

Invasive Species

Over the past 200 years, several thousand foreign plant and animal species have become established in the United States. About one in seven have become invasive, leading to problems that, according to figures provided by Cornell University, cost the United States more than \$138 billion each year. An invasive species is an alien species whose introduction does, or is likely to, cause economic or environmental harm or harm to human health. Invasive plants, animals, and pathogens have often reduced the economic productivity and ecological integrity of agriculture, forestry, and the Nation's other natural resources.

Common vertebrate invasive species in the continental United States include nutria, house sparrows, European starlings, and commensal rodents (roof rat, Norway rat, and house mouse). In Hawaii and in some continental U.S. States, feral pigs, goats, and cats have severely impacted natural and environmental resources. Additionally, numerous invertebrate invasive species have become established in the United States, including zebra mussels, imported fire ants, Africanized honey bees, and Asian longhorned beetles, to name a few.

Effects of Invasive Species

Many harmful invasive species clearly impair biological diversity by causing population declines, species extinctions, shifts in predator-prey dynamics, shifts in species niches, changes in habitat, and reductions in ecosystem complexity.

In 1993, the Congressional Office of Technology Assessment reported that devastating invasions of plants, insects, aquatic invertebrates, pathogens, and other organisms have changed ecosystems and permanently diminished the biological diversity associated with them. Examples of these in the United States and its territories include: melaleuca (a wetlands tree), gypsy moth, spruce bark beetle, zebra mussel, larch canker, chestnut blight, and the brown tree snake.

Conservation experts have found that in the United States invasive alien plant infestations cover 100 million acres (an area twice the size of Delaware) and are spreading at a rate of 14 percent per year. Recent studies have also revealed that the San Francisco Bay is invaded by a new exotic species on the average of once every few weeks.

Movement

Naturally occurring movement of species into the United States is uncommon. Most invasive species arrive in association with human activities or transport. Species can be brought into the country and released intentionally or unintentionally through the international movement of people, commodities, and their conveyances.

Many species enter the United States each year as contaminants of commodities. Agricultural produce, nursery stock, cut flowers, and timber can harbor insects, plant pathogens, slugs, and snails. Weeds continue to enter the United States as seed contaminants. Plant pathogens sometimes arrive as unintended contaminants of plant materials.

Fish and shellfish pathogens and parasites have been introduced unintentionally into the United States on infected stock destined for aquaculture. Crates and containers can harbor snails, slugs, mollusks, beetles, and other organisms. Military cargo transport may unintentionally bring in harmful species. Ballast water that is released from ships when cargo is loaded or unloaded has historically brought in numerous unwanted aquatic species.

Safeguarding the United States from Invasive Species

On February 3, 1999, the President signed Executive Order 13112, requiring coordination and enhancement of Federal activities to control and minimize the economic, ecological, and human health impacts caused by invasive species. The Executive Order also established a National Invasive Species Council to oversee a management plan detailing the goals and objectives of the Federal agencies and departments involved.

The Executive Order builds upon existing Federal, State, and non-government organizations to help solidify the Nation's protection against invasive species and to enhance communication between all that are involved. The National Invasive Species Council, which the Secretary of Agriculture co-chairs, was established by the Executive Order to develop an overall Federal strategy for minimizing the impact of invasive species. This goal was outlined in the National Invasive Species Management Plan, published in 2001. This plan contains 57 specific action items that Federal agencies need to address to improve coordination, prevention, control, and management of invasive species.

This Executive Order and its National Invasive Species Management Plan provide impetus and importance to the basic work performed by the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) to prevent pests and diseases that threaten the Nation's biological resources from becoming established in the United States.

Both natural pristine ecosystems and those modified for agriculture are vulnerable to invasive pests and pathogens. In protecting the United States from harmful invasive species, APHIS is responsible for excluding and managing invasive species that can potentially affect plant and animal health, either directly or indirectly. Through its activities, APHIS protects not only agriculture but also forest, range-land, and wetland ecosystems. APHIS works closely with USDA's Forest Service and the U.S. Department of the Interior's Bureau of Land Management, National Park Service, and Fish and Wildlife Service. APHIS is also actively engaged in controlling certain types of invasive species and vertebrate pests that affect native ecosystems, rather than agricultural resources. Certain specific activities focus on protecting and managing endangered species as well as migratory bird populations.

The first and most effective means of protection is through exclusion or prevention of intentional or unintentional entry of harmful invasive species. A second strategy uses tactics that include detecting, eradicating, managing, or controlling specific pests that have become established. Third, certain endangered species need special protection against a host of human and biologically induced stressors.

APHIS' Role in Safeguarding

Many plants or their associated germplasm are imported intentionally for propagation and use. Organisms are intentionally brought in for biological control, including insects, fish, snails, plant pathogens, and nematodes. APHIS has a permitting system to assess organisms for plant pest risk or risk to animals. Entry may be authorized under certain conditions. Scientifically based methods of risk assessment allow APHIS to make informed decisions as to the potential for risk to the environment. APHIS has biological scientists skilled in making the assessments necessary to issue or deny a permit.

Risk assessment uses scientific information to determine numbers and kinds of organisms that have the potential to become established and become harmful. Sophisticated methodologies are used to estimate the level of risk. This information assists APHIS with decisions to issue permits for introduction, interstate movement, and release into the environment of organisms that can be beneficial to society.

In response to, and in anticipation of, increased movement of people and biological products and organisms (both intentional and unintentional, legal and illegal), APHIS scientists and risk assessors are developing new risk assessment methodologies, regulatory processes, and assessments of effectiveness in the agency's programs. These efforts include the development of specific regulations that outline the types of scientific information needed to obtain a permit to import and/or release into the environment non-native species that are potential plant pest risks. In addition, APHIS is reviewing and assessing the effectiveness of its activities for safeguarding the United States from invasive species.

