

# The Dingo Dilemma

SHARON LEVY

Australian dingoes have long been hunted and poisoned, but they play an important role in maintaining native wildlife.

Adam O'Neill is a hired gun in the cause of Australian conservation. A muscular man with close-cropped hair, he drives a battered Toyota pickup, fitted with a rifle rack, that's seen many miles of use in the remote outback. "I've always been a professional shooter," he explains. Landowners who want to protect or reintroduce native marsupials on their property call on him to clear out populations of invasive rabbit, cat, and fox, all of which have devastating impacts on native creatures. After years of this work, he's become a passionate advocate for the dingo, a predator introduced to the continent thousands of years before the first Europeans arrived. "The native mammals that still survive," says O'Neill, "do so under the protective influence of dingoes."

Australian society has been at war with the dingo since the 1830s, when the first pastoralists began to raise livestock in the forbidding, arid interior. Dingoes found sheep and calves easy prey, and settlers quickly concluded that the only good dingo was a dead one. By the turn of the 20th century, construction had begun on one of the most ambitious projects of a predator-averse era, a cross-continental barrier designed to keep dingoes out of sheep pastures in southern Australia. Today, the "dog fence" stretches more than 5000 kilometers across the desert, the longest fence on the planet. On



*The cross-continental dingo fence meets the sea in western Australia.*

*Photograph: Michael Letnic.*

both sides of this humanmade divide, ranchers, governmental officials, and even conservationists routinely shoot and poison dingoes.

Meanwhile, many of Australia's native mammals have vanished forever or teeter on the brink of extinction. Among the endangered are an array of small marsupial carnivores: the polka-dotted quolls; the phascogale, which looks like a miniature opossum with an ostrich plume for a tail; and the numbat, which specializes in eating termites using rapid-fire motions of its tongue. Petite relatives of the

kangaroos, such as bettongs and hare-wallabies, have also been hard-hit. Two predators introduced by European settlers, the red fox and the house cat, are responsible for much of the damage. Overgrazing by sheep and cattle, as well as the rabbit (another piece of European biological baggage), disrupts habitat, contributing to the decline of the natives. A growing contingent of ecologists now advocates protecting the dingo, an efficient hunter of rabbit, cat, and fox, for the sake of Australia's dwindling native creatures and its shrinking biodiversity.

### Survival by stealth

O'Neill's interest in dingoes began when he was working far south of the dog fence, in country where the predators had long been thought extinct. To his surprise, he found that not only were dingoes alive and well, they seemed to be protecting rare populations of threatened native species.

He'd been hired to eradicate invasive mammals from a series of properties in South Australia, fenced off and destined to be managed as sanctuaries for native wildlife. "If you just attack the animals, you won't have much luck," explains O'Neill. "So I start out by feeding the predators." He set up feeding stations for the foxes, which brought them in to the refuge areas. "I had this beautiful thing happening," he remembers. "I had a high density of foxes, and they were killing off all the rabbits and scaring off all the cats. Those foxes were tame, they'd take cheese out of my hand. But then I went away for a couple of weeks and when I returned, the foxes had disappeared."

At first, O'Neill angrily assumed the landowner had set out poison baits to kill off the foxes—a routine tactic among many Australian conservationists, and one that he considers a serious mistake. It took him some time, and the chance to repeat the experiment at other sites south of the dog fence, before he understood what was happening. Foxes would vanish when dingo signs began to show up in landscapes that had been thought to be dingo-free for decades. "Dingoes were coming in, pissing on the feed stations I'd set up for foxes," he says. "They'd never eat it themselves; they just don't like so many foxes around, getting free food." South of the fence, dingoes have learned to live in ways that make them all but invisible to humans, yet a bit of scraped-up earth spattered with urine spoke loud and clear to the foxes and sent them packing. In North America, gray wolves often attack coyotes that try to share their turf. The dingo, Australia's top dog, likewise shows little tolerance for its smaller cousin.

