms.[327] Tens of thousands have taken up residence in the Everglades.[328] When they escape (or are let go) into the wild, they have no natural predators, produce prodigious amount of eggs annually, and consume enormous quantities of native wildlife, including at least

326. Press Release, U.S. Fish & Wildlife Serv., U.S. Fish and Wildlife Service Finalizes Strategy to Manage Invasive Barred Owls to Protect Imperiled Spotted Owls (Aug. 28, 2024), https://www.fws.gov/press-release/2024-08/strategy-manage-invasive-barred-owls-protect-imperiled-spotted-owls. Detailed justification and methods can be found in the official document, U.S. FISH & WILDLIFE SERV., FINAL BARRED OWL MANAGEMENT STRATEGY 19–20 (2024), https://www.fws.gov/sites/default/files/documents/2024-08/final-barred-owl-management-strategy-2024_508.pdf.

327. Injurious Wildlife Species; Listing Three Anaconda Species and One Python Species as Injurious Reptiles, 80 Fed. Reg. 12702, 12709 (Mar. 10, 2015) (to be codified at 50 C.F.R. pt. 16).

328. *How Many Burmese Pythons Inhabit Southern Florida?*, U.S. GEOLOGICAL SURV. (Mar. 19, 2025), https://www.usgs.gov/faqs/how-many-burmese-pythons-inhabit-southern-florida; *Burmese Python*, FLA. FISH & WILDLIFE CONSERVATION COMM'N, https://myfwc.com/wildlifehabitats/profiles/reptiles/snakes/burmese-python (last visited Oct. 1, 2025).

twenty native species.[329] (If you must, join over a million others who have tuned into YouTube to see one consuming a white-tailed deer.)[330]

In 2012, the USFWS noted that "[t]housands of Burmese pythons are now established in the Everglades and preying on many imperiled species and other wildlife"[331] and that more than one thousand three hundred pythons had been removed from the Everglades National Park and surroundings between 2000-2010.[332] In response to petitions from Florida government officials, in 2012, the Service published their final rule to list the Burmese python (and three other snake species) as injurious.[333] Using their power under the Lacey Act, this designation prevents import of the snakes into the United States and forbids interstate transport without a permit. In its Environmental Assessment of the Final Rule listing these snakes as injurious, the USFWS lists fifteen federally endangered mammals, thirteen endangered bird species, and two endangered reptiles that could be "preyed upon" or "be outcompeted by [the python] for prey."[334] While some commenters noted that snakes do consume other non-native species, the Service responded,

> of greater conservation and management concern are the effects that invasive species pose to native populations of wildlife and wildlife resources—in particular, those that are endangered or threatened or otherwise at risk of extinction . . . . This includes the highly endangered Key Largo wood rat, which has been found in the stomachs of Burmese pythons, and whose population may number only in the hundreds.[335]

The USFWS is further concerned that if allowed to spread, the pythons would imperil other ESA-listed species in Florida, Hawaii, Puerto Rico, Guam, and the Virgin Islands.[336] In 2018, the USFWS' updated the recovery plan for the endangered Key Largo woodrat and planned to eliminate the Burmese python

329. FLA. FISH & WILDLIFE CONSERVATION COMM'N, S. FLA. WATER MGMT. DIST., FLA. FOREST SERV. & FLA. DEP'T OF ENV'T PROT., FLORIDA PYTHON CONTROL PLAN 10 (2021), https://lccnetwork.org/sites/default/files/Resources/Florida%20Python%20Control%20Plan_2021.pdf; Cassandra Burdyshaw, *Detailed Discussion of Laws Concerning Invasive Species*, MICH. STATE UNIV. ANIMAL LEGAL & HIST. CTR. (2011), https://www.animallaw.info/article/detailed-discussion-laws-concerning-invasive-species; Injurious Wildlife Species; Listing Three Anaconda Species and One Python Species as Injurious Reptiles, 80 Fed. Reg. 12702, 12707–08 (Mar. 10, 2015) (to be codified at 50 C.F.R. pt. 16); Guardian Staff, *The Burmese Python Problem: How 20ft. Predators Are Wreaking Havoc on the Everglades*, GUARDIAN (Dec. 13, 2024, 5:51 AM EST), https://www.theguardian.com/environment/2024/dec/13/the-burmese-python-problem-how-20ft-predators-are-wreaking-havoc-on-the-everglades.

