

PRESCRIBED BURNING



Prescribed burning is a very important management tool for maintaining and enhancing grasslands. Fire was an important natural part in the development and maintenance of grasslands, forests, and wetlands, throughout history. To many of us, fire is a feared enemy that destroys everything in its path. Because of this, the use of controlled fires, such as prescribed burning, is underutilized as a management tool for improving and maintaining habitats.

For thousands of years, tall grass prairies and open brushlands were kept free of trees by the occasional wildfires that cleared the landscape every two to 50 years. These fires were caused by lightning, or set intentionally by Native Americans. They had discovered that fire killed woody plants, but encouraged fruit bearing shrubs, and forage producing grasslands.

Present day research and experience have shown that prescribed burning can be an effective management tool. Prescribed burns are used most frequently to maintain and restore native grasslands. Prescribed burning can recycle nutrients tied up in old plant growth, control many woody plants and herbaceous weeds, improve poor quality forage, increase plant growth, reduce the risk of large wildfires, and improve certain

wildlife habitat. To achieve the above benefits, fire must be used under very specific conditions, using very specific techniques.

Brushlands can be invigorated and maintained with fire to benefit species such as bluebirds and sharp-tailed grouse. Burning old fields controls saplings and woody vegetation, and improves grasslands for use by nesting wildlife and grazing livestock. Forest openings can be manipulated with burns to benefit more than 150 wildlife species. Upland nesting cover used by pheasants, waterfowl, and songbirds will remain productive if periodically burned. Cattails and sedges are returned to vigor by an occasional burn. Lastly, if you want more oaks in a hardwood stand, a fire will kill off less tolerant species such as maple, and basswood, allowing the oak to compete more successfully. Burning is also more cost-effective than other treatments like bulldozing, cutting, or chemicals.

Objective

Every prescribed burn should have a clear objective. This objective is necessary to evaluate the success of the burn. To show the success, or lack thereof, of a prescribed burn, a photograph can be taken before, directly after, and one year following the burn. Objectives for a prescribed burn often include one or more of the following:

- Kill woody plants
- Remove grass and wildflower dead vegetative build-up (duff)
- Promote regrowth of warm season plants
- Promote regrowth of cool season plants
- Reduce or set back noxious weeds
- Increase populations of wild flowers
- Reduce cattail mono-cultures
- Reduce wildfire fuel build-up
- Promote growth of fire dependent trees such as Jack pine
- Increase populations of threatened and endangered species.

Burn objectives should be identified in the burn plan. The objectives help determine the weather conditions for the burn, the timing of the burn, and how hot the burn should be.

Notification

For both safety and legal reasons, certain groups should be notified before a burn to prevent unnecessary concerns and danger.



Notifying neighbors, fire departments, and local law enforcement officials should be part of the prescribed burning process. Working with the local fire department is crucial because a burn permit may be necessary, and there may be a burning ordinance in your area. A copy of the burn plan should be given to the local fire department. The National Weather Service should have a telephone number listed in your area. They will be able to keep you up to date with changing weather conditions.

Considerations

There are many things to consider when planning for a prescribed burn. **Burns need to be conducted by individuals who are experienced and trained in the use of fire.** However, as a landowner, it is important to understand prescribed burning and its use. For instance fire moves faster uphill than on a level surface, so slope of the burn area must be taken into account.

When using fire it is important to plan for firebreaks. A firebreak is an area that will contain a fire within its boundaries. A plowed or disked strip, reaching down to mineral soil, is the most common method of establishing a firebreak. Sometimes, a mowed path, or a walking trail, can be used as a fire break. Firebreaks can also be planted to grasses and clovers so they can provide key food and cover to wildlife. For example, if an area is burned every five to seven years, the firebreak is disked up the fall before the burn. Then, after the spring burn, the firebreak is planted to grasses and clovers. Firebreaks should be at least 20 feet wide.

Equipment

Basically three kinds of equipment are needed for prescribed burning:

1. tools to ignite the fire
2. tools to control the fire
3. safety equipment

A drip torch, a can of liquid fuel with a long spout, burning lightly at the end, may be used to start and spread the fire. It will drop a three to one fuel oil-gas mixture on the grass at a steady rate. This allows for a continuous fire line, and quicker, more efficient fire application than a fire rake.

