NRCS Natural Resources Conservation Service

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Invasive Species

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Introduction

Invasive species are one of the world's leading threats to environmental health. Invasive species can be plants, animals, or other types of organisms. In their native range, plant and animal populations are generally kept in balance by factors such as competition, predation, and disease. If introduced into new geographic areas or if environmental conditions change substantially, species are sometimes freed from environmental constraints and can spread rapidly, becoming invasive and potentially overly abundant. Invasive species can have severe economic impacts and can wreak havoc on ecosystems and populations of native animal and plant species (see Key definitions).

The dispersal of and colonization by plant and animal species is a natural process that can be affected by human activities. Historically, birds and other wildlife colonized new areas very slowly as they moved to new areas, bringing with them plants and other animals that were contained in their digestive tracts or stuck to their fur or feathers. In general, the native species were best adapted to local environmental conditions and had an advantage over these new species. Depending on environmental conditions, the new plants and animals either died out or adapted to their new homes. While this process still happens today, the transport of potential invasive species has been accelerated because of increased global commerce. Furthermore, many ecosystems are increasingly susceptible to invasions because they have been degraded by inappropriate land uses.

Many of today's invasive species are introduced to new areas through human activities such as recreation, transportation, and commerce. These introductions can be either intentional or accidental. Many plant and animal introductions have been intentional for food, fiber, ornamental purposes, or biological control of invasive species. For example, the common carp (*Cyprinus carpio*), introduced for aquatic plant control and recreational fishing, became an in-

Key definitions

Native species: a species that historically occurred or currently occurs in a particular ecosystem (other than as a result of an introduction). Native species have adapted over thousands of years to their surrounding plant and animal communities and local climate and soil conditions.

Exotic species (also ***alien*** or ***nonnative species***): a species, including its seeds, eggs, spores, or other biological material capable of propagating it, that is not native to a particular ecosystem.

Invasive species: a species whose dominance causes harm to the economy or the environment. Invasive species can be native or exotic. Native species can become invasive if environmental conditions change substantially and the balance of the ecosystem is disrupted. Exotic species can become invasive when they are freed from the environmental constraints that are unique to their native range.

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The Asian Longhorned beetle (*Anoplophora glabripennis*), an invasive species, threatens hardwood trees in the northeastern United States.

vasive species that eats desirable plants and indirectly reduces water quality by increasing turbidity, thereby replacing or causing declines of some native fish species. On the other hand, introductions of many other organisms have been accidental. For example, zebra mussels (*Dreissena polymorpha*) were accidentally brought into the Great Lakes through ballast water discharged by ships.

In the United States, invasive species are often thought of as species that come from other continents. However, invasive species in some regions of the United States are actually native to another region in the United States. For example, the bullfrog (*Rana catesbeiana*) is native in the eastern United States but is considered an invasive species west of the Rocky Mountains. Bullfrogs were introduced west of Rockies in the 1800s for human consumption. They have since proliferated and have disrupted the existing food chains by feeding on local amphibians.

This leaflet is intended to serve as a brief introduction to invasive species for landowners. The potential ecological and economic impacts of invasive species are addressed. Case studies for six invasive species are presented to illustrate the diverse and often detrimental effects of these species invasions. General methods of control are presented, and various assistance programs are listed for landowners wishing to control invasive species on their land.

Ecological impacts

The ecological impacts of invasive species can be both severe and wide-ranging. For example, invasive species can impact terrestrial and aquatic ecosystems, natural fire and water regimes, soil productivity and stability, and wildlife habitat and diversity.

Impacts on terrestrial ecosystems

In some terrestrial ecosystems, transformations by invasive species are so complete that the landscape itself has been changed. For example, bluegrass (*Poa pratensis*), often associated with rural Kentucky, is an invasive species from Eurasia that took over the region's native vegetation after European settlement.

Invasive plants often grow in dense patches, displacing native plants and degrading wildlife habitat. Invasive species often have an advantage when competing with native species for food, water, and sunlight. For example, in coastal California, the iceplant (*Carpobrotus edulis*) takes up scarce water that native plant species would otherwise use. It forms a mat over native plants blocking sunlight and, on some California beaches, iceplant is destroying native vegetation that is the habitat for endangered species.

