



Utilizing Prescribed Burn for Pasture Management

Volume 5, Issue 2

Rocky Lemus and Jason Gordon

Extension Forage Spec. and NWMS Forestry Extension Spec.

February 2012

Visit us at: <http://mississippiforages.com>

Burning has been used for the last 10,000 years to rejuvenate grasslands. Burning pasture or hay fields as means of managing excess residue is commonly practiced in the Southern U.S. Fire could be used to control brush and the encroachment of woody plants without harming the grasses since their root system extend deep into the ground. Forage producers commonly use burning to stimulate vegetative growth of unproductive or heavily weed infested pastures. Burning is an inexpensive, labor efficient means of removing unwanted residues prior to green up than mowing or using herbicides. Keep in mind that it might not be the only management tool to control invasive species in a pasture. Prescribed burning must be integrated with rotational grazing to gain the full benefits. Combining the appropriate stocking rate and rest periods with prescribed burning will allow the desirable vegetation to be competitive and help reduce the encroachment of many undesirable plants.

Burning is carried out for a variety of reasons: to remove excessive vegetation, increase plant productivity by increasing photosynthetic capability, control weeds and insects and to reduce diseases where dead biomass could host pathogens. Also, burning changes soil temperature, soil moisture, and short-term nutrient availability, especially nitrogen mineralization. Although there are some short-term benefits to burning pastures, it can also have long-term detrimental effects, if not managed correctly. Some of those effects include decrease in soil organic matter and nutrients (total nitrogen, total sulfur, carbon/nitrogen ratios, extractable carbon, polysaccharide, ammonium, and available phosphorus), decreased potential for water holding capacity, increase injury to vegetation (especially to short and shallow rooted grasses) and increase soil erosion. Heavy rains between the time of burning and green up may allow the beneficial ash and soil to wash out of the field.

Prescribed burning is planned to achieve a specific objective in a specific area under appropriate conditions at the right time of the year. This will require equipment and a crew to keep the fire under control. A prescribed burn will require some planning to meet certain management goals. A plan should consist of:

1. **Define the area to be burned** – This could be achieved by using an aerial photo or map of the pasture or property to be burned. It is important to define the conditions of the properties adjacent to the area to be burned and notify the surrounding landowners. Identify the location of fences, gates, power lines, property boundaries, streams, wetlands, roads, trails, nearby buildings and working cattle facilities, etc. Walking the property to be burned is important to identify areas of heavy fuel loads such as matted grass, dead trees, or any dry pines that could intensify the blaze.
2. **Determining when is the best time to burn pastures in Mississippi** – Timing of the burn is a critical element for obtaining the desired response. The safety and effectiveness of a prescribed burn can vary according to the region and climatic conditions. Most perennial pastures in Mississippi can be burned from Mid-January to early March before green-up. During this time, fire will feed off of dead grass without harming the stand. Summer burning is not recommended because of the high temperatures and humidity and the active growth of perennial grasses. Burning should be carried out every 3 to 5 years when an excessive amount of dry material is accumulated on the pasture from the previous years or weed infestation is over 50% of the stand. Burning too early may allow weeds to regrow more rapidly and early, which can increase competition at the time of grass green up. Early burning will also cause the perennial grasses such as bahiagrass and bermudagrass to be more susceptible to late freezes. Burning too late may damage grasses that has begun to green up and reducing the stand.



3. **Create Firebreaks** – Firebreaks should allow for the containment of fire within the burn area. Although ponds, plowed fields and roads could be used as firebreaks, there is the need to develop firebreaks that are wide enough to stop the fire. Depending on the type of vegetation in the pasture, the load of biomass and topography of the terrain, firebreaks could be created by mowing, plowing, disking, establishing a wet line or backfiring.

4. **Obtain the necessary man power** – The number of people needed for a fire varies with the size and complexity. Generally, three to four people are necessary for each fireline. One for ignition, one or two to control the fireline and one to extinguish all smoldering debris such as logs or stumps. If burning occurs close to a highway, it is highly advisable to have a road patrol and signs posted in case smoke blows across the highway and impair the visibility of the drivers.

