

Prescribed Fire and Wildlife in Southern Forests

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CONSIDERATIONS IN PRESCRIBING FIRE ON NATIONAL WILDLIFE REFUGES

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Abstract: Prescribed burning has been used on the southern National Wildlife Refuges in coastal areas since the 1940's. An intensive forest wildlife program was initiated in 1962 on the Piedmont National Wildlife Refuge which included prescribed burning and timber harvest as wildlife management tools. Major benefits expected from burning on refuges are: general habitat improvement, endangered species habitat preservation, and protection against catastrophic conflagration. Probably the greatest detrimental effect of prescribed burning is the potential risk of a fire escape.

Key Words: *prescribed fire, wildlife, national wildlife refuges, habitat management*

The use of prescribed fire on National Wildlife Refuges was begun in the 1940's to improve marshlands and forest habitat and for fire hazard reduction in the Coastal Plains. An extensive use of prescribed burning of Refuge forest lands was initiated in the 1940's on the Piedmont National Wildlife Refuge in Georgia (Cushwa and Czuhai 1968). Much of this paper focuses on the prescribed burning program on the Piedmont Refuge.

The initial burning efforts on the Piedmont created some benefits and some conflicts under the basic concept of all-aged forest management. Benefits included some improvement in habitat conditions on the forest floor especially where the overstory was regulated by selective timber harvest. Also, there was a major reduction of wildfire hazard as the prescribed fire reduced some of the heavy accumulation of litter on the forest floor. The adverse effects included destruction or damage to regeneration needed to perpetuate the forest resources. Damage also occurred to important hardwoods needed to provide mast production for the broad spectrum of wildlife.

Because of the problems encountered in the destruction of regeneration under the all-aged silviculture system on the Piedmont and damage to hardwoods, prescribed burning was discontinued until the early-1960's when a more realistic management approach was taken to maximize the benefits and reduce the adverse effects of fire. During this period of exclusion of prescribed burning, dense brush growth and heavy accumulations

of litter contributed to a rapid deterioration of wildlife habitat and created serious fire hazards (USDI 1969). However, in 1962, the even-aged forest management system, often referred to as all-aged management in even-aged units, was adopted and the flexibility of this system accommodated the resumption of prescribed burning of pine forests on Refuges.

SCOPE AND METHOD OF BURNING

National Wildlife Refuges containing most of the southern pine forest types suitable for prescribed burning are Noxubee and Mississippi Sandhill Crane in Mississippi, Eufaula and Wheeler in Alabama, Piedmont and Okefenokee in Georgia, St. Marks in Florida, Carolina Sandhills and Santee in South Carolina, Pee Dee, Mattamuskeet and Pungo in North Carolina and Felsenthal in Arkansas.

A commonly used burning technique on Refuges is stringing fire along roads and firebreaks using head and back fires and burning during daylight hours, also using natural fire barriers as much as possible. Each year some 1,000 ha of pine forest understory are burning under prescription for upland wildlife habitat improvement. Open pine forests are becoming common to the South once again not only through the use of prescribed fire, but in conjunction with scheduled forest thinnings and harvest cuts.

PRESCRIBED BURNING ON NATIONAL WILDLIFE REFUGES

Some of the important wildlife considerations to be met when prescribing fire on National Wildlife Refuges are as follows:

Season of Burning. Most Refuges burn during the months of December, January and February. Other Refuges select October through March but all select the winter months when nesting activity is minimal. Summer burning has been done experimentally, and if it is needed to accomplish a wildlife objective, it will be done after the nesting season.

Time. Prescribed burning on Refuges is done during daylight hours.

Burning Cycle. A 4-year burning cycle is used usually although some Refuges burn on a 3-or-5 year cycle. More frequent burns may be used to create desired conditions for certain species like quail.

Conditions. The weather, fuel and topographic conditions are considered for their effect on fire intensity. The goal is usually to maintain a low intensity fire.

Economics. Economic advantages of prescribed burning over other habitat modification methods are considered.

Stand Selection. Prescribed burning is conducted in pine stands with the exception of pine regeneration areas less than 4 m in height which are excluded.

Erosion. Areas with steep slopes where soil erosion may occur are excluded from fire.

Area Size and Dispersion. Relatively small areas (usually less than 200 ha) are prescription burned and these burning units are interspersed throughout the forest for greater diversity of habitat.

Technique. The pattern or burning technique used in prescribed burning operations is usually a backing fire, strip-head and/or flank fire which allows for safe movement of wildlife away from the heat and flames.

EXPECTED BENEFITS

The expected benefits from prescribed burning on Refuges may be placed in 3 categories: wildlife habitat enhancement and perpetuation, endangered species habitat preservation, and protection against catastrophic conflagration.