O'Neill believes that dingoes south of the fence have developed a sophisticated culture of survival by extreme stealth, which is passed down from one generation to the next. He's watched dingo packs



*"It doesn't look like much, but it's effective," Michael Letnic says of the 5000-kilometer fence built to keep dingoes out of sheep pastures in southern Australia.*

*Letnic's studies show clear ecological differences on opposite sides of the fence: biodiversity is higher where dingoes are more common. Photograph: Michael Letnic.*

working skillfully together to bring down kangaroos. In a landscape rich with sheep, dingoes seldom hunt livestock, though historical records show they are capable of doing so to devastating effect. Instead, they survive on a diet dominated by rats, rabbits, birds, and snails. In places where

intense poisoning campaigns are started, dingo predation on livestock can actually increase. This makes sense if poison baits kill off older, wiser dingoes, leaving inexperienced youngsters to fend for themselves. Similar impacts of predator control programs have been documented among



*A diverse array of native grasses reaches maturity where dingoes live in stable packs and function as top predators, controlling herbivore populations. Photograph: Arian Wallach and Adam O'Neill.*

wolf packs in North America. In Australian wilderness areas where dingoes are not persecuted, they live in stable packs like those formed by Asian dingoes or North American wolves. Little is known about dingo societies near towns or cattle stations, but dingoes in these areas howl less often and carefully keep out of sight. O'Neill is now working with Arian Wallach, a doctoral student at the University of Adelaide, collecting data to support some of his ideas about dingoes and their role in Australia's ecology.

The two researchers set up transects in habitats that shelter rare remnant populations of yellow-tailed rock-wallaby and carefully searched for tracks and scats at sites on both sides of the dog fence. The wallaby was once common but has been decimated by fox predation and competition for forage from introduced goats. O'Neill and Wallach found that dingoes coexist with wallabies on both sides of the fence; where dingoes walk, foxes are rare, supporting the idea that the top dogs offer protection from fox predation. They also note that most wallaby colonies are found within two kilometers of a water source. Dingoes need to drink up to twice daily, so they are tied to water sources; foxes, by contrast, can survive without free water. Nobody knows for sure how often yellow-footed rock-wallabies need to drink, but they are well adapted to arid Australia. They may be sticking close to water sources to stay near the protective influence of dingoes.

Where dingoes are frequently poisoned, native mulga forests are dying out. Many conservationists have assumed that this is caused by a combination of drought and overgrazing by introduced herbivores, including rabbits and goats. O'Neill and Wallach suggest that it is a direct consequence of the persecution of dingoes, which, if left unmolested, would keep rabbit and goat numbers under control.

Dingoes also seem to lend some protection to the malleefowl, an eccentric bird that builds large mounds of leaf litter, using the heat generated by the composting process to incubate its eggs. Malleefowl survive in only a few scraps of habitat far south of the dog fence, yet every site O'Neill and Wallach surveyed



*An adult dingo and a pup are relaxing in the outback. Like other kinds of wolves, dingoes live in packs and cooperate to feed and raise the young of the alpha female. Photograph: Arian Wallach and Adam O'Neill.*

that had active nests also held evidence of dingoes: their scats, tracks, and places where they'd scent-marked malleefowl nest mounds.

#### **A bum rap**

The first dingoes reached Australia about 4000 years ago, brought by Southeast Asian seafarers. These dingoes were a

barely domesticated variety of the Indian wolf. Unlike domestic dogs in western Asia, which by then had been intensively bred for a variety of un wolflike characteristics, dingoes looked, and often acted, like their wild ancestors. Aboriginal people adapted to the new arrivals, using them as pets, as helpers in kangaroo hunts, and, in a pinch, as a supplemental food source. Meanwhile, dingoes quickly went feral and began to compete with aboriginal hunters for available kangaroos and other prey.

Australia once hosted some very impressive carnivores: *Thylacoleo*, a marsupial lion with teeth like long knives and a set of piercing claws; *Megalania*, a monster lizard that would dwarf a modern Komodo dragon; and *Wonambi*, a 6-meter-long snake that waited in ambush near water holes, then suffocated its prey in the coils of its massive body. But these giants died out about 45,000 years ago, when the first Aborigines settled the continent. By the time dingoes arrived, Australia held one last large marsupial predator, the thylacine. A wolfish-looking beast with striped hindquarters, the thylacine was also known as the marsupial tiger. It vanished from the mainland soon after the dingo was introduced, but it survived into the 20th century on the



*Dead mulga forest is a common sight in the Gammon Ranges of South Australia, where Adam O'Neill and Arian Wallach are studying dingo ecology. While many have assumed that scenes like this one are the result of drought and overgrazing by introduced rabbits and goats, O'Neill and Wallach suggest the damage is a direct result of the persecution of dingoes. Photograph: Arian Wallach and Adam O'Neill.*

island of Tasmania. Historical records describe some thylacine behavior and document the intense bounty hunting that destroyed the last populations.

Many students of ecological history have assumed that the dingo drove the thylacine to extinction on mainland Australia. The linchpin of this argument is a powerful bit of circumstantial evidence: the thylacine disappeared at about the time the dingo arrived, but it survived on Tasmania, an island the dingo never reached. For Chris Johnson, an ecologist at James Cook University in Queensland who specializes in the study of Australia's mammal extinctions, this picture is too simple.