David R. Worley, Florida Departement of Environmental Protection, www.invasive.org

Water Hyacinth (*Eichhornia crassipes*) is an invasive aquatic plant species.

Steve Dewer, Utah State University, www.invasive.org

The tamarisk (*Tamarix* spp.) has invaded nearly one million acres in the western United States.

Impacts on aquatic ecosystems

Aquatic invasive weeds are a significant problem in the United States. For example, exotic aquatic plants including hyacinth (*Eichhornia crassipes*), hydrilla (*Hydrilla verticillata*), and water lettuce (*Pistia stratiotes*) are disrupting native aquatic animal food sources and habitat, choking waterways, changing nutrient cycles, and reducing recreational use of rivers and lakes in Florida and several other southern states. Forty-four native fish species in the United States are considered threatened or endangered due to the presence of nonnative fish species.

Impacts on natural fire and water regimes

Some invasive plant species may affect native ecosystems by changing vegetation fuel properties, which can either promote or suppress fire. Many native species are adapted to a characteristic fire regime and can suffer when this fire regime is altered. If changes in the fire regime subsequently promote the dominance of the invasive species, an invasive plant/fire regime cycle can be established. For example, European cheatgrass (*Bromus tectorum*) has invaded and spread throughout the shrub-steppe habitat of the Great Basin in Idaho and Utah, predisposing the invaded habitat to fires. Before this invasion, fire burned once every 60 to 110 years, and shrubs had a chance to become well established. Now, fires occur every 3 to 5 years, leading to a decrease in shrubs and other mid- and late-seral vegetation preferred by indigenous wildlife.

Invasive species can also alter an ecosystem's natural water regime, causing water tables to rise or lower and, subsequently, making it difficult for native plants and animals to survive. For example, tamarisk (*Tamarix* spp.), has invaded nearly one million acres of flood plains, riparian areas, lake margins, and wetlands in the western United States. Due to the deep tap root and large water requirement of tamarisk, it may deplete water from desert sands, lowering water tables and drying up springs upon which some rare desert fish depend.

Impacts on soil composition

Invasive plants can alter the physical or chemical composition of soils, making it difficult for native plants to survive. Often, invasive species help to increase the survival potential of other nonnative species, thus, profoundly altering the biotic community. For example, firetree (*Morella faya*), a native of the Canary Islands, is transforming soils in Hawaii Volcanoes National Park by fixing nitrogen 90 times faster than native plants. In this area, native plants are being displaced by nonnative species that are able to take root only on sites with fertile soils. Firetree also attracts the introduced Japanese white-eye (*Zosterops japonicus*), a competitor of several native bird species.

Direct impacts on wildlife

Native wildlife can be negatively impacted by both plant and animal invasives. Invasive plants are spreading and invading approximately 1,700,000 acres

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The invasive brown tree snake (*Boiga irregularis*) prays on native wildlife on the island of Guam.

USDA, APHIS PPQ Archives, USDA APHIS, www.invasive.org

In Texas, the red fire ant is the target for millions of dollars in invasive species control.

of wildlife habitat in the United States each year. Invasive animal species can reduce or even eliminate populations of native wildlife through predation, grazing, competition, and habitat alteration. Through predation, the brown tree snake (*Boiga irregularis*), a native of the South Pacific and Australia, has led to the extirpations of 10 native bird species, 6 native lizard species, and 2 native bat species on the island of Guam.

Threatened or endangered species or those whose natural range and population size are already limited are particularly vulnerable to invasive species. Approximately 42 percent of threatened or endangered species in the United States are considered to be at risk primarily due to competition with or predation by nonnative species.

