

Prescribed Burning Cooperatives: Empowering and Equipping Ranchers to Manage Rangelands

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As we enter the 21st century, the use of prescribed fire in the Edwards Plateau region of Texas and on rangelands in many other regions faces an uncertain future. The rapid increase in population and increased “urbanization” of rangeland has resulted in increased concerns over issues such as air quality and liability when prescribed fire is considered as a management option. These concerns will continue to increase in the future. However, these problems should not lessen our enthusiasm for prescribed fire as a rangeland management practice. In fact, now is the time to become bold and innovative while always remaining prudent in the use of prescribed fire. The objective of this article is to identify the problems and opportunities related to the implementation of a sustained prescribed fire management regime by ranchers on privately owned lands in the Edwards Plateau of Texas.

Historical Perspective

To understand the present and future use of fire, we need to understand its history. Before there were fences, roads, towns and cities, rural fire departments, livestock, and Western civilization, “natural fires” in the Edwards Plateau of Texas must have been awesome. Just imagine the fuel loads that built up and the consequences of a lightning strike starting a fire in July or August without rain following. The fire would start small but quickly spread, driven by the wind from the thunderstorm. Soon the fire would be large enough to create its own wind, sucking in oxygen to feed its appetite for more fuel. Flame lengths would be reaching into the trees from the head fire. Firebrands would be traveling hundreds of feet into the air and starting new spot fires ahead and to the sides of the fire front. Soon the horizon would be covered with

smoke and particulate matter, both being lifted high into the atmosphere, possibly enough to create a rainstorm but not enough moisture to put the fire out. The momentum of the fire would carry it across rivers and streams and over the tops of hills and through ravines. Hundreds of thousands of acres would be burned. At night the fire would slow down and almost stop as if it were resting. But the next day temperatures would rise, the humidity would decrease, and the winds increase, and the fire would rekindle and continue to burn across the landscape, seeking more fuel for its ravenous appetite.

Depending on the weather conditions, the fire might burn for days or weeks; only nature would decide its fate. In the fire’s wake, untold acres of vegetation and litter would be burned down to mineral soil. The burned areas would look like a moonscape, charred and blackened with no green leaf left for either ant or buffalo. With no soil moisture or rain, the landscape could appear uninhabitable for either human or beast for many months. But the rains would come, and when they did, the perennial grasses with their energy and growing points stored underground would quickly reappear. Liveoak, shinoak, and most other woody plants would also sprout from underground crowns or roots. Recurrent fires were a primary influence stabilizing vegetation composition as grassland or savanna. Species that are intolerant of fire, such as Ashe juniper and prickly pear, were mostly absent from the vegetation.

Summer was the primary fire season. Warm-season grasses generally produce over 60% of their annual growth by the first of August. July and August are generally dry and hot, corresponding with peak lightning strikes and abundant dry fuel, a perfect system for frequent summer fire (Fig. 1). There

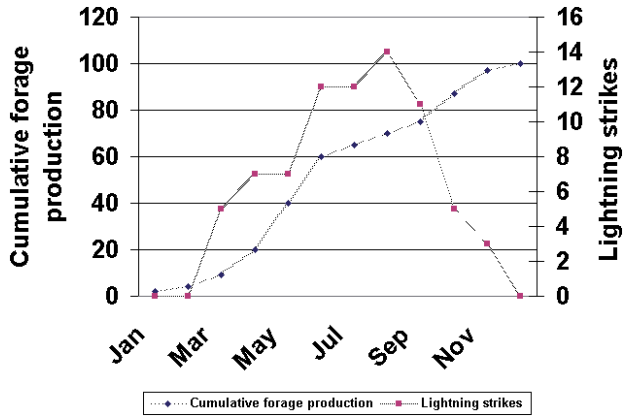


Figure 1. Nature's burning system. Lightning frequency and long-term monthly cumulative forage production for the Edwards Plateau. Lightning frequencies represent the percentage of 24-h periods (days) with two or more lightning flashes per 28-mile grid square 1987–90 (Climatology of lightning frequency – Scientific Services Division, National Weather Service). Forage production determined from various studies on the Texas A&M University Research Station at Sonora, Texas.

is evidence that American Indians started fires in the southern mixed-grass prairie in mid- to late summer.¹ The American Indians understood that they had to maintain mostly a grassland for the buffalo to roam.