Twentieth-century accounts of thylacines paint them as solitary creatures that hunted alone. But these are records of the last of their kind, members of a heavily persecuted population. Older reports, from early in the days of Tasmania's settlement, describe thylacines hunting in groups, "with the pertinacity of a pack of wolves on the steppes of frozen Russia." They were fast, nimble, and big—more massive than a dingo and strong enough that, in at least one case, seven domestic hunting dogs couldn't kill a lone individual. A recent analysis of the bite force thylacines exerted, based on studies of their skull and jaw bones, suggests that thylacines took prey bigger than themselves. All this conflicts with the idea that the dingo pushed the thylacine into oblivion.

Johnson suggests that intensified human hunting severely reduced thylacine populations in northern Australia before the dingo ever became established. He points out that while both dingoes and thylacines have often been depicted in rock art in the north, the aboriginal people who first painted dingoes worked in a distinct style, which is not apparent in any known image of the thylacine. The dingo is likely to have played some role in the thylacine's disappearance, perhaps because dingoes and humans hunting together became a truly formidable enemy. Regardless of how exactly the thylacine died out, says Johnson, the beast is gone, and the dingo is the only large predator left on the continent. He argues that native wildlife, and perhaps

even outback cattle ranchers, are far better off with dingoes than without them. (In the absence of dingoes, kangaroo populations can skyrocket, leading to overgrazing of pasture land.)

In an analysis of threatened and extinct marsupial species across the continent, Johnson found that small mammals survived much longer in areas with healthy dingo populations. "Where dingoes have been removed, 90 percent of ground-dwelling mammal species have gone extinct, due to predation by foxes and cats," he says. His interest in the protective effect of dingoes began years ago, when he was studying wallabies on an outback cattle station in northeastern New South Wales. "The place was owned by a couple of ranchers who were very good naturalists," he recalls. "It was a haven for bettongs and rat kangaroos, threatened small marsupials. The owners said the bettongs were there because there were no foxes on the property, and that was because they did not bait dingoes, and the dingoes drove the foxes out." Soon after that experience, one of Johnson's colleagues was studying a threatened species, the rufous hare-wallaby, in the Tanami Desert. Dingoes in the area were occasionally eating hare-wallabies, so the local parks and wildlife service decided to poison the dingoes. "Within two weeks, there were foxes on the site, and they killed off the hare-wallabies. That species is now extinct on the mainland."

The sad fate of the rufous hare-wallaby is an example of mesopredator release, a syndrome that's been delineated in several studies from North America. The loss of a large predator can reverberate through ecosystems with surprising impacts on prey. In one classic study, the decline of coyotes in fragments of southern California scrub habitat allowed domestic cats to flourish, wiping out a variety of scrub-breeding bird species. Related findings from Grand Teton National Park show that the renaissance of the gray

wolf there has dramatically reduced the number of coyotes, which prey heavily on pronghorns. As a result, the pronghorn population has grown by 50 percent since wolves were reintroduced.

These examples illustrate the importance of top predators and the ecological problems that can follow when they disappear. "In Australia," observes Johnson, "we've only got one top predator left that's not a fox or a cat, and that's the dingo. We'd better make sure we manage it properly." Conservation biologist Michael Soulé, who helped define the concept of mesopredator release, agrees. "Whatever damage the dingo has caused in Australia is already done," he says. "By my calculus, it's clear that the dingo now creates a net benefit in the ecosystem."

### Different universes

Changing popular perspectives on the dingo is a challenge in a country where dingo management has long meant shooting or poisoning as many of the animals as possible. In modern Australia, dingoes exist in a strange kind of conservation limbo. Depending on who you ask or which law you consult, they may be described as native or introduced, as pestiferous vermin or an integral part of the country's ecosystem. In the Northern Territory, dingoes have been protected for some time, and in a controversial move, the state of Victoria recently listed dingoes as a threatened species. In most of the other states, rural landowners are legally required to kill dingoes on their property. Even in national parks, where the conservation benefits of dingoes are beginning to be recognized, officials set out poison bait in large buffer zones to keep dingoes from straying onto neighboring grazing lands.

