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OAK WILT: ITS IMPACT ON A GROWING TEXAS

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ABSTRACT

Since its official laboratory confirmation in the state of Texas in the early 1960s, the fungus which is responsible for the disease known as oak wilt (*Ceratocystis fagacearum*) has been confirmed in over 60 counties in central and west Texas. Since that time, explosive human population growth throughout central Texas has led to the fragmentation of traditionally large agricultural property holdings into smaller 10-50 acre "ranchettes." This fragmentation has been partly responsible for a transition in land use that moves away from traditional agriculture and toward a more multi-use management style. This new management regime also recognizes the added value that trees and tree canopy can provide. Not only do the introduction and preservation of trees satisfy these new multi-land use objectives which include recreation, aesthetics, and wildlife habitat, but trees directly contribute to an increase in overall property value. This newfound fondness of trees and their value to a growing population of tree-loving Texans also creates certain opportunities. The key lies in the ability of state forestry officials and their public and private partners to effectively increase the level of oak wilt awareness among these environmentally-conscious landowners. Currently, this is being addressed by creating one-stop sources of technical oak wilt information and assistance, and making them more easily accessible to the public by way of web-based services and GIS technology. By increasing the current levels of oak wilt awareness and providing the public with accurate and timely information on management of the disease, citizens and communities alike can be empowered to partner with state officials in better managing this statewide epidemic.

Key words: *Ceratocystis fagacearum,* disease management

Since the official laboratory confirmation of oak wilt in Texas in the early 1960s (Dooling 1961), and reports of oak disease centers long before that in many other areas of the state (Tabubenhaus 1934), forested areas throughout regions of central Texas (Fig. 1) have been severely impacted by this tree disease.

Oak wilt is caused by the fungus *Ceratocystis fagacearum* (Bretz) Hunt. The most obvious impact of this pathogen has been the loss of millions of Texas oaks over the last four decades (Lewis 1977, Appel and Maggio 1984). The continuing loss of these valuable tree resources has played a slow but steady role in altering many forest stewardship and land management decisions, if not permanently changing the perspectives that both rural and urban Texas communities have regarding the value and benefits of trees.

The occurrence and subsequent spread of the disease can be partly attributed to various human activities that result in the improper maintenance and wounding of trees (Craighead and Nelson 1960, French and Stienstra 1975, Juzwik and French 1983). Thus, oak wilt occurrences and impact have shown to be most significant in areas of greater human population.

TEXAS POPULATION GROWTH

Texas is growing, and growing fast (Fig. 2). To get a clear perspective on just how fast, consider the following statistics: During a period from 1990 to 2000, Texas' population grew by an estimated 3.9 million people, surpassing New York as the nation's second most populated state (Gilmer 2005). Currently, Texas ranks 8th in the US for percent population gain (22.8%). This considerable gain in net population now gives the state 13 of the top 100 fastest growing counties in the U.S. (Wilkins et al. 2003)

FRAGMENTATION

The steady increase in population directly results in an increased demand for land and housing. Fragmentation is a term commonly used by economists to describe the process in which traditionally large agricultural property holdings are broken down, or fragmented, into smaller 10-50 acre "ranchettes" (Fig. 3). To illustrate the impact of this trend; in a period from 1982 to 1997, Texas led all other states in the conversion of rural farming and ranching lands into some form of residential-based development. It is also estimated that the conversion of formerly agricultural-based landholdings into urban uses during this period exceeded 2.6 million acres. This is approximately double the rate of conversion compared to the previous 10 years (American Farmland Trust[1]).

A NEW BREED OF TEXAS LANDOWNER

The fragmentation of traditional agricultural land produces many smaller parcels. These parcels simply do not have the acreage needed to justify any type of potentially profitable farming, ranching or forestry practices. Most of these new landowners have little or very limited interest in working the land for a living – but are interested in land management from a non-conventional perspective. This new perspective has evolved into a new generation of land and forest stewardship for Texas landowners. This new type of stewardship has placed new emphasis on developing land for uses other than traditional agriculture.