This landscape was sustained through thousands of years by fires set by lightning and American Indians, but with settlement by Europeans and their descendants in the late 1880s, a dramatic change began. The tall grasses were grazed out, largely fireproofing the range. In addition to the severe grazing pressures imposed on the rangelands, laws were passed by the Texas legislature regulating fire (ie, a law was passed in 1884 that made setting range fires a felony).² Also, some ranches began developing fire guards. For example, the XIT ranch began plowing guards in 1885. Within a year, over 1,000 miles of guards, 100 feet wide, had been plowed on the ranch. It wasn't until 1999 that a law was passed in Texas that unambiguously stated that a landowner had the right to conduct a prescribed burn on his or her own property.

With widespread suppression of fire across the Edwards Plateau, woody plants, especially juniper, mesquite, and prickly pear, began to increase in both numbers and cover. Despite many government-sponsored programs and dedicated ranchers trying to eliminate, control, manage, and eventually sculpture woody plants, the "brush problem" continues to return with increasing frequency.

Current Conditions

A major part of the Edwards Plateau is characterized by shallow soil and rocky outcrops that result in discontinuous fuel loads. It's difficult to conduct a winter burn that will suppress juniper and prickly pear. Another factor that makes winter burning difficult in the area is growth of cool season plants and high humidity during mild winters. It is not unusual for winter weather conditions to delay a burning program 3 or 4 years.

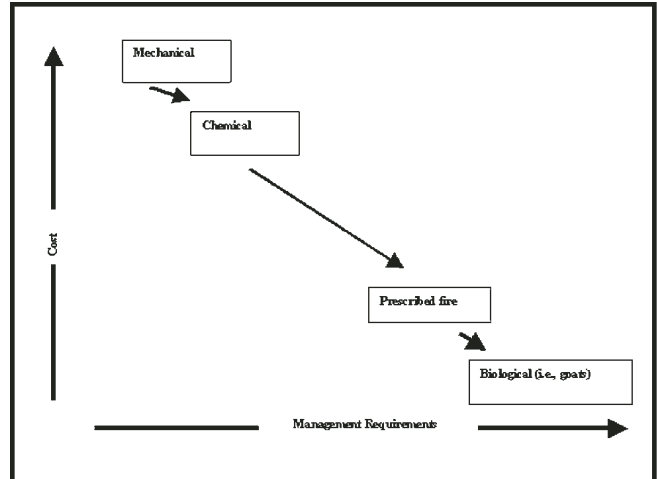


Figure 2. Economics and management required for different management practices.

Today, dense stands of redberry and Ashe juniper severely reduce forage production, interfere with handling and movement of livestock, degrade wildlife habitat, and waste the water resources of Texas.³ As economics of ranching becomes tighter, one of the hardest decisions to make is how to manage the forage resource so that the higher-successional, more productive grasses, forbs, and browse can be returned and maintained in the vegetative complex. Another important consideration is budgeting the forage resource (ie, grass) for either livestock consumption or fuel for prescribed fire.

The most widely used approaches to brush management are mechanical treatment and the application of herbicides.⁴ However, because these treatments have high costs (Fig. 2) and frequently do not give satisfactory control, interest in the use of fire has increased. The relatively low cost of prescribed fire, both cool- and warm-season fires (multiseasonal), can make fire an extremely viable tool.^{5,6} A combination of prescribed fire, coupled with proper grazing management (ie, proper budgeting of grass to either forage or fuel) should offer the best-case scenario for managing undesirable woody plants.

