



The health of our forests and what we are doing about it

By Terry Cacek

The health of forests in the National Park System is not good. The reasons are many, and they vary from east to west. Although problems with western forests have received the most publicity, the most critical problems may be in the East.

A suite of foreign diseases and insects has assaulted the eastern forests (figs. 1–3). The chestnut, once the dominant tree species in many areas of the East, is ecological-

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ly extinct, as is the American elm. Both were taken by imported diseases. Oak, hemlock, dogwood, ash, maple, beech, and butternut are being diminished by exotic diseases and insects.

For decades, the major management response by the National Park Service in eastern forests has been protecting oaks from attack by the European gypsy moth. Stands are monitored annually, and when egg mass counts exceed threshold levels, the stands are treated with target-specific insecticides.

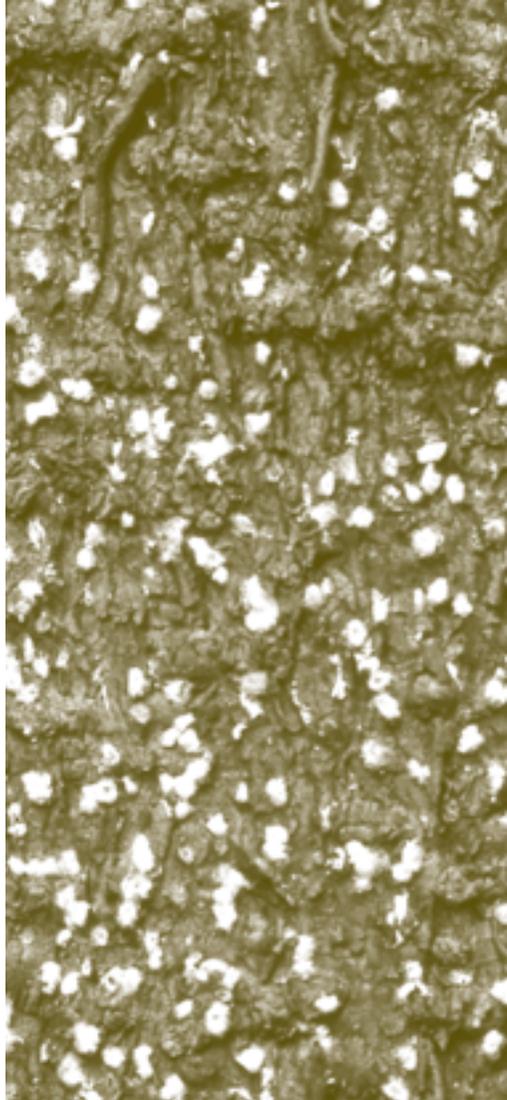
Western forests suffer primarily from excessive tree density, the result of decades of over-protection from natural wildfire. Now, close spacing makes trees vulnerable to catastrophic, unnatural wildfires. The trees compete with each other for space, light, water, and nutrients. This crowding combines with stresses associated

with air pollution, long-term climate change, and recent droughts to weaken the trees and make them vulnerable to

native insects. Under these conditions, bark beetles and other insects kill some trees and move tree density back toward a pristine, healthy condition. Therefore, parks generally manage native insects only in campgrounds and other developed areas.

However, exotic organisms are also threatening western forests. The Port Orford cedar of the Pacific Northwest is being decimated by a root disease. Hikers spread it on the soles of their boots. The staff at Redwood National Park (California) is trying to contain the disease by rerouting a trail around an infected area so that it will be avoided by hikers.

Sudden oak death is a deadly fungus that is no longer confined to oaks, having been confirmed recently in redwood, Douglas fir, and dozens of other species. It spread rapidly along the Pacific Coast but was contained by the barriers of deserts and high mountains. Nevertheless, in 2004 it was detected in nursery stock shipped from California to eastern nurseries. Foresters have scrambled to impose quarantines in the hope of preventing its escape to the wild in the East.



Programmatic action

Two programs in the National Park Service deal with forest health. The larger is the Fire Program, which controls catastrophic wildfires and is assuming a role in reducing tree densities of western forests. Its many activities are beyond the scope of this article. The Forest Health Program assumes the task of protecting forests from immediate attacks by insects and diseases. The program employs the full array of integrated pest management methods, ranging from spraying insecticides to sanitation (i.e., removal of infected trees). Sometimes, the objective is simply to control the rate of spread of an insect or disease. For example, Muir Woods National Monument, northwest of San Francisco, is a hotspot for sudden oak death. Hikers leaving the park are required to walk across a pad soaked with disinfectant to kill the fungus on their boots and prevent its spread to other stands of trees.

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The Forest Health Program is supported entirely by monies from the USDA Forest Service, which funds technical assistance of a highly professional, nationwide staff of forest entomologists and pathologists. The National Park Service typically forwards 12 to 15 proposals to the Forest Service annually, with total funding requests in the range of one-third to one-half million dollars. In most years, about 90% of the proposals are funded.

Forests for the future

What should ultimately be the goal of these interventions to aid forests in the National Park System? Incessant threats, both alien and domestic, are causing biologists to rethink a desirable vision of forest health, what forest conditions are possible to achieve, and what trade-offs we may be forced to make. Some believe we can return our forests to their original condition. In some western forests, that vision may be biologically possible by reducing tree densities, but costs and logistics are major, perhaps insurmountable, impediments. In the East, so many species have been lost that the pre-Columbian condition will never be restored.

Other biologists have a more pragmatic vision. The larger landscape in which forests survive has been irrevocably altered. The remaining besieged forest is fragmented by roads and other development, and over-browsing by deer is hindering regeneration.

Perhaps the best we can do is assess ecological history, current conditions, and the biological feasibility of restoration, and try to achieve a future forest that is functional and comprises the remaining vigorous native species.

Figure 1 (top left). Balsam woolly adelgid, a nonnative insect, has killed more than 80% of mature Fraser fir trees in Great Smoky Mountains National Park (Tennessee and North Carolina). The park contains 74% of all Fraser fir in the southern Appalachian Mountains.

Figure 2 (top right). Native to central Europe, the tiny adelgid feeds on the stem and large branches where it disrupts nutrient flow, potentially killing Fraser firs in less than five years. Nationally and globally rare bryophytes that live on the bark of Fraser fir also are threatened by the drier conditions that occur when firs die.

Figure 3 (left). In limited areas, resource managers at Great Smoky Mountains National Park spray balsam woolly adelgids with insecticidal soap to keep a remnant fir population alive.

NPS Photos

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