

Management Methods: Prescribed Burning

FIGHTING FIRE WITH FIRE: WHEN FIRE-ADAPTED PLANTS INVADE FIREDEPENDENT ECOSYSTEMS

Prescribed Fires

Fire is a common and important abiotic component of southern Florida's ecology. The 720,000-acre Big Cypress National Preserve near Ochopee, Florida, implements the National Park Service's largest prescribed fire management program. About 40,000 acres are burned annually to maintain desirable plant communities and to reduce accumulated fuels.

Invasion

Melaleuca quinquenervia was introduced to southern Florida in the early 1900s. Since then, this Australia native has expanded rapidly. Five years after the Big Cypress National Preserve was established in 1974, the total area infested by *Melaleuca* was estimated at 37,000 acres.

Melaleuca is a slender tree that can grow to 65 feet tall. It invades marshes, wet prairies, cypress swamps, and pinelands, all common habitats in the southern end of the Florida peninsula that require fire for continued survival.

Fire Ecology

Unfortunately, *Melaleuca* is also adapted to fire and very successfully survives, regenerates, and facilitates the spread of fire. Because fire triggers seed release that results in the spread of *Melaleuca*, preserve managers avoided the use of prescribed burning for many years and attempted to exclude fire from habitats with mature *Melaleuca* trees.

While there may be no further spread of *Melaleuca* in the absence of fire, undesirable successional changes often occur in the vegetation of these fire-dependent ecosystems. Furthermore, even with active fire suppression, wildfire may still burn the area and potentially result in massive *Melaleuca* regeneration.

Dispersal

Mature and emergent *Melaleuca* trees disperse tremendous amounts of seeds (up to 20 million) when the tree's growth is interrupted. Disturbances such as fire, flood, or freezing, and control methods such as cutting and herbicide application stimulate seed production and often result in more *Melaleuca* stems on the site.

Challenges

Since fire is an essential component to the preserve's ecosystems, preserve managers were challenged to find ways to incorporate prescribed burning into an integrated *Melaleuca* control program and to develop strategies for addressing the mass regeneration that occurs in *Melaleuca* stands burned by wildfires.

Researchers from the National Park Service, The Nature Conservancy, and US Geological Survey teamed up to identify growth stages or times of year during which *Melaleuca* is susceptible to fire. With this information, they hoped to develop management recommendations that can take advantage of the effects of burning, regardless of whether the fires are prescribed or wild.

Results

Through a series of field studies, the researchers found that fire related mortality in *Melaleuca* seedlings and saplings decreased with increasing plant size. Most *Melaleuca* seedlings less than 20 inches tall are killed by prescribed fire.

These results indicate that prescribed fire could be effective as a follow-up treatment to destroy *Melaleuca* seeds and seedlings that are stimulated by other treatments such as cutting or herbicide application.

The authors used these and other observations from the experiments to develop recommendations that integrate rather than exclude prescribed fire from *Melaleuca* management strategies.

Unburned Sites

Recommendations for unburned sites include cutting down seed-source trees and treating stumps with herbicide. Although felling the trees triggers seed release immediately, it also limits the wind-dispersal of seeds. Follow-up treatments with prescribed fire can be used to destroy released seeds and control developing seedlings before they have reached a size where many will survive the fire.

Wildfires

In *Melaleuca*-infested areas burned by wildfire, it is most important to treat mature trees with herbicide before they flower and set seed again. Within two to three years, the site can then be prescription burned as soon as fuels are available. This should kill many of the seedlings resulting from the wildfire-caused seed release. Saplings that survive the fires would also have to be treated with herbicides.

Program Success

These recommendations were incorporated as part of the *Melaleuca* Management Plan by the Florida Exotic Pest Plant Council and have contributed to the National Park Service's successful *Melaleuca* control program at Big Cypress National Preserve.

Managing Invasive Plants: Concepts, Principles, and Practices

About 15 million trees have been removed from the entire preserve and *Melaleuca* trees are no longer common. Although fire was not always used as a primary method for the initial treatments, prescribed fires are planned to maintain and retreat areas in the future.

Learn More

Myers RL, Belles HA, Snyder JR. 2001. **Prescribed fire in the management of *Melaleuca quinquenervia* in subtropical Florida.** Tall Timbers Research Station Miscellaneous Publication No. 11:132-140.

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Big Cypress National Preserve

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TAME Melaleuca Project, University of Florida.

<http://tame.ifas.ufl.edu>