

APPENDIX IV

INVASIVE SPECIES WITH GLOBAL IMPACT

TWELVE TYPES OF INVASIVE SPECIES THAT ARE HAVING A GLOBAL IMPACT

The following are examples of some of the worst types of invasive species that are having a global impact. They originate from all continents except Antarctica, illustrating the diverse variety of organisms that can be invasive and the different ways in which invasive species are problematic. A list of 100 of the world's worst invasive alien species is included in Appendix VI.

MICRO-ORGANISM

Avian malaria is a mosquito-borne disease that occurs worldwide and is caused by *Plasmodium relictum*, a parasitic protozoan. These parasites occur in many avian species but primarily affect passerines (songbirds) that have not evolved in the presence of the parasite. On the islands of Hawaii, avian malaria has contributed to the extinction of at least 10 native bird species and threatens many more. Researchers have reported mortality rates of 65–90% for some native bird species after being bitten by a single infective mosquito. Many native birds can no longer breed in their historic breeding grounds at lower elevations because of avian malaria, forcing them to breed in higher elevations where food and cover may be scarce.

FUNGI

The parasitic chytrid fungus *Batrachochytrium dendrobatidis* causes a fungal infection of the skin of amphibian species, killing the individual and leading to significant population declines. Thought to originate in Africa, this fungus is now found in North and South America and Australasia-Pacific.

AQUATIC PLANT

Water hyacinth (*Eichhornia crassipes*) is one of the world's worst aquatic weeds. Originally from the Amazon basin in South America, this plant is now found in more than 50 countries throughout Africa, Asia, North America, Australia, and New Zealand, where it clogs up waterways with dense growth, preventing native plants and animals from surviving.

LAND PLANT

Japanese knotweed (*Fallopia japonica*) is an aggressive semi-woody perennial plant that is native to eastern Asia. In the 1800s, it was introduced to North America as an ornamental species and also planted for erosion control. It has since spread throughout the United States (including southeast Alaska) and Canada. It spreads quickly, creating dense thickets that degrade wildlife habitats, and reduces plant biodiversity by competing with other native vegetation.

LAND INVERTEBRATE

The Argentine ant (*Linepithema humile*) is a widely distributed invasive species that displaces native ants throughout its introduced range by creating super colonies and outcompeting native species for food and habitat resources. The vast colonies can contain billions of workers and queens spread over hundreds of square miles.

AQUATIC INVERTEBRATE

The European green crab (*Carcinus maenas*) is a small, aggressive, intertidal crab that is not known to occur in Alaska but has been introduced in the Pacific Northwest, as far north as British Columbia. This invasive crab competes with native crab species and is a major predator of clams, mussels, and juvenile fishes.

AMPHIBIAN

The American bullfrog (*Lithobates catesbeianus*) is native to North American and has been introduced to more than 40 countries and 4 continents around the world, most often with the intent of establishing a new food source for humans. They are voracious predators, and have had devastating effects on native amphibian, fish, and bird populations.

FISH

The common carp (*Cyprinus carpio*) is a freshwater fish originating from Europe and Asia (two subspecies); today carp occur on every continent except Antarctica and are the third most frequently introduced species in the world. Their bottom-feeding behavior stirs up sediments and uproots aquatic plants, reducing water quality and altering aquatic habitats.

BIRD

Native to Europe, Asia, and Northern Africa, the European Starling (*Sturnus vulgaris*) was introduced to North American, Southern Africa, Australia, and New Zealand, where they can form large flocks that feed on agricultural crops and compete aggressively with native birds for nest cavities.

REPTILE

The brown tree snake (*Boiga irregularis*) was introduced to the island of Guam from its native range of Australia, Indonesia, the Solomon Islands, and Papua New Guinea. Lacking natural predators, the population on Guam exploded, causing the extirpation of nearly all of the native forest birds, including the extinction of the Guam Rail (*Gallirallus owstoni*) and the Micronesian kingfisher (*Todiramphus cinnamominus*). Nine of the eleven bird species present at the time of the brown tree snake's introduction have since been extirpated. The ecosystem of Guam has become extremely fragile as a result.

MAMMAL HERBIVORE

Domestic goats (*Capra hircus*), originally native to Asia, are raised for food around the world. Feral goat populations are extremely damaging to native ecosystems, overgrazing a wide variety of native plant and tree species and resulting in ecosystem degradation, soil compaction, soil erosion, and altered soil moisture regimes, especially when they are introduced to islands.

MAMMAL PREDATOR

Rats (*Rattus rattus*, *Rattus norvegicus*, *Rattus exulans*) have been introduced worldwide, where they quickly adapt to a wide variety of habitats and prey on most animal species smaller than themselves, such as reptiles, birds (including seabirds), bird eggs, and freshwater and intertidal species. Their presence in an ecosystem results in significant declines and even extinctions of native species and major changes to the ecosystem, especially on islands.