

# PLANNING A PRESCRIBED BURN

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If you are considering burning rangeland for the first time, you may think that a detailed planning process seems largely unnecessary. You may be thinking:

“I’ll wait until after frost and burn out the southwest 40 acres of the back pasture. If I burn when there’s no wind, I won’t need any help. I can drive the cows to the other side of the Section Pasture and shoot a gun a few times to scare out the deer so they won’t burn up. And the belly-high broomweeds should burn hot enough to kill most of the mesquite, whitebrush, and prickly pear.”

Wait a minute—this thinking contains at least eight misconceptions, including those dealing with timing, wind, help, fuel, expected brush kill, grazing management, the size of the burn, and its impact on wildlife habitat. If you burned using this plan, you would probably never burn rangeland again on purpose because of the risks taken and the potential for disappointing results.

Effective planning well in advance is vital for achieving the beneficial effects of a prescribed burn. The elements of a plan are described in Extension publication RWFM-PU-015, *Prescribed Range Burning in Texas*, which is available from your county Extension agent or on the web at <https://agrilifelearn.tamu.edu>.

At the end of this publication is a checklist to use when planning a prescribed burn. After the ninth or tenth burn, you may find that some of the items on the checklist become almost automatic; however, it is a good idea to review the checklist and plan each burn as if it were the first.

Although warm-season prescribed burning is becoming more popular, in Texas prescribed burning is usually scheduled for January, February, and March. However, the exact timing depends on the weather, the ranch operations, and the purpose of the burn. Because burning is most effectively used in conjunction with other management techniques to control brush, such as biological, mechanical, and chemical methods, plan to achieve a combination effect.

Elements of a prescribed burning plan include setting objectives, planning for adequate fuel, assessing weather conditions, planning for controls, communicating with the authorities, planning the fire methods and sequence, and following up.



## SETTING OBJECTIVES

Why do you want to burn? What do you want to accomplish? Before lighting a fire, determine and clearly state your objectives. Fires are set to accomplish different objectives, such as to manage brush and weeds, remove old growth, improve forage quality, and improve wildlife habitat.

## PLANNING FOR ADEQUATE FUEL

The second step in managing the pasture is to have enough grass fuel at the right time. An effective burn requires a lot of dry grass. Many ranchers have grown up believing that dry grass on the ground is better than hay in the barn. For them, seeing grass go up in flames in the middle of winter is hard to take.

However, no other vegetation works as well as grass as a source of fuel. Without an understory of grass to maintain a continuous flame, broomweeds flare and go out. Other forbs, which are broad-leaved herbaceous plants other than grass, may look rank (vigorous) and dense enough to burn, but by midwinter they often have broken down. Woody debris and standing dead trees help little in spreading a fire.

The grass fuel also needs to be ready at the right time. On ranges in good condition, deferring grazing during the last half of the growing season in an average year may be adequate. On ranges in fair or poor condition, especially those that are low production sites, a deferment of several years may not be adequate to accumulate enough fuel.

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The amount of fuel needed for a prescribed burn is about 3,000 pounds per acre of dry grass; however, in some situations, half that amount will produce satisfactory results. Although during hot summer conditions, wildfires may burn fiercely with little fuel, prescribed burns require high fuel loads and a continuous supply of fuel to burn adequately during winter conditions.

Table 1 lists approximate amounts of different kinds of grasses that can be expected in midwinter. Except for the first two grasses, the values were measured on nongrazed sites during an average growing season.

TYPE OF GRASS	POUNDS PER ACRE
Closely grazed buffalo grass	300
Curly mesquite and buffalo, mowed lawn	600
Buffalo grass	1,000
Texas wintergrass	2,000
Sands dropseed	2,200
Tobosa	2,300
Sideoats gram	3,000
Kleingrass	5,000
Little bluestem	6,200
Johnsongrass	7,000

Deferment is almost always needed to retain enough fuel for effective burning.

Almost as important as the amount of fuel is the coverage or continuity.

Tobosa-dominated ranges often have adequate tobosa grass to burn effectively, but the more palatable buffalo grass between the tobosa patches has been grazed out. Therefore, the fire doesn't carry well. Avoid this problem by using a grazing management program that prevents the cattle from grazing the pasture. By November you can determine whether there is enough fuel on the ground to continue planning for a burn.