330. Conservancy of Sw. Fla., *Conservancy Biologists See Invasive Burmese Python Consuming a Deer*, YOUTUBE (Oct. 24, 2024), https://www.youtube.com/watch?v=YvdWXEyL6F0.

331. Injurious Wildlife Species; Listing Three Anaconda Species and One Python Species as Injurious Reptiles, 77 Fed. Reg. 3330, 3331 (Jan. 23, 2012) (to be codified at 50 C.F.R. pt. 16).

332. *Id.* at 3337.

333. *Id.* at 3330.

334. *Id.* at 3338.

335. Injurious Wildlife Species; Listing Three Anaconda Species and One Python Species as Injurious Reptiles, 80 Fed. Reg. 12702, 12723–24 (Mar. 10, 2015) (to be codified at 50 C.F.R. pt. 16).

336. Injurious Wildlife Species; Listing Three Anaconda Species and One Python Species as Injurious Reptiles, 77 Fed. Reg. 3330, 3338 (Jan. 23, 2012) (to be codified at 50 C.F.R. pt. 16).

from its range.[337] The USFWS also noted the Burmese python as a threat to the endangered Key Largo cotton mouse.[338] Beyond pythons, the Service is concerned that large constrictor snakes could "severely impact and further imperil" thirty-one federally endangered/threatened species and twenty-six Florida species of special concern.[339]

Florida officials are serious about killing these creatures that have snaked their way into the state's swamps and waterways and wreaked havoc on imperiled species. In 2008, the Florida Fish and Wildlife Commission ("FWC") promulgated an Exotic Pet Amnesty Program, which allowed willing pet owners to legally adopt "unwanted exotic pets" to prevent wild release.[340] In 2018, Florida prohibited possession of the Burmese python without a permit.[341] As of 2021, they are prohibited as pets and can be "humanely killed" on private property.[342] "Humanely killed," as recommended by the American Veterinary Medical Association, means the method must result in the animal losing consciousness immediately (shot with a bolt gun or firearm), followed by destroying the animal's brain by pithing (inserting a sharp tool "into the cranial cavity using deliberate, multi-directional movement, ensuring destruction of the entire brain").[343] And, in 2010, and again in 2023, the FWC authorized the unlicensed killing of non-native reptiles (including Burmese pythons) by any private person on commission-managed lands, including the Everglades.[344]

Everyone is invited to kill the invaders. Since 2013, the FWC has hosted the multi-day Florida Python Challenge®[345], a competition to foment lethal killing of Burmese pythons. In 2024, $25,000 in cash prizes were awarded, including a $10,000 "Ultimate Grand Prize" to the entrant who removes the most pythons, and separate prizes for Professionals, Novices, and Military participants. Including awards for the longest python killed. Contestants pay $30

337. S. FLA. ECOLOGICAL SERVS. OFF., U.S. FISH & WILDLIFE SERV., RECOVERY PLAN FOR THE ENDANGERED KEY LARGO WOODRAT (NEOTOMA FLORIDANA SMALLI) AMENDMENT 1 (2019), https://ecos.fws.gov/docs/recovery_plan/Key%20Largo%20Wood%20Rat%20Recovery%20Plan%20Amendment_1.pdf.

338. S. FLA. ECOLOGICAL SERVS. OFF., U.S. FISH & WILDLIFE SERV., KEY LARGO COTTON MOUSE *(PEROMYSCUS GOSSYPINUS ALLAPATICOLA)* 5-YEAR REVIEW: SUMMARY AND EVALUATION 8 (2009), https://ecos.fws.gov/docs/five_year_review/doc2378.pdf.

