

Fire Ecology of South Florida Pinelands

The USGS Florida Caribbean Science Center's Restoration Ecology Branch at the Big Cypress National Preserve Field Station is conducting research on the ecological effects of fire on South Florida pine forests.

Prescribed fire is one of the most widespread management actions in South Florida natural areas, where Department of the Interior managers are responsible for the vast majority of the remaining pine rocklands. The forests dominated by South Florida slash pine (*Pinus elliottii* var. *densa*) growing on limestone are unique in that they are home to several endemic plant taxa, have a diverse shrub layer of tropical hardwoods and several palm species, represent the only subtropical pine system in the United States, and are a globally imperiled ecosystem. Pine rocklands are found in three areas of South Florida: the Miami Rock Ridge of southeastern Florida, with the larg-



Prescribed fire, Everglades National Park

est remaining stands in Everglades National Park; the Lower Florida Keys, where much of the pine forest is within the National Key Deer Refuge; and the southern Big Cypress pinelands, entirely within Big Cypress National Preserve. The latter pine rocklands are actually transitional to typical pine flatwoods found further north because a shallow layer of sand covers the limestone substrate and many tropical elements of the flora are missing.

The importance of fire in this ecosystem has long been recognized. In the absence of fire a closed hardwood canopy develops and the characteristic pineland herb flora is lost. In fact, it is the requirement of these endemic herbaceous species for fire that led to the initiation of the prescribed burning program in Everglades National Park in 1958.

Both Everglades National Park and Big Cypress National Preserve have active prescribed burning programs. While pinelands in Everglades National Park and Big Cypress National Preserve are within vast natural areas, protection and management of the Lower Keys pinelands is made particularly difficult by the pattern of



Pineland petunia (*Ruellia caroliniensis*)

land ownership and development. Much of the remaining pineland is in small, privately owned parcels and there are private in-holdings within the National Key Deer Refuge.

The fire ecology program seeks to document the response of South Florida pine forest vegetation to a broad range of fire management options through the application of experimental prescribed fire treatments. This research will provide the necessary in-



NPS fire crew lighting off prescribed fire

formation for managers to use in developing or refining prescribed burning programs that will perpetuate this unique ecosystem.

Ongoing research and collaborations

Long-term Experimental Study of Fire Regimes in South Florida Pinelands

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This study is designed to examine the effect of repeated fires at different seasons and frequencies. It is being carried out in the Raccoon Point area of Big Cypress National Preserve, a mosaic of unlogged pine forests and cypress domes. The experimental treatments are combinations of spring, summer, and winter burns at three-year and six-year intervals. Each treatment is replicated three times, with one replicate burned each year for three consecutive years. The burn units are quite large and contain at least 50 hectares of pineland. We sample the pineland vegetation in each unit with three 1.0 ha tree plots and five 0.1 ha understory plots. The first burns were conducted in spring 1996. Treatments are back on schedule after both flooding- and drought-caused delays. Preliminary observations confirm that mature South Florida slash pines are very resistant to fire at any season.



Fire at Raccoon Point, Big Cypress National Preserve

Developing Ecological Criteria for Prescribed Fire in South Florida Pine Rockland Ecosystems

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This research is a shorter term study to compare the response of pine rockland vegetation to winter and summer burning. The study is being conducted on Big Pine Key within the National Key Deer Refuge. The total area of all remaining Lower Keys pine rockland is less than the area included in the long-term study burn units in Big Cypress. We selected six blocks about four hectares in size, three of the blocks with grassy understories and three with shrubby understories. In each block we set up three 1.0 ha plots in which we sample trees, shrubs, and herbs. One of the plots will remain unburned and the others will be burned in the winter or summer. For three years plots in one grassy block and one shrubby block will be burned. Burning treatments began in summer 1998.

Recent Publication

Spier, L.P. and J.R. Snyder, 1998. Effects of wet- and dry-season fires on *Jaquemontia curtisii*, a south Florida pine forest endemic. *Natural Areas Journal* 18: 350-357.

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Measuring char height, National Key Deer Refuge

ence Center base funds. Research burns are carried out by the Fish and Wildlife Service (National Key Deer Refuge) and National Park Service (Big Cypress National Preserve). The Big Cypress National Preserve fire management division also provides logistical support in the data collection aspects of the long-term study.



Pre-burn herb sampling, Big Cypress National Preserve