

PRESCRIBED BURNING SAFETY

Prescribed burning can be an important land management tool in Montana. 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. Follow basic burning procedures, wear proper clothing, and be prepared for the unexpected.

PERSONAL SAFETY

Prescribed burning, like any management practice, must be accomplished with careful planning, understanding, and care. In addition to planning the burn and providing for adequate fire guards, it is important that everyone on the burn meet specific requirements. This is for the safety and protection of everyone.

Health Considerations. People with known health problems, such as high blood pressure, heart conditions, certain allergies, and respiratory diseases, must not be allowed to participate. Prescribed burning is a strenuous, stressful, and demanding job that requires good physical conditioning. Should a medical emergency occur, some people will have to be pulled away from the fire control to provide emergency assistance. The result could be an uncontrolled burn (wildfire).

Clothing. Clothing must be of natural fiber (cotton, wool, etc.) that covers the body, arms, and legs. A cap or hat of natural material is needed to cover the hair. Gloves (preferably leather) and high-top boots are mandatory (Steel-toed boots are prone to accumulating heat). Wear pant legs outside the boots—not inside. In areas where burning includes timber, brush, or trees, a hard hat should be used.

Clothing made of most synthetic fibers, such as polyester and nylon, is a hazard to personal safety near fires. Some synthetic fibers can melt at temperatures which are common in prescribed burning, causing severe burns. While such incidents are rare, the risk of wearing synthetic materials should be avoided.

The one exception to the use of synthetic fibers is "NOMEX" (a registered trademark of Du Pont) or any other materials designed for fire fighting. These are special fire retardant fibers and are used by fire fighters, military pilots, and race car drivers. Shirts, pants, and coveralls made of NOMEX are the best available alternative.

PUBLIC SAFETY

From the public's viewpoint, fire is dangerous and should be avoided. Always maintain good public relations and avoid situations which might endanger the public. Dangerous situations can create legal liability.

Notification. For both safety and legal reasons, certain groups should be notified before a burn to prevent unnecessary concern and danger. Check with local authorities.

Neighbors, the fire department, and law enforcement officials should be notified. This can prevent misunderstandings, unnecessary fire calls, and poor public relations.

Neighbors. Notifying neighbors can help in determining their attitudes toward burning and possibly help in finding assistance. Notifying neighbors of a burn can lead to cooperation in conducting the burn. With good relations, neighbors may be willing to share labor and equipment.

Fire Department. Follow any state and local regulations such as obtaining a burn permit. Working with the fire department is crucial. Contact the fire chief to determine state and local regulations and to develop specific plans for requesting emergency help.

Law Enforcement. If a potential traffic hazard exists, notify local law enforcement personnel. Discuss the location of the burn with officials to determine what actions may be needed to prevent traffic problems.

Smoke Management. From a public safety standpoint, smoke may present the greatest safety hazard. Airports and public roads are the major concerns. The following situations merit special considerations:

- Public Roads—smoke moving over public roads may create a visibility problem and should be avoided. Three alternatives are available when burning next to public roads: (1) burn with the wind blowing away from public roads; (2) use burning procedures that limit the amount of smoke and/or cause the smoke to lift over the road; and, (3) arrange for traffic control during the time of the burn.
- Airports—burning near an airport is a major concern. Smoke over airports can cause poor visibility created by smoke. Turbulence and updrafts within the smoke column can create control problems for light aircraft. When planning burns near airports, select a time when wind directions will carry the smoke away from

the airport. Also, notify airport authorities and discuss your plans with them.

Weather. Weather conditions must remain within acceptable limits to safely manage a prescribed burn. The main factors that need to be monitored are wind speed, wind direction, cloud cover, relative humidity, and temperature. These factors affect fire behavior and control. Acceptable ranges and limits for prescribed burns are summarized on the burn plan itself. Burning when conditions are outside these ranges should rarely be done and only by experienced personnel.

Wind speed and direction are crucial to fire behavior. Wind speeds of 5–15 mph, steady from a desirable direction, are preferred. Listen to the weather forecasts closely. Changes in wind direction, variable wind speed, or gusty winds, are unacceptable conditions. Wind speed is modified by relative humidity, temperature, and frontal movements. As relative humidity decreases and temperature increases, the effect of the wind is increased. Frontal movements can cause changes in wind direction and speed. Burning should not be completed if frontal movements are forecast within 24 hours.

Cloud cover plays a significant role in prescribed burning. As a rule, as cloud cover increases, it becomes more difficult to ignite and maintain a burn. Cloud covers of more than 0.7 (meaning more than 70 percent of the sky is covered) and ceilings below 2,000 feet are conditions to avoid. When cloud ceilings are below 2,000 feet, smoke will stay near the ground and can cause visibility problems.

Relative humidity controls the rate at which fuels dry. Most grassy fuels change moisture content quickly as relative humidity changes. During late morning and early afternoon hours, relative humidity can drop quickly, causing fire size and intensity to increase rapidly.