5. **Use proper equipment** – Drip torches are the most efficient way for igniting a uniform fireline. Flares or matches could work, but are not as efficient. Crews should have a sprayer capable of high pressure and at least an output of 5 to 10 gallons of water per minute. If burning small pastures that have extremely safe boundaries, a low-pressure, low-volume cattle or field crop sprayers might work. Always make sure that there is enough water close by to refill pumps and sprayers. Backpack sprayers, wet sacks, bow rakes, broom rakes and swatter could be used to smoldering fire afterwards. Although hand signals could be used as communication in small burns, having band radios or cellular phones could make commutation more effective. It is also advisable to have farm tractors, 4-wheel ATVS, or 4-wheel vehicles available for transport crew, equipment or water when necessary.

6. **Wear proper clothing** – Crew member should wear clothing made of natural materials such as cotton, leather boots (or rubber boots in wet areas), and leather gloves. Do not wear torn clothing and avoid any synthetic material such as polyester, plastic, or rubber. These materials will melt and stick to the skin if they catch fire. Wearing eye goggles and face masks (dust or painting masks will work) is recommended. Hard hats are advisable if working around trees, brush or power lines.

Suggested Prescribed Burn Requirements

- Should have a prescription notarized at least 1 day prior to burn.
- Should have a permit from the MFC on the day of the burn.
- Should be in the public interest (Public interest means that the fire is for one of the following reasons: Site Preparation, Hazard fuel reduction, Wildlife Management, Other).
- A burn prescription is a written plan that states the how, what, where, when, and why of burning.
- Should be site specific.
- Include burning technique(s) to be used.
- Take time to “scout” the site and surrounding area.
- Know topography, fuel types, species, smoke sensitive areas, any elderly in the area, hospitals, highways, chicken houses, etc.
- Once notarized, becomes a “legally binding” document.

The MFC District Office will issue a burning permit for a specific county when:

- Transport wind speed of 3.5 m/s (Approx. 8 mph).
- Mixing height of 500m (Approx. 1750 feet).
- These conditions need to be met so that smoke will rise, and be dispersed.
- Just because you get a permit, doesn't mean you can legally burn. All necessary conditions need to be met.

1992 Mississippi Prescribed Burning Act and Liability.

- Simple Negligence: Pay actual damages and up to \$150 fine.
- Gross Negligence: Pay actual damages, up to \$500 fine, and potentially 3 months in county jail. (misdemeanor).
- It's up to a jury to ultimately decide on negligence.
- Acts of a reasonable prudent person.
- You do not have to be a certified prescribed burn manager to have a burn on your property; however, without a manager, your risk and liability increase dramatically. If something goes wrong (particularly in smoke management), you can be found in gross negligence.
- MFC foresters can immediately issue “tickets” if they are called to a site. The fine accounts for labor and materials used to correct the problem.

For more information, see **The legal Environment for Prescribed Burning in MS.**

FWRC publication FO 351.

Figure 1. Summary of requirements and regulations for prescribed burning in Mississippi.

7. **Obtain a permit and notify the necessary authorities** – Any prescribed burning in Mississippi will require obtaining a permit in advance from the Mississippi Forestry Commission (MFC) (**Fig. 1**). Contact your county MFC office for permit information. If weather conditions are not favorable for a burn, the permit will not be granted. It is important to notify in advance and the day of the burn the proper authorities such as fire department, law enforcement officials, Forestry Office and neighbors. Having a cell phone within reach is recommended to quickly request help in case of an emergency. It is also important to have a contingency plan in case the wind shifts, the fire gets out of control, someone gets injured, equipment breaks down, or smoke creates severe visibility problems.

Once a plan has been developed and the proper permits have been obtained, it is necessary to get prepared for the burning date. There are several guidelines that need to be taken into consideration before executing the prescribed burn:

- A. **Observe the weather conditions** – It is important to monitor the weather conditions several days ahead of the designated date for burning. It could make or break a prescribed burning. Weather conditions need to meet several specific parameters such as wind speed and direction, relative humidity, air temperature, and forecasted weather conditions. It is very important to pay attention to forecast prediction changes in wind direction. A burn should not be executed when wind exceeds 12 to 15 mph (miles per hour), humidity is lower than 25% (desirable 30-55%), and the temperature is above 80 °F. If these conditions are not met, be prepared to reschedule the burn. Do not take chances. Because producers get so many chances in a year, it is recommended trying to burn as much as possible at a single time if the conditions are favorable. This is also more cost effective. Producers should not have a fire burning at night due to temperature inversion. Temperature inversion occurs when a layer of warm air is sitting over a layer of cold air. Inversions are common during the night and early morning when cool air is present in the atmosphere. Damp conditions produce more harmful smoke emissions. Temperature changes (cooler temperatures) and calmer conditions often cause smoke retention or poor dispersal.
- B. **Igniting a fire** – The day of the fire make sure that you have crew together and go over the burn plan and check the equipment to make sure that everything is working properly. Before igniting a pasture, it is recommended to ignite a small test fire in the downwind corner of the burn site to observe fire behavior and crew's reaction and performance. This will allow correcting any issues before beginning the main burn. Once the test fire is completed, start the actual burn by igniting a backfire in the downwind corner. Since a backfire moves against the wind, it will be effective at scorching and killing woody brush and weeds.