In addition to an adequate supply of continuous fuel, the grass needs to be dry enough to burn. This usually means that its moisture content is less than 15 percent. An easy field test for moisture content is to break off a bunch of grass at the base and then bend it at the middle. If it easily snaps in two, it is dry enough for a prescribed burn.

## ASSESSING WEATHER CONDITIONS

Weather conditions are a vital consideration in determining fire behavior and effectiveness. Again,

depending upon burning objectives, the burn plan may need to consider air temperature, relative humidity, and wind speed and direction. Because these factors are interrelated, lower fuel loads may be compensated for by higher winds and/or lower humidities. A range of values is usually necessary (for example, 30 to 50 percent relative humidity and 8 to 15 mph winds).

## PLANNING FOR CONTROLS

Arrange for appropriate controls to keep the fire within bounds. For physical control of the fire:

- ▶ Check that the pumpers and other equipment are in working order.
- ▶ Cut fireguards, which are a strips of land that have been plowed or cleared to check the spread of a fire.
- ▶ Check access roads.
- ▶ Acquire fire-retardant chemicals.
- ▶ Line up communication equipment.

Although there is considerable flexibility in timing these arrangements, do not wait until the last minute. Delay building fireguards until after frost and until you are fairly certain that a burn will be carried out.

Decide on the types of fireguards needed and how they will be installed. Fireguards must be clear of any grass that will allow the fire to "bridge" the fireguard.

Types of fireguards include disced fireguards, in which the ground has been turned over with a disc and the grass buried; bladed fireguards, in which a tractor has physically removed the grass with a blade; and blacklines, in which the grass has been burned off. Generally, bladed fireguards are preferred over disced guards.

Fireguards must be of adequate width. A rule of thumb is that the width should be 3 times the height of the fuel on each side of the guard. They also need to be drivable to enable a vehicle to reach all parts of the pasture as necessary.

Blacklines can be burned out before the prescribed burn. Install two bladed fireguards some distance apart and then burn out the grass in between them. Once the fuel is removed, the prescribed fire can be set safely.

For some financial control, increase the liability coverage of your insurance. The landowner carries the burden of liability for damages resulting from a prescribed burn if the fire goes beyond the intended boundaries. Damage may occur to fences, utility poles, trees, buildings, feeders, hunters' blinds, vehicles, and livestock. Smoke crossing public highways may obscure the vision of passing motorists and contribute to serious accidents.

The courts have determined liability on the basis of what

“a reasonably prudent, ordinary person would do in the situation.” Because there have been few test cases, there are very few court decisions to guide the landowner in determining the precautions to take. A landowner could be sued if a neighbor can show significant damage or if a motorist can show damage as the result of the fire and smoke. Also, it has been suggested that the cost of stopping an escaped fire should be assumed by the landowner.

One way to reduce the risk of escape is to enlist all the neighbors as part of the fire crew. Inform the neighbors at an early stage of the planning so they can choose whether or not to participate in the burn.

## COMMUNICATING WITH THE AUTHORITIES

Another element in planning is to notify local authorities of your intentions and to arrange for communications on the day of the burn. Every county handles emergency calls a little differently. In some counties, all calls go through the sheriff's office, which then notifies the volunteer fire department. In other counties fire emergency calls go directly to the volunteer fire department. Regardless, notify all authorities beforehand as to the date and location of a planned burn. Also tell them who will call in case of an emergency. Otherwise, they might respond to a false alarm called in by someone who sees the smoke.

Inform the Department of Public Safety if the prescribed burn is scheduled next to a highway or close enough that smoke could be easily visible (about 1 mile). The landowner is responsible for providing personnel to flag traffic if the smoke is expected to cross the road. A sign indicating that it is a prescribed burn of rangeland can help inform concerned passersby.

A potential traffic fatality or serious injury associated with smoke from a prescribed burn is a risk that should be taken seriously.

## PLANNING THE FIRE SEQUENCE AND METHODS

On the day before and the day of the scheduled burn, check the National Weather Service to get reasonably accurate estimates of wind direction and speed, air temperatures, barometric pressure, and relative humidity. Detailed fire weather forecasts can be obtained from the National Weather Service at <http://www.nws.noaa.gov>; click on your region and then on Fire Weather. On the location, use instruments to measure wind, temperature, and relative humidity to monitor local conditions and compare them with the forecast.