Economic impacts

Invasive species have caused major financial losses in agriculture, forestry, and other economic sectors around the world. These species impact the economy through loss of potential economic output (loss of crop production, reductions in livestock fitness) and through the direct costs of combating invasions including quarantine, control, and eradication. For example, the glassy-winged sharpshooter (*Homalodisca coagulata*), an invasive insect in California, carries with it a disease that has caused nearly $40 million in losses of California grapes. The red fire ant (*Solenopsis invicta*) kills poultry chicks, as well as wildlife species such as lizards, snakes, and ground-nesting birds. In Texas, $200 million per year is invested for controlling red fire ant. One study estimates that the total cost of invasive species in the United States amount to more than $100 billion each year.

For individual landowners, the economic trade-offs of invasive species can be complicated. Some invasive species are considered valuable forage for livestock, and others may reduce soil erosion. Furthermore, invasive plant species often require less time and effort to establish themselves than native species. In the past, the U.S. Department of Agriculture (USDA) promoted the use of some nonnative plant species (kudzu to decrease soil erosion) that quickly became invasive. However, as a member of the National Invasive Species Council (see Establishment of the National Invasive Species Council), the USDA now works to prevent the introduction of invasive species and to minimize the economic, ecological, and human health impacts that invasive species cause. Though there may seem to be some initial economic benefits associated with some nonnative species, landowners are strongly advised to encourage native species and discourage nonnative or invasive species wherever possible. In the long run, native species generally will provide more ecological and economic benefits than nonnative ones.

Case studies

The case studies that follow will give the reader an understanding of some of the most widespread and/or serious invasive species in the United States. The case studies include three invaders of terrestrial ecosystems, one of wetland ecosystems, and two of aquatic ecosystems. This list is by no means exhaustive and is simply intended to demonstrate the diversity of invasive species and the damage they can do. For a more comprehensive list of invasive species case studies, see *www.invasivespeciesinfo.gov* or *http://www.issg.org/database/welcome/*. Although control methods are mentioned in this section, it is recommended that the landowner consult with natural resource professionals before undertaking an invasive species control plan for their specific situation.

Management and control

Eradication of invasive species is difficult and requires large inputs of time and money. Eradication is easier if an invasive species is detected early and an eradication plan is undertaken quickly. Some eradication efforts have been successful. However, the complete eradication of invasive species is often impossible, and efforts are more often focused on man-

Establishment of the National Invasive Species Council

On February 3, 1999, President Clinton signed Executive Order 13112, establishing the National Invasive Species Council. Executive Order 13112 is intended to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. The National Invasive Species Council is interdisciplinary and helps to coordinate and ensure complementary, cost-efficient, and effective federal activities regarding invasive species.

agement and control. Many invasions can be reversed or slowed, and infested areas can be restored to healthy ecosystems.

Before attempting to manage or control invasive species, landowners must first learn what, if any, invasive species exist on their properties. The Natural Resources Conservation Service (NRCS) assessment protocol can assist landowners in determining to what extent invasives are present. Some invasive species may be well known to landowners, whereas others may be less well known. It is suggested that landowners begin by compiling a list of aquatic and terrestrial plants, animals, and insects that can be found on their own or adjacent properties. From this list, landowners can consult with local natural resource professionals to find out which species are invasive. Online invasive species databases may also be helpful in this regard. Many of these databases can be found at *http://www.invasivespeciesinfo.gov/resources/databases.shtml*. If invasive species are found to be present, the landowner can pursue management and control activities specific to those particular species.

Landowners should remember that methods used to control invasive species can both positively and negatively affect the ecosystem. The landowner must determine which control method or methods will be most effective in controlling invasive species while being least damaging to the ecosystem. It is recommended that landowners consult with local natural resource professionals before undertaking any invasive species management plan.

There are three main approaches to invasive species control: mechanical, chemical, and biological control methods. More often than not, invasive species control requires the combination of several methods. For example, cutting followed by herbicide applications is effective in controlling some invasive plant species.

Mechanical methods

Mechanical methods for plants for controlling invasive species include pulling, cutting, or grazing; for animals, they include hunting, trapping, and exclusion by physical barriers. Mechanical methods can be extremely specific, minimizing damage to other organisms. Mechanical techniques are most effective when the invasive population is relatively small. For larger populations, mechanical controls can quickly become labor-intensive and cost-prohibitive. When using mechanical techniques to control invasive plants, the nature of the plant must be known in advance; sometimes plants can grow back much more quickly from the root system than they did initially. Frequently, these methods must be administered repeatedly to prevent the plant from reestablishing in a given area.

