

The green menace: thousands of non-native plants have gained a foothold on some 2.6 million acres of national parkland. To help eradicate these plants, the National Park Service has established Exotic Plant Management Teams throughout the country

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Full Text:

Alien invaders ooze toxins into the soil, affecting the health of nearby plants, or they grow so vigorously that they cover virtually any stationary object, eventually blocking the sun. These invaders are strangling and suffocating the native flora on millions of acres of national parkland.

The National Park Service (NPS) is countering this botanical aggression with a force of its own. Protected by helmets, face guards, reinforced chaps, and steel-toed boots, or wrapped in goggles, gloves, and chemical-resistant Tyvek suits, mobile strike forces of Park Service recruits march into the woods in pursuit of targets with names like bittersweet, mile-a-minute vine, knapweed, and kudzu. Sixteen different Exotic Plant Management Teams have been established around the country to deal with non-native plant invasions in national parks. Thus far, they have eradicated or controlled a dozen species, but given the number of intruders, these specialized teams have their work cut out for them.

Each year invasive exotic plants infest about 100 million new acres, a land mass about twice the size of Delaware. Public natural areas lose an estimated 4,600 acres per day to these aliens. The plants are spread by birds, by the wind, in mud on construction equipment, and in feed for horses. Elimination is a huge task, but left unmanaged, the invaders will eventually rob the parks of their treasured biological resources.

NPS Director Fran Mainella has said that non-native species "pose a major and nearly universal threat to the preservation and restoration of natural habitats" within the National Park System. In fact, nonindigenous plants have gained a foothold on some 2.6 million acres of Park Service land. Non-native, invasive species typically comprise 15 to 25 percent of a park's plant populations. According to Forest Ecologist James Akerson, leader of the Mid-Atlantic Cooperative Exotic Plant Management Team based at Shenandoah National Park in Virginia, 319 of the park's identified 1,376 vascular plant species (23 percent) are aliens.

Akerson's team serves ten park units in addition to Shenandoah, including Appomattox Court House National Historical Park and Booker T. Washington National Monument in Virginia, and Gettysburg National Military Park in Pennsylvania.

"Mild climate and abundant rainfall in the Mid-Atlantic and southeastern states create ideal conditions for the growth of exotics," says Akerson. Among the team's foes are Japanese barberry and privet shrubs, kudzu and oriental bittersweet vines, tree of heaven, garlic mustard, mile-a-minute weed, phragmites, Japanese stiltgrass, and Johnson grass.

Two of the most pernicious alien species in the region are oriental bittersweet and tree of heaven. "Oriental bittersweet is the kudzu of the MidAtlantic," says Akerson of the ornamental vine with orange seeds. "It has the potential to kill large areas of forest vegetation" by preventing photosynthesis or girdling and toppling trees with excessive weight. Tree of heaven, which creates toxins that suppress

the growth of surrounding plants, can produce up to 325,000 seeds annually and now chokes fields and forest edges in 42 states.

Hundreds of thousands of plant species have been introduced to this continent either accidentally or intentionally. Mile-a-minute vine was first documented 70 years ago in York County, Pennsylvania. It now invades fields, forests, backyards, and wetlands throughout the Mid-Atlantic region. Melaleuca trees, an Australian import, clog portions of the Everglades. Spotted knapweed, a Eurasian immigrant, is considered western Montana's toughest problem weed. It has shown up in native grasslands along roadways at Glacier National Park.

Leafy spurge, from Eurasia, has taken over prairies in the northern Great Plains. The plant can displace native grasses and forbs in just a few years, says Linda Drees, Park Service Exotic Plant Management Team coordinator. "Badlands National Park has the largest mixed-grass prairie protected by the National Park Service, yet more than 8,200 acres are occupied by non-native invasive forbs, and 2,100 acres are dominated by non native grasses. Critical habitat for bison, elk, and bighorn sheep is being encroached upon, or in some localities have been completely replaced by exotic plants."



A monarch on a native cardinal flower.

