Nonnative Invasive Plants of Southern Forests
Threats to our Biological Diversity
A Guide to National Strategy

Introduction

Invasive species have been identified by the Chief of the U.S. Department of Agriculture Forest Service as one of the four significant threats to our Nation's forest and rangeland ecosystems.

Prevention

The most effective strategy against invasive species is to prevent them from ever being introduced and established. Preventive measures typically offer the most cost-effective means to minimize or eliminate environmental and economic impacts. Prevention relies on a diverse set of tools and methods, including education. The Forest Service has a wealth of experience and skills within its own organization in addition to those available through numerous collaborators. As an agency capable of working across the landscape and with international partners, the Forest Service is in a good position to lead efforts to prevent potential invaders.

Our emphasis will be to identify and protect forests and grasslands that have not been invaded by invasive species. Prevention includes education and outreach to raise the awareness of the invasive species problem and reduce the chance of unintentional introduction of invasive species. By enlisting the skills of our science and education programs, we can achieve a successful invasive species prevention awareness campaign on a national scale. Establishing effective domestic and international partnerships is also critical for effective prevention programs.

Early Detection and Rapid Response

The Forest Service is actively working with partners to detect new invasive species infestations and support the infrastructure necessary to rapidly contain or eradicate these infestations.

Sometimes considered the "second line of defense" after prevention, early detection and rapid response (EDRR) is a critical component of any effective invasive species management program. When new invasive species infestations are detected, a prompt and coordinated containment and eradication response can reduce environmental and economic impacts. This action results in lower cost and less resource damage than implementing a long-term control program after the species is established.

Early detection of new infestations requires vigilance and regular monitoring of the managed area and surrounding ecosystem. The Forest Service is well suited to improve its early detection capabilities through the collaborative and coordinated efforts of numerous agency programs, field offices, and partners. We are proactive in developing broad networks with many partners to detect, contain, and eradicate new invasive species before they become established.

Eurasian watermilfoil (Above) is recently introduced and spreading. Threatens native game fish and aquatic habitat.

Control and Management

The Forest Service currently has programs for control and management of invasive species in terrestrial and aquatic ecosystems. Many of these activities are accomplished with partners across jurisdictional boundaries. We identify and prioritize which invasive species will be controlled and managed and we strive to effectively implement management plans to do so. When invasive species become established as free-living populations in an ecosystem, a strategic approach for control is required to minimize their impacts or reduce their spread. Effective control relies on a clear understanding of the target species including its biology, the ecosystem it has infested, and associated introduction pathways and effective tools. It also relies on persistent follow-through with monitoring of treatment efficacy. Forest Service control and management activities are founded on integrated pest management principles that may include a combination of physical or mechanical, biological, cultural, and chemical techniques. This integrated approach also includes assessments of risk, identification of thresholds for action, and planning to reach the most desired outcome. Tools developed by Forest Service and partners support our control and management activities. In addition, the Forest Service works collaboratively with domestic and international partners to identify potential new techniques and biological control agents for invasive species control and management. A key component of the Forest Service's Invasive Species Management Program is to determine the extent and progression of invasive species that have been introduced into aquatic and terrestrial ecosystems. Using inventory data collected from a variety of sources, the Forest Service develops estimates of the size of targeted infestations and the rate of spread for those species or groups of species.

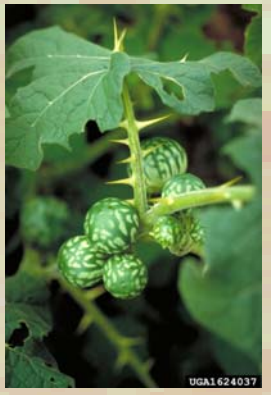
Restoration and Rehabilitation

The Forest Service is striving to restore or rehabilitate degraded areas to their proper ecological function to prevent invasive species infestations or to prevent reoccurrence after invasive species removal. Because each invasion characteristic is unique, specific restoration and rehabilitation programs need to be designed at the appropriate level. The application of appropriate restoration and rehabilitation concepts to invasive insect, animal, or pathogen problems is also a critical component of a fully functional invasive species program. The Forest Service improves its effectiveness by pooling the expertise of partners in rehabilitation and restoration efforts and technology development.

The Forest Service is experienced in conducting rehabilitation and restoration programs—from the project level to broader ecoregional scales, which address the effects of disturbance from a variety of sources—and restoring ecosystem sustainability.