The Application of an Effective Fire Program on Rangelands Is Not a Simple Task

Prior to 1997, prescribed fire was being applied to Edwards Plateau rangeland, but the frequency and numbers of fires were low. Most ranchers were waiting for state and federal agency employees to conduct the burns for them. For example, the Texas Agricultural Extension Service, Texas Agricultural Experiment Station, Texas Parks and Wildlife, and Natural Resource Conservation Service along with universities were helping a few ranchers do some burning. Most of the burns were conducted in the winter or spring, and the results were variable. Very few ranchers were actually con-

Table 1. Guidelines of the Edwards Plateau Prescribed Burning Association, Inc.

1. Dues—\$25.00 per rancher per year. Income will purchase, repair, and maintain equipment and support activities such as newsletters.
2. Fire training education—Members should attend a burn school to learn the basics of prescribed fire and receive training on how to operate equipment.
3. Fire plans—Prescribed fires will have burn plans prepared by the rancher and reviewed by Edwards Plateau Prescribed Burning Association, Inc. (EPPBA).
4. Personnel—A critical number of trained personnel will be determined for each burn. The number will depend on the size and complexity of the prescribed burn as described by the prescribed burn plan.
5. Liability—Each rancher will be liable for fires on their property. Proof of insurance is required before the EPPBA will be able to assist on the burn.
6. Fire lines—Each landowner is responsible for preparing their own fire lines. Fire lines will be inspected before the initiation of the prescribed fire and should meet specifications outlined in the burn plan.
7. Equipment—Use of EPPBA equipment will be available to all association members.
8. Fire boss—Each rancher will be the fire boss on their own property unless other arrangements are made.
9. Participation—Members are encouraged to help on as many burns as possible. Participation provides members with fire-line experience, helps them become acquainted with other members with the same goals and objectives, and builds an experienced team. Participation is recorded for each burn. Exceptions are made for members not physically able to actively participate on burns.
 - a. Officials—Only ranchers can serve as officials for EPPBA (no agency personnel are allowed in an elected, official capacity).
 - b. All agency and university personnel are encouraged to be members of the association and provide technical advice and assistance.

ducting fires on their own, and most were advised *not* to burn during the hot summertime.

Why Summer Fire?

In the fall of 1997, a prescribed burn tour was held at the Texas A&M University Research Station located between Sonora and Rocksprings, Texas. Data from various research projects were presented at the tour. At the conclusion of the tour, the participants, who were mostly ranchers, were asked which pastures they preferred: summer burned, winter burned, or control (nonburned). The response was almost unanimous for the summer-burn pastures.

After 14 years of conducting prescribed fire research on the Texas A&M University Research Station, summer fire appears to be a viable treatment for this area. Summer fire should be considered a reclamation type burn to be conducted in areas with shallow soil and rocky outcrops and with a significant juniper and/or prickly pear canopy cover.

Generally, winter or spring burns should be considered first, and if it is thought that they will not meet the goals and objectives of a prescribed burn, then summer fire should be an option. For most situations, fuel moisture and fuel load will probably be major factors determining whether a summer or winter burn is needed. Also, target plants are important. For example, juniper and prickly pear are very susceptible to hot fires. Summer fires can raise the temperature of

plant tissues to higher levels than winter fires. Most prickly pear plants quickly recover from winter burns.

Why Weren't Ranchers Using Prescribed Fire More Frequently?

If prescribed fire was recognized as a viable tool to manage noxious woody plants, why weren't more ranchers burning and burning more frequently? It was obvious that most ranchers were waiting for agency personnel to do most of their burning for them. Also, many of the ranchers had tried cool-season fires and were disappointed with the results. Most ranchers agreed that major obstacles to an active fire program were liability, insufficient help, and lack of proper equipment and experience. It was clear that ranchers did not need to be "sold" on the benefits of prescribed burning, but they needed to be educated, equipped, trained, and empowered to implement burning on their own ranches. Following the burn research tour, the ranchers were asked if they wanted to form a group of like-minded individuals who would join together to implement a sustainable fire management program.