339. S. FLA. ECOLOGICAL SERVS. OFF., U.S. FISH & WILDLIFE SERV., FINAL ENVIRONMENTAL ASSESSMENT FOR LISTING LARGE CONSTRICTORS AS INJURIOUS WILDLIFE UNDER THE LACEY ACT 45–49 (2012).

340. *Exotic Pet Amnesty Program*, FLA. FISH & WILDLIFE CONSERVATION COMM'N https://myfwc.com/wildlifehabitats/nonnatives/amnesty-program (last visited Oct. 1, 2025).

341. Prohibited Non-Native Species, FLA. ADMIN. CODE r. 68-5.006 (2021).

342. *Burmese Python*, *supra* note 328.

343. *Humane Killing Methods for Nonnative Reptiles*, FLA. FISH & WILDLIFE CONSERVATION COMM'N, https://myfwc.com/wildlifehabitats/nonnatives/python/humane-killing-methods (last visited Oct. 1, 2025).

344. *Timeline of Control,* FLA. PYTHON CONTROL PLAN, https://flpythoninvasion.org/python-problem/timeline/#: (last visited Oct. 1, 2025); FLA. FISH & WILDLIFE CONSERVATION COMM'N, EXEC. ORD. NO. 23-16 (2023), https://myfwc.com/media/31857/eo-23-16.pdf.

345. FLA. DEP'T OF STATE, *supra* note 10.

entry fee and must complete a pre-participation online training.[346] While not everyone is certain the Florida Python Challenge® is effective in removing the python, the stated main goal is to "spread awareness of the python invasion."[347]

The FWC provides free training programs to teach citizens about the state's management of the Burmese python, even allowing "hands-on experience catching wild Burmese pythons."[348] An app ("IveGot1") allows citizens to notify FWC immediately if they spot a python.[349] Additionally the Southern Florida Water Management District's Python Elimination Program encourages citizens to "locate and remove" Burmese pythons and pays "removal agents" wages with bonus payments for each removed snake measuring over four feet long.[350] The FWC's Python Action Team Removing Invasive Constrictors (PATRIC) pays experienced "[h]unters, anglers, and outdoor recreationalists" and strongly encourages veterans to apply.[351] As of June 2024, the team had removed more than eleven thousand pythons (out of twenty-one thousand total killed).[352]

F. AND MORE

In the United States, we are committed to killing some invasive species in some ecosystems in the name of biodiversity conservation. It's done in a piecemeal fashion without an overarching government legal command to coordinate or implement such killing.

A 1990 review shows other attempts in California to kill native species who have spread due to human activity. Through exurban sprawl with ample available trash to scavenge, humans helped raven populations grow fifteen-fold in California deserts, and as they decimated local populations of endangered desert tortoises (ravens eat the young), managers injected poison into chicken eggs, which the ravens (also) ate ravenously, yielding dead ravens. To protect California least terns from a host of predators (house cats, non-native foxes, native coyotes), managers deployed traps and guns. They gunned down coyotes

346. *Florida Python Challenge Prizes*, FLA. PYTHON CHALLENGE 2024, https://flpythonchallenge.org/participate/competition/prizes (last visited Oct. 1, 2025); *Required Online Training*, FLA. PYTHON CHALLENGE 2024, https://flpythonchallenge.org/participate/required-online-training (last visited Oct. 1, 2025).

347. FLA. FISH & WILDLIFE CONSERVATION COMM'N ET AL., *supra* note 329, at 27.

348. FLA. S. APPROPRIATIONS SUBCOMM. ON THE ENV'T & NAT. RES., BILL ANALYSIS AND FISCAL IMPACT STATEMENT: S. 168, 2018 Leg., Reg. Sess. (2018).

349. *Burmese Python*, *supra* note 328.

350. *Python Elimination Program*, S. FLA. WATER MGMT. DIST., https://www.sfwmd.gov/our-work/python-program (last visited Oct. 1, 2025); *Python Action Team Removing Invasive Constrictors (PATRIC)*, FLA. FISH & WILDLIFE CONSERVATION COMM'N, https://myfwc.com/wildlifehabitats/nonnatives/python/action-team (last visited Oct. 1, 2025).

