

# Use of Fire on Southeastern Wildlife Refuges

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THE SUBJECT "Fire Ecology" is very appropriate and timely to meet the present needs of southern wildlife and forest management. In the past, mixed opinions have existed among wildlife and forest managers regarding prescribed burning as a management technique. Perhaps this is a normal reaction when we consider that fire can be both beneficial and destructive. The damage of some wildfires is sometimes very extensive. On the other hand, prescribed and controlled fires prove to be a very beneficial and economical management tool. On many of our National Wildlife Refuges in the Southeast, prescribed burning has been used very effectively for conditioning upland wildlife and marsh habitat.

Our main objective concerning our forest lands is to create and maintain optimum wildlife habitat conditions through sound forest management practices. Prescribed burning is considered an important and necessary phase of our management program. Although our policies favor the use of controlled fires, some restrictions occur due to limited funds and personnel to carry out the job. Due to the changes in personnel from time to time on the refuges, it is necessary for us to donate considerable time to plans and records pertaining to burning operations.

Most of our burning on the refuges is done in the winter

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months because of the damage that occurs in spring burning to nests and plant foods. We realize the need for using spring and summer fires and may consider their use on special problem areas in the future.

General practices of commercial timber harvest operations have conditioned overstory crown densities sufficiently for sunlight penetration which is necessary for tree growth as well as a requirement for wildlife food plant production on the forest floor. Even then, the understory consists of so much rough that prescribed burning is a must in order to obtain suitable wildlife habitat. Conditions of the forest floor vary considerably in different areas. More specifically, the conditions found in the coastal plain area consist of heavy stands of palmetto, gallberry, wire grass, and excessive accumulations of needle cast. Back burning, or burning against the wind, is used to reduce this roughness. The overstory consists of Longleaf and Slash Pine. The understory conditions on our Piedmont National Wildlife Refuge, located in the lower Piedmont area of Georgia, consist of off-site hardwood invasion; on some of the pine sites dense hawthorn thickets are a problem. Excessive amounts of pine reproduction, which is not required until several years later in the forest management program, are adding to the roughness. Also, a heavy mat of pine straw covers the forest floor, thus preventing the establishment of low-growing herbaceous plants. Since this rough condition is interfering with our primary objective of turkey management, we have begun to use prescribed fires to correct this situation. Once the use of fire was decided upon, it became necessary to modify the All Age Timber Management Theory to All Age Management in Even Age Blocks. Topographic features and fuel conditions are suitable for various types of burning including strip-head fires, flanking and backing fires. The overstory is dominated by Loblolly and Shortleaf Pine. Conditions on the Noxubee National Wildlife Refuge in east-central Mississippi are similar to those in the Piedmont.

There is a variety of problems and conditions involved in our burning programs, and we expect a variety of benefits

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and we do not rule out the possibility that some degree of damage will occur. However, in view of the prescribed burning studies by Refuge Management Biologist Eugene Cypert and additional studies and observations by others, we can list many multi-benefits following our periodic burning operations.

Desirable wildlife food plants, such as legumes, panic grasses, three-seeded mercury, ragweed, beggar-tick and other desirables show an increase. Various seed are more accessible to wildlife, nesting conditions and movability are greatly improved, hunting conditions and hunter success are also improved. Other advantages are wildlife hazard reduction, aids forest regeneration, checks undesirable vegetative trends, and in general, improves working conditions.

Our experience in prescribed burning indicates that alternating block or patch burning is more attractive to wildlife than vast areas being burned in a single annual operation. We have also found that no one burning cycle is suitable for all conditions. Burning cycles should be very general and all conditions involved should receive close analysis prior to actual burning.

Prescribed burning cost records are maintained and they reflect a considerable difference in burning cost. Variable conditions, inexperienced personnel, and many other factors undoubtedly contribute to fluctuating cost. Our average regional cost appears to be approximately 40 cents per acre. We believe that burning costs will decrease in the future, since previous burning has eliminated most of the excessive rough on the forest floor.

We feel that considerable progress has been made in using and evaluating controlled fires as a desirable wildlife and forest management tool. There is real need for additional fire research as to its beneficial and damaging effects under various conditions. Future conferences regarding the use of fires should prove to be a desirable medium for exchanging information and ideas on prescribed burning.