Grazing—Depending on the invasive plant species, grazing can either promote or reduce its abundance at a particular site. Grazing is often combined with chemical or biological control methods to reduce or eliminate infestations. Grazing animals can also be used as part of a restoration program by breaking up the soil and incorporating seeds of desirable native plants. Animals should be brought into an infested area at a time when they will be most likely to damage the invasive species without significantly impacting the desirable native species. This can be done during seed or flower production of the invasive plant.

Burning—Many invaded habitats are best treated by restoring the ecosystem's natural disturbances such as fires or floods. In particular, prescribed burning can be used in some areas to promote native plant and animal species. The most effective burns for controlling invasive plant species are often those performed just before flowers or seeds set or at the young seedling/sapling stage. Repeated burns are sometimes necessary to effectively control invasive plants, and chemical methods may be required in combination with burning. Caution must be exercised and professional advice obtained since, in some cases, prescribed burns can promote an invasive species, such as when their seeds are specially adapted to fire or when they resprout vigorously.

NRCS

Grazing is often combined with chemical or biological methods to reduce or eliminate infestations.

Chemical methods

Chemical methods involve the use of insecticides, herbicides, or other pesticides to kill the species in question. For example, herbicides and soil fumigants have been instrumental in the successful reduction of witchweed (*Striga asiatica*) from 400,000 acres to 15,000 acres in North Carolina. Unlike mechanical controls, chemical controls may not be specific to the species being controlled. In addition to killing the invasive species, pesticide applications can destroy native plants and animals if not applied properly and safeguards followed. Chemicals must be used carefully and according to the labeled directions to minimize harmful effects on nontarget species.

Biological methods

Biological control methods use organisms such as animals, fungi, or other microbes to feed upon, parasitize, or otherwise interfere with an invasive species. For example, South American alligator weed (*Alternanthera philoxeroides*) has been controlled in Florida and Georgia by the alligator weed flea beetle (*Agascicles hygrophila*), also from South America. Biological controls are not expected to eliminate the invasive species but rather to control their abundance. When the invasive species increases in numbers, the biocontrol organism increases correspondingly, causing the invasive species to decline. Biological control is often used for large infestations of invasive species; however, it may also be a viable option for landowners.

Biocontrols are carefully selected and screened to make sure they will not attack crops or nontarget species before they are certified for use. Although slower acting than mechanical or chemical controls, biological controls may be the best choice for long-term management of an invasive species problem. In general, biological control is cost-effective and the best alternative for stopping invasions which could consume production and support systems. Biocontrol continues to be the only potential method for controlling widely dispersed and inaccessible invasives like old world climbing fern (*Lygodium microphyllum*) in the Everglades.

Control of invasive species that are well established and that occupy large areas may require the use of two or more methods used at the appropriate times. Use of a number of methods for the control of an invasive or pest species is referred to as integrated pest management. For more information on integrated pest management options, refer to Fish and Wildlife Habitat Management Leaflet Number 24: Integrated Pest Management (IPM) and Wildlife. Immediate mechanical or chemical control of an invasive species followed by biological control may be the most effective approach for long-term management.

Robert H. Mohlenbrock, USDA NRCS Plants database, www.invasive.org

Biocontrols are used on aligator weed (*Alternanthera philoxeroides*) in Florida and Georgia.

University of Connecticut

Dense mats of hydrilla impede recreational use of lakes and rivers, but also provide food and refuge for wintering waterfowl.

Terrestrial ecosystem invaders

European starling (Sturnus vulgaris)

Description: Medium-sized bird; in the summer, plumage is black with purple and green iridescence and bill is yellow and legs are reddish; in the winter, plumage is black with light colored tips on the feathers

Native range: Eurasia and North Africa

Invasive range: Throughout the United States

History: Introduced in New York in 1890 and 1891 by an individual who wanted all birds mentioned in the work of William Shakespeare to be established in the United States. In 1994, it was estimated that 140 million European starlings lived in North America.