351. FLA. FISH & WILDLIFE CONSERVATION COMM'N, *supra* note 350.

352. *Contractor Removal Program*, FLA. PYTHON CONTROL, https://flpythoninvasion.org/control-and-research/contractor-removal-program (last visited Oct. 1, 2025); *Python Action Team Removing Invasive Constrictors*, *supra* note 350.

to protect San Joaquin Kit Foxes.[353] A 1986 report on protecting Sandhill Cranes notes, "One hundred sixty-six coyotes were removed by the following methods: aerial gunning (51%), trapping and snares (27%), calling and shooting (19%), and denning (3%). An estimated forty-four ravens were removed, using forty-four dozen chicken eggs injected with DRC-1339. Eleven raccoons were removed, ten by hunting with dogs and one was caught in a snare. Overall crane production was fifty chicks, the highest count since 1970."[354]

USFWS kills rodents and mongooses in Hawaii to protect "adults, chicks, and eggs of seabirds, waterbirds, and forest birds."[355] The Service "utilize[s] staff or contract services to conduct hunting and trapping efforts to remove feral hogs" to protect migratory birds at a Texas wildlife sanctuary.[356] FWS kills lots and lots of cormorants to save salmon.[357]

Many states have control programs to kill mute swans. Rhode Island's 2006 Mute Swan management plan aimed to dramatically reduce the mute swan population,[358] in order to "minimize[] negative ecological impacts to wetland habitat and native flora and fauna,"[359] in particular to protect endangered or threatened species including black skimmers and three species of terns.[360] Between 2005 to 2008, the Maryland Department of Natural Resources killed 1,396 mute swans,[361] in part because the swans' aggressive behavior caused the least tern and black skimmer, "state-threatened waterbirds" (at the time the least tern was federally listed as endangered[362]) to abandon their nests.[363] The USDA's 2012 plan to control Michigan's Mute Swan populations allows agencies to "use the full range of legally available nonlethal and lethal methods

353. Peter H. Butchko, *Predator Control for the Protection of Endangered Species in California*, 14 VERTEBRATE PEST CONF. PROC. 237, 237 (1990).

354. David G. Paullin, *Predator Control at Malheur N.W.R.*, 13 OR. BIRDS 16, 16 (1987).

355. Notice of Intent to Prepare a Programmatic Draft Environmental Impact Statement for Invasive Rodent and Mongoose Control and Eradication on U.S. Pacific Islands Within the National Wildlife Refuge System and in Native Ecosystems in Hawaii, 80 Fed. Reg. 37286, 37287 (June 30, 2015).

356. *Id.*

357. Audubon Soc'y of Portland v. U.S. Army Corps of Eng'rs, No. 3:15-cv-665-SI, 2016 U.S. Dist. LEXIS 117262, at *55–56 (D. Or. Aug. 31, 2016); *Challenge the Killing of Thousands of Cormorants,* ANIMAL LEGAL DEF. FUND (Sept. 5, 2016), https://aldf.org/case/challenge-the-killing-of-thousands-of-cormorants.

358. DIV. OF FISH & WILDLIFE, STATE OF R.I. DEP'T OF ENV'T MGMT., MUTE SWAN MANAGEMENT PLAN 11 (2006), https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/bnatres/fishwild/pdf/muteplan.pdf.

359. *Id.*

360. *Id.* at 6.

361. Larry J. Hindman, William F. Harvey, Iv, Hutchison R. Walbridge, Mark Hooper & Cindy P. Driscoll, *An Efficient Method of Capture and Field Euthanasia of Flightless Mute Swans*, 16 WILDLIFE DAMAGE MGMT. CONF. PROC. 55, 59 (2016).

362. Endangered and Threatened Wildlife and Plants; Removal of the Interior Least Tern from the Federal List of Endangered and Threatened Wildlife, 86 Fed. Reg. 2564, 2564 (Jan. 13, 2021) (to be codified at 50 C.F.R. pt. 17).

