



Updated January 11, 2017

## Federal Efforts to Control Invasive Plant and Animal Species

An “invasive” species (also known as an alien, exotic, injurious, introduced or naturalized, non-native, nonindigenous, nuisance, or noxious species) refers to an animal or plant that is introduced into an environment where it is not native. Of particular concern are non-native animal and plant species that have caused or seem likely to cause substantial economic or ecological harm. However, not all non-native species are invasive or harmful.

The introduction of invasive species to the United States from around the globe—whether deliberate or unintentional—can pose threats to native animal and plant communities and may result in extinctions of native species, ecosystem disruptions as native and non-native species compete for limited resources, reduced biodiversity, and altered terrestrial or aquatic habitats. Invasive species may also introduce new pests and diseases. An estimated 50,000 non-native invasive animal and plant species have been introduced to the United States, resulting in economic costs estimated at more than \$100 billion annually.

Various invasive species have had severe economic impacts on U.S. industries and the natural environment. Damage can span an enormous range of effects, such as power outages; loss of farmland property value; contamination of grain; spread of human and other diseases; increased operating costs; loss of irrigation water; collapse of buildings; competition with native plants; loss of sport, game, or endangered species; and ecosystem disturbance.

Some invasive plants have been notorious for years for causing economic and ecological damage. For example, leafy spurge is lowering the forage value of western grazing land and reducing overall land values. Others include kudzu, melaleuca, cordgrass, tamarisk, purple loosestrife, spotted knapweed, and Russian thistle. Their damage includes lowering water tables, poisoning livestock, decreasing crop yields, and increasing pest control costs.

Invasive invertebrates are also well known and include gypsy moths, Japanese beetles, Asian longhorn beetles, zebra and quagga mussels, Asian tiger mosquitoes, fire ants, and Africanized honey bees, among others. An example of a damaging non-native insect species is the light brown apple moth, a native pest of Australia, which has been detected in California and is causing damage to a wide range of plant species and commercial fruit and vegetable crops. Zebra and quagga mussels from Eastern Europe are clogging intakes for urban water supplies and nuclear power plants in the Great Lakes and the Mississippi basin.

Introduced vertebrate pests—including walking catfish, lake trout, cane toads, monk parakeets, starlings, bighorn sheep, nutria, and rats—can also have serious economic and ecological impacts. An example includes Burmese pythons,

which are multiplying in south Florida, becoming a top carnivore, and killing large numbers of native species of reptiles, birds, and mammals. Introductions also include various human parasites and diseases.

### Pathways for Invasive Species Introductions

- **Transportation Corridors** such as railroads, rivers, and highways that may unintentionally spread invasive species
- **Intentional Introductions** such as non-native landscaping plants or fish species for use by aquaculture facilities, as well as other deliberate releases for propagation in the wild (such as tamarisk to control erosion along river banks)
- **Intentional Importation of Non-Native Pets** that may escape or are released into local lakes, streams, or forests

### Basic Control Methods for Invasive Species

- **Preventing Dispersal After Entry** by taking steps early to limit the spread of an invasive species that has begun to escape confinement by removing the pests’ sources of food, water, and shelter or blocking their access into buildings or plants to prevent population growth
- **Controls Designed for Confined Spaces** such as using lethal substances to target pests in confined areas or to prevent them from crossing a geographic bottleneck
- **Cultural Controls** such as agricultural production practices that modify a pest’s environment or habitat to curtail its spread by reducing its ability to survive, disperse, establish, or reproduce (examples include crop rotation, intercropping, managed application of water or fertilizer, improved sanitation and hygiene, timed plantings and harvests, purchasing of certified plants, and other practices)
- **Mechanical and Physical Controls** such as mowing and use of heavy machinery (harvesters, shredders), traps, or mulches/barriers to manage weeds; and manual controls (hand-pulling weeds, physical removal of a plant or animal)
- **Baits and Attractants** to attract individuals of a target species toward a potential source of food or mates, where the target species can be trapped, killed, or studied
- **Biological Control Organism** to compete with, prey on, parasitize, or cause disease in a targeted pest species
- **Chemical Control Agents** such as pesticides and other manufactured (conventional) controls as well as natural (biological) sources and biopesticides derived from natural materials, animals, plants, bacteria, and certain minerals
- **Site Removal** of an area where the invasive species lives
- **Bounties and Commercial Exploitation**, where someone is paid to catch and kill the target species
- **Use of Other Species for Detection** such as training dogs to detect a target species at high-risk entry points (airports, cargo terminals, dockyards)

