

Melaleuca and Fire

Fires in wilderness areas either occur accidentally or deliberately. Accidental causes can be from lightning or careless human activity. Deliberately set fires are from either malicious human activity (arson) or prescribed by land managers. Generally speaking, all the fires other than prescribed fires are considered wildfires.

Wildfires

Most residents of South Florida are familiar with the frequently occurring wildfires during the dry season. Arson, lightning, and carelessness are the most common causes of these wildfires. South Florida has more lightning strikes than anywhere else in the United States. Over the last half-century there has been an increase in wildfire activity in South Florida caused by:

- Lowering of the water table, causing the soil to dry well before the severe lightning season.
- Increases in the permanent population and tourism, increasing the risk of arson and carelessness.
- Changes in land use from wetlands and upland forest to agricultural and developed land.
- Attitudes about fire, compelling authorities to suppress all wildfires thus causing them to be more intense when they do occur.
- Shortening the hydro-period by using an elaborate system of canals and drainage ditches.

There are many benefits associated with fires for native species in natural areas, including:

- Increased mineral elements in the soil (from the ash)
- Concentration of some nutrients in the soil
- Triggering the release of seeds
- Stimulating the growth of plants
- Stimulating flowering and fruiting
- Selectively eliminating components of the plant community
- Regulating the yield of some fruit and nut bearing plants
- Regulating the insect population
- Regulating the numbers and kinds of soil organisms

The public is more aware of and more concerned about the detrimental effects of wildfires. Some negative consequences of fire include:

- Reduced air quality. Many people come to South Florida for its clean air. Also, many elderly people have medical conditions that are aggravated by smoke, especially smoke caused by burning organic soil.
- Decreased visibility on roads and highways clogs the roadways and increases traffic accidents.
- Unsightly spans of blackened and charred vegetation which may take years to recover.

- Destruction of homes and property. South Florida is peppered with developed areas that border on large natural areas.
- Interference or disruption of power from burning poles, lines, transformers, and so on.

Scientists and land managers have additional concerns:

- Consumption of organic soils. Excessively hot fires burn away the topsoil making the land less suitable for plant growth and kill the root systems of normally fire adapted species.
- Increased invasion of exotic species. Areas cleared by fire are often rapidly populated by more aggressive plants that crowd out the slower-growing ones.
- Damage to vegetation, especially endangered and threatened species.
- Damage to wildlife habitat, especially endangered and threatened species.

Abundant rainfall and warm temperatures from May through October promote the buildup of fuel for wildfires. Recent intensified hurricane activity may also lead to increased fuel loading.

Prescribed fires

Land managers learned years ago that fire was a natural and necessary part of the life cycle of many ecosystems. In an effort to mimic nature, scientists experimented by intentionally setting carefully controlled fires to restore health to natural areas. The first prescribed burn in the national parks occurred in the Everglades National Park in the late 1950's. Prescribed burns provide many functions for helping to maintain the natural environment, including:

- Reducing accumulated plant debris
- Controlling exotic plants
- Maintaining native species habitat

Melaleuca wildfires

Fire is an important part of Florida's native ecosystems. Naturally occurring fires in Florida's natural areas have historically been ground fires that burn through low-growing grasses and bushes but characteristically do not reach the upper tree canopies. Many people are not aware that most of the South Florida wildfires now involve melaleuca. The introduction of melaleuca and its subsequent invasion into natural areas brought with it the increased occurrence of intense crown fires, something to which the Florida landscape and its inhabitants were unaccustomed.

Melaleuca is a fire adapted species. Its thick, spongy bark protects its cambium layer from fire while the papery outer layers serve as a ladder to shuttle flames into the canopy. Volatile oils in the foliage fuel intense crown fires that produce thick, black smoke that can be a nuisance, even a danger, to people. These intense fires create high winds that carry burning embers over homes, businesses, and highways. Leaf litter from melaleuca decomposes slowly, creating a heavy ground fuel load (2.6 to 4 tons per acre per year of leaves, twigs, and bark). Although adult melaleuca trees can survive the intense crown fires, the fires often kill native and endangered vegetation.

Stress from fire induces melaleuca seed release and the fire leaves behind nutrient-rich ashen soil and a newly opened canopy, ideal conditions for melaleuca seed germination and seedling growth. Epicormic buds on surviving trees quickly sprout and flowers may occur within weeks of a fire. This process can quickly increase melaleuca's spread and density.

Fire as a melaleuca management tool (prescribed fire)

Employing fire to manage melaleuca requires careful consideration and timing. Because of the expected seed release from mature melaleuca trees following a fire, burning of mature stands should be timed either at the beginning of the wet season when soil is moist enough to induce germination and seasonal flooding will soon submerge and kill seedlings, or at the end of the wet season when soil moisture is still high enough for germination but drought will soon kill seedlings. The unpredictability of seasonal inundations and droughts, however, may make follow-up treatments of seedlings necessary.

Another method of incorporating fire into melaleuca management is to kill mature trees using other methods, thereby inducing seed release, and follow up with controlled ground burns to kill newly emerged seedlings. However, melaleuca trees treated with herbicide with apparent success have been observed to re-sprout following a fire, as if the herbicide were never applied. Therefore, to ensure maximum efficacy of herbicide treatments, it is recommended that you wait at least one year after herbicide application before conducting a follow-up burn.

Expanses of melaleuca seedlings produced by a seed-fall generated by a previous burn (wildfire or prescribed) may not be suitable for treatment using another burn because of a lack of ground fuel.

Not an ideal management tool

Despite these possible strategies, fire is not an ideal management tool for melaleuca. It can be particularly risky in many upland habitats where melaleuca may be intermixed with desirable tree species such as pines or cypress. The risk exists because mature melaleuca trees will survive the fire while their papery bark and oil-rich leaves increase the fire's intensity to a level deadly to the other trees in the area. Also, many melaleuca infested areas are inaccessible to fire suppression equipment, making it more expensive and risky to use fire as a control method.

Fire and biological control

Interaction between the melaleuca biological control agents and fire is not yet clear. There are some indications that melaleuca trees exposed to the insects for multiple seasons may be so stressed by feeding damage that they are less likely to survive an intense fire. And insects that re-colonize melaleuca after a fire may help suppress new foliage and flowers on surviving trees and increase mortality of emerging seedlings.