363. Hindman et al., *supra* note 361, at 56. Virginia lists these species as rationales for their own Mute Swan elimination program but doesn't specify their status as endangered or threatened. *See* VA. DEP'T OF GAME & INLAND FISHERIES, MUTE SWAN MANAGEMENT PLAN 12 (2012), https://dwr.virginia.gov/wp-content/uploads/virginia-mute-swan-management-plan.pdf.

to reduce damage by and conflicts with Mute Swans"[364] noting, "[a]dverse impacts of Mute Swans on Trumpeter swans and swan habitat are among the primary reasons for the proposed action."[365] New York specifies species of conservation concern in their Mute Swan management plan (Mute Swans cause these species to abandon nests), although it requires wildlife officials to exhaust non-lethal means before resorting to killing.[366]

To protect ESA-listed species, wildlife managers kill Brown-headed Cowbirds (*Molothrus ater*). Cowbirds are nest parasites, that is, they do not build their own nests, but they lay their eggs in other birds' nests. Once hatched, the cowbird young often outcompete their feckless "siblings" for food, resulting in lower survival rates of parasitized species.[367] Managers kill cowbirds to protect Least Bell's Vireos, Black Capped Vireos, Southwest Willow Flycatchers,[368] and Kirtland's Warblers, all federally listed endangered species.[369] California gnatcatchers have yet to be ESA-delisted because of continued threats from cowbird nest parasitism.[370] The FWS' Least Bell's Vireo Recovery Plan concludes that "[e]xtensive and continuous cowbird removal from the least Bell's Vireo management area during the last decade is probably the single most important factor reversing population declines and producing the recent population increases in the southwestern United States portion of the least Bell's vireo range."[371] In 1972, over two-thirds of Kirtland Warbler nests had been parasitized; by 1984, FWS killed forty-five thousand cowbird invaders, and the rebounding species was removed from the endangered species list in 2019.[372]

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364. WILDLIFE SERVICES, U.S. DEP'T OF AGRIC., FINAL ENVIRONMENTAL ASSESSMENT: MUTE SWAN DAMAGE MANAGEMENT IN MICHIGAN 55 (2012), https://www.aphis.usda.gov/sites/default/files/mi-2012-mute-swan-ea.pdf.

365. *Id.* at 71.

366. N.Y. STATE DEP'T OF ENV'T CONSERVATION, MUTE SWANS IN NEW YORK: A FINAL MANAGEMENT PLAN TO PREVENT POPULATION GROWTH AND MINIMIZE IMPACTS OF AN INVASIVE SPECIES 6, 12 (2019), https://www.dec.ny.gov/docs/wildlife_pdf/muswmgmtplan19.pdf.

367. *Brown Headed Cowbirds*, CONN. DEP'T OF ENERGY & ENV'T PROT., https://portal.ct.gov/DEEP/Wildlife/Fact-Sheets/Brown-headed-Cowbird (last visited Oct. 1, 2025).

368. U.S. FISH & WILDLIFE SERV., FINAL RECOVERY PLAN SOUTHWESTERN WILLOW FLYCATCHER (EMPIDONAX TRAILLII EXTIMUS) F-19–20, F-36 (2002), https://www.fs.usda.gov/rm/pubs_other/rmrs_2002_finch_d001.pdf; U.S. FISH & WILDLIFE SERV., DRAFT RECOVERY PLAN FOR THE LEAST BELL'S VIREO (VIREO BELLII PUSILLUS) 33 (1998), https://ecos.fws.gov/docs/recovery_plan/980506.pdf.

369. CONN. DEP'T OF ENERGY & ENV'T PROT., *supra* note 367.

370. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to Delist the Coastal California Gnatcatcher, 81 Fed. Reg. 59952, 59952, 59969 (proposed Aug. 31, 2016) (to be codified at 50 C.F.R. pt. 17).