Research has shown that the new landowners actively seek out properties that are away from the crowded urban areas; a place where they can escape the crowds and noise of urban life. These new land stewards commonly spend large sums of money in developing their properties to enhance various natural features such as wildlife habitat, picturesque view-scapes, and hiking trails. The only livestock that are managed on these properties are typically very small populations consistent with hobby farming or which allow the landowner to qualify for various agricultural tax exemptions or credits. In all - it's just enough to reconnect them to the spirit of the old West. In addition, a recent survey found that 80% of these new Texans stated that finding land for non-agricultural uses, like hunting, fishing and other recreation was a "very important" motive for their purchase (American Farmland Trust[2]).

As stated earlier, this new breed of Texas landowner seems to find great excitement in staking claim to a small piece of the rustic and colorful legacy of the state. These new landowners are younger, more educated and notably more affluent than their predecessors. According to a publication sponsored by the Federal Reserve Bank of Dallas (Gilmer 2005), this trend toward increased wealth can be further verified by monitoring levels of Texas employment and income growth records. Their data confirms that the Texas economy has outperformed the U.S. economy since 1969 (Fig. 4). And, by 2001, the state as a whole had raised its per capita income to 94 percent of the national average, up from 88 percent in 1969. Over the same period, the average annual growth rate of per capita income was 2.3 percent for Texas versus 2.1 percent for the United States (Fig. 5) (Bryson 2006).

When it comes to the purchase of land in Texas, wealth does have its advantages. According to the American Farmland Trust[1], since 1994, residential development consisting of

lots 10 acres in size or greater, has accounted for 55 percent of the land developed. Consequently, land prices are no longer driven by productivity of the land in terms of cattle and crops, but rather by its scenic and recreational value. These are natural features that have become the dominate factor in determining land value, and in many counties across Texas, these attributes have pushed prices to unprecedented levels (Gilliand 2007). The Texas Hill Country serves as a prime example; over the last decade, in a relatively isolated location of central Texas known as the Llano uplift (a region lacking a metropolitan area), the average market value for rural land increased by more than 86% over the last decade. This equates to approximately $514 per acre for land with an average agricultural value of $62 per acre (Wilkins et al. 2003).

VALUE OF TREES IN URBAN AND RURAL AREAS

The new style of stewardship also recognizes the importance of trees, both for their beauty and for the economic value they add to the property. Recognized methods of tree valuation have revealed that the presence of trees on a particular property may range from 13-19 percent of the total land value (Martin 1986). Unlike the economic contributions of trees, the aesthetic, social, communal, and environmental values are much more difficult to quantify, therefore, tend to be very subjective.

Although trees provide numerous aesthetic and economic benefits, they do come at a cost. For example; Texas landowners who are interested in reforesting an area denuded by oak wilt will quickly become aware that a sizable investment is required in order to purchase, plant, protect, and maintain the trees they desire. The largest expenditure besides the purchase and planting of new trees is the removal of the dead trees. This cost alone can be more than enough incentive for the landowner to increase his/her level of knowledge and awareness of not only oak wilt, but also of other potential forest and tree health issues that must be actively managed in order to protect the investment.

TREES FOR A GROWING TEXAS; RESPONSE OF STATE AND COMMUNITY FORESTRY PROGRAMS

As the population in Texas grows and land becomes more fragmented, the need for comprehensive tree and forest awareness programs increases. In 1982, in an attempt to address this need, the Texas Forest Service (TFS) initiated ane oak wilt demonstration project within selected counties of central Texas with funding from the United States Forest Service' Forest Health Protection Program. After 5 years (in 1988), the project was further expanded to include approximately 40 counties and became a federal suppression project. The Texas Forest Service strategically placed field offices throughout the region of central Texas to provide on-site technical and financial assistance to landowners battling this difficult tree disease. This was the first presence of TFS in this portion of the state (Billings et al. 2001).