To control (mop up) your fire properly, fire swatters, 12 inch X 18 inch pieces of reinforced rubber attached to a handle, or fire brooms, are great to smother small grass fires. A backpack water pump can be teamed up with a swatter for maximum efficiency. The pump operator would lead knocking down larger flames (using a spray for cooler fires and a stream for hotter ones) while the swatter can follow up making sure the fire is put out. To aid in the extinction of the fire, one quart of dishwashing detergent can be added to 50 gallons of water (one tablespoon of detergent to one gallon). This mix helps the water to "cling" to the grass fuel. Low-pressure, field crop sprayers with handgun nozzles can work for small burn areas that have safe boundaries, as well as backpack and herbicide sprayers. An all-terrain vehicle can also be helpful for carrying extra tools or tanks of water to your site. If high-pressure pumps are used, then water should be rationed to prevent it from running

out partway through the burn. If a wetland, pond, stream, or other water source is near the burn site, then pumps and sprayers will be easy to refill.

Safety equipment is also very important. Make sure that a first aid kit and plenty of drinking water are always nearby. Poorly managed burns or ignorance of safety measures can lead to property damage, and even injury or death. Even in well-managed burns accidents can occur. **Before, during, and after every burn, safety should be the major consideration.** Proper clothing can also add a measure of safety. Fireproof Nomex pants and shirts are essential. Leather boots and gloves, along with eye protection, should be worn at all times. Never wear synthetic fibers like nylon, which can melt and stick to skin. A long sleeve shirt, a hard hat, and long pants, will keep you safe from radiant heat and flare-ups. The more skilled the burn crew is the more likely the fire will be controlled and thus beneficial. Generally, three or four people are needed on each fireline (more if safety may be challenged). One will ignite the fire and be in charge of operations (the fire boss), one or two should keep the fire on its correct path, and any others should help mop-up (extinguish flare ups or escaped flames).

Timing

The timing of a burn determines the plants which will be benefited and controlled, the impact on wildlife species, and safety. Most burns are conducted mid to late spring, or in the fall. Burning to favor desired grasses should take place just as they are starting to green up, and the soil surface is damp. Generally, a late spring burn

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will control woody vegetation and cool season grasses better than an early spring burn but are not as beneficial for wildflowers. This burn will also provide warm season grasses with nutrients they need to grow.

Before burning, nesting times of grassland species should always be checked to prevent the destruction of nests and their inhabitants. The best time for spring fires is late March into April; generally in the morning or evening, when the relative humidity and temperature are not changing as rapidly as during daylight hours. The drier the area the earlier the burn should be to avoid damaging the earliest blooming wildflowers. Though fall burns are possible and can be beneficial, they are often avoided, due to the cooler temperatures, drier ground, and destruction to winter wildlife habitat they may cause.

Weather Conditions



Weather has an overriding effect on a prescribed burn. A burn plan will outline the weather conditions, which must be met before the burn is conducted. It is very important to have the latest and most updated weather conditions available before starting the burn. Relative humidity is an important factor to consider when planning a controlled burn. If the relative humidity is below 50%, the dryness of the grass is prone to causing very hot fires. If the relative humidity is above 70% the fire will have a hard time catching at all. Therefore a relative humidity between 50% and 70% works best.

Temperature is also important when laying out a burn plan because of its relation to relative humidity. Below 32 degrees Fahrenheit grass mats will rarely burn, and above 80 degrees Fahrenheit burning is hazardous. Between 40 degree Fahrenheit and 60 degrees Fahrenheit is ideal.

Wind direction and speed should both be taken into account as well. The wind speed should be between three and seven mph, and the wind direction should remain steady. If either varies greatly, the fire can shift with gusts of wind, and may burn too quickly with an increase in wind speed. Both of these variables can severely hinder safety precautions if not watched closely. In general, wind is calmer in the morning and the evening. Smoke management is crucial. Always warn your neighbors of your burn, and prevent smoke from hindering any roadways by planning your burn when the wind direction is going away from the road.