371. U.S. FISH & WILDLIFE SERV., *supra* note 368, at 73.

372. *Kirtland's Warbler No Longer Needs Protection from Brown-Headed Cowbird in Michigan*, SMITHSONIAN'S NAT'L ZOO & CONSERVATION BIOLOGY INST. (July 31, 2019), https://nationalzoo.si.edu/news/kirtlands-warbler-no-longer-needs-protection-brown-headed-cowbird-michigan; Endangered and Threatened Wildlife and Plants; Removing the Kirtland's Warbler From the Federal List of Endangered and Threatened Wildlife, 84 Fed. Reg. 54436, 54436 (Oct. 9, 2019) (to be codified at 50 C.F.R. pt. 17); U.S. FISH & WILDLIFE SERV., KIRTLAND'S WARBLER RECOVERY PLAN 13 (1985), https://esadocs.defenders-cci.org/ESAdocs/misc/850930.pdf.

Killing cowbirds to protect listed species is controversial. Ortega et al. note that cowbirds "have a long history of being disrespected and even loathed by humans . . . accused of being wretched, immoral, pests, arch villains, lazy, social outcasts."[373] They assert that for species for whom recovery plans require cowbird removal, the proof is inconclusive, and, "an easy alternative to the difficult problem of implementing strategies that address habitat loss and land-use changes, but cowbird control does not contribute to the objective of self-sustaining host populations . . . based on unscientific, anthropomorphic disrespect for their cunning and successful reproductive strategy."[374] The authors note that "arguments between academic researchers and managers became so passionate that they deteriorated into shouting matches at the national cowbird meetings."[375] Here we have a native species that may or may not be a chief threat to the actual threatened native species. The researchers are not opposed to all biological control problems; in fact, their concern is: "if animal rights activists become alarmed over massive destruction of cowbirds, they may be able to effect a change in policy and potentially jeopardize well-justified control problems."[376] As this is a law review and not a biology journal, I won't weigh in on the biological justification (cowbirds: enemy of ESA-listed songbirds or not?), but note that their point is well taken: kill only when necessary, that is, when it's absolutely clear that the animals to be killed are clear threats to the imperiled species. As Ortega et al. also point out, one should not look for easy solutions (kill the invaders) when the real problem may be habitat loss.[377]

The Channel Islands, off the coast of Southern California, have long been the site of large scale killing of invasive pigs, deer, elk, rats, and goats to protect endemic species. These efforts (successful at saving several endemic species) and resulting animal rights protests merit a law review article of their own. As in Australia and New Zealand, it's a lot more effective and sustainable to eliminate feral animals on islands than it is on the mainland, where there's often a reservoir of animals waiting to fill any vacuum, as soon as the regulators drop their guard. And, at least sometimes, lethal methods of feral animal control on islands can occur outside the vigilance of animal rights defenders. By killing—lots of killing—of invasive species, the USFWS has been able to remove the San Miguel Island Fox, Santa Rosa Island Fox, and Santa Cruz Island Fox from the

373. Catherine P. Ortega, Alexander Cruz & Myriam E. Mermoz, *Issues and Controversies of Cowbird (Molothrus Spp.) Management*, 57 ORNITHOLOGICAL MONOGRAPHS 6, 7 (2005).

374. *Id.* at 13.

375. *Id.* at 8.

376. *Id.* at 11.

377. *Id.* at 13.

Endangered Species List, and downlist the Santa Catalina Island Fox from Endangered to Threatened.[378]

FWS has also killed thousands of pigs in the Channel Islands. How and why do pigs, even if they're not directly preying on protected species, act as anti-ecosystem engineers? Well, they make pigs of themselves. In one study on Santa Rosa Island, researchers found that pig grazing and trampling steadily eroded and increased siltation in island waterways and caused serious erosion to rangeland (thus damaging root systems of endemic oaks). The pigs gorged themselves on those same oaks' acorns (thus preventing regeneration), and, through rooting, encouraged various invasive plants species to thrive and outcompete native threatened plants.[379] Before the National Park Service took over, a private company on the island tried introducing hog cholera, which the pigs survived.[380] Then they tried shooting pigs on sight.[381] When the NPS took over, they, too, determined the pigs had to go.[382] They trapped, and hunted by air and by ground (the latter using dogs trained to avoid non-target species).[383] The Nature Conservancy claims that the pigs attracted Golden Eagles (mainly a mainland species) to the Channel Islands, where they found foxes to be a tasty accompaniment to pig; the NPS also trapped and relocated the eagles.[384]