To date, the Texas Oak Wilt Suppression Project has worked cooperatively with private and public partners in the field to effectively manage over 2,400 oak wilt centers (see Billings, these proceedings). TFS has placed further emphasis on increasing levels of public awareness regarding oak wilt and worked with multiple public and private partners to provide technical training for county extension volunteers and professional arborists. In 2005, TFS in cooperation with the Lady Bird Johnson Wildflower Center in Austin created an Internet web page (http://www.texasoakwilt.org). Devoted exclusively to the identification and management of oak wilt in Texas, this web page received some 385,000 visitors in 2006.

Currently, seven multi-disciplined TFS foresters provide technical on-site services to landowners in six central Texas program delivery regions (Fig. 4). To complement the oak wilt management services, these foresters also have resources to provide technical assistance in areas of forest stewardship, reforestation, forest health, urban/community forestry, and other forestry-based practices. In 2007, the Texas Oak Wilt Suppression Project will have completed 20 years of service to the citizens of central Texas, one of the longest federal suppression projects on record.

In an on-going effort to get the word out to landowners throughout central Texas, specialists with TFS, Texas Cooperative Extension (now Texas AgriLife Extension Service), and Texas Agricultural Experiment Station (now Texas AgriLife Research) have trained various groups of Master Gardeners/Master Naturalists and ISA-certified arborists on the basics of oak wilt identification and management. These volunteers and professionals are now intercepting many of the numerous inquiries about oak wilt, lessening the burden on the few TFS foresters that deliver the Suppression Project.

CONCLUSION

By increasing the current levels of oak wilt awareness and empowering the public with accurate and timely information on management of the disease, citizens and communities alike can become partners with state officials in effectively addressing oak wilt at the local level and collectively managing a serious tree disease at the state level.

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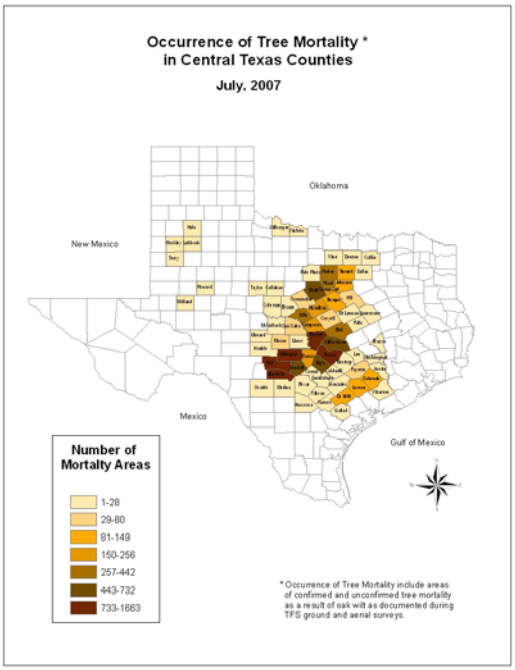


Figure 1: Tree mortality in Texas counties, July, 2007 (Texas Forest Service unpublished data).