With crew members in place, equipment ready, fireguards

checked, and local authorities contacted, you are almost ready to strike the first match. Review the checklist to make sure you have arranged for:

- ▶ Matches (carry them with you at all times in case you have to burn out a blackline to protect yourself)
- ▶ Drinking water for the crew (carbonated drinks are best used when it's over)
- ▶ Water or fire retardant in the pumpers
- ▶ Gasoline for the pumpers
- ▶ Diesel fuel and gas for the drip torches
- ▶ Lunch for the crew (a cooler with sandwich makings is handy)
- ▶ First-aid kit
- ▶ Keys or combinations for locked gates
- ▶ Wire cutters
- ▶ Contingency plans for an escape
- ▶ Water locations for refilling pumpers
- ▶ Radios in working order
- ▶ Cameras to record the event
- ▶ Pumpers in working order

The burning procedure is spelled out in the fire plan. Although many people may have contributed to the fire plan, on the day of the burn it is the fire boss who is finally responsible for carrying it through to a successful burn. The fire boss should use a map of the pasture to explain to the crew how each person fits into the overall plan, what if any changes have been made to the plan, and what the specifics of the procedure are. The fire boss must be confident enough to assert authority over the crew and guide the operation, and experience helps.

## FOLLOWING UP

Arrange for follow-up management. Grazing animals removed from a pasture to allow grass accumulation for fuel will also need a place to go for 60 to 90 days after the burn. But if soil moisture is low and it doesn't rain, it may take a year before they should be allowed to return.

High-quality forage can be expected to sprout up in an average rainfall year after a burn, and livestock and wildlife quickly recognize this. If only a small area is burned in a large pasture or if deer from a large area are attracted to a burn, the excessive grazing pressure can considerably slow the recovery of desirable grasses, forbs, and browse.

Conversely, if prickly pear is abundant in the burned pasture, you may turn in cattle for 2 weeks immediately after the burn to consume some of the singed pads. The pads rot soon after burning. Goats could be turned in

temporarily when the prickly pear pads are resprouting to control the prickly pear further.

Ordinarily, grazing should be restricted until May or June. In an average rainfall year, the better grasses usually will have fully recovered by then. Spraying prickly pear in the spring after the burn will result in a good kill; otherwise, many plants will resprout.

## FINALLY

Before trying a prescribed burn on your own property, participate in conferences and workshops on prescribed burning, and help with prescribed burns that have someone else in charge. To get an idea of the results you can expect on your land, examine the results of burning on range sites similar to yours.

Because each burn is different, as are the growing seasons after a burn, the results can differ greatly from year to year on the same range site, even with similar fuel conditions. The more information you have, the more realistic you can be in anticipating the results from your burn.

If this explanation has successfully explained how to plan a prescribed burn, and you are landowner considering burning for the first time, you might think:

“I’ll plan to burn the Creek Pasture this winter when weather conditions are right and get some control on the prickly pear and mesquite sprouts from that dozing job I had 5 years ago. To grow some grass, I can put the cows in the Section Pasture until next summer and spray the broomweed if it comes on strong like



it did this year. I’ll get some help from the neighbors with the burn since I’ve helped them on fence building and shearing. And the county Extension agent wants to use this as a county demonstration on prescribed burning. I’ll spray in April with picloram to knock out my prickly pear.”

Now you are heading in the right direction.

## OTHER READING

*Prescribed Range Burning in Texas*, RWFM-PU-015. Texas AgriLife Extension Service.

## ACKNOWLEDGMENT

The original manuscript on which this publication is based was written by Dr. R. Q. Landers, Jr., Extension Range Specialist Emeritus.

### RANCH CHECKLIST FOR PRESCRIBED BURNING

Use this checklist to help ensure that you do not overlook important considerations in your prescribed burn. For best results, amend the checklist to fit your situation.