The subject of what to do about free roaming feral cats, about feral cats that people feed (so called "managed colonies"), and about people who let their cats run free is grist for several hundred law review articles. But they sure kill a lot of birds. A 2013 review—which attracted significant press attention—estimated that free-ranging domestic cats kill 1.3 to 4.0 billion birds and 6.3 to 22.3 billion mammals each year. Un-owned cats (that is, not pets), cause most of this mortality, and are responsible for two-thirds of total bird deaths. The authors suggest that feral cats are "likely the single greatest source of anthropogenic mortality for U.S. birds and mammals. . . . This magnitude of mortality is far greater than previous estimates of cat predation on wildlife and may exceed all other sources of anthropogenic mortality of US birds and mammals."[385] As reported by National Geographic ("To Save Birds, Should We Kill Off Cats?"),

378. Removing the San Miguel, Santa Rosa, and Santa Cruz Island Foxes from Endangered List and Reclassifying the Santa Catalina Island Fox, 81 Fed. Reg. 53315, 53315 (Aug. 12, 2016) (to be codified at 50 C.F.R. pt. 17).

379. Carmen A. Lombardo & Kate R. Faulkner, *Eradication of Feral Pigs (Sus Scrofa) from Santa Rosa Island, Channel Islands National Park, California*, 5 CAL. ISLANDS SYMP. PROC. 300, 300 (2000).

380. *Id.*

381. *Id.* at 300–01.

382. *Id.* at 300.

383. *Id.* at 300–02.

384. *Santa Cruz Island Fox*, NATURE CONSERVANCY (Sept. 10, 2018), https://www.nature.org/en-us/get-involved/how-to-help/animals-we-protect/santa-cruz-island-fox/#:~:text=For%20thousands%20of%20years%2C%20the,preyed%20on%20the%20island%20fox.

385. Scott R. Loss, Tom Will & Peter P. Marra, *The Impact of Free-Ranging Domestic Cats on Wildlife of the United States*, NATURE COMMC'NS, Jan. 29, 2013, at 1, 1–2.

one of the researchers followed up with a book ("Cat Wars"), for which he received death threats.[386]

In the United States, we are more ambivalent—or at least less committed—to killing for biodiversity conservation. We kill for conservation on a species-by-species contingent basis, usually when it's clear that if we don't, the legally protected species will not survive. And we don't advertise our killing, in part to ward off protests from our very vocal animal rights movement. It's difficult to visualize a legal Threat Abatement Plan for feral cats in the United States, and not just because United States law lacks that mechanism. It's impossible to visualize the government mobilizing us for Predator Free U.S. 2050. We don't regard our biodiversity as quite the badge of national pride or patrimony as citizens in Australia and New Zealand do, and balancing the ethics of saving individuals of invasive, sentient creatures versus saving the species those creatures imperil tilts further towards the former than it does Down Under. Our laws are not as explicit as in New Zealand and Australia with respect to protecting whole ecosystems. In those countries, the law views biodiversity more holistically. That is to say, the law mandates not just that every species gets its own granular plan, but legal mechanisms exist to look at whole threatened habitats or ecosystems, or to look at "Matters of Environmental Significance" beyond the species, or to view "Key Threatening Processes" as requiring government attention. In Australia and New Zealand, it's quite clear what has been lost and what will be lost if they choose not to kill. Because what's lost is clearly cherished, calculations to kill or not to kill tilt more resoundingly towards killing.

CONCLUSION

Whose lives matter? Whose pain and suffering matters? How much damage can we do to ecosystems before we damage, irreparably, ourselves?

As in any conversation about biodiversity in the Anthropocene, the answers come down to: What kind of planet do we want? With whom do we want to share it going forward? How much can we homogenize our surrounding ecosystems and still sustain human life?