Under the Threatened Species Conservation Act, any animal that inhabited Australia in 1788, when the first British colony was established, is eligible for protection. The dingo was nominated for

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[www.pnas.org/content/101/33/12387.full](http://www.pnas.org/content/101/33/12387.full)

*Australia's Mammal Extinctions*, by Chris Johnson  
(Cambridge University Press, 2007)

protection as a threatened species in New South Wales more than a decade ago, but the state government never acted on that petition. Now, however, the state has accepted a separate petition that defines hybridization between wild domestic dogs and dingoes as a “key threatening process.” The finding is likely to lead to a continuation of the state’s long-standing practice of air-dropping poisoned baits across much of the landscape. “The nomination effectively declares that there are few, if any, dingoes in NSW [New South Wales], due to interbreeding between dingoes and feral dogs,” explains Michael Letnic, of the University of Sydney.

For some biologists, the prospect of genetic pollution from free-roaming domestic dogs is a major threat facing “pure” dingoes. For others, the issue is overblown, too often used as a justification for mass predator-control campaigns. When I asked Letnic to explain the difference between dingoes and wild dogs, he nodded toward the ginger-colored pelt of a dingo lying across his office chair. “That,” he said, “is a wild dog. It’s difficult because basically dingoes are dogs; they are an ancient domestic dog. Seventy percent of the animals in the wild look and act like dingoes, but if you call them wild dogs you can throw poison out the back of a helicopter and that’s fine.” O’Neill and Wallach also see the hybridization problem as unimportant compared with the need to protect Australia’s last top predator. “The best way to overcome it is just to leave them alone, stop baiting them,” O’Neill says. “Gradually the domestic dog genes will be winnowed out through the process of evolution. Dingoes are going to be selected for over domestic dogs because they can survive better in the wild.”

Letnic has been comparing the ecologies of outback habitats on opposite sides of the dingo fence. His results are still emerging as he grapples with the logistical challenges of studying some of the most remote areas in Australia. But a strong trend stands out. “In a nutshell, there is more biodiversity where there are dingoes,” says Letnic. Dingoes knock down the numbers of foxes. They also control populations of kangaroos, which

can boom out of control in places where ranchers have dug artesian wells to provide water for their stock. “The result is that we have more species and more abundant native rodents, lizards, and grass. Plant diversity rises where dingoes are present, too.”

Letnic began his career working for government pest control agencies in New South Wales and the Northern Territory, embedded in a culture of dingo destruction. His interest in the ecological benefits of the dingo blossomed when he was working in the Simpson Desert, a remote corner of the outback where little effort to control dingoes had ever been made. Compared with heavily managed lands in and around sheep and cattle stations in New South Wales, what Letnic found in the Simpson Desert was “a different ecological universe.”

Letnic counts dingo, fox, and cat tracks in his research plots and collects and analyzes scats. Likewise, he estimates the size of kangaroo populations by counting the animals’ dung piles. His findings show that as dingo activity rises, fox activity declines. Kangaroo populations persist at low numbers where dingoes live but often boom in their absence. As Letnic sees it, outback Australia contains two separate worlds. “There’s a grassland ecosystem with dingoes. The grass feeds rabbits and some livestock, and the rabbits feed the dingoes. Foxes and kangaroos are minor players, not consuming much energy, and biodiversity is relatively high. On the other hand is the system without dingoes. There foxes and kangaroos dominate, with the net result that smaller species suffer, and biodiversity drops.”

One of the endangered natives affected by the interplay between dingoes and foxes is the dusky hopping mouse. Letnic has shown that the mouse is more abundant where dingoes live, and that it declines or disappears where dingoes are absent and foxes roam without interference. Skinks and other small lizards are also more abundant and diverse under the protection of dingoes. He has focused on the fate of rodents and the dunnart, a tiny marsupial carnivore with a sharply pointed face, because in most



*The dusky hopping mouse is one of many threatened native Australian mammals that thrives under the protection of dingoes.*

*Photograph: Freya Koch.*

of his study sites, they are all that’s left of the small native mammal fauna.

Across Australia’s interior, much of the once diverse community of native mammals has already vanished. Over the past 200 years, nearly half of all mammalian extinctions worldwide have occurred in Australia. Eighteen endemic species, most of them common and widespread at the time of European contact, have now disappeared forever; another nine survive as small remnant populations in islands of protected habitat.

Turning to the dingo as a savior of biodiversity goes against many ingrained ideas of what is natural, what is or is not native or deserving of protection. But the reality is that Australia, like so much of the planet, has been forever reshaped by human actions, and nothing we do can return the land to its primeval state. Over the course of 4000 years, the dingo has proved its mettle as a survivor and an efficient top predator. The first dingoes may have tumbled onto its shores straight out of human hands, but their descendants are now essential to the survival of Australia’s wildness.

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