

Foxes



Voluntarily introduced in 1855 for sporting purposes, the fox population established quickly in Australia to become a significant threat to Australian native animals and livestock. It is believed that foxes have played an essential role in the threatening and extinction of ground-dwelling fauna species since their introduction. Foxes are also carriers of diseases such as round-worm, scabies, and tapeworms. They also predate on cats, and rabbits.

Wild Dogs



Wild dogs such as dingoes (native to Australia, listed as vulnerable to extinction), feral domestic dogs and hybrids significantly impact agriculture and the environment. Some evidence shows that wild dogs as 'apex predators' positively impact the environment but can severely impact native wildlife populations. They may have played a role in the extinction of the Tasmanian devil and the thylacine on mainland Australia.



Deers

Deer browsing behaviours have caused changes in native vegetation by promoting the establishment and survival of browse-tolerant plant species. A more significant pest in New Zealand, deer are increasingly becoming an issue in Australia. The knowledge about their impact is limited and management of deer populations is minimal. They are thought to participate in weed spreading, soil erosion, diseases transmission, and waterhole pollution.

Wild Cats



Cats are believed to have arrived in Australia with European colonies. They are carnivorous predators and eat birds, reptiles, small mammals and invertebrates. It is estimated that cats are responsible for the death of 272 million birds annually. They also carry infectious diseases transmissible to wildlife, livestock and humans. They have caused the extinction of some birds and small rodents and threatened over 100 native species.



Rabbits & Hares

Rabbits and hares were introduced in Australia in the 1770s for sporting purposes. They both, but rabbits especially, pose a severe threat in Australia to the environment and agriculture. They graze on emerging crops, degrade soils, compete for food with native grazers and livestock. Rabbits and hares prevent the regeneration of edible shrubs, trees, and grasses and have caused permanent changes in some Australian grasslands.

Wild Horses & Donkeys

Scattered populations of wild horses can be found in NSW. Donkeys and horses are pests in Australia and, due to their hooves, contribute to soil erosion and plant degradation. They may carry weeds and also foul waterholes. Their impact on native vegetation is particularly noticeable during droughts by degrading areas close to waterholes used by many native species during such events.



Goats

Feral goats severely impact the Australian agricultural sector resulting in massive economic losses (\$25 million/year). They compete with grazing livestock and destroy pastures. Feral goats also impact the natural environment by promoting soil erosion, debarking trees and competing for food with native animals. Goats take shelter in rock formations preventing rock wallabies from taking refuge, making them more vulnerable to predators such as foxes and wedge-tailed eagles.



Wild Pigs

Feral pigs have a terrible impact on the forest ecosystems by being vectors for plant soil-borne pathogens. Pigs can carry a lot of soil on their body and propagate those pathogens to the roots of plants, whilst disrupting the ground when digging for food. They have been found to carry a strain of *Phytophthora cinnamoni* responsible for the dieback of jarrah trees in Australia. Wild pigs can also travel great distances.



Table 10.1 The primary invasive vertebrates of Australia and New Zealand, and their main impacts in each country.

Present in the wild		Impacts on native ecosystems									Impacts on modified ecosystems	
Species	Common name	Australia	New Zealand	Herbivory	Predation	Competition	Disease	Hybridisation	Habitat change	Toxicity	Human health	Industry
Ungulates												
<i>Capra hircus</i>	Feral goat	✓	✓	BOTH		AUS			BOTH			BOTH
<i>Sus scrofa</i>	Feral pig	✓	✓	BOTH	BOTH	AUS	BOTH		BOTH		BOTH	BOTH
<i>Equus caballus</i>	Feral horse	✓	✓	BOTH		AUS			BOTH			BOTH
<i>Equus asinus</i>	Feral donkey	✓		AUS		AUS			AUS			AUS
<i>Bubalus bubalis</i>	Feral buffalo	✓		AUS		AUS			AUS			AUS
<i>Camelus dromedarius</i>	Feral camel	✓		AUS		AUS						AUS
<i>Bos taurus</i>	Feral cattle	✓	✓	BOTH								BOTH
<i>Ovis aries</i>	Feral sheep	✓		BOTH								BOTH
<i>Axis axis</i>	Axis deer	✓		AUS		AUS			AUS			AUS
<i>Cervus porcinus</i>	Hog deer	✓		AUS		AUS			AUS			AUS
<i>Cervus elaphus scoticus</i>	Red deer	✓	✓	BOTH		AUS			BOTH			BOTH
<i>Cervus unicolor</i>	Sambar deer	✓	✓	BOTH		AUS			BOTH			BOTH
<i>Cervus timorensis</i>	Rusa deer	✓	✓	BOTH		AUS			BOTH			BOTH
<i>Dama nippon</i>	Sika deer	✓	✓	NZ					NZ			NZ
<i>Dama dama</i>	Fallow deer	✓	✓	BOTH		AUS			BOTH			BOTH
<i>Cervus elaphus neisoni</i>	Wapiti deer	✓	✓	BOTH					BOTH			BOTH
<i>Odocoileus virginianus</i>	White-tailed deer	✓	✓	NZ					NZ			NZ
<i>Rupicapra rupicapra</i>	Chamois	✓		NZ					NZ			NZ
<i>Hemitragus jemlahicus</i>	Himalayan tahr	✓	✓	NZ					NZ			NZ