Ecological and economic impacts: European starlings contribute to the decline of native bird populations through competition for resources and nesting space. They usurp other birds' nests by contamination and physical competition. They can damage infrastructure and pose health risks to humans and livestock. European starlings cost hundreds of millions of dollars in agricultural damage each year due to consumption and contamination of livestock feed and stored grain and damage to fruit crops. On the beneficial side, European starlings do consume some insects and other invertebrate pests.

Control methods: Exclusion, trapping, shooting, poisons, tactile and sounds repellents, and startle devices

For more information, visit *http://www.invasivespecies.gov/profiles/eurostarling.shtml.*

Kudzu (Pueraria montana)

Description: Deciduous vine, 35 to 100 feet long, lobed three-leaflet leaves, large root crowns that increase in size with age

Native range: Japan and China

Invasive range: Most severe in the southeastern United States but can occur as far north as Connecticut and Illinois and as far west as Oklahoma and Texas

History: First introduced to the United States as an ornamental vine in 1876. Later, it was grown in southern states as a forage crop to reduce erosion and improve the soil. In 1935, the Soil Conservation Service began using it to prevent soil erosion on road cuts and farmlands. By 1955, kudzu had overtaken native vegetation and infrastructure in many areas. Today, kudzu has infested over 7 million acres in the Southeast.

Ecological and economic impacts: Kudzu blankets the ground and existing vegetation with a dense canopy through which little light can penetrate. Few plants can survive when covered by kudzu.

Control methods: Prescribed burning combined with herbicide application

For more information, see Driesch et al. *Biological Control of Invasive Plants in the Eastern United States* or Miller, J. H. *Nonnative Invasive Plants of Southern Forests*, or visit *http://www.invasivespecies.gov/profiles/kudzu.shtml.*

U.S. Fish and Wildlife Service

European starling

U.S. Fish and Wildlife Service

Kudzu

Tree-of-heaven (Ailanthus altissima)

Description: Deciduous tree, up to 90 feet tall with a broad spreading crown of few branches, gray bark, 1- to 3-foot light green to reddish stalks divided into 12 to 30 pointed leaflets, flowers between April and July with small yellowish-green flowers, flowers develop into wing-shaped fruits on female trees

Native range: Eastern China

Invasive range: In the East, it is distributed from Massachusetts and southern Ontario south to Texas and northern Florida. Less abundant but still prevalent in the West, it grows from New Mexico west to California and north to Washington.

History: Introduced to North America on three distinct occasions. In 1784, it was introduced to Pennsylvania as an ornamental plant. In 1820, it was again planted as an ornamental in New York. Finally, Chinese immigrants during the gold rush introduced tree-of-heaven to California, probably due to its medicinal uses and cultural importance. Tree-of-heaven was available commercially by 1840.

Ecological and economic impacts: Tree-of-heaven colonizes disturbed, semi-natural habitats and riparian areas. It grows rapidly and forms dense stands, displacing native vegetation. It colonizes by root sprouts and spreads by prolific wind and water-dispersed seeds.

Control methods: Herbicides and cutting

For more information, see Miller, J. H., *Nonnative Invasive Plants of Southern Forests*, or visit *http://www.invasivespecies.gov/profiles/treeoheaven.shtml.*

Wetland ecosystem invader

Purple loosestrife (Lythrum salicaria)

Description: Wetland plant, 1 to 4 feet tall, 30 to 50 square stems, lance-shaped leaves that grow opposite each other on the stem or in whorls of three, spikes of purple flowers between June and September

Native range: Eurasia

Invasive range: Much of the United States, particularly serious in the Northeast and Upper Midwest

History: First introduced to the United States in the early 1800s, both accidentally (in ship ballast water) and intentionally (for medicinal and ornamental uses). Since 1880, its distribution has been increasing rapidly.

Ecological and economic impacts: Purple loosestrife out competes native plants and reduces the availability of food and shelter for wildlife. It has caused reductions in 44 native plants and wildlife species including the endangered bog turtle, waterfowl, amphibians, and butterflies. Stands can grow to thousands of acres in size, eliminating open water habitat. Purple loosestrife costs $45 million per year in control methods and forage losses.