Fire has always been an important factor in the ecology of our southeastern coastal marshes. Natural fires, started by lightning, presumably have always occurred in our coastal

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marshes. Indians probably set fires deliberately to facilitate hunting and travel. Early white settlers continued the practice for the same reasons and added some of their own—one of the most important being to provide succulent green growth for cattle grazing. To this day burning is an important tool to the private marsh owner and is used advantageously by cattlemen, muskrat trappers, hunting clubs and others, including alligator poachers.

In the very early years of the National Wildlife Refuges system, intentional burning of marshes was, to say the least, not considered an acceptable practice for waterfowl management. After assuming responsibility for managing marsh refuges, however, the Service was rather quickly convinced that burning had to be considered if large acreages of marshland were to provide waterfowl habitat. This acceptance of marsh burning came more readily than did Service acceptance of prescribed forest burning, presumably because the damage resulting from uncontrolled marsh fires is more temporary and certainly less tangible than that resulting from wildfires in timber.

Marsh burning is now an accepted management practice on practically all of our coastal waterfowl refuges in this region—from Blackwater in Maryland to Sabine in Louisiana. In all cases the benefits derived from the burning contribute either directly or indirectly to one of the primary purposes of our Federal refuges in the South—that of providing adequate food supplies for large numbers of wintering waterfowl. As is true with a prescribed timber burn, a marsh burn may have one primary objective but will invariably be beneficial in a number of ways. Burning objectives, techniques, and results vary considerably with geographic location, vegetation types, soils, who's doing the burning, and so forth. However, there are a number of general uses of marsh burning that are important on many of our refuges.

One of the most common purposes of marsh burning is the removal of dense vegetation and accumulated litter. Most marshes in the Southeast, because of the coarse plant species involved, long growing seasons, abundant precipitation, and other factors, quickly build up a "rough" that, unless removed,



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*Fig. 7.* Control burning a marsh area on Sabine Wildlife Refuge in 1951 to provide browse for Snow, Blue, and Canada Geese.

limits the growth of desirable food plants, precludes waterfowl use, and creates a fire hazard during periods when burning is not desirable. All of these problems can be corrected by proper burning. The former vast sawgrass marshes of southwest Louisiana, all but eliminated as a result of Hurricane Audrey, produced enormous quantities of seed readily taken by mallards but unavailable unless the dense cover was removed by burning. Dense growths of valuable seed-producing plants such as millet and Giant Foxtail stands at Mattamuskeet Refuge can be made more readily available by burning. Other marsh species of little or no value to waterfowl, such as mixed stands of cattail and *Spartina* at Mattamuskeet and Giant Cutgrass stands at Savannah, almost always contain valuable food plants that become available and in some cases are actually increased by burning.

Burning is often used to maintain marshes in earlier, more productive stages of plant succession. The best example of this is the brackish 3-square marshes of Louisiana that are the favored habitat of Blue and Snow Geese, as well as muskrats. Without burning, these marshes in a matter of several years are dominated

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by the climax species, *Spartina patens*, which has relatively little value for waterfowl. Proper burning at least every other year is the only dependable way to maintain good stands of Olneys' 3-square and Leafy 3-square, the preferred foods of blues and snows and muskrats.

While burning alone rarely controls undesirable plant growth more than temporarily, it is often used in conjunction with other practices to obtain more effective control of certain pest plants. At Savannah Refuge, where we have better than average water control, burning has been very effective when used in combination with disking and/or deep flooding. A Maidencane marsh is burned and then disked. Smartweed stands in one of our Savannah impoundments developed naturally after a combination of treatments, including burning and deep flooding, killed the original dominants, Giant Cutgrass and Alligatorweed. Burning can be used effectively to prevent encroachment of brush species such as myrtle and *Baccharis* on the beach marshes of Pea Island Refuge.

On peat soils during extremely dry weather, fires can very effectively eradicate existing plant communities by completely destroying the root systems. This type of fire is responsible for the prairies and lakes in Okefenokee Swamp, and in southwest Louisiana during the late 20's such fires transformed vast areas of climax sawgrass into aquatic ponds that persist today. While such changes to very early successional stages generally create improved waterfowl habitat, peat burns are rarely planned because of the dangers involved in burning under conditions that would permit them.

Another use of burning in marsh management for waterfowl is that of providing succulent plant growth for browsing species such as the Canada Goose. At Sabine and Lacassine Refuges in Louisiana, where the growing season for many grasses extends throughout the winter, shallow marshes and low ridges are burned in early fall and the new growth maintained in a low, succulent condition for geese by grazing cattle. On many of our refuges, late winter burning of marshes provides green browse for geese at a time when they need this type of food.