**Table I. Estimated Funding for Invasive Species Activities, FY2016, Enacted (\$1000)**

	DHS	NOAA	USACE	DOI	DOS	DOT	EPA	USDA	Total (%)
<b>Prevention</b>	776,300	8	31,850	11,184	565	810	57,000	100,064	<b>977,781</b> <b>(42%)</b>
<b>Early Detect./Rapid Resp.</b>	0	289	15,254	15,604	772	0	—	277,572	<b>309,491</b> <b>(13%)</b>
<b>Control/Management</b>	0	126	61,066	46,643	12,002	0	—	526,498	<b>646,335</b> <b>(28%)</b>
<b>Research</b>	0	925	6,029	19,970	2,194	1,585	110	237,692	<b>268,505</b> <b>(11%)</b>
<b>Restoration</b>	0	54	18,638	4,332	0	0	0	25,145	<b>48,169</b> <b>(2%)</b>
<b>Educ./Public Awareness</b>	0	1,102	7,334	613	219	0	—	78,427	<b>87,695</b> <b>(4%)</b>
<b>Leadership/International</b>	0	5	2,377	673	2,021	40	0	2,926	<b>8,042</b> <b>(&lt;1%)</b>
<b>Total</b>	<b>776,300</b>	<b>2,509</b>	<b>142,548</b>	<b>99,019</b>	<b>17,773</b>	<b>2,435</b>	<b>57,110</b>	<b>1,248,324</b>	<b>2,346,018</b>
<b>%Federal Spending</b>	<b>33%</b>	<b>&lt;1%</b>	<b>6%</b>	<b>4%</b>	<b>1%</b>	<b>&lt;1%</b>	<b>2%</b>	<b>53%</b>	<b>100%</b>

**Source:** NISC, “Invasive Species Interagency Crosscut Budget,” December 2016, [https://www.doi.gov/sites/doi.gov/files/uploads/nisc\\_2016\\_crosscut\\_budget\\_summary.pdf](https://www.doi.gov/sites/doi.gov/files/uploads/nisc_2016_crosscut_budget_summary.pdf). Does not include USAID (to be determined).

**Notes:** DHS (U.S. Department of Homeland Security); NOAA (National Oceanic and Atmospheric Administration); USACE (U.S. Army Corps of Engineers); DOI (U.S. Department of the Interior); DOS (U.S. Department of State); DOT (U.S. Department of Transportation); USAID (U.S. Agency for International Development); USDA (U.S. Department of Agriculture). These data are self-reported by the federal agencies engaged in these activities and are not independently compiled; also the criteria used by agencies to compile these data are unclear and may be inconsistent across different agencies.

Control of invasive species involves eradication where possible and reduction to manageable or tolerable levels where eradication is not possible. Key to this effort is early detection and rapid response in order to eradicate invasive populations before they become established. Several methods may be used to address an unwanted pest population and cover a range of control methods (see text box). To apply any of these strategies effectively, however, considerable knowledge of the target species’ behavior, biochemistry, dietary preferences, diseases, or other aspects of its biology is usually essential.

Comprehensive legislation on the treatment of invasive species has never been enacted, and no single law directs coordination among federal agencies. No laws focus on the broad problems of invasive species—their interception, prevention, and control across a variety of industries and habitats. Instead, the current legal framework is largely governed by a patchwork of laws, regulations, policies, and programs. Some laws are tailored to individual species or narrowly focused on what is affected by the species, such as agricultural production or certain aquatic or terrestrial ecosystems. Other laws have a broader intended purpose and may only peripherally address invasive species, such as certain environmental, resource management, and species or wildlife protection laws. Some laws, though they do not

directly address invasive non-native species control or prevention, have effects that may limit introductions.

Control of invasive species is not often the major purpose of the law, and agencies have little authority to eradicate invasives, except where they occur on federally managed lands, thus undermining the effectiveness of these programs. In general, laws addressing threats to agriculture—an industry for which the risks from invasive species are well established—tend to be more developed than laws protecting other industries or ecosystems.

In the United States, numerous federal and interagency efforts share responsibilities regarding invasive species. Among the federal agencies involved are the Departments of Agriculture, Commerce, Defense, Homeland Security, Interior, and Transportation, as well as the Environmental Protection Agency and the Executive Office of the President. Of these, three departments—Agriculture, Commerce, and Interior—play a major role by co-chairing the National Invasive Species Council (NISC). Created by Executive Order 13112 in 1999, NISC provides high-level interdepartmental coordination of federal invasive species actions and works with other federal and nonfederal groups to address invasive species issues at the national level.

In FY2016, the U.S. government spent an estimated \$2.3 billion across a range of federal agencies and activities in an

effort to prevent, control, and eradicate invasive species domestically (**Table 1**). Activities at the Department of Agriculture accounted for the bulk of available federal funding, nearly \$1.2 billion (53% of total available funds). Activities at the Department of Homeland Security, comprised of mostly border protection and security activities, accounted for about \$0.8 billion (33% of total funding). The remainder of federal funding, about \$0.3 billion (about 14% of total funding), covers activities across a range of agencies at the Departments of Interior, Commerce, and Defense, and other independent agencies.

For details, see CRS Report R44049, *Invasive Species: Issues in Brief*; CRS Report R44011, *Invasive Species: Control Options and Issues for Congress*; and CRS Report R43258, *Invasive Species: Major Laws and the Role of Selected Federal Agencies*.

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