APHIS is responsible for implementing several multilateral and bilateral international agreements directly or indirectly related to invasive species. These include, but are not limited to, the International Plant Protection Convention, Office International des Epizooties, North American Plant Protection Convention, North American Free Trade Agreement (NAFTA), Convention on Prevention of Diseases in Livestock, Convention on International Trade in Endangered Species of Wild Flora and Fauna, Convention for the Protection of Migratory Birds, and Convention for the Protection of Migratory Birds and Game Animals.

Domestic laws that APHIS implements include the Plant Protection Act, Animal Health Protection Act, Federal Seed Act, Honeybee Act, and the Agricultural Bioterrorism Protection Act. The following are examples of some of APHIS' domestic prevention, eradication, and control programs for invasive species:

Asian longhorned beetle, which kills hardwood trees, has been detected in New York, Chicago, New Jersey, and warehouses in several other U.S. cities. APHIS is working to implement new regulations for incoming solid wood packing material and has issued an interim rule for solid wood packing material coming from China. These initiatives will minimize the likelihood of future Asian longhorned beetle introductions. Additionally, APHIS works with local agriculture officials in eradication campaigns to eliminate Asian longhorned beetle from areas where it has been detected.

The glassy-winged sharpshooter, an invasive insect detected in California in the early 1990s, carries with it the plant bacterium *Xylella fastidiosa*, which causes a variety of plant diseases, including Pierce's disease. This disease has already caused multi-million-dollar losses of California grape crops and continues to pose a major threat to the grape, raisin, and wine industries, and the tourism associated with them. APHIS has allocated millions of dollars to help California implement a statewide management program for inspection of inter- and intra-state nursery stock; to establish multi-county pest management areas; and to conduct aggressive public outreach to educate growers and others about this pest problem.

Brown tree snakes have eliminated 10 of the 13 native bird species and most lizard species and bat species on the island of Guam. This native of the South Pacific and Australia is responsible for large economic losses from damaged electrical lines and resultant power outages, and poses hazards to human safety (especially children) from bites. The Departments of Defense and Interior provide \$1 million and \$400,000 respectively, to APHIS each year to prevent the spread of the snake off island. As part of this effort, APHIS has established cooperative service agreements for snake control with nearly every company and agency involved with the shipment of cargo from Guam. Aircraft, ships, and their associated cargo pose the highest potential risks for snake introduction into Hawaii and other places currently free of the brown tree snake. Snake populations are reduced using specially designed traps and hand capture. In addition Jack Russell terriers are used to detect snakes in outbound cargo. To further efforts, personnel at APHIS' National Wildlife Research Center continue to develop and test brown tree snake toxicants, traps, barriers, repellants, and attractants. Other APHIS cooperators include: Guam International Airport Authority, Guam Power Authority, Port Authority of Guam, U.S. Geological Survey, and 19 privately owned cargo-processing warehouses.

Nutria, a furry rodent that was once considered a fur market resource, escaped into Louisiana's coastal marshes in the late 1930s. Since that time, the market collapsed and less than 200,000 animals are now caught each year. In addition to damaging private property by destroying ornamental plants and excavating burrows, nutria contribute to coastal erosion, which already destroys as much as 40 square miles of Louisiana's coastal marshes each year. Nutria can be found from Texas to Florida on the Gulf Coast and as far north as Maryland on the Atlantic Coast. Their geographic range continues to expand, essentially unchecked, into new areas. APHIS cooperates with the Louisiana Department of Wildlife and Fisheries, providing direct control and technical assistance. APHIS also provides technical assistance to managers of the Blackwater National Wildlife Refuge in Maryland, in helping to resolve nutria problems along the Chesapeake Bay and its tributaries.

Tropical bont tick is a pest of concern to the United States because it can carry a parasite that causes heartwater disease—a threat to domestic livestock. This tick belongs to the genus *Amblyomma* and is present on several Caribbean islands, posing a threat to the U.S. mainland because of frequent travel and commerce between the areas. APHIS provides technical advice and counsel to the Caribbean *Amblyomma* Programme (CAP). CAP continues to achieve successes in eliminating this livestock pest, with four of the original nine Caribbean islands where

it was present now listed as free of the tropical bont tick. Working with livestock owners and government staffs throughout the Caribbean, CAP has expanded its surveillance coverage to several medium-risk islands as a preventive measure. APHIS contributes more than \$300,000 annually to help fund the program, along with the United Nations' Food and Agriculture Organization, the International Fund for International Development, and the European Commission's Caribbean Agriculture and Fisheries Programme.

Boll weevils are the primary insect pests of cotton. They came to the United States from Mexico in 1892. This pest costs U.S. farmers more than \$200 million annually in control efforts and yield losses. APHIS participates in the boll weevil eradication program through sharing costs with the affected States and cotton growers and by providing technical support. Due to the overall success of the program, many States contribute additional funding to these eradication efforts, reducing grower costs and stimulating rural economies. Today, many areas of the United States remain free of boll weevil.

Additional Information

For more information on APHIS' role in minimizing the impact of invasive species, please visit the APHIS Web site at www.aphis.usda.gov or contact:

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For more information on the Invasive Species Executive Order 13112, visit the National Invasive Species Council at Web site www.invasivespecies.gov.

For more information on the National Invasive Species Act, visit the Aquatic Nuisance Species Task Force at Web site www.ANSTaskForce.gov.

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