

An Economic and Spatial Analysis of Silvopasture Viability in East Texas

Jeremy Priest, Jeremy Stovall, and Yanli Zhang, Gary Kronrad, and Brian Oswald

Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University



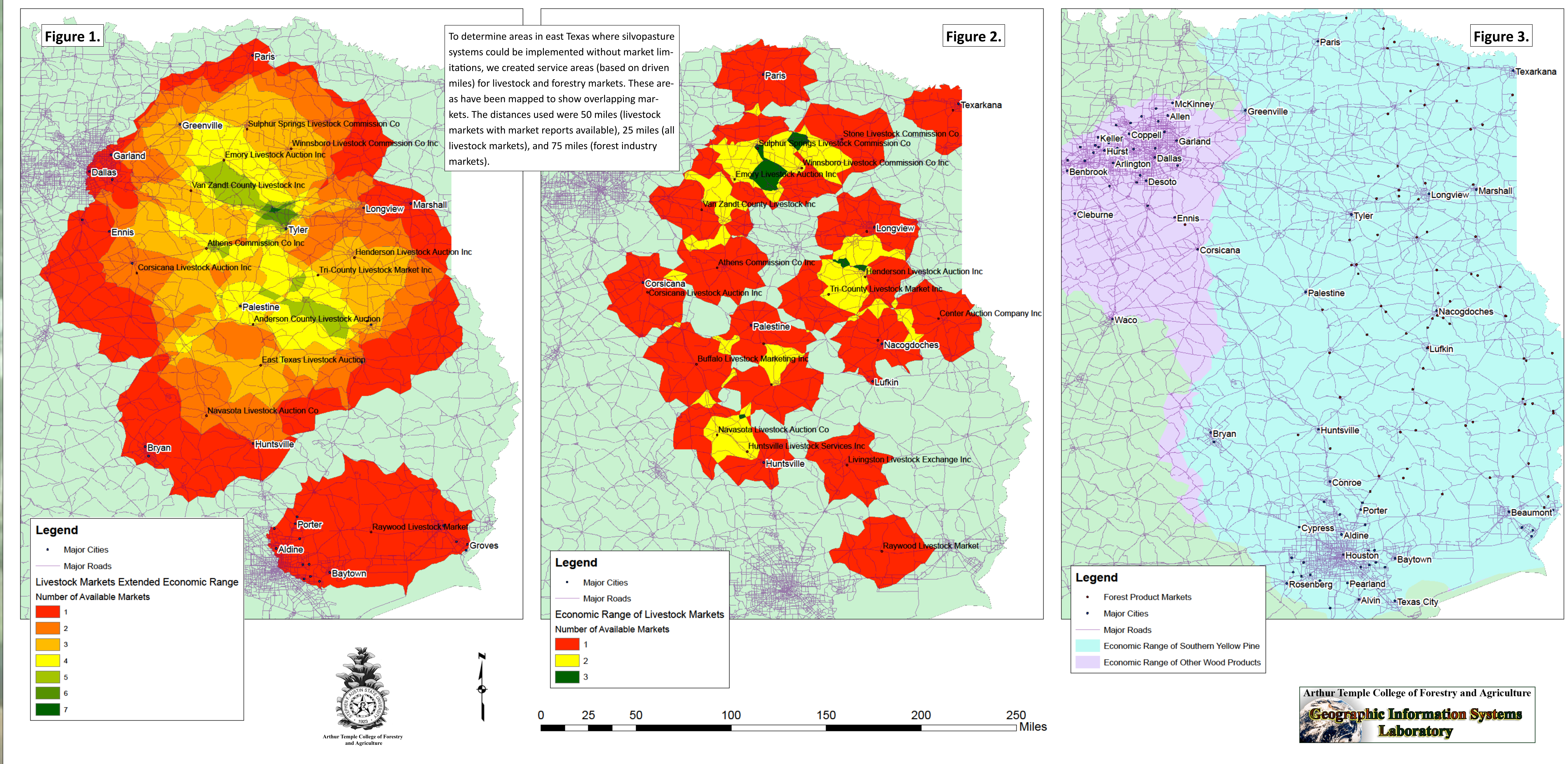
INTRODUCTION

Silvopasture is an agroforestry system which intentionally manages trees, forage, and livestock on the same land unit. Implementation of such agroforestry systems is aided by tools which evaluate economic viability of the proposed system. We developed a spatial analysis approach for landowners and managers to determine the suitability of locations in east Texas for agroforestry systems such as silvopasture.