Control methods: Herbicides, hand pulling, and cutting. Digging should not be attempted because soil disturbance may enhance the spread.

For more information, see Driesch et al., *Biological Control of Invasive Plants in the Eastern United States*, or visit *http://www.invasivespecies.gov/profiles/purplstrf.shtml.*

Chuck Bargeron, University of Georgia, www.invasive.org

Tree-of-heaven

Bernd Blossey, Corness University, www.invasive.org

Purple loosestrife

Aquatic ecosystem invaders

Eurasian water-milfoil (Myriophyllum spicatum)

Description: Submersed aquatic plant with many finely divided leaves that are limp when out of the water; long stems often branching at water surface, flowers on emerged spikes

Native range: Eurasia and North Africa

Invasive range: Throughout much of the United States, particularly problematic in the Northeast, northern Midwest, and Pacific Northwest.

History: First introduction difficult to determine due to past confusion with a similar native aquatic plant. Established in the United States by the 1940s, although may have been in the United States since 1900 or earlier. Eurasian water-milfoil was probably brought to the United States on a commercial or private boat or possibly dumped from an aquarium.

Ecological and economic impacts: The Eurasian water-milfoil grows rapidly in ponds, lakes, and pools of stagnant or slowly moving fresh to slightly brackish water, creating dense canopies at the surface that reduce light penetration. It reduces species diversity, fish spawning areas, and the abundance of native water plants, macroinvertebrates, and native fish. Recreational use of waterways is virtually impossible where the Eurasian water-milfoil grows.

Control methods: Mechanical methods and herbicides

For more information, see Driesch et al., *Biological Control of Invasive Plants in the Eastern United States* or visit *http://www.invasivespecies.gov/profiles/watermilfoil.shtml*.

Zebra mussel (Dreissena polymorpha)

Description: Thumbnail-sized mollusk with a striped shell

Native range: Caspian and Black Seas

Invasive range: Most of the aquatic ecosystems in the eastern United States, from the Great Lakes through the Mississippi River drainage.

History: Accidentally introduced in 1988 to the Great Lakes from ballast water of a transatlantic freighter. In less than 10 years, zebra mussels spread to all five Great Lakes and into the Mississippi, Tennessee, Hudson, and Ohio River basins.

Ecological and economic impacts: Zebra mussels reduce the availability of food and oxygen for native fauna. They cement themselves to any and all submerged hard surfaces and have been observed completely covering native mussels, clams, and snails, interfering with these native species' feeding, growth, movement, respiration, and reproduction. Zebra mussel invasions could result in the extinction of up to 140 species. Zebra mussels invade and clog water intake pipes at industrial and utility plants. Water treatment facilities have experienced fouling and loss of intake heads, obstruction of valves, corrosion of cast iron and steel piping, and buildup of methane gasses from the decaying mussel tissue. It is estimated that zebra mussels will soon cause $100 million per year in damages and associated control costs. On the other hand, zebra mussels act as filters and can help to drastically improve water clarity in lakes. Clearer water can increase recreational opportunities such as scuba diving. However, clearer water can also lead to increased vegetative growth, which can decrease opportunities for recreation. Generally, it is thought that the

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Eurasian water-milfoil

Randy Westbrooks, U.S. Geological Survey, www.invasive.org

Zebra mussel

negative impacts of the zebra mussel largely outweigh its positive impacts.

Control methods: Remove attached vegetation and wash boats or trailers before moving them to new lakes or rivers.

For more information, visit *http://www.invasivespecies.gov/profiles/zebramussel.shtml or http://el.erdc.usace.army.mil/zebra/zmis/*.

Assistance programs

Various public and private organizations are available to provide technical and financial assistance to landowners interested in improving wildlife habitat by controlling invasive species. Table 1 lists some of these organization and specific programs.