Most of the tour participants agreed that an association would be beneficial, so by a unanimous vote, it was decided to start a burn association. Nominations were taken for officials, and a president and board members were elected. Guidelines were developed and approved on the same day (Table 1).

Table 2. Rancher obstacles to prescribed burning

| Obstacle to burning | Individual's response to obstacle | Prescribed burn association response to obstacle |
|------------------------------|--|---|
| Summer fire | Unable to burn because of burn bans and because burns may not be an accepted practice by all government agencies and universities | Exempt from burn bans because of safety record and training and political clout |
| Lack of equipment | Buy or rent equipment | Membership pool equipment to help each other; use income from dues, grants, and contributions to purchase more equipment, which is available to all members |
| Lack of labor to help | Hire labor, but may be difficult to find trained and experienced labor | Neighbor helping neighbor; trained labor force available |
| Lack of education/experience | Attend schools where available | Opportunity to attend free schools; actual burns to gain experience |
| Liability | Purchase insurance, but lack of understanding for the need for prescribed fire within community increases risk; difficult for an individual to overcome prejudice against fire | Purchase insurance but manage risk with experienced and trained burn crew equipped with proper equipment; organization has greater political clout within community than individual |

The association decided on a name for the organization: the Edwards Plateau Prescribed Burning Association, Inc. (EPPBA). The association started with approximately 30 members but quickly grew to 60 members the first year. The summer-to-winter burn ratio has been 7:1, and there is a good reason for this. Most landowners have tried cool-season burns in this area and found that they frequently don't work very well, especially with marginal fuel loads and/or juniper and prickly pear canopies over 30%. Overcoming the reluctance to burn in the summertime as well as other obstacles have been major factors in the success of the burn association (Table 2).



Figure 3. Edwards Plateau Prescribed Fire boss discussing fire plan with members of the ignition crew.

Providing Education and Experience

Members of the EPPBA are encouraged to attend prescribed burning schools and actively participate in as many burns as possible. Free prescribed burn schools are provided for all members. Most schools are taught or supervised by “lead instructors” certified by the State of Texas in the application of prescribed fire. Ranchers must develop a burn plan for each prescribed burn and prepare their own fire lines. This hands-on fire approach helps build an experienced and trained community labor force (Figs. 3 and 4). Another benefit is a critical mass of like-minded people who have greater political power within a community (ie, the power and historical precedent of individuals joining together to accomplish a common goal is more efficient than individual efforts).

The formation of this neighbor-helping-neighbor cooperative has provided the resources, education, encouragement, and empowerment necessary to help restore fire on a sustained basis. The association was incorporated in 2000. In the spring of 2002, the burning association received the Texas Environmental Excellence Award. This award is presented every year to honor the state's most outstanding environmental projects. Since its founding, the EPPBA has conducted more than 75 prescribed burns on approximately 40,000 acres (Table 3).

The EPPBA continues to grow in size and concept. The organization has received a large grant and numerous cash donations as well as donated equipment, including 2 fire trucks. Originally, the burn association was formed to serve 2 or 3 counties. By the summer of 2003, membership had risen

Table 3. Sample of 1999, 2000, 2001, and 2003 burns conducted by Edwards Plateau Prescribed Burning Association, Inc.