RESULTS

We researched market locations in east Texas on an area of nearly 23 million acres (Fig. 4). The forest industry was not found to be limiting as nearly the entire area of interest was within range of some form of forest products market. We found much of central east Texas to be within range of one or more livestock markets. And after expansion of the economic range for those markets which have available market reports online, all of central east Texas appeared to be economically viable. Particularly conducive areas for silvopasture seem to be a large area between Tyler and Greenville, as well as another area between Palestine and Nacogdoches.

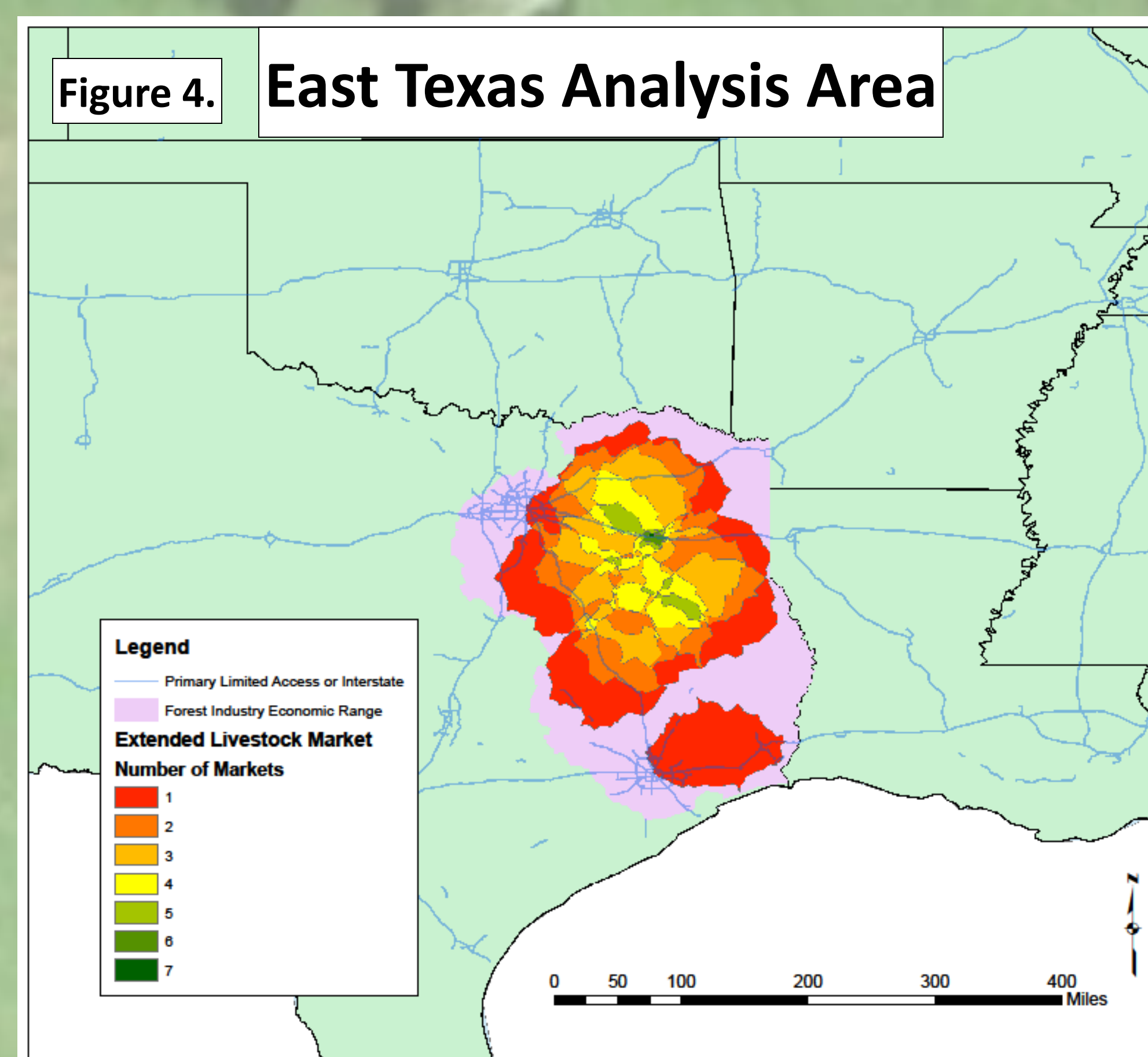
Economically Viable Range of Relevant Market Locations in East Texas



