Prescribed Burning

Habitat HOW-TO'S

Prescribed fire can be defined as a fire applied in a skillful manner to wildland fuels, in a predetermined place, under exacting weather conditions, to achieve specific management objectives. For this reason prescribed fire is much different than arson fire. Arson fire is a fire that has been set for destructive purposes and not for wildlife habitat enhancement. Prescribed fire is one of the most cost effective and dynamic methods known for managing wildlife habitat. The use of fire has traditionally played a big role in habitat management. A burn will set back natural succession and stimulate the growth of valuable grasses and legumes through seed scarification (breaking down the seed coat). Prescribed fire releases nutrients allowing lush herbaceous growth conducive to high insect production while at the same time producing bare ground for better movement and feeding.

The role of fire in habitat management has become accepted and well used in the southern coastal plain states, while in Kentucky the use of fire for habitat improvement is rarely used and not well understood. Decades of fire prevention have led many to believe that all fire is bad. However, under carefully controlled conditions fire can be a very effective management tool. Most uses of prescribed fire in Kentucky are for managing open lands (fields). Some beneficial uses of fire for wildlife management include:

- reducing invasion of trees and shrubs
- managing grassland communities
- removing excess leaf litter that inhibits vegetative growth and wildlife use
- releasing seed for germination
- increasing species diversity
- reducing hazardous fuels
- controlling disease

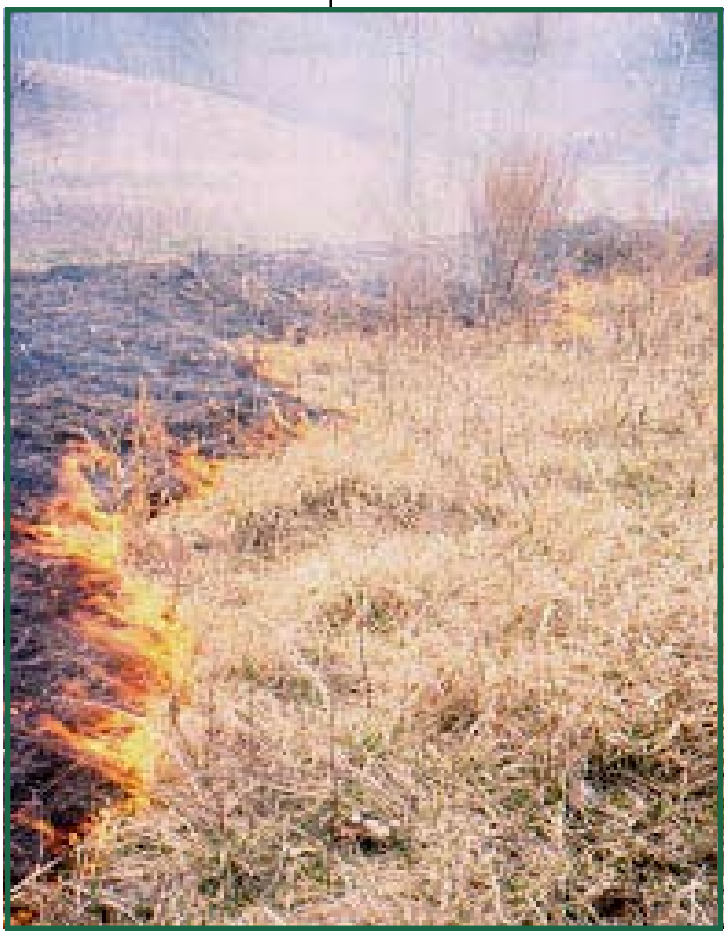

Figure 1. Never burn without a burn plan and the appropriate equipment and manpower to keep the fire under control.

Two major factors influencing fire behavior include:

1) Weather Conditions:

Weather conditions control the effectiveness and safety of

Fire is one of the most cost effective and dynamic methods known for managing wildlife habitat.

Figure 2. Prescribed fire is a very effective management tool of Kentucky's grasslands.

