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RABBITS, FOXES, CATS AND MICE IN AUSTRALIA: A HISTORY

Four alien mammals - the rabbit, the fox, the cat and the mouse - have caused great damage to Australia's unique flora and fauna in the past 150 years. Each is a serious pest in its own right, but their interaction has magnified their impact on Australian species and ecosystems.

Rabbits compete with native herbivores and destroy their habitat, exposing smaller species to the depredations of cats and foxes. Starving rabbits have been known to strip bark from trees or climb to browse on foliage two metres above the ground. Australia also experiences recurring plagues of wild house mice in the wheat belt every few years, which cause great damage, economic loss and distress in farming communities.

Rabbits became a living conduit for cats and foxes to invade Australia's interior, by providing an abundant new food source in the harsh, climatically variable ecosystems of the arid and semi-arid rangelands. The two alien predators colonised environments from which they would normally have been excluded, taking a heavy toll of native mammals and birds. Of the 18 marsupials and native rodents that have become extinct in Australia since European settlement, most were rangeland species in the 35g to 5.5kg weight range preferred by cats and foxes. These extinctions occurred over a vast region of the interior that overlaps closely with the ranges of these three pests.

By 1991, another 57 native mammals were classified as endangered and 54 others as threatened. Agriculture and grazing, and associated changes in fire frequency and intensity, undoubtedly hastened the demise of some native mammals and birds and the decline of others by destroying or fragmenting their habitat. But the evidence against the invaders is compelling - and in the fox's case, damning.

Exhibit 1: There are no foxes in Tasmania; significantly, the island's marsupial fauna remains intact except for the thylacine or Tasmanian tiger.

Exhibit 2: On the mainland, endangered marsupials like the insectivorous numbat (*Myrmecobius fasciatus*), the predatory chuditch (*Dasyurus geoffroii*), the brushtailed bettong (*Bettongia penicillata*) and the black-footed rock wallaby (*Petrogale lateralis*) have recovered rapidly in several wildlife reserves and forests in southwest Western Australia after intensive baiting programs to reduce fox numbers.

But the rabbit ranks as Australia's most serious vertebrate pest - it has an enormous environmental impact and costs Australian primary industry nearly a billion dollars a year in lost production. The first domesticated rabbits imported by the First Fleet in 1788 failed to spread; the species did not become a pest until seven decades later, in 1859, when Geelong grazier Thomas Austin released several pairs of wild European rabbits on his property as game animals.

The First Fleet also brought cats, but tribal lore among Aborigines in the Western Desert suggests that ships cats that came ashore from Dutch vessels shipwrecked on the Western Australian coast early in the 17th century may have begun colonising the

continent almost two centuries earlier.

Like the rabbit, the fox - a more destructive predator than the cat - was also introduced for sport. The Melbourne Hunt Club imported several breeding pairs in the 1860s to perpetuate the English tradition of hunting with the hounds. These animals did not establish, perhaps because the city's environs were still heavily wooded and inhospitable to their preferred prey, rabbits. But soon after, Ballarat's Acclimatisation Society introduced foxes into the Geelong area - where they prospered in the already rabbit-infested basalt grasslands west of Port Phillip Bay. As rabbits spread rapidly into the Australian hinterland, foxes followed in their wake.

By 1886, rabbits were so abundant that Victorian authorities launched Australia's first crude attempt at biological control, by releasing dozens of domestic cats into the wild. The same was done on the Nullabor Plains in the early 1900s. These deeply misguided measures served only to increase predator pressure on native mammals and birds. In 1888, the Inter-Colonial Commission was set up to "rid the country of this pest". One hundred years later, Australian scientists are still trying to fulfil the Commission's historic charter.

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