

The U.S.
National Park Service
Experience With
Exotic Species

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This issue of the Natural Areas Journal is devoted to the problems for nature conservation caused by exotic species. The papers presented are selected from those given at a special session on exotic species control at the Natural Areas Association's Sixteenth Annual Natural Areas Conference held October 17-20, 1989 at Knoxville, Tennessee.

The session chairmen were Mr. Keith Langdon of the U.S. National Park Service and Mr. John Schwegman of the Illinois Department of Conservation. The program consisted primarily of invited papers along with panels addressing biocontrol of weeds, exotics control through management, and control through regulations.

The program began with comments from Dr. Eugene Hester, Associate Director Natural Resources, the National Park Service. His comments on the service's experience with exotics and their impact on the national parks served as an introduction to the session, and are reprinted here as an introduction to this special issue of the Natural Areas Journal.

Exotic species constitute a major threat to the integrity of native ecosystems in the U.S. National Park System. National Park Service (NPS) policy generally prohibits the introduction of exotic species into natural zones of national parks; exotic species that threaten park resources or public health are to be managed or eliminated if feasible. Exotic species are defined by the NPS as "those that occur in a given place as a result of direct or indirect, deliberate or accidental actions by humans (not including deliberate reintroductions)."

In a survey conducted by the NPS in 1977, 155 parks reported the presence of one or more exotic vertebrate species. In 1986 and 1987, the NPS conducted a systemwide survey of the condition of natural resources in parks and the specific sources of threats to those resources. Out of a list of 101 threat sources, exotic plants were the most commonly reported threat, and exotic animals were the fourth most commonly reported. Eighty-eight parks reported a problem with exotic plants, and 44 had problems with exotic animals. Exotics ranked ahead of such well-known threats as poaching and overcrowding. The parks affected by exotics occur in all ten NPS regions, but the highest percentages of such parks are in the Western, Rocky Mountain, Southwest, Pacific Northwest, and Southeast regions.

Among the most troublesome species in parks are kudzu, melaleuca, peppertree, cheatgrass, other bromes, leafy spurge, knapweeds, thistles, tamarisk, gypsy moth, balsam woolly adelgid, pig, goat, mon-

goose, and rat. Our problems with exotics are probably most acute in Hawaii and the Virgin Islands. Here many of the native island species are not able to compete with or avoid introduced species, and they face possible extinction because of the exotics.

Applying our exotics management policy usually involves four major steps: (1) identify the exotic species present, (2) determine which are most disruptive, (3) determine which species are feasible to manage, and (4) prioritize management to the extent that funds are available. Many exotic species in parks are innocuous and do not require management. Some are too difficult or expensive to manage using presently available methods, although some of these may be managed on specially designated areas within parks.

Management of popular exotic species, such as burros in the Southwest, mountain goats in Olympic National Park, and various trout species throughout the country, requires sensitive public education as well as effective management methods.

Our management methods include mechanical, cultural, biological, and chemical techniques, often in combination. Our integrated pest management program provides the guidelines for management of exotics. NPS has used biological control in some situations and is experimenting with it in others. We see biocontrol as a valuable technique but one that entails some ecological risk.

The costs of managing exotics can be quite variable. For example, at Whitman Mission National Historic Site in Washington we have been able to replace exotic grassland vegetation with native plants at a cost of about \$240 per acre. Kudzu removal at several southeastern parks in the early 1980s cost about \$228 per acre. On the other hand, removal of exotic mangroves at Kaloko-Honokohau National Historic Park in Hawaii cost \$50,000 per acre; and live capture and relocation of mountain goats in Olympic National Park ran about \$800 per goat. Our total yearly expenditure for management of exotic species probably is several million dollars. Our parks have identified over 200 unfunded projects, costing almost

\$30 million, that are needed to deal with high-priority exotic species problems.

Because exotics move across park boundaries, cooperation with park neighbors and other agencies responsible for management of exotics is essential. The Exotic Pest Plant Council, which coordinates the exotic plant management activities of more than 30 organizations in south Florida, including NPS, is an excellent example of the type of cooperation needed.

Research and monitoring are also essential, to document effects of exotics, develop effective management methods, and measure the results of management. Re-

search into the ecological role of exotics in ecosystems is also important so that restoration of native ecosystems, rather than simply removal of exotics, can be achieved.

Solving exotic species problems, in our country as a whole and in natural areas specifically, will also depend on public attitudes. In most cases, exotics must be seen as potential threats rather than welcome additions. The U.S. National Park Service will continue to educate people about this issue. Meanwhile, we will press our fight against exotics. We have made progress, but the struggle probably will have no end.