Some of the ways in which wildlife habitat enhancement and perpetuation are benefitted by prescribed fire include:

1. Establishment and maintenance of desirable stages of vegetation succession.
2. Quantity of seed production and plant abundance may be increased when prescribed burning with a "hot" fire (Cushwa *et al.* 1969), and seeds are more available for wildlife.
3. An increase in quantity and nutritional quality of woody sprouts and herbaceous vegetation may occur following fire (Cushwa and Czuhai 1968).
4. Fire prepares a seed bed and aids in germination of understory plant and tree seeds.
5. Prescribed fire can provide a degree of control over tree species composition.
6. The available forage profile is improved for browsing species of animals.
7. Winter burns in pine stands make available large amounts of insects for insectivorous birds and mammals during summer and fall (Hurst 1972).
8. Removal of thick rank vegetation enhances the feeding, mobility and general movement of wildlife.
9. Better utilization of the wildlife resources may be achieved for consumptive and appreciative purposes by users.
10. Modified fire lanes can serve as wildlife openings.

Burning for the preservation of endangered species habitat on the National Wildlife Refuges is mainly for the Red-cockaded Woodpecker (*Picoides borealis*). Mature pine stands are prescribed burned to maintain an open, park-like forest which they prefer for the development of colony areas. Burning also controls the understory cover and aids in prevention of nest hole disturbance by tall shrubs and trees. Other endangered species for which prescribed burning may be beneficial are the Eastern Indigo Snake (*Drymarchon corais couperi*) and Southern Bald Eagle (*Haliaeetus leucocephalus leucocephalus*). The Delmarva Peninsula Fox Squirrel (*Sciurus niger cinereus*) prefers mature loblolly forests for nesting and relishes feeding on the oily seed of loblolly pine. Prescribed fire is a recommended tool to be used for perpetuating loblolly pine within the squirrel's range.

In addition to the use of fire as a desirable wildlife management tool, the Fish and Wildlife Service has found it necessary in certain sections of the country to adopt a practice of controlled burning to prevent the destruction of wildlife habitat by incendiary or accidental fires. Protection is afforded by prescribed burning which causes the reduction of fuels on

the forest floor and lessens the damages that could result from wildfires.

Other benefits that may accrue from prescribed burning include:

1. the control of brown spot needle rust on longleaf seedlings;
2. the improvement of working conditions for those engaged in management and harvest activities; and
3. provision of a safer environment with greater opportunity for the using public to achieve their objectives whether they be consumptive or non-consumptive users.

Fire, because of its tremendous destructive characteristics when wild or used improperly, may become a controversial subject when its use is suggested for management purposes. In addressing the expected detriments of prescribed burning, probably the potential risk of an escape would be top-most in the minds of resource managers. This can be especially troublesome and perhaps even disastrous when weather conditions change unexpectedly during the course of burning within a prescribed set of conditions. In addition to the adverse repercussions from losing control of a fire other detriments can be:

1. reduced visibility and air quality due to smoke;
2. direct loss of wildlife by the fire;
3. reduction in some fruit producing vines, shrubs and trees;
4. soil erosion and increased run-off of rainfall when burning with high intensity fire and/or improper placement of firebreaks in rolling terrain since both expose mineral soil;
5. potential scorching or other damage to pine and/or hardwood trees when high intensity fire is used;
6. temporary reduction in specific wildlife habitat and rodent populations by removing some cover, and
7. potential damage and/or destruction of pine regeneration or hardwoods from fire escapes.

In the final stage of preparing this paper my thoughts reflected on the fact that it was ending on the detrimental effects of prescribed

burning. Being an advocate of prescribed burning since 1962 and a practitioner as well, I would like to conclude with two excerpts that more or less reinforce the positive aspects of fire. First, Komarek (1971) said:

"The southeastern pine forests are one of the world's best examples of a fire-adapted community of plant and animal life. If man interferes in the fire environment through exclusion, it would be followed by a successional elimination of many valuable species of wildlife, plants and trees. This could include the pine forest itself, which might be eliminated by disastrous wildfires."

This was followed by the comments of Lyons (1978) who said:

"Based on the state-of-knowledge review, fire represents a dynamic and important force in the life histories of many faunal species. Our understanding of the role played by fire is weak in several areas and requires additional research efforts."

SUMMARY

Through experimentation and experience acquired in the early-1940's, prescribed burning has gained acceptance as an effective and economical management tool on the National Wildlife Refuges. Its primary use is for conditioning pine forest habitat for wildlife. Secondly, it affords protection to the forest habitats by reduction of hazardous fuels.

The most economical method of prescribed burning on Refuges is by applying head and back fires during daylight hours while using barriers such as roads, trails, gullies and streams as firebreaks.

The proper use of prescribed burning generates fire of rather low intensity. The beneficial effects of this type of prescribed fire to wildlife and their habitat far outweighs the detrimental effects of fire. The exclusion of fire by man in fire adapted plant and animal communities would endanger the existence of many valuable forms of wildlife, plants and trees. The pine forest itself could be destroyed by wildfire. Continued research is needed to better understand the role that fire plays in the life history of many animal species.

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