



IFAS EXTENSION

Effects of Fire on Florida's Wildlife and Wildlife Habitat¹

Martin B. Main and George W. Tanner²

Perspectives on Fire

Do fires truly "destroy" or "devastate" wildlife habitat as is often reported in the media? Clearly, fire can have negative consequences when it occurs in the wrong place at the wrong time, but these consequences are generally related to humans and are measured in terms of commercial value of forest products or the destruction of personal property. From an ecological perspective, fire generally has positive effects on wildlife habitat and wildlife populations.

The positive aspects of fire may be at odds with images of Smokey Bear and blackened forests. The effects of fire, however, are temporary. Although uncontrolled wildfires can have extreme effects on wildlife habitats, even these are temporary. In contrast to uncontrolled fires, controlled or prescribed fire is a useful and important tool for land management in Florida and in other areas of the United States. Nonetheless, a history of powerful images and messages regarding fire as a destructive element are difficult to ignore and have caused many people to question the wisdom of intentionally using fire as a management tool. What effect does fire

actually have on wildlife and wildlife habitat? In this document we address concerns regarding the use of prescribed fire to manage wildlife habitat in Florida.

Prescribed Fire and Land Management

Resource managers in Florida rely on prescribed fire as an important land management tool. They use prescribed fire to remove combustible vegetation and reduce the risk of uncontrolled wildfire that threatens habitat, human safety, and personal property (Figure 1). By definition, prescribed fires are intentionally started under favorable climatic and environmental conditions and are designed to modify habitat structure, such as reduction of shrubby vegetation without destroying major habitat components, like mature pine trees.

Resource managers also argue that prescribed fire is an important tool for managing habitats and the wildlife populations that depend upon them. Many Florida environments evolved with fire and require periodic fires to maintain conditions that sustain plant communities and provide food and shelter for wildlife. For example, the endangered longleaf

1. This document is WEC 137, one of a series of the Wildlife Ecology and Conservation Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date November 1999. Reviewed April 2003. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.

2. Martin B. Main is Assistant Professor and Wildlife Extension Specialist; and George W. Tanner is Professor; Department of Wildlife Ecology and Conservation, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611. This publication was produced by the University of Florida with assistance from a grant from the Advisory Council on Environmental Education of the Florida Fish and Wildlife Conservation Commission.



Figure 1.

pine-sandhill ecosystem requires periodic fire for its continued existence. In the absence of periodic fire, research has demonstrated that characteristics of habitats change. For instance, vegetation in fire-suppressed habitats often becomes dominated by a thick growth of shrubs and vines. Dense vegetation shades important herbaceous food plants, which then decline in diversity, abundance, and nutritional quality. In addition to the loss of food plants, the physical clutter of dense vegetation may reduce the use of these areas by many species of birds and other wildlife. Hence, by periodically burning areas, habitats are returned to more open and diverse plant communities and, as post-fire recovery proceeds, these habitats benefit those original wildlife populations by providing the food and structural components they require.

Don't Fires Harm Wildlife?

Fires certainly can kill animals, but mortality among most species has been found to be minor and fire generally poses no significant threat to wildlife populations. There are a number of factors that influence the extent to which fires cause wildlife mortality including: wind speed, fuel loads, moisture content in vegetation, time of year, size of fire, and others.

Uncontrolled fires may move much faster and burn at higher temperatures than prescribed fires, posing a much greater risk to wildlife and humans alike. During prescribed fires, however, a greater level of control is exerted over these factors by selecting environmental conditions that minimize risks. For example, prescribed fires are not approved by the Florida Division of Forestry during overly dry conditions or when wind speeds are too high.

Various studies and observations suggest fire typically causes little direct mortality to large mobile animals such as deer, bobcats, and bear. Even during the extensive wild fires at Yellowstone National Park during 1988, helicopter surveys revealed a surprisingly low number of deer and other large animals had been killed by fire. Young animals are at greater risk of being killed by fires. But even at young ages, deer and other mammals are highly mobile and have been observed avoiding fires. Conducting smaller prescribed fires, avoiding the practice of re-lighting unburned patches, and avoiding burning during peak birthing periods can reduce mortality among young individuals. For example, land managers would be advised to limit the size of prescribed fires during peak fawning periods, which occur during May-June in north Florida and February-March in south Florida.

Destruction of bird nests by fire, particularly among shrub and ground-nesting species, is a chief concern of wildlife managers. Attempts to protect nests have resulted in recommendations by some biologists to burn only during the winter months or after the nesting season. If their nests are destroyed, however, most birds will attempt to re-nest. Studies of bobwhite quail indicate it is not unusual for a hen to re-nest several times during a single nesting season. Even turkeys have been found to re-nest at rates higher than previously supposed. Also, prescribed fires typically do not burn entire areas, but result in a mosaic of burned and unburned patches that provide refuge and opportunities for re-nesting amidst regenerating, high-quality habitat.

Although information on the effects of fire on reptiles and amphibians is less available, fire is known to be important for the survival of some species. The gopher tortoise, which is a species of special concern in Florida, requires periodic fire to maintain habitat quality and structure.

Using Fire to Manage Wildlife Populations

We have discussed how species that live in fire-adapted landscapes cope with fire and how fire is important to maintain habitat conditions that foster healthy wildlife populations. This brings up an

important point that is often overlooked during discussions between wildlife managers and citizens concerned about the welfare of wildlife. Whereas the public often express concerns about the fate of individual animals, biologists typically discuss wildlife in terms of populations. This is because successful wildlife management focuses on the health of the population, not of the individual. Consequently, wildlife managers support using prescribed fire to promote habitat conditions that result in healthier populations over the long term, even if the temporary effects of fire may result in the death of some individuals.