Setting a backfire – Usually beginning a backfire in late afternoon or early evening will allow a slow ignition of backfire lines when humidity is at its lowest point and winds are quietest. Besides controlling the flames, it is also important to control the smoke. Try to avoid burning along the roadways where wind will blow toward the road, making it hard for drivers to see. It is always recommended to lengthen the backfire by igniting short segments of fireline along the boundary of the burn side that is downwind. Never ignite more fire than the crew can easily control. The person igniting the fire should pay close attention to wind speed and direction as well as the location of the crew. It is important to check back along the fireline to make sure that fire has not re-ignited or went across the firebreak.

Setting a flank and headfire – It is recommended to continue working along the perimeter of the burn area, igniting the flanks. A flankfire moves at right angles to the wind and burns more quickly than a backfire. You need to be cautious because with a wind shift a flankfire could turn into a fast-burning headfire. The backfires and flankfires should create a firebreak or burned ground around most of the perimeter of the burned pasture. This will allow igniting a headfire. Keep in mind that headfires could spread quickly, have long flames, and create the most heat. Because fire escapes usually happen when igniting a headfire, it is recommended to have a firebreak that is two times wider than the average flame height before igniting a headfire.

- C. **Smoldering the fire and evaluation the results** – After a complete burn, it is important that the fire is completely out before leaving the premises. One smoldering ember could re-ignite a fire. Check the perimeter of the burned pasture several times. If burning in late afternoon, it might be a good idea to wait around until dark to find any hot spots. Cut down and extinguish any trees burning near the break. Drench all smoldering debris and hot coals with

water. Water mixed with detergent or other surfactants might work better in penetrating smoldering debris. Do not bury smoldering debris since it can burn for a long time underground. Once the work has been done, evaluating the entire the process (from planning to extinguish) is one of the most important steps (**Fig. 2**). This will ensure that the objectives were met and the operation was safe and efficient. Keep in mind that the burn plan should account for starting a fire and completely finishing it within daylight hours.

A properly planned and carried out prescribed burn can be a very effective management tool for pastures or hay fields. Occasional burning of pastures may provide the producer with an economical and effective management tool; however, repeated, long term burning of pastures can have a more permanent negative effect on soil quality and overall soil health. Repeated burning could cause long term reduction in yields. Also, soils that are high in fertility may take several

years to show the detrimental effects of burning. Remember to always burn against the wind for better controlling the fire, burn before a rain for hot spot control and to incorporate the ash into the ground, and burn early at night to easily identify the hot spots. Also, if fertilization might follow a burn, wait after the burn to soil test.

Prescribed burning could be dangerous if improperly or carelessly done. The producer is liable for any damages or suppression costs that could occur as a result of the prescribed burn, including fire damages or problems created by smoke. Take precautions and appropriate measures

before, during and after burning to reduce any risks. The benefits are many and the cost is relatively cheap, but never forgets the dangers and costs of poor planning or an accidental escape of fire. Get help before you burn. Contact your local Forestry Commission Office and/or your County Extension Office for more information on planning and executing a prescribed burn of a pasture or hay field. For more information related to fire ban, permits and fire trainings visit the MFC website at <http://www.mfc.ms.gov>.

Figure 2. Fire Management Practices

Pre-burn – Identify the area to be burned, the burn objectives, site characteristics, firebreaks have been established, the necessary equipment is ready for burn and the crew has been notified as well as proper authorities and neighbors.

Day of Burn – Identify the conditions on the day of the burn: wind speed, wind direction, relative humidity, air temperature, fuel load, fuel moisture, test fire behavior.

Post-burn – Double check that hotspots are extinguished, smoldering is completed, final perimeter is checked, equipment is collected and local officials are notified that the fire is out. Assess the success of the prescribed burn.

