

Prescribed Fire: Is it an Option for Coastal Barrier Management?

Aside from the very extensive program in Everglades NP, parks in the Southeast Region have done only limited work with prescribed fire. About a decade ago, Great Smoky Mountains NP began a series of research projects in fire ecology and effects, and other southeastern park areas outside of south Florida have since experimented with new directions in fire management. Although one might not expect coastal barrier islands to have both interesting fire histories and fire dependent vegetation, several National Seashores are investigating their needs for prescribed burning.

Over the past four years, the NPS/CPSU at the University of Georgia has studied the sources, size and frequency of past fires in coastal sites; monitored the effects of recent burns; and with the CPSU at North Carolina State, mapped vegetation and fuels. For the four areas investigated, Cape Hatteras, Cape Lookout, Cumberland Island and Canaveral, the probability of a lightning caused fire differs. In the Georgia Sea Islands and south, summer thunderstorms occur almost daily. Canaveral and Merritt Island National Wildlife Refuge have some of the highest frequencies of lightning in the country. Dry lightning is common. The Outer Banks of North Carolina in contrast, have fewer summer thunderstorms, and most natural fires are extinguished by rain. When compiling recent fire history data for Cape Hatteras, Kent Turner, the park resources manager, found only three documented lightning-caused ignitions, two occurring on the same day.

The barrier islands also have differing histories of pre-park, human-caused fire. All the parks had at least occasional fires before European colonists arrived, but the extent and location of Indian burning was probably dependent on the density of Indian settlements, the acreage under cultivation, and the characteristics of the native vegetation. After the colonists arrived, anthropogenic fire continued as an important factor and may have increased in frequency. Kit Davison has found that farmers in the Canaveral area burned their grazing lands to clear shrubs, improve forage, and to reduce the chance of hot fires. Although there is less evidence of residents purposefully setting fires on Cumberland, they did burn fields in the center of the island to improve grazing, and during the "Carnegie era," around the turn of the century, burned the sloughs to keep them open for hunting and canoeing.

Before the Civil War, plantation owners and slaves probably used fire to help clear fields for cotton. Prior to the establishment of Cape Hatteras National Seashore, the residents of the Buxton area burned the woods frequently. Some of these fires probably were intended to clear duck "holes" for hunting. Others may have been intended to clear brush or eliminate snakes. Due to the intense livestock grazing and frequent burning, which reduced fuels, most of these fires were probably of low intensity. Further, nearby grasslands and interior marshes would have burned infrequently due to cattle, ponies and sheep cropping vegetation.

The southeastern parks also vary in the distribution of fire prone plant communities. Canaveral has a high proportion of palmetto or oak scrub lands that build

up fuels quickly after a fire. Palmetto can burn again in as little as two or three years. Canaveral's pine forests accumulate deep litter and are also fire prone, although the hardwood hammocks are fire resistant. Cumberland has two major areas of pine-oak-palmetto scrub. Investigation of fire scars around scrub that burned in a controversial lightning ignited fire in 1981 and interviews with local residents suggest this site has burned at least three times this century. The natural fire rotation is thus about 25 years and is probably correlated to coastal drought cycles.

Given time for fuels to accumulate, coastal scrub produces very hot fires that are difficult to suppress within the boundaries of the fire prone vegetation types. Cape Hatteras and Cape Lookout have shrub and grassland communities that will burn, but the fires are generally easier to contain and consume smaller acreages.

A major concern for the manager at Cape Hatteras is the Buxton Woods area. The park owns less than half the woods, the other portion lying outside the legislated boundary. High land prices and the market for summer homes, may expand residential development in mature loblolly pine adjoining park lands. Although the risk of fire here is not exceptionally high, the area has burned before. Buxton Woods would probably only burn under drought conditions or when surface fuel moistures were very low, possibly producing a fire intense enough to threaten private dwellings.

Research into the history of Buxton Woods has found that the site has been logged, grazed and burned since early Colonial times, and these distur-

bances have changed forest structure. Buxton was probably originally dominated by live oaks, with scattered pine and red cedar. Loblolly pine is now the dominant tree, although young hardwoods are invading the understories of the loblolly stands. Mature pine stands may have twice the surface fuels of mature hardwoods and pine litter is more flammable than oak litter. Dale Wade, of the U.S. Forest Service, has suggested that some of the small hardwood stands in the back dune areas would not burn even during drought.

Considering these differences in fire history and in potential fire management problems, the question then becomes, should the barrier islands utilize prescribed fire, and, if so, where and when? The research data indicate the programs will have to be tailored to the individual parks and may vary in the use of natural versus prescribed fire. Canaveral, for example, has a need to reduce fuels near the boundary, and has already conducted successful controlled burns in palmetto scrub. With appropriate fuel breaks, natural ignitions could be permitted in the wilderness area south of the park boundary.

Cumberland is presently using fire to manage House Field, which was farmed formerly and will remain open to maintain the historic scene near Stafford House. Chief Ranger Kevin Kacer is testing prescribed fire as a potential control for exotic tung trees escaping from old plantations. The park is planning to reduce fuels and establish appropriate fuel breaks around scrub in the Table Point area, and eventually will implement a plan that allows fire in the wilderness.

Cape Hatteras is not presently intending to use fire to reduce fuels in Buxton Woods but will construct a fuel break along the park boundary. The woods should succeed to oak and other hardwoods, eventually reducing the risk of fire even further. Park management is aware, however, that decay of the loblolly stands may cause temporary increases in fuels. Supt. Tom Hartman is initiating work on the unnatural scrub succession along park roadsides and tackling the problem of vista maintenance in areas where modification of drainage or construction of artificial dune lines have encouraged invasion by bayberry.

Fire is not a frequent natural disturbance in this type of community, but the shrub thickets are no longer in their natural locations. Fire could be one of the least expensive and least ecologically problematic methods of shrub control. Cape Hatteras hopes to conduct research burns in shrub and interior marsh-edge areas in late winter of 1986 or 1987. Cape Lookout, like Cape Hatteras, has little need to use fire for general fuels reduction, but could consider using fire to reduce shrub invasion particularly near Portsmouth Village.

As the southeastern National Seashores build fire expertise, their management programs will become more sophisticated and should make increasing use of prescribed fire. Managers will have to tailor the programs to individual park needs and natural fire regimes. With the Georgia CPSU now finishing a series of preliminary research projects, research efforts will be integrated into experimental management programs. Future research will include monitoring of permanent plots in burned areas, careful assessment of marsh and shrub zone burning, and construction of forest and scrub stand dynamics computer models to predict effects of long-term managerial changes in fire frequency and intensity.

Reports on the disturbance history of Cumberland Island, Cape Hatteras and Canaveral are currently available from the Georgia CPSU, as are reports on fire and grazing effects on Cumberland Island. Addi-



Monitoring transects are established in a bayberry thicket at Cape Hatteras National Seashore prior to prescribed burning. The area is a freshwater wetland that provides habitat for black ducks.

tional information on Cape Hatteras and Canaveral will be available shortly. The vegetation and fuels maps for Cape Hatteras and Cape Lookout have been digitized and can be obtained by special request to either Hugh Devine at the North Carolina State CPSU at Raleigh (who developed the maps) or to the CPSU at University of Georgia.

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Scorch marks on pine after a surface fire on Cumberland Island National Seashore reach height of about two meters.



Spanish moss laden scrub, or poccosin, frame the author, Susan P. Bratton, at Cumberland Island National Seashore. Understory fuels here are similar to western chaparral. Dead snags are products of a lightning ignited fire in 1977.