#### I. PREBURN CONSIDERATIONS

##### A. Rationale for the burn (1 to 5 years preburn)

- Purpose (such as brush management or downed wood removal)
- Location (target pastures identified)
- Timing (cool season, tentative date)
- Method (preliminary fire plan including fire lane design)
- Preburn pasture treatments needed and timing (mechanical, chemical, deferment)
- Legal aspects (ranch liabilities)
- Training and experience (workshops and actual burns)

##### B. Planning for the burn (6 months to 1 year preburn)

- Map of pasture to be burned
- Vulnerability (erosion, wildlife)
- Determination and location of alternative forage for livestock
- Final fire plan preparation
- Deadlines for preburn removal of grazing animals based on fuel load requirements
- Budget

**C. Equipment arrangements (3 to 6 months preburn)**

- Contracted equipment (bulldozer, maintainer)
- Locally available (for example, a pumper truck)
- Communications (two-way radios)
- Ranch owner (cattle sprayer, water trailer, water barrels)
- Deadlines for equipment work to be completed

**D. Personnel (1 to 3 months preburn)**

- Fire boss designated
- Assignment of ranch personnel, time provisions and training if necessary
- Considerations for other people needed

**E. Notification (2 to 4 weeks preburn)**

*Contact*

*Telephone number*

- Texas Committee on Environmental Quality \_\_\_\_\_
- Neighbors
  - Name: \_\_\_\_\_
  - Name: \_\_\_\_\_
  - Name: \_\_\_\_\_
  - Name: \_\_\_\_\_
  - Name: \_\_\_\_\_
- Sheriff's department \_\_\_\_\_
- Fire department(s) \_\_\_\_\_
- Texas Department of Public Safety \_\_\_\_\_
- County commissioner \_\_\_\_\_
- Oil and gas lessees \_\_\_\_\_
- Hunters \_\_\_\_\_

**F. Preburn construction and patrols (1 week to 1 month preburn)**

- Construction of fire lanes according to the fire plan (install as early as possible)
- Removal of remnant livestock
- Facilities protection
- Feeders
- Pens
- Power line poles
- Oil and gas structures
- Fences
- Hunting facilities
- Inspection of completed fire lines (if built more than 30 days preburn)
- Condition of ranch roads

**G. Weather information and final inspection**

*Forecast*

*Telephone number and Web site*

- 3-day: National Weather Service \_\_\_\_\_
- 24-hour: Local weather \_\_\_\_\_
- Final inspection (firelanes, facilities or protection, etc.) \_\_\_\_\_

**II. JUST BEFORE THE BURN**

**A. Last-minute calls**

<i>Contact</i>	<i>Telephone number</i>
<input type="checkbox"/> National Weather Service	_____
<input type="checkbox"/> Sheriff	_____
<input type="checkbox"/> Fire department	_____
<input type="checkbox"/> Highway patrol	_____
<input type="checkbox"/> Check with spouse	_____

**B. Equipment and supplies**

- |   |   |
|---|---|
| <input type="checkbox"/> Diesel fuel and gas for drip torch                     | <input type="checkbox"/> Keys and combinations for locked gates                               |
| <input type="checkbox"/> Gas for pumpers  | <input type="checkbox"/> Camera   |
| <input type="checkbox"/> Fire retardant or water in pumpers                     | <input type="checkbox"/> Weather instruments (wind, relative humidity, recording pad, pencil) |
| <input type="checkbox"/> Hand tools (garden rakes, axes, shovels, wire cutters) | <input type="checkbox"/> Two-way radios   |
| <input type="checkbox"/> Matches  | <input type="checkbox"/> Warning signs and flags on public roads                              |

**C. Crew support**

- |  |  |
|--|--|
| <input type="checkbox"/> Drinking water and cups | <input type="checkbox"/> First-aid kit |
| <input type="checkbox"/> Lunch cooler            |  |

**III. AFTER THE BURN**

**A. Patrols of burned areas (immediately postburn)**

- |   |   |
|---|---|
| <input type="checkbox"/> Firebrands, hollow logs, and trees near edge of burn | <input type="checkbox"/> Livestock access, prickly pear cleanup |
| <input type="checkbox"/> Poles and posts                                      | <input type="checkbox"/> Observations on effectiveness of burn  |
| <input type="checkbox"/> Smoldering piles                                     |   |

**B. Grazing control (immediately, 1 year, or longer postburn)**

- |   |   |
|---|---|
| <input type="checkbox"/> Deferment period provided          | <input type="checkbox"/> Decision on restocking pastures, stocking rate, grazing period |
| <input type="checkbox"/> Observations of vegetation changes |   |

**C. Spraying for prickly pear control**

- |  |   |
|--|---|
| <input type="checkbox"/> Adequate fire damage to prickly pear for reduced rate of picloram | <input type="checkbox"/> Adequate soil moisture |
|--|---|