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-
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. Research 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.