METHODS

We determined locations of acceptable markets in the livestock and forest industries utilizing data from the Texas Animal Health Commission, the Texas Department of Agriculture, and the Texas Forest Service. ArcGIS 10.2 was used to map markets in each industry and the Network Analyst tool was used to calculate service areas for each market location. These service areas act as an estimated range of economic viability by creating polygons based on distance by road (road miles). Livestock auctions, commissions, or sale barns were analyzed using a range of 25 road miles (Fig. 2). For livestock market locations which had market report data available, a range of 50 road miles was used (Fig. 1). Forest industry market locations were evaluated using a range of 75 road miles (Fig. 3). The distances used were approximations based on normal market conditions; however, there can be large amounts of variability which may increase or decrease the economically viable range for each industry. The forest market locations were analyzed with all wood product markets (which included biomass and cooking uses) and then by markets which specifically receive southern yellow pine (e.g. *Pinus taeda*). The purpose was to distinguish markets for typical timber producing silvopasture systems from atypical systems which utilize species such as mesquite (*Prosopis* spp.). The economic range of forestry markets which utilize pine seems to encompass much of the natural range for these species.

Figure 4. East Texas Analysis Area



DISCUSSION

Our analysis demonstrated that mapping of both industries was unnecessary for silvopasture as forest industries were not limiting in this region. However, the livestock market maps were useful in highlighting areas more economically suitable to silvopasture. We should again clarify that the distances used were only estimations based on typical market conditions. The range of economic viability for forestry is generally less plastic due to the need for professional transportation of forest products. However, the range for livestock market locations is often more at the discretion of the landowner or operator. The economic range increases during periods of high prices or when market reports indicate benefits from driving to distant markets outweigh the additional transportation costs. Utilization of the closest market is perhaps the lowest risk option, while studying past data in market reports to determine which market location to utilize may result in greater economic returns. Prices and market locations may change over time. Given the lengthy rotation periods until harvest of forest products (e.g. 25 years) compared to more frequent annual sales of livestock, we can now locate lower risk areas for silvopasture systems that are within range of multiple livestock market locations. Determination of appropriate strategies is dependent on the land manager's knowledge of local markets, although the tools presented may assist in decision-making.

LINKS

Market Reports: <http://www.texasagriculture.gov/Home/ProductionAgriculture/MarketNews/TexasLivestockAuctions.aspx>
Texas Directory of Forest Product Industries: <http://tfsfrd.tamu.edu/ForestProductsDirectory/DirectoryofForestProductsIndustries.html>
Texas Natural Resources Information System: <http://www.tnris.org/get-data#transport>

ACKNOWLEDGMENTS

Thanks to Dr. Erin Brown at Stephen F. Austin State University, Mr. Larry Jacobs, and also the Region 4 Field Office of the Texas Animal Health Commission for assistance in locating livestock auction markets.