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Rodents												
<i>Rattus rattus</i>	Ship rat/ black rat	✓	✓	BOTH	BOTH	BOTH					BOTH	BOTH
<i>Rattus norvegicus</i>	Norway rat/ brown rat	✓	✓	BOTH	BOTH	BOTH					BOTH	BOTH
<i>Rattus exulans</i>	Kiore/Polynesian rat	✓	✓	NZ	NZ	NZ					NZ	NZ
<i>Mus musculus</i>	House mouse	✓	✓	BOTH	BOTH	BOTH					BOTH	BOTH
Lagomorphs												
<i>Lepus europaeus</i>	European brown hare	✓	✓	BOTH		AUS			BOTH			BOTH
<i>Oryctolagus cuniculus</i>	European rabbit	✓	✓	BOTH		AUS			BOTH			BOTH
<i>Erinaceus europaeus occidentalis</i>	European hedgehog	✓			NZ	NZ						
Marsupials												
<i>Macropus eugenii</i> *	Tammar (dama) wallaby	✓	✓	NZ					NZ			
<i>Macropus rufogriseus rufogriseus</i> *	Bennetts wallaby	✓	✓	NZ					NZ			
<i>Trichosurus vulpecula</i> *	Common brushtail possum	✓	✓	NZ	NZ		NZ		NZ		NZ	NZ
Carnivores												
<i>Vulpes vulpes</i>	European red fox	✓			AUS	AUS						AUS
<i>Canis lupus ssp.</i>	Wild dog	✓			AUS						AUS	AUS
<i>Felis catus</i>	Feral cat	✓	✓		BOTH	AUS	AUS				BOTH	BOTH
Mustelids												
<i>Mustela erminea</i>	Stoat	✓	✓		NZ							NZ
<i>Mustela rivialis vulgaris</i>	Weasel	✓	✓		NZ							NZ
<i>Mustela furo</i>	Ferret	✓	✓		NZ							NZ
Birds												
<i>Branta canadensis</i>	Canada goose	✓	✓			NZ	NZ				NZ	
<i>Anas platyrhynchos</i>	Mallard	✓	✓			BOTH		BOTH				
<i>Columba livia</i>	Rock pigeon	✓	✓				BOTH				BOTH	
<i>Streptopelia chinensis</i>	Spotted dove	✓	✓			BOTH	BOTH					
<i>Cacatua galerita</i> *	Sulphur-crested cockatoo	✓	✓			NZ	NZ					
<i>Trichoglossus haematodus</i> *	Rainbow lorikeet	✓	✓			NZ	NZ					
<i>Platyercus eximius</i> *	Eastern rosella	✓	✓			NZ	NZ					NZ
<i>Gymnorhina tibicen</i> *	Australian magpie	✓	✓		NZ	NZ					NZ	
<i>Corvus frugilegus</i>	Rook	✓	✓									NZ
<i>Pycnonotus jocosus</i>	Red-whiskered bulbul	✓	✓			AUS						AUS
<i>Turdus merula</i>	Blackbird	✓	✓									BOTH
<i>Sturnus vulgaris</i>	Common starling	✓	✓			BOTH	BOTH				BOTH	BOTH
<i>Acridotheres tristis</i>	Common/Indian myna	✓	✓		BOTH	BOTH	BOTH				BOTH	BOTH
<i>Passer domesticus</i>	House sparrow	✓	✓			BOTH	BOTH				BOTH	BOTH
<i>Lonchura punctulata</i>	Nutmeg manikin	✓	✓			AUS						
Fish												
<i>Tilapia mariae</i> and <i>Oreochromis mossambicus</i>	Tilapia	✓		AUS		AUS			AUS		AUS	
<i>Misgurnus anguillicaudatus</i>	Oriental weatherloach	✓			AUS	AUS	AUS		AUS			
<i>Gambusia spp.</i>	Gambusia	✓	✓		BOTH	BOTH			BOTH			
<i>Cyprinus carpio</i>	Koi carp	✓	✓	BOTH	BOTH	BOTH			BOTH		BOTH	
<i>Salmo trutta</i>	Brown trout	✓	✓		BOTH	BOTH						
<i>Oncorhynchus mykiss</i>	Rainbow trout	✓	✓		BOTH	BOTH						

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<i>Perca fluviatilis</i>	Redfin perch	✓	✓		BOTH	BOTH						
<i>Carassius auratus</i>	Goldfish	✓	✓	BOTH			BOTH		BOTH			
<i>Scardinius erythrophthalmus</i>	Rudd	✓	✓	NZ			NZ				NZ	
<i>Ameiurus nebulosus</i>	Catfish	✓	✓		NZ	NZ						
Reptiles												
<i>Trachemys scripta elegans</i>	Red-eared slider	✓				AUS	AUS				AUS	
<i>Hemidactylus frenatus</i>	Common house gecko	✓				AUS	AUS					
<i>Lampropholis delicata</i>	Rainbow skink	✓	✓			NZ						
Amphibians												
<i>Rhinella marina</i>	Cane toad	✓			AUS					AUS	AUS	

* Native to Australia but invasive in New Zealand.

** Native to Australia and considered a pest, invasive in New Zealand.

Krull, C., Galbraith, J., Glen, A., & Nathan, H. (2014). Invasive vertebrates in Australia and New Zealand. In A. Stow, N. Maclean, & G. Holwell (Eds.), *Austral Ark: The State of Wildlife in Australia and New Zealand* (pp. 197-226). Cambridge: Cambridge University Press. doi:10.1017/CBO9781139519960.012