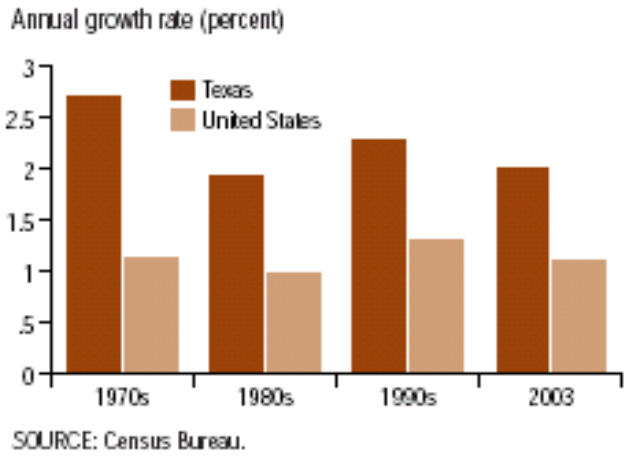
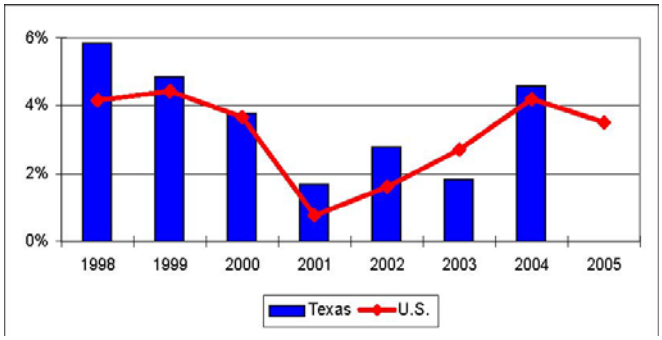


Figure 2: Texas and U.S. population growth, 1970-2003 (Source: U.S. Census Bureau).

Figure 3: Tree-friendly “ranchettes” located in central Texas (Photo by J.B. Rooni).



Sources: Economy.com and Wachovia Corp.

Figure 4: Texas and U.S. economic growth 1998 – 2005: Strong population growth has helped fuel the Texas economy.

	2001 per capita income (dollars)	Percent of U.S. level	Annual growth rate 1969–2001 (percent per year)
United States	30,413	100	2.1
Texas	28,472	94	2.3
Dallas–Fort Worth	33,247	109	2.2
Houston	34,916	115	2.5
Austin	31,511	104	2.8
San Antonio	26,887	88	2.3
Texas Triangle	32,897	108	2.4
Rest of Texas	21,357	70	1.8

SOURCES: Bureau of Economic Analysis; author's calculations.

Figure 5: Performance of regions of the Texas economy.

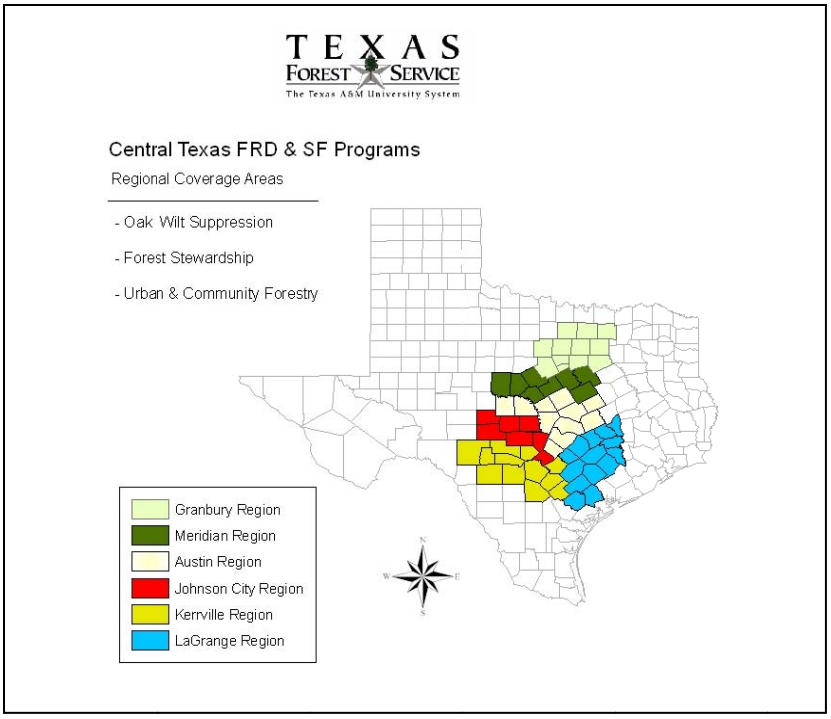


Figure 6: Texas Forest Service program delivery regions.