

Mesquite Savanna

A Brush Management Option

A new approach to managing mesquite that ongoing research suggests will be cost-effective, sustainable and will strike a balance between land-use needs.



Mesquite Savanna: A Brush Management Option



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1. Repeated controls which kill the above-ground parts of mesquite result in these multistemmed, regrowth thickets.

It may be time to investigate a new approach to the management of mesquite on southwestern rangelands.

Increases in the distribution and density of mesquite continue to threaten southwestern livestock agriculture. Mesquite reduces grass productivity and makes livestock management more difficult.

Mesquite encroachment may also concern city dwellers. Mesquite may reduce the quantity and quality of water from watersheds. Dense stands also reduce diversity of understory plant species.

Theories suggest that the invasion of mesquite has been caused by suppression of naturally occurring fires, overgrazing and distri-

bution of mesquite seed by domestic livestock, and possibly increased carbon dioxide in the atmosphere. CO₂ may favor mesquite over warm season grasses.

To compound the problem, many efforts to reduce mesquite in the last 50 years have repeatedly killed above-ground parts of the plant, but not the roots.

Mesquite treated in this way resprouted from dormant buds at stem bases. This mesquite exists today as multistemmed, regrowth thickets (See Photo 1).

Multistemmed mesquites can be more of a problem than single- or few-stemmed plants of equal height, for several reasons. Regrowth plants are more competitive with grasses. They present more of a visual and physical barrier to livestock management. Re-

growth mesquites are also more resistant to subsequent herbicide applications.

The goal of this article is to present a new option for mesquite management that ongoing research suggests will be cost-effective, ecologically sustainable, and will strike a balance between the needs of ranchers and city dwellers.

It's called a *mesquite savanna*. Not all the answers are in yet, but here are some trends our research group at Vernon and others around the state are finding.

Fire in savanna development

A mesquite savanna is a relatively low density of large trees. It can be created and maintained in large part by using prescribed fire, which currently is one of the more environmentally acceptable and most economically sustainable options for managing woody plants. In most years, fire can be used safely and economically.

Prescribed fire can be used to

achieve different goals. Hot, intense fires will likely top-kill mesquite and stimulate resprouting. But cooler, low-intensity fires usually do not completely top-kill mesquite.

Low-intensity fires kill some lower canopy foliage and stems to create what appears to be a browse line (See Photo 2). Canopy foliage will be reduced from original pre-burn amounts and will compete less with understory grasses for water. Yet this foliage will still exert apical dominance and prevent resprouting from tree bases (See Figure 1).

With repeated low-intensity fires, mesquite foliage will be positioned high enough not to impede vision for livestock management. But it will still provide some shade for livestock. Frequent low-intensity fires also remove rank vegetation around mesquite and increase availability of understory forage.

Current research suggests that the desired low-intensity fire can be achieved by burning under certain fuel loads, humidities and air temperatures. Creating a savanna from thickets using low-intensity fires will take time and should be part of a long-term management plan. We estimate that three to four fires in a 10- to 15-year period will be needed.

Benefits of a mesquite savanna

Historical accounts describe much of Texas rangeland as an open grassland with scattered large mesquite. Such a mesquite savanna may have certain ecological advantages over open grassland or dense woodlands (See Photo 3).

Mesquite may enhance soil fertility through nitrogen fixation and organic carbon additions.

Plant species diversity often is enhanced because growth of some plants (such as cool-season grasses) is better beneath mesquite canopies than in open spaces. This is probably because of differences in microenvironment or soil fertility.

A mesquite savanna or a mosaic of savanna, grassland and thickets may enhance wildlife habitat over open grassland alone (See Photo 4).

Mesquite managed as a savanna or in patches of savanna, grassland and thicket will maximize