| Date | No. personnel | % Humidity | Temp (° F) | Acres |
|-------------------|---------------|------------|------------|-------|
| August 18, 1999 | 12 | 30 | 98 | 200 |
| August 19, 1999 | 8 | 32 | 100 | 300 |
| August 23, 1999 | 13 | 41 | 90 | 500 |
| August 27, 1999 | 10 | 40 | 95 | 900 |
| August 31, 1999 | 15 | 32 | 97 | 150 |
| September 8, 1999 | 16 | 35 | 90 | 200 |
| October 5, 1999 | 17 | 35 | 89 | 546 |
| February 8, 2000 | 10 | 25 | 75 | 250 |
| March 2, 2000 | 6 | 30 | 85 | 80 |
| March 29, 2000 | 14 | 12 | 88 | 878 |
| August 8, 2000 | 9 | 32 | 101 | 80 |
| August 8, 2000 | 6 | 30 | 101 | 652 |
| August 30, 2000 | 29 | 22 | 101 | 965 |
| September 5, 2000 | 14 | 25 | 100 | 2,000 |
| July 31, 2001 | 8 | 28 | 101 | 845 |
| August 7, 2001 | 12 | 18 | 101 | 280 |
| August 9, 2001 | 8 | 25 | 100 | 300 |
| August 16, 2001 | 12 | 27 | 100 | 287 |
| August 22, 2001 | 8 | 29 | 97 | 600 |
| August 18, 2003 | 13 | 30 | 95 | 560 |
| August 20, 2003 | 15 | 29 | 98 | 70 |
| August 20, 2003 | 16 | 27 | 94 | 540 |

to approximately 200 members who represented close to 1 million acres of ranchland distributed across a 12-county area.

How to Deal With the Growth

Interest in joining the burn association has spread into other counties. As membership has increased, distances between burns have also increased, making it difficult for everyone to participate on each burn. One solution to this problem has been the formation of chapters. For example, separate chapters of the EPPBA have been established in McCollough County (Brady Chapter), Mason-Llano-San Saba Counties (Central Basin Chapter), Menard County (Menard Chapter), Schleicher County (Eldorado Chapter), and Crockett County (Ozona Chapter). Additional chapters are currently being planned in other counties.

Chapters are a part of the EPPBA (ie, they are governed by the EPPBA bylaws and guidelines), but they also can have their own president and board of directors. Each chapter also has a director who serves on the main board of the parent EPPBA. All membership fees, donations, grants, and so on are deposited in the EPPBA's account, but a separate accounting is kept for each chapter. This allows the individual chapters to determine how they want to spend their money. Board meetings are generally held twice a year to discuss budgets, burn schools, equipment purchases, and grant activities. Field tours are conducted throughout the year to view pastures previously burned and discuss other related topics regarding prescribed burning.

Conclusions

The EPPBA has empowered local ranchers with the educa-



Figure 4. Head fire being set on Edwards Plateau burn near Sonora, TX.

tion, experience, and political clout to conduct prescribed fire during all seasons of the year on a sustained basis. Agricultural associations are certainly not new. The Texas Sheep and Goat Raisers' Association and Texas and Southwestern Cattle Raisers Association are examples of producer organizations that were established early in the 20th century and have served their membership well. Early on, the founders realized that organizing people with like-minded goals and objectives would be more effective than operating as individuals.

All these associations, regardless of size, were organized around a sequence of predetermined steps. They include 1) vision—someone has to start the momentum and take a leadership role and start communicating with other like-minded individuals; 2) organization—the initial meeting with interested parties (ie, ranchers, agency and university personnel, and so on) provides education, information, and ideas on organization; 3) leadership—election of president, board, and other officials; 4) guidelines and bylaws—develop and approve guidelines and bylaws, goals and objectives, and so on; 5) operation—collection of dues, purchase of equipment, writing newsletters, scheduling schools, and so on; and 6) public relations—document benefits of organization to members as well as general public through newsletters and other media outlets.

Based on history, the principle behind the association is proven, but can a prescribed burn association succeed logistically? The EPPBA has developed a logistical model that appears to be successful. Only time will tell, but as long as the goals and objectives of the organization remain relevant and ranchers actually run the organization, the EPPBA should have a “bright” and long-lasting future. The EPPBA



Figure 5. Typical rangeland in the western part of the Edwards Plateau region of Texas dominated by juniper and Prickly Pear. “Happiness is Smoke on the Horizon.”

is an environmental organization with a long-range goal of sustaining Edwards Plateau ecosystems. Our motto is “happiness is smoke on the horizon.” We hope to be putting smoke on the horizon for many years to come (Fig. 5).

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