



A Guide to Biodiversity for the Private Sector

www.ifc.org/BiodiversityGuide

The Threat of Non-native Species to Biodiversity

The threat of invasive non-native, or alien, species is one of the most significant risks to global biodiversity. Introducing plant and animal species that are not native to an area can cause major disruption to local ecosystems, replacing and sometimes devastating native plants and animals. This disruption can result from the deliberate introduction of non-native species, such as for agriculture or landscaping, or the inadvertent introduction and release of alien species into an environment, for example through transport along roads and railway lines or in ship ballast water. In some cases, an alien species can become invasive, spreading rapidly throughout a habitat and replacing or destroying native species through competition for resources, predation or habitat destruction.

There are many examples of significant economic, social and environmental impacts caused by invasive alien species.

- **Brown tree snakes.** One of the most commonly known examples of invasive alien species, brown tree snakes, which are native to Australia, Indonesia, Papua New Guinea and the Solomon Islands, were accidentally introduced to Guam via a military aircraft in the late 1940s or early 1950s. There were no natural predators for the snake on Guam, which had previously been snake-free, and plenty of prey, allowing the brown tree snake population to explode. By the 1970s, the snake had decimated the island's native species, nearly exterminating Guam's native forest birds. By hitching rides in the cargo of ships and planes, and even in aircraft wheelwells, the snake has since reached Micronesia, Spain, Hawaii and the mainland United States.
- **The Nile perch.** More than 200 endemic fish species have vanished from Uganda's Lake Victoria since the introduction of the non-native Nile Perch in the 1950s. Originally introduced to counteract the drop in native fish stocks caused by over-fishing, the fish preys on native species and competes with them for food. Commercial processing of the Nile perch for food has also resulted in a host of other environmental and social problems. Because the fish's flesh is oilier than that of local species, more trees had to be cut to

fuel fires to dry the catch. This deforestation led to increased erosion and run-off, which caused higher nutrient levels in the lake and in turn led to invasions by algae and water hyacinth, depleting water oxygen levels and resulting in the death of even more fish. Large-scale commercial exploitation of the Nile perch has also displaced many local people who earned their livelihoods through traditional fishing.

- **Mnemiopsis jellyfish.** Accidentally introduced to the Black Sea through a ship's ballast water in 1982, the *Mnemiopsis leidyi* jellyfish, which is native to the eastern United States, has decimated the native fish species of the Black Sea and has moved east to the Caspian Sea. The Mnemiopsis, which is a comb or non-stinging jellyfish, is relatively benign in its native waters, eating plankton and kept in check by various predator species. However, in the Black Sea, the jellyfish encountered an abundant food supply and none of its natural predators. It ate the eggs and larvae of many fish species and the plankton on which other species fed. Breeding rapidly, the Mnemiopsis rapidly overran the Black Sea, reducing fish catches across the sea by 90 percent. The population of Mnemiopsis jellyfish began to decline in the late 1990s after the accidental introduction of another non-native species, the *Beroe ovata* jellyfish, which eats only Mnemiopsis jellyfish. However, shortly thereafter, Mnemiopsis was discovered in the Caspian Sea, having traveled through a canal that links the two seas and in the ballast water of other ships. In the next several years, fishing stocks in the Caspian declined by 50 percent. Among the hardest hit of the native species is the kilka fish, which is also the preferred diet of both the Caspian's indigenous seals and the beluga sturgeon, which provides most of the world's caviar. Both species are threatened by the jellyfish invaders.
- **Water hyacinth.** The South American water hyacinth, which has large purple and violet flowers, is extremely popular as an ornamental plant for ponds. It is also one of the most voracious and fast-growing aquatic weeds in the world; water hyacinth populations can double in only 12 days. The

introduction of water hyacinth around the world for landscaping has led to severe disruption of native aquatic ecosystems. The plant is now found in 50 countries on five continents, where infestations of the weed block waterways and interfere with boat traffic, swimming and fishing. Water hyacinth also prevents sunlight and oxygen from reaching the water column and submerged plants. This shading and crowding of native species has dramatically reduced biodiversity in many aquatic ecosystems.

Sometimes, attempts to control invasive species can make matters worse.

- **Indian mongoose.** In the late 1800s, the small Indian mongoose, which is native from Iran through India to the Malay Peninsula, was introduced to Fiji, Mauritius, Hawaii and the West Indies, to control rats, which had themselves been accidentally introduced and were decimating sugar cane and other crops. Unfortunately, this attempt to quell the rat problem had catastrophic effects, leading to the extinction of a number of endemic native birds, reptiles and amphibians. The mongoose is a continuing threat to other species, including the rare Japanese Amami rabbit, and it carries rabies, which can spread to other animal populations.

For more on IFC expectations in relation to the introduction of alien species, please refer to [IFC Performance Standard 6 - Biodiversity Conservation and Sustainable Natural Resource Management](#).

- **Invasive Alien Species Prevention and Control: The Art and Science of Managing People** <http://www.ecos-systems.org/downloads/humdinfnl.pdf>
- **Invasive Exotic Species** <http://www.invasive.org>
- **IUCN Invasive Species Specialist Group** <http://www.issg.org/index.html#ISSG>
- **National Invasive Species Information Center, US Department of Agriculture** <http://www.invasivespeciesinfo.gov/index.shtml>
- **The Global Invasive Species Programme** <http://www.gisp.org>
- **The Global Invasive Species Database** <http://www.issg.org/database/welcome>
- **APIRS: The database of aquatic, wetland and invasive plants** <http://plants.ifas.ufl.edu/search80/NetAns2/>