Temperature and relative humidity are related in that as temperature increases, relative humidity decreases. When temperatures exceed 80° F, people perform at lower efficiency, tire quickly, and require higher levels of fluids to maintain stamina.

Weather forecasts. The two best sources of weather information are weather radio or the National Weather Bureau located in Great Falls. Weather information is updated regularly at the National Weather Bureau and should be contacted for the most current weather information.

SAFETY DURING THE BURN

Communications. Two types of communication during a burn are desirable: Contact with a location that can relay a request for emergency assistance; and, between crews working on the burn. Communications can be by CB, business band or similar radios, or cellular phones. Cellular phones are the best alternative for requesting emergency assistance in most areas. It can be vital to have fast response by emergency help in case the fire gets out of control or an injury occurs.

Emergency Situations. Several dangerous situations can occur during a prescribed burn. Potential dangers can be minimized with good advance planning. Have escape

routes planned, wear proper clothing, use well-maintained equipment, plan for good communications, and have a good overall plan for conducting the burn.

Probably the most frightening situation is to be in front of a head fire. This can occur as a result of unexpected wind shifts or from becoming disoriented. Unless the fire front is low and it is possible to determine that the depth of the fire is small, never attempt to run or drive through the fire. High temperatures, smoke, and lack of oxygen make it virtually impossible for a person on foot to walk or run through larger fire fronts. If matches or a lighter are available, a small fire can be started. Stay behind it until the main fire passes. If a person is in a vehicle in running condition, a similar approach can be used. If the vehicle is inoperable, wet down an area around the vehicle and remain inside it. Try not to get in front of a head fire.

Crew Preparation. Every person working on a burn should be briefed on the burning plan. This briefing should include designating who is in charge, the responsibility of each person during the burn, and the responsibility of each person in case the fire escapes. In addition, each person should be briefed on communication procedures for notifying emergency personnel if needed. This item is extremely important.

Each person on the burn must be familiar with basic prescribed burning and fire techniques. Persons who are not familiar with these basics pose a potential hazard to the entire operation and to themselves. Every effort should be made to train or familiarize each person on the techniques needed during the prescribed burn and what to do in case the fire escapes.

Equipment Operation. Safe operation of all equipment should be first and foremost. Tractors and other vehicles should be trained and experienced persons. Equipment operators should remain in communication with other personnel. Power take-offs, belts, and other dangerous parts should be shielded and marked.

Night Burning. Burning at night should be avoided. Darkness prevents the drivers of vehicles or personnel on foot from being able to find their way, see obstacles and landmarks, judge distances, and assess the overall fire situation. Night fires also appear more severe than they are and many times result in false alarms.

SPECIAL CONCERNS

Electrical power lines and oil and gas production and transmission equipment can pose special hazards for prescribed burns. Special consideration during the planning and conducting of a prescribed burn can eliminate or greatly reduce injury and damage from these factors.

Power Lines. When burning under or near electrical power lines or high voltage transmission lines, exercise extreme care. The following situations can lead to injury or deaths.

Smoke Buildup. Smoke consists of carbon particles, which can conduct electricity. If the concentration of

carbon is high enough, an electrical discharge from the line discharge hazard increases as line voltage increases, distance to the ground decreases, and the amount of smoke increases. Such discharges have killed fire fighters.

To reduce the potential for discharges, the fire front should not be allowed to cross under the lines in large areas. By properly coordinating the location of the burn with the wind direction or by lighting the fire parallel to the line, no major smoke build-up can occur.

Water and Power Lines. When working below power lines with water hoses, extreme care must be taken to keep water streams out of overhead lines. Water will conduct electricity and the water stream will act as a conductor causing electrocution.

Downed Power Lines. Power lines can be downed during a prescribed burn by vehicles colliding with poles or poles being burned, etc. If power lines are downed, there are two hazards: the lines themselves and the combination of lines on wire fences.

to the ground, similar to lightening, can occur. The When lines are downed they become hard to see and people or vehicles can run into them. Electrocution or serious shock injury can occur. Also, wildfires can be started by the downed lines arcing.

If lines fall on fences, a new hazard is created. Electricity can be conducted by the fence wires for long distances. The distance will be determined by the type of posts (steel posts may reduce the hazard) and the contact between the wires at corner and pull posts. As long as the wire contact each other, there is the potential for shock.

Oil and Gas Production. Burning near oil or natural gas production sites or around pipelines, pump stations, and storage facilities can be potentially hazardous. Explosions and/or fire at these sites can result. In all cases, during the planning of the prescribed burn, contact the company representative to determine what might be needed to prevent damage. Leaks, open vents, and plastic lines and parts are potential hazards.

Reprinted from a supplement to their prescribed burning workshop, *A Guide to Understanding Prescribed Burning in Agriculture*, 1977 Nebraska Edition, Nebraska Extension Service.