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*...promoting the natural heritage of North Texas...*



## **Lewisville Lake Environmental Learning Area**

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# *Value-Added Brush Clearing in North Texas Prairie Restoration*

*LLELA Research Note 2*

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# *Value-Added Brush Clearing in North Texas Prairie Restoration*

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As hard as the Texas landscape and as tenacious as a Texas cattleman, the mesquite (*Prosopis glandulosa*) has been the bane of restorationists and ranchers for many years. “Inflexible” and “flinty” are terms often used to describe many Texas residents, including mesquite; eradication efforts to date have been useless. In 1945, there were 45 million acres of mesquite woodlands in Texas (Marshall 1945). Since then, in the face of massive burning, chaining, bulldozing, and herbicide efforts, mesquite has extended its Texas range to over 50 million acres (Felker 1996). The transition from unbroken expanses of prairie to impassable mesquite woodlands is disconcerting and even offensive to restorationists and ranchers alike. Sisyphus had a boulder; we Texans have mesquite.

The tallgrass prairies of Texas once stretched across 12 million acres, from the Red River to San Antonio. Less than 4,000 acres remain, mostly having been converted by agriculture and urban development (Sharpless and Yelderman 1993). The widespread and effective suppression of fire, combined with the gradual abandonment of agricultural land and the shift of the majority of the ranching industry to the east, has allowed the mesquite to expand its range and density throughout the grasslands of Texas. The mesquite has always been native to Texas, myths of travel up from Mexico to the contrary (Los Amigos del Mesquite 1986; Rogers 2000), but was a minor component of Texas prairies due to frequent fire intervals and fewer animals (such as cows and coyotes) that would readily consume and spread the seed.

Mesquite rapidly colonizes new areas unless treated immediately, and can create dense monocultures exceeding 4,000 stems/acre (9,880 stems/ha) in a matter of a few years. Although burning successfully kills young mesquite trees, adult trees readily resprout even after the root crown is damaged or removed. Moreover, the mesquite’s hard-cased seed can remain dormant and viable for years after adults are effectively removed. Prairie ecosystems are normally nutrient-poor ecosystems—especially in nitrogen—and native prairie plants are well adapted to these conditions (Risser et al. 1981; Wilson and Gerry 1995); thus, mesquite shift the competitive advantage away from native prairie species. This makes it an economic nightmare for ranchers, where shifts in cattle production from 2 acres/head to as much as 100 acres/head have occurred due to the increase of mesquite and the decline of suitable forage species (Wiley 1977). With taproots extending as deep as 40 feet, mesquite can easily out compete native prairie grasses for water; in regions that experience frequent drought, mesquite can take in 2,500 lbs. of water for every pound of dry matter (Felker et al. 1987). For these reasons, mesquite can be controlled, but not eradicated. Yet complete eradication of mesquite may actually be an undesirable goal. In this note, we propose making the best of an infestation by considering the economic benefits this fellow Texan can offer.

Human residents in this region have a long history of making useful items from mesquite. For example, Native Americans and early settlers used various parts of the plant for fuel, fence posts, spurs and pins, coffee, flour, alcoholic drinks, clothes whiteners, and medicines (Marshall 1945, Marshall 1953, Los Amigos del Mesquite 1986). Today, many commercial enterprises offer liquid smoke products created from mesquite sawdust. In addition, the durability of

mesquite wood makes it an excellent choice for flooring and furniture. These socioeconomic properties inspired us to develop a project demonstrating the utilitarian benefits of mesquite in conjunction with our effort to restore tallgrass prairie to the Lewisville Lake Environmental Learning Area (LLELA) in north Texas.

Since 2001, we have experimented with different methods to control mesquite on our 600-acre (283-ha) project site. In fall 2001, we treated 115 randomly selected mesquites with a mix of 75 percent diesel and 25 percent triclopyr (Remedy™), as described by McGinty and Ueckert (2001). We used two treatments: 1) spraying cut stumps and 2) spraying the lower 12 inches of the stems of standing trees. We applied the herbicide/diesel mixture by wetting almost to the point of runoff (McGinty and Ueckert 2001). One year after treatment, 95 percent of the treated stumps and 77 percent of the stem-sprayed trees were dead, and all remaining trees had dead limbs (Table 1). Although we continue to use both treatments, we found that time limitations favor the stem spray method, which can treat almost three times as many trees as the cut-and-spray method during the same time period.

We leave the stem-treated trees standing as snags or bulldozed and piled for wildlife habitat, while the cut trees are used for a variety of purposes. We make rough, small-dimension lumber using a chainsaw with an Alaska mill attachment (due to imperfections common in mesquite wood, it is impractical to mill high-grade pieces). We also make coasters, cutting boards, hotplates, candleholders, and small tables. We use medium-sized branches as firewood, and fashion coasters, cutting boards, hotplates, candleholders, and small tables from various sized stems and limbs. Any unused material is stacked into brush piles for wildlife habitat. Because LLELA is located on federal land, selling the items we create would require going through the federal timber sale process. Therefore, we use our products for demonstration purposes or donate them to nonprofit groups. However, mesquite has the potential to financially benefit restoration efforts on private lands. For example, in 1987, when returns on cattle were running around \$2/acre (\$4.94/ha) per year, mesquite produced up to \$700/acre as wholesale firewood, \$360/ton as chipwood, and \$3.66/board foot (about \$2,000/ton) as lumber (Felker and others 1987). Recent prices for wholesale firewood and chipwood have risen slightly (up to \$900/acre and \$400/ton, respectively), while high quality lumber has risen as high as \$15.95/board foot (Brazos Mesquite Company 2002). These returns often exceed the value of cattle, hunting leases, and even the land itself (Peña 2002). Make the best of an infestation, we suggest: the potential of mesquite to add value to restoration efforts is tremendous.

**Table 1. Mesquite treatment results from LLELA.**

	<b>spray</b>	<b>cut-and-spray</b>
n	60	55
dead	46	52
damaged	9	0
alive	0	0
not found	5	3
kill percentage	77%	95%
total basal area treated (cm <sup>2</sup> )	18,315.9	11,719.7
average stem diameter (cm) (?s)	17.4 (8.20)	15.1 (6.53)
average time to treat (min) (?s)	0.5 (0.26)	1.7 (0.75)

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