Occurrences of non-native plants invading the continent have escalated because of increased international travel and global trade. In the last 100 years, nearly 4,500 plant and animal species of foreign origin have established free-living populations in this country, and the economic costs are high. The Weed Science Society of America lists 2,100 species that cause economic harm in the United States and Canada. Non-native species damage cash crops and invade rangelands, making them worthless for grazing. An estimated \$100 million a year is spent to control non-native aquatic plants such as hydrilla, which blocks canals, impedes navigation, and can reduce the productivity of recreational fishing. The National Park Service alone spends more than \$2 million annually on controlling exotic plants

Invasive species multiply rapidly because controlling factors, such as diseases or animal predators that keep them in check within their native ecosystems, are lacking in their new surroundings. Their biological characteristics ensure copious seed production, long viability in the soil, and quick maturation to produce the next generation. They outcompete natives for sunlight, water, and soil nutrients.

"The startling invasions of kudzu vine, mile-a-minute, and oriental bittersweet are difficult to control," says James Akerson, "but with a will and persistence, they are controllable. More worrisome are

species like garlic mustard and Japanese stiltgrass. Most people take little notice of them because they're low to the ground and don't seem as dangerous, but the damage they cause is astounding. No native wildflowers grow where they dominate, and few shrubs and trees can find their way through them."

Garlic mustard is a European herb introduced by settlers for medicinal purposes. It pervades woodlands in MidAtlantic and Midwestern states, bearing clusters of tiny white flowers in its second year that quickly mature into slender pods full of shiny black seeds. When the pods pop open, the seeds are flung several yards from the parent. At Shenandoah and elsewhere throughout the region, white-tailed deer munch native wildflowers but avoid the garlic-tinged leaves. Eventually the plant crowds out native bloodroot, toothwort, trillium, spring beauty, and Dutchman's breeches. The garlic mustard's spread also contributes to the demise of the West Virginia white butterfly, a declining species. The butterflies ordinarily lay eggs on toothwort, a native mustard, but when this plant disappears, the butterflies lay eggs on the European import. Chemicals in the garlic mustard prevent the eggs from developing properly.

The Animal and Plant Health Inspection Service, a division of the U.S. Department of Agriculture, is charged with preventing the introduction and establishment of invasive aliens. An executive order mandates that agencies, including the National Park Service, the U.S. Fish and Wildlife Service, U.S. Forest Service, and Bureau of Land Management, control and eliminate these plants. In all, 17 federal entities make up the Federal Interagency Committee for the Management of Noxious and Exotic Weeds.



Trillium often is crowded out by invasive species.

Four years ago, the Park Service began organizing skilled strike forces of plant management specialists, modeled after similar teams used to fight wildfires. Each Exotic Plant Management Team (EPMT) is capable of assisting multiple parks in its geographic area with inventory, control, and monitoring of exotic plants. In addition to Shenandoah, teams are based in Alaska, Arizona, California, the District of Columbia, Florida, Hawaii, Nevada, New Mexico, North Carolina, North Dakota, Pennsylvania, Texas, Washington, and Wyoming. Another team will be based in the Great Lakes region. Funding for these special units has come from the Natural Resource Challenge, a program begun nearly five years ago that was intended to improve scientific understanding and to create Science and Learning Centers in the parks. This initiative also was designed to sock additional funds from Congress for high-priority natural resource park projects.

In 2003, the 16 teams inventoried 619,000 acres of Park Service land, identifying gross infestations of weed species on 518,898 acres. Since the inception of the teams, 12 exotic plant species have been eradicated or controlled to a maintenance level, including Australian pine at Dry Tortugas National Park and De Soto National Memorial in Florida and tamarisk at Hubbell Trading Post National Historic Site in Arizona, Colorado National Monument in Colorado, and Joshua Tree National Park and Mojave National Preserve in California.



Garlic mustard and other invasive species outcompete native plants for sunlight, water, and soil nutrients.