2. Low-intensity fires kill some lower canopy foliage and stems to create what appears to be a browse line.

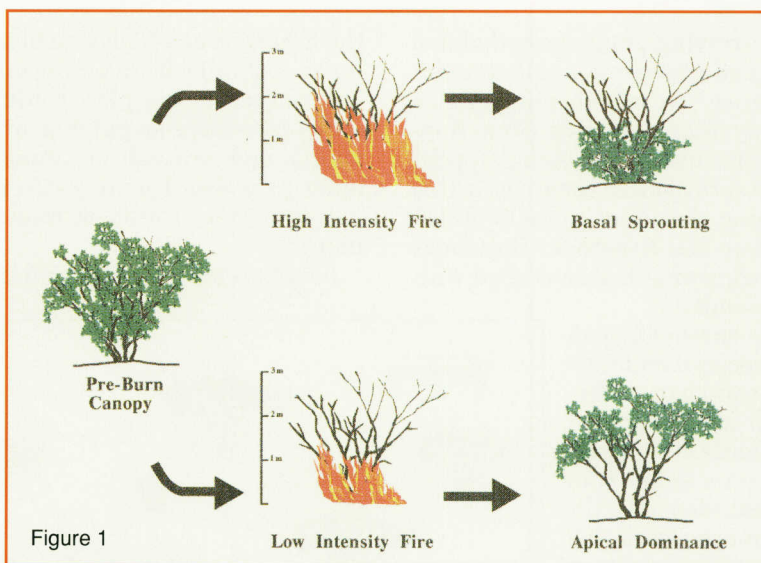


Figure 1

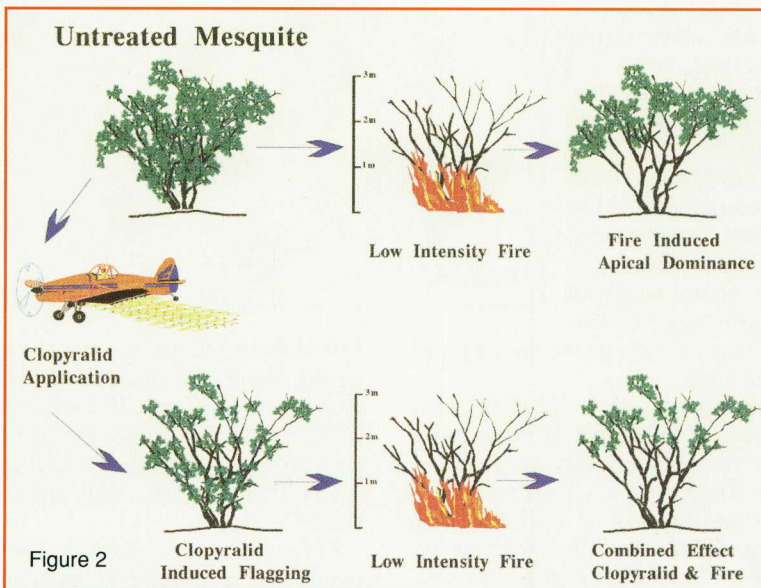


Figure 2

benefits and minimize negative effects of mesquite.

Integrating fire and herbicides

Reclaim* herbicide (cloprialid) is an important tool for mesquite management because it can root-

kill the plant. Yet the full potential of this chemical alone, or in combination with prescribed fire, has not been realized.

Broadcast applications of Reclaim will root-kill some mesquite,

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3. Mesquite savannas may have certain ecological advantages over open grassland or dense woodlands.



4. A mosaic of savanna, grassland and thickets may enhance wildlife habitat over open grassland alone.

but surviving plants usually have a ragged appearance called “stem flagging” in which portions of canopy foliage survive. Stem flagging diminishes the visual appeal of the spray job. In some cases, this flagging continues to make it difficult to see livestock. Ranchers haven’t always been satisfied with this result.

The current broadcast recommendation of a mixture of Reclaim and Remedy* herbicide (triclopyr) achieves some root kill but also top-kills surviving plants because of the triclopyr. This effect is initially more appealing, but in time, surviving mesquite may become multistemmed growth.

In contrast, stem-flagged mesquite that survive a treatment of Reclaim alone generally do not resprout from the base. The remaining foliage preserves apical dominance.

Current research suggests that combining an initial treatment of a low rate of Reclaim (to produce stem flagging) with subsequent low-intensity fires will develop mesquite savanna faster than using fire alone (See Figure 2).

Reclaim can also be used to create “lanes of access” as part of a “rangescaping” plan as shown in Figure 3. Rather than treat the entire pasture with a diluted rate of Reclaim (which may not achieve much root kill), a rancher could spend the same money to apply

the herbicide at a high rate to maximize root kill within access lanes.

A rangescaping plan could include mesquite in patches or savanna, and strategic placement of open grassland near gathering points to help livestock management.

Access lanes of grassland com-

lem (See Figure 3).

Managing the mesquite seed

The mesquite seed is ultimately the true source of the brush problem. Foraging animals ingest seed in the process of eating the pod which is high in sugars.

Passage through an animal’s digestive system enhances germination. We have seen mesquite establish from the feces of cattle, deer and even coyotes. Animals transport mesquite seed to mesquite-free areas rapidly.

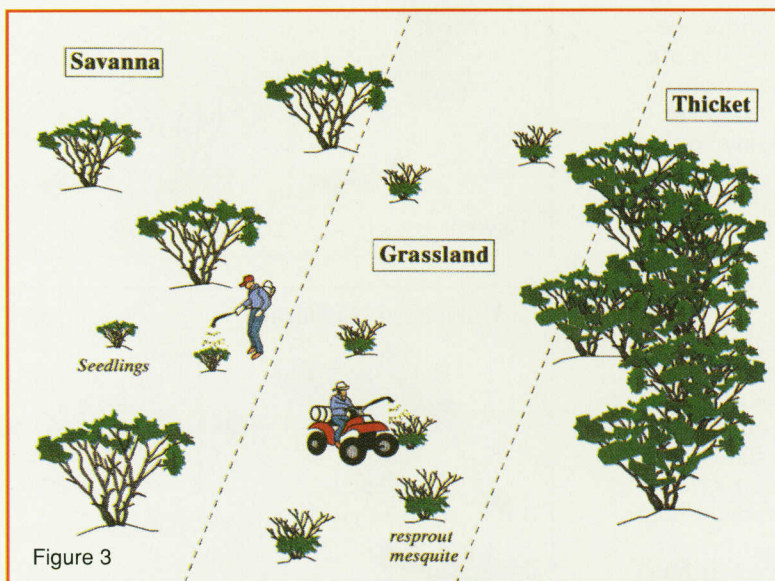
Recent research has also found that the heat from low-intensity fires inhibits flower and bean development during the growing season following the fire.

So a “tree-like” savanna maintained with frequent, low-intensity fires will likely have less seed production than multi-

stemmed regrowth thickets.

The question is not, “Should we keep some mesquite trees out there?” We think mesquite will continue to invade whether we like it or not. But by managing for a savanna, we may be able to let mesquite work *for* instead of against us.

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bined with the mesquite savanna areas can be maintained primarily with periodic low-intensity fires. Standing dead stems on top-killed or root-killed mesquite will gradually burn down with repeated fires.

However, some new mesquite seedlings will emerge over time, and some of the smaller mesquite will be top-killed even under the mildest of fires. These plants are ideal candidates for individual plant treatment with Reclaim and/or Remedy. Hand-treating these mesquites will root-kill them before they’re a significant prob-