Of all the weather parameters the wind speed and direction are most critical. Unless professionals are included in the burn crew a burn at over seven mph is not recommended. Faster burns are less effective. They may not remove all the litter and unwanted species. In addition, safety comes first. Often the safest time to burn is in the evening between 7 pm and 10 pm. This is when humidity is on the rise, temperature decreases, and wind speed dies down, creating the setting for a slower (and safer) fire. However, burning after dark can be dangerous. Areas still smoldering can be missed.

Burn Techniques

There are 4 basic burn techniques used in the prescribed burning of grasslands. These four techniques include:

1. back fire
2. parallel (flank) fire
3. perimeter (ring) fire
4. strip head fire

Each method has strengths and weaknesses depending on the weather conditions, size of the area, and expertise of the individuals conducting the fire. Special considerations when conducting the burn include power lines, telephone lines, and oil or gas lines.

A **backfire** is used downwind of the burn site. This is most often the coolest and safest fire. However, it is slower burning and therefore takes longer to finish. The fire is ignited on the downwind side of the fuel and slowly burns into the field against the wind, expanding the firebreak. This burn technique is often used in conjunction with other burn methods.

A **parallel or flank fire** burns hotter and faster than a strip fire or backfire. It works well on square or circular parcels. A fire is ignited on the sides of the burn site parallel to the wind direction at the same time or soon after a backfire is lit. The people igniting the fires on either side should keep continuously in touch by 2 way radio.

A **perimeter fire** is not only one of the quickest burn methods, but also creates a hotter fire than those listed above. Since this type of burn technique develops a hotter and faster moving fire, which can be harder to control, it must be handled carefully. This method

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PRESCRIBED BURN PLAN

(attach aerial photo)

Landowner: _____

Address: _____

Location of Burn: County _____ Township _____ Range _____
Section _____ Field # _____

Burn Objective: _____

Burn target date(s): _____

Desired Burn Conditions: Wind Speed _____ Wind Direction _____
Relative Humidity _____ Soil Moisture _____

Parties to Notify

Local Fire Dept. _____ Sheriff's Dept. _____
Resource Agency _____ Neighbors _____

Fire Plan: indicate on aerial photo the wind direction, fire lanes, location and type, back-up fire lanes, firing sequence and hazards such as roads, buildings, power lines, etc.

Suppression in Event of Escape Plan: Discontinue firing sequence. Leave sufficient personnel with the prescribed burn to prevent further escape. Remainder of crew suppress escaped fire. Notify local department if necessary.

Equipment Needs Rake _____ Swatters _____ Drip torches _____
Backpack Sprayers _____ Water Wagons _____
Other _____

Burn Crew:

Fire Boss _____ L-Flank fire _____
Backfire _____ Water Wagon _____
R-flank fire _____ Mop-up _____

maintain native grassland communities. An objective is established and a burn plan is developed which meets the burn objective. Experienced and trained individuals conduct the burn under the guidance of a burn plan. Neighbors, local law enforcement agencies, and local fire departments should be notified. Safety is always the top priority for the burn.

starts with a backfire, followed by lighting the flanks, and finished by lighting the upwind side of the burn site called the head of the site. This headfire will move rapidly towards the flanks and backfire.

A **strip head fire** burns slightly faster than a backfire, is relatively safe, and works well for burning rectangular or odd shaped parcels. It is also cost-effective. A series of strips are lit, starting at

the downwind side of the site, burning only one at a time. Ideal when burning with a limited number of personnel. Remember when choosing a burn technique, your level of experience with burning, and that of your burn crew, should be a major factor in your choice.

Summary

Prescribed burning is an important management tool to

FOR ADDITIONAL CHAPTERS CONTACT:

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Private Land Partnerships: This partnership was formed between both private and public organizations in order to address private lands wildlife issues. Individuals share resources, information, and expertise. This landowner's guide has been a combined effort between these groups working towards one goal: Natural Resources Education. We hope this manual provides you with the knowledge and the motivation to make positive changes for our environment.

FOR ADDITIONAL ASSISTANCE: CONTACT YOUR LOCAL CONSERVATION DISTRICT