Generally the best time to conduct a prescribed burn is during the period from February 1 to April 15.

prescribed fire. Wind speed and direction is the first condition you need to consider, followed by relative humidity, temperature, fine fuel moisture, atmospheric stability, rainfall and soil moisture.

- Ideal transport wind speed, or wind measured at 20 feet above ground level, should range from 6 to 18 mph for smoke dispersion. This is the wind speed that is usually given by your local weather center. Surface wind, or wind speed at eye level, should range from 1 to 3 mph.
- Relative humidity is the proportion of moisture in the air, to the maximum amount of moisture the air is capable of holding at the same temperature and pressure if it were saturated. Relative humidity should range from 30% to 50% for a prescribed burn.
- The temperature for a late winter to an early spring burn should range from 20 to 60 degrees Fahrenheit.
- Soil moisture should be ideal if you have received a 1/2" or greater rainfall within 1 to 3 days prior to the burn depending on previous conditions. This is important to prevent rapid spreading of fire and permanent damage to the soil and the microorganisms that help maintain soil composition.
- Ideal fine fuel moisture (FFM) ranges from 10 to 20%. This is directly controlled by relative humidity (RH), rainfall & soil moisture. A rough estimate can be obtained by taking the relative humidity and dividing it by 2: (RH ¸ 2 = FFM).
- Atmospheric stability is the resistance of the atmosphere to vertical movement. Unstable atmospheric conditions are preferred. Such conditions promote rapid smoke dispersion but, if severe, can make fire control difficult. Indicators of unstable conditions include wind gusts, clear skies, and sometimes dust devils. Stable atmospheric conditions can cause severe smoke problems. Indicators of stable conditions include haze, layered clouds, and no wind or very steady low wind.

2) Topography:

Topography, or the lay of the land, is also a major influence of fire behavior. There are three main considerations regarding topography: aspect, slope and terrain.

- Aspect is the direction a slope faces. This determines the amount of heating it gets from the sun and the amount, condition and type of fuels present. South and southwest slopes are normally most critical.
- Slope is the degree of incline of a hillside, and determines the rate at which a fire burns. Fires burn more rapidly uphill than downhill. The steeper the slope, the faster the fire burns.
- Terrain is the shape of the land and has major effects on fire behavior. Narrow canyons are conducive to the spread of fire to the opposite side by radiation and spotting.

Three steps to conducting a prescribed burn:

1) Planning:

The first step in prescribed fire is to evaluate the site to be burned. Conditions such as the amount and type of fuel

on the land, moisture conditions, expected environmental conditions and the presence, size and expected effectiveness of firebreaks should all be determined and recorded on a Prescribed Burning Unit Plan (see attached document). The following should be incorporated into a prescribed burning plan:

Map: The map should show the boundaries of the planned burn, adjacent landowners, topography, control lines (both existing and those to be constructed), anticipated direction of the smoke, smoke-sensitive areas, roads, and houses.

Equipment: List equipment and personnel needed on site and on standby.

Fire Prescription: The amount of fuel, fuel moisture, weather conditions and desired intensity of the burn.

Season: Generally the best time to conduct a prescribed burn is during the period from February 1 to April 15. Check with KY Division of Forestry regarding fire regulations.

Time of Day: Normally, plan burning operations so the entire job can be completed within the same day. Start between 10 a.m. and noon if conditions are favorable and if Kentucky forest fire laws allow.

Firing Plan: Make sure all firebreaks are within the suggested guidelines. Choose the correct firing technique for your desired results. Make sure all weather patterns are within the suggested guidelines. Test burn with a small fire to check smoke behavior and fire intensity. Be alert to changing conditions. Patrol the area until the fire is completely out with no danger of re-ignition or smoke problems.

2) Firebreaks:

Control lines or firebreaks are physical changes on the landscape which allow for control of the burn. Firebreaks should be a minimum of 8-15 feet wide and should border the entire burn area. There are essentially 4 different types of firebreaks commonly used.