With respect the relationship between invasive plants and fire impacted areas, our Burned Area Emergency Rehabilitation (BAER) program provides support to restore burned areas with native species that have the greatest chances of success and where native seed is readily available.

Resource managers have an increased awareness of invasive species issues and the need to incorporate native or desired nonnative species into restoration and rehabilitation planning to mitigate mining, road construction and maintenance, recreation, and other ground-disturbing activities. The Forest Service has strong partnerships with other Federal, State, and nongovernmental entities. Although invasive species management may not be a stated purpose for these entities, their activities may lead to ecosystem restoration that may help the ecosystem resist future invasions.



Plant. Upright, thorny perennial subshrub or shrub, 3 to 6 feet (1 to 2 m) in height, with leaves shaped like oak leaves, clusters of tiny white flowers, and green-to-yellow golf-ball size fruit. Fruit sweet smelling and attractive to livestock and wildlife. Remains green over winter in most southern locations.

Ecology. Occurs on open to semishady sites. Viable seed in green or yellow fruit but not in white fruit. Reaches maturity from seed within 105 days. Persists by green stems or rootcrowns in warmer areas. Rapidly spreading by cattle and other livestock transportation and by wildlife-dispersed seeds as well as seed-contaminated hay, sod, and machinery.

Tropical Soda Apple (Left)

Chinese Tallowtree (Above and Right).

Plant. Deciduous tree to 60 feet (18 m) in height and 3 feet (90 cm) in diameter, with heart-shaped leaves, dangling yellowish spikes in spring yielding small clusters of three-lobed fruit that split to reveal popcorn-like seeds in fall and winter.

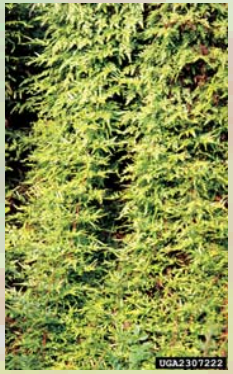
Ecology. Invades stream banks, riverbanks, and wet areas like ditches as well as upland sites. Thrives in both freshwater and saline soils. Shade tolerant, flood tolerant, and allelopathic. Increasing widely through ornamental plantings. Spreading by bird- and water-dispersed seeds and colonizing by prolific surface root sprouts.

Water hyacinth is a free floating aquatic plant that has invaded aquatic areas throughout the United States. Plants can grow to 3 ft. in height. The very showy blue-purple flowers are born on upright spikes. Each flower has six petals with the uppermost having a yellow patch. Water hyacinth invades lakes, ponds, rivers, marshes, and other types of wetland habitats. It reproduces chiefly by vegetative means and can quickly form dense floating mats of vegetation (populations can double in size in two weeks!). These dense mats restrict light to the underwater environment, reduce the light availability for submersed plants and aquatic invertebrates, and deplete the oxygen levels. Water hyacinth is native to South America

Water Hyacinth (Above Right)

Deep Rooted Sedge (Above)

Deep rooted sedge (*Cyperus entrerianus*), a native of South America, has recently become a serious pest in the coastal plain of the southeastern United States. First reported in the United States in 1990, this aggressive weed is now well established in disturbed habitats in Texas, Louisiana, Mississippi, Alabama, Georgia, and Florida. Flooding, construction equipment, mowing, and soil moving activities, especially along highways, all spread its tiny seeds, resulting in infestations in new areas. Currently deep rooted sedge is beginning to displace native vegetation even in undisturbed habitats, and without widespread control it will likely continue to spread rapidly, infesting agricultural, forested, riparian, and urban areas.



Japanese Climbing Fern (Above and Right).

Plant. Perennial viney fern, climbing and twining, to 90 feet (30 m) long, with lacy finely divided leaves along green to orange to black wiry vines, often forming mats of shrub- and tree-covering infestations. Tan-brown fronds persisting in winter, while others remain green in Florida and in sheltered places further north. Vines arising as branches from underground, widely creeping rhizomes that are slender, black, and wiry. **Ecology.** Occurs along highway right-of-ways, especially under and around bridges, invading into open forests, forest road edges, and stream and swamp margins. Scattered in open timber stands and plantations, but can increase in cover to form mats, smothering shrubs and trees. Persists and colonizes by rhizomes and spreads rapidly by wind-dispersed spores. Dies back in late winter with dead vines providing a trellis for reestablishment.

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