In some nations, for some species and ecosystems, the moral calculus tilts towards killing for conservation. In the United States, Australia, and New Zealand (as well as other nations), citizens have made the decision that nonhuman life matters. The law translates this value preference into legal mandates for conserving species, and sometimes for conserving ecosystems that they comprise and that sustain them. What happens next—how these laws are

386. Noah Strycker, *To Save Birds, Should We Kill Off Cats?*, NAT'L GEOGRAPHIC (Oct. 2019), https://www.nationalgeographic.com/animals/article/essay-to-save-birds-should-we-kill-off-cats?loggedin=true&rnd=1705179200004; *see also* PETA (People for Ethical Treatment of Animals), *Jonathan Franzen and PETA Talk About Dangers of Letting Cats Outdoors*, YOUTUBE (Mar. 20, 2023), https://www.youtube.com/watch?v=IDXx_1cc94o&t=86s.

implemented—depends on who values what, and how much effort and time and expense we are willing to undertake to perpetuate a multitude of nonhuman lifeforms on Earth, including the sentient individuals that comprise species and ecosystems.

I do not argue that those who advocate for animal rights or compassionate conservation are disingenuous. I do, however, believe that when it comes to biodiversity conservation—or even saving the most sentient individuals of any species—neither their empirical nor ethical claims add up in many situations. For many species, only through killing do we sustain endemic species, the ecosystems they comprise, the individuals that comprise them, and the evolutionary process that created them.

A "One Welfare" perspective "recognizes that animal welfare, biodiversity and the environment are intertwined with human wellbeing and community resilience."[387] We can look through this lens to view the paradox of killing for conservation. We kill for conservation because if we don't, we will inhabit an impoverished planet, with an ever-diminishing number of species and increasingly dysfunctional ecosystems that will increasingly be unable to support nonhuman and human communities. We'll also have a severely reduced number of sentient individuals that comprise those species now and in the future, while having a lot more cats, foxes, rats, and pythons damaging the ecosystems to which they have found their ways. Paradoxically, we kill to conserve: when we strategically kill some sentient beings, we save more sentient beings than we kill, and we guarantee more sentient beings will be birthed in the future. And, crucially, the calculus of lives saved embraces a diversity of lives of species beyond cats and stoats and rats and foxes and goats. Even more crucially, the calculus of lives saved incudes flourishing ecosystems that support even greater diversity, which supports a flourishing evolutionary process that pumps out even a greater diversity of individual lives, in more diverse now and forever, and which undergird human health, prosperity, and survival.

I have written previously about "deep equity," that is, laws and policies are preferable if they simultaneously and synergistically promote individual human health and potential, community health and potential, and nonhuman health and potential. The equity is "deep" because it requires that we re-imagine our community structures and responsibilities, because values infuse each individual, and because we root these values and responsibilities in our legal systems and policy choices. Our laws and policies then, in turn, support actions and values promoting even deeper equity.[388] At least in New Zealand and Australia (and sometimes in the United States), citizens and their lawmakers

387. Brooke P.A. Kennedy, Nick Boyle, Peter J. S. Fleming, Andrea M. Harvey, Bidda Jones, Daniel Ramp, Roselyn Dixon & Paul D. McGreevy, *Ethical Treatment of Invasive and Native Fauna in Australia: Perspectives Through the One Welfare Lens*, 12 ANIMALS 1405, 1406 (2022).

388. David Takacs, *Forest Carbon Projects and International Law: A Deep Equity Legal Analysis*, 22 GEO. INT'L ENV'T L. REV. 521, 526 (2010); David Takacs, *An Aye Aye for an Aye Aye: Making Biodiversity Offsets Sustainable*, 45 COLUM. J. ENV'T L. 519, 527 (2020).

have decided that individual, community, and nonhuman health and potential depend on a tremendous amount of killing. Law and policy reify British ecologist C. S. Elton's advocacy that killing for conservation can be justified by religious, aesthetic, and intellectual, and, especially, practical arguments, and killing for biodiversity works towards Elton's vision of "keeping or putting in the landscape of the greatest possible ecological variety—in the world, in every continent or island, as far as practicable in every district."[389]

389. ELTON, *supra* note 21, at 143–44, 155.