Of much greater influence to wildlife than direct mortality from fire are the effects of fire, or the lack of fire, on habitat quality. There are many species of plants and animals that require periodic fire to maintain habitat conditions needed for their survival. For example, the Florida scrub jay and red-cockaded woodpecker are both listed as endangered species and both are dependent upon fire to maintain suitable habitat conditions. In the absence of fire, habitat conditions change; the diversity and abundance of wildlife eventually declines.

Even when fire kills trees, positive wildlife benefits can be found. Many cavity nesting birds depend upon dead, decaying trees for excavating cavities. Other species, known as secondary cavity nesters, depend upon these nest sites after they have been abandoned. Decaying trees attract insects that are fed upon by many species of wildlife. The decay process also returns important organic material and nutrients to the soil.

The Post-Fire Recovery Process: How Long Does It Take?

Anyone who has observed a recently burned forest or wetland may wonder how long before wildlife begin using what may look like a charred wasteland. This is an important question because the loss of habitat is recognized as the most serious threat to wildlife populations worldwide, and the struggle between habitat loss and preservation of native habitats in Florida is constantly in the news. If fire severely alters the utility of habitat to wildlife, is it a good land management strategy to use fire,

particularly in areas where wildlife habitat may be limited?

Surprisingly, wildlife begin to use areas immediately following a fire, often literally before the smoke clears. Observations include a wide variety of species; white-tailed deer, tortoises, snakes, and all manner of bird life in areas immediately following a fire. Of course the response of wildlife varies, depending primarily upon the severity and size of the fire. For example, wildfires that burn out of control in areas with high fuel loads may remove many species of plants and may reduce or delay the extent to which wildlife repopulate the burn site. Periodic prescribed fires, on the other hand, maintain lower fuel loads, typically burn cooler, and may leave more patches of unburned vegetation. These unburned patches of vegetation provide both refuge from the fire and hiding cover during the immediate post-fire recovery process.

The post-fire recovery process is influenced by fire intensity, type of habitat, and patterns of rainfall. In general, vegetation in Florida recovers quickly to pre-fire levels of cover. For example, studies have reported that Florida's fire-adapted shrubs, such as saw-palmetto and sabal palm, often recover to pre-fire levels within a year of being burned. Similar findings have been reported for herbaceous vegetation in Florida wetlands. The rate at which herbaceous vegetation recovers, however, is more strongly influenced by rainfall than are fire-adapted shrubs. This is because shrubs possess greater energy reserves in the roots that are used to promote resprouting. Hence, herbaceous vegetation does not recover as quickly in areas burned during the Florida dry season (January-April) as in areas burned at the beginning of the growing season (May-June).

Recently burned areas actually attract many species of wildlife and seem to have little effect on use by others. Tender shoots from resprouting shrubs and herbaceous vegetation that emerge following a fire are highly nutritious and attract white-tailed deer and other herbivores. Fruit production is stimulated by fire, resulting in increased availability of seeds and berries that provide food for many species of wildlife. Predators too, are attracted to these areas, presumably in response to the abundance of prey. Radiotracking

studies of the Florida panther indicate panthers prefer areas in 1- to 2-year stages of post-fire recovery over more densely vegetated habitat on the Florida Panther National Wildlife Refuge in south Florida. Recently-burned areas also are important feeding areas for chicks of ground foraging species, such as turkey and bobwhite quail. In general, therefore, fire positively influences wildlife populations in Florida.

Concluding Thoughts

The rapid recovery of vegetation, the apparent ability for most species of wildlife to use recently burned areas, and the high-quality habitat provided during post-fire recovery suggests that fire enhances habitat for most plants and animals in Florida. When considering the effects of land management practices, we should ask whether our actions help maintain healthy plant and wildlife populations and conserve the diversity and abundance of Florida's native species over the long term. The information available from research indicates that periodic fires benefit and are indeed vital to wildlife populations in fire-adapted habitats in Florida. Fire in Florida, therefore, represents not devastation, but renewal of wildlife habitats. In many ways fire in Florida has an effect similar to the coming of spring in northern states, both events represent a new beginning for plant communities and for the wildlife that depend upon them.

Additional Reading

- Abrahamson, WG, and DD Hartnett. 1990. Pine flatwoods and dry prairies. In: Myers RL, Ewel JJ, editors. *Ecosystems of Florida*. Gainesville, FL: University of Central Florida Press. p 103-280.
- Carlson, PC, GW Tanner, JM Wood, and SR Humphrey. 1993. Fire in key deer habitat improves browse, prevents succession, and preserves endemic herbs. *Journal of Wildlife Management* 57(4):914-8.
- Emlen, JT. 1970. Habitat selection by birds following a forest fire. *Ecology*. 51(2):343-5.
- Fire Effects Information System [Online] (1996, September). Prescribed Fire and Fire Effects Research Work Unit, Rocky Mountain Research Station (producer). Available: www.fs.fed.us/database/feis/ [1998, March 12].
- Fitzgerald, SM, and GW Tanner. 1992. Avian community response to fire and mechanical shrub control in south Florida. *Journal of Range Management* 45:396-400.
- Hall, G. 1983. The role of fire in land-use management. Dept. of Water Resources. St. Johns River Water Management District technical publication SJ 83-4. Palatka, Florida.
- Robbins, LE, and RL Myers. 1992. Seasonal effects of prescribed burning in Florida: a review. Tall Timbers Research, Inc., Misc. Public. No. 8. 96 pp.