EPMTs currently assist 219 parks. Each team has a liaison that works with park managers to develop site-specific plans. Using state noxious weed lists, team directors determine which invaders are most troublesome. They also interview park managers to learn which cultural resources or architectural sites need protection and where pressure on endangered or threatened species occurs. Team directors enter potential damage data into a ranking matrix to determine treatment priorities. They monitor control and restoration efforts on a sophisticated web-based system with Geographic Information System maps.

After identifying priorities, team members use a variety of techniques to kill as many of the non-native plants as possible, while limiting any side effects. In early summer, for example, the MidAtlantic team pulls mile-a-minute and garlic mustard plants before they flower. In late August, they cut Japanese stiltgrass before it goes to seed. For small infestations, they "point mad squirt" herbicide. Team members treat areas overrun with a single plant such as kudzu more aggressively. In winter, the MidAtlantic team applies herbicide to the stems of tree of heaven, privet, barberry, multiflora rose, and Japanese honeysuckle, cutting where aesthetics dictate. These applications are highly effective, but follow-up is needed for three to five years to ensure eradication.

"Four to six people on a regional EPMT are never going to get the job done," says Akerson. "Controlling invasive exotics is a much bigger problem than any one landowner can handle. The NPS alone certainly can't stem the invasion. We need the help of our neighbors and visitors. The greater community needs NPS lands and resources to provide refugia for a host of native plants and animals. We need their eyes and energy to spot invasions and control them--on their own land first and perhaps, as they have interest, in parks as well."

Like Sisyphus, the mythological figure sentenced to push a rock uphill only to have it roll down when he approached the summit, the Park Service's special teams face a formidable task. Even so, they are making headway, and attention directed to this problem is greater than at any recent time. EPMT

Coordinator Linda Drees affirms, "This is a golden time to manage invasive species in national parks." Like the scores of dedicated field workers dealing with this problem on a daily basis, she believes control of invasive species in national parks is possible if the agency stays the course. If it doesn't-- much of the nation's biological riches could be lost.



Native fritillary butterflies rely on native plants, such as the purple cone flower, for food.

Tips for Eliminating Exotic Plants In Parks

Informed visitors can help reduce the spread of exotic plants and help to protect the parks. Here's how:

- * Visit exotic plant web sites to become familiar with the most worrisome aliens in your area. Excellent sites include www.invasivespecies.gov and www.nps.gov/plants/alien
- * Backcountry users should report sightings of exotic plants growing in remote areas to the park's resource management staff.
- * Boaters should remove plants or mud stuck to watercraft and trailers before leaving the ramp area. Also, thoroughly clean paddles, clothing, and pets that contact the water.



A Park Service technician sprays kudzu vines.

* Horseback enthusiasts should provide weed-free feed for animals that will be ridden in parks or used for overnight camping.

* Users of recreational and off-road vehicles should remove weed seeds in tire treads before entering the park and stay on authorized trails.



Melaleuca and other invasives threaten Everglades, above, and Big Cypress.

* Hikers should clean caked mud from their boots before venturing on park trails.

Celebrate Natives

Numerous plants introduced for private landscaping or flower gardens have spread into the wild, threatening native ecosystems. Purple loosestrife, English ivy, and oriental bittersweet are among the worst offenders in the East. Scotch broom and eucalyptus pose serious problems in the West. Stop the spread of exotic plants by consulting state invasive plant lists and encouraging nurseries, especially those you patronize, not to sell non-native, invasive species.

If you garden, consider replacing exotic species with natives. They are often hardier, require less care, and host beneficial insects or birds. For more good reasons to plant natives, and a step-by-step formula to create your new garden, visit www.npca.org/gardening

Never dig native species from the wild. Instead, purchase plants from a reputable nursery that propagates its stock responsibly. Become an advocate for native landscapes by sharing your knowledge with fellow gardeners so they do not unsuspectingly purchase or plant invasives. Consider asking your homeowners' association or your county environmental office to sponsor a program on landscaping with native plants.

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