- Natural firebreaks are changes in the landscape, such as streams, rivers, ponds and roads that prevent the fire from continuing its path due to a loss of fuel.
- Constructed firebreaks can be established by mechanically disturbing the soil or spraying the vegetation with water or fire retardant to remove fuel or make it unavailable to burn.
- Another method includes the use of planted or existing barrier crops or strips that are fire resistant. Crops such as winter wheat, winter barley, annual rye-grass, orchardgrass and clovers are usually “green” during the recommended burning dates.
- A final method requires careful control of fire under very slow burning conditions to create a “black zone” where the fuel has been removed and the fire is then suppressed. Generally this type of firebreak is more difficult to install.

Figure 3. Burned fescue study plot.

Always notify the local fire department(s), adjacent landowners, and the Division of Forestry of your burn plans.

Figure 4. Prescribed fire will help remove woody vegetation from fields.

SUMMARY OF OPTIONS:

Purpose of Burn:
- Manage grassland communities
- Remove excess ground litter
- Increase diversity
- Control disease

Factors Influencing Fire Behavior:
- Past and present weather conditions
- Type of fuel
- Lay of the land

Conducting a Burn:
- Have a written plan
- Follow Ky. Division of Forestry burn laws
- Create fire breaks
- Type of fire to use
- Locate smoke sensitive areas
- Contact proper authorities and landowners

***Related *Habitat How-To* references:**

Native Warm Season Grasses

Wildflowers

Fescue Eradication

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However, it can be installed as an enhancement to other firebreaks by utilizing strategic placement of fire in the burning plan (see firing techniques below). The most common application of this type of firebreak is by the use of backfire-burned fire lanes.

3) Firing Techniques:

Techniques used to start and control the fire vary form site to site. Generally, a back-fire or a fire started along a firebreak, such as a road, plow line, stream or other barrier, and allowed to burn into the wind, is most commonly recommended. Other types of recommended firing techniques include; strip-heading fire, flanking fire, ring fire and point source fire. Explanations of these can be found in A Guide for Prescribed Fire in Southern Forests. Contact the National Interagency Fire Center, Attn: Supply, 3833 S. Development Ave., Boise, Idaho 83705. Order NFES # 2108.

Smoke Management and Other Considerations

Smoke management must be incorporated in the planning period. Obtain weather and smoke management forecasts for reference. Comply with air pollution control regulations. Do not burn during pollution alerts or low transport wind conditions. Burn when conditions are good for rapid dispersion or during slightly unstable atmospheric conditions. Use caution when near or upwind of smoke-sensitive areas such as towns, schools, highways or public park areas. Do not burn if smoke-sensitive areas lie within 1/2 mile downwind. Estimate the amount and concentration of smoke you expect to generate. Always use a test fire to confirm smoke and fire behavior.

There are a number of other features that will affect a prescribed burn. For these reasons it is recommended that contacts be made with KY Department of Fish and Wildlife Resources Wildlife Division, KY Division of Forestry, and others who have successfully used prescribed burns to manage habitat. Always notify the local fire department(s), adjacent landowners and the Division of Forestry of your burn plans. The KY Division of Forestry (KRS 149.400) regulates burning in and around Kentucky's woodlands. By contacting the Forestry Division (800/866-0555) you will be able to acquire any burn bans or restrictions in your area. Current laws state that from February 15-April 30 and from October 1-December 15, you cannot burn within 150 feet of any woods or brushy area except between the hours of 6:00 p.m. and 6:00 a.m. local time. Consideration must be given to the down-wind effects of the resulting smoke and the need for adequate manpower for suppression and control. Experimentation is part of learning the technique. Start off by burning a small plot and increase plot size as your knowledge increases.

Always start the planning process with a desired objective in mind, develop a complete written plan, only burn when environmental conditions are correct and make a record of the final results by noting the good and bad points. Retain the plans, prescriptions, conditions, records and results for future reference. **NEVER ATTEMPT TO BURN ALONE, WITHOUT A BURN PLAN, OR WITHOUT PROPER GUIDANCE AND EQUIPMENT!**