Conclusion

Invasive species pose a serious environmental threat. They can destroy wildlife habitat, disrupt ecosystem functions, and impact native plant and animal populations. Interference with agriculture and other commercial land uses may require expensive solutions. Invasive species problems must be approached in a coordinated, well-planned manner for successful treatment of their damaging effects. With advice and assistance from natural resource professionals, conservation organizations, and government agencies, landowners can take a proactive approach to eradicating and/or managing invasive species on their land.

Table 1 Example assistance programs for invasive species management

Program	Description	Land eligibility	Opportunities for invasive species management	Contact
Conservation Reserve Program	Up to 50% cost-share for establishing permanent cover and conservation practices, and annual rental payments for land enrolled in 10- to 15-yr contracts	Highly erodible land, wetland, and certain other lands with cropping history, stream-side areas in pasture land	Annual rental payments may include an additional amount up to $5 per acre per year as an incentive to perform certain maintenance obligations including invasive species management activities	NRCS or FSA State or local office
Conservation Security Program	Financial and technical assistance to promote the conservation and improvement of soil, water, air, energy, plant and animal life, and other conservation purposes	Tribal and private working lands in selected watersheds, including cropland, grassland, prairie land, improved pasture, range land, and forested land	Technical and financial assistance available for invasive species management	NRCS State or local office
Conservation Technical Assistance	Technical assistance, including conservation planning, design, and implementation, to help preserve, maintain, and improve natural resources	Private, Tribal, and other non-Federal lands	Technical assistance available for invasive species management	NRCS State or local office
	Cost-share and incentive payments for conservation practices in accordance with 1- to 10-yr contracts	Cropland, range, grazing land, and other agricultural land in need of conservation	Incentive payments may be provided for invasive species management as a component of a larger land management plan	NRCS State or local office
Grassland Reserve Program	Financial incentives, technical assistance, and cost-share for enhancement and restoration of grasslands in permanent or 30-yr easements or rental agreements	Restored, improved or natural grassland, rangeland, pastureland, shrubland, and certain other lands	Participants must follow a site-specific grassland resources conservation plan, which can include invasive species management. Land threatened by invasive species is prioritized for program eligibility	NRCS State or local office
Partners for Fish and Wildlife Program	Up to 100% financial and technical assistance to restore wildlife habitat under a minimum 10-yr cooperative agreement	Most degraded fish and/or wildlife habitat	Restoration projects may include removing of invasive plants and animals that compete with native fish and wildlife and alter their natural habitats	U.S. Fish and Wildlife Service local office
Waterways for Wildlife	Technical and program development assistance to coalesce habitat efforts of corporations and private landowners to meet common watershed level goals	Private lands	Can provide State-specific advice and/or contacts for invasive species management projects	Wildlife Habitat Council

Table 1 Example assistance programs for invasive species management—Continued

Program	Description	Land eligibility	Opportunities for invasive species management	Contact
Wetlands Reserve Program	Up to 100% cost-share and technical assistance to address wetland, wildlife habitat, soil, water, and related natural resource concerns in an environmentally beneficial and cost-effective manner under 10-yr contracts, 30-yr easements, or permanent easements	Previously degraded wetland and adjacent upland buffer, with limited amount of natural wetland and existing or restorable riparian areas	Can provide technical and financial assistance for invasive species management provided these activities are consistent with the protection and enhancement of wetland habitats	NRCS State or local office
Wildlife at Work	Technical assistance on developing habitat projects into programs that allow companies to involve employees and the community	Corporate lands	Can provide State-specific advice and/or contacts for invasive species management projects	Wildlife Habitat Council
Wildlife Habitat Incentives Program	Technical assistance and up to 75% cost-share assistance to establish and improve fish and wildlife habitat for 5 to 10 yr	High-priority fish and wildlife habitats	Cost-sharing is available to manage invasive species that have negative impacts on the habitats of declining wildlife species	NRCS State or local office

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The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

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Wildlife Habitat Council

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The mission of the Wildlife Habitat Council is to increase the amount of quality wildlife habitat on corporate, private, and public land. WHC engages corporations, public agencies, and private, nonprofit organizations on a voluntary basis as one team for the recovery, development, and preservation of wildlife habitat worldwide.

www.wildlifehc.org

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