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16. Abstract  An efficient multimodal transportation system is critical to the economic vitality of large metropolitan areas, smaller communities, and rural areas. The transportation issues in urban areas are receiving a good deal of attention, with less focus on the needs of rural areas. This research project examines the rural transportation system in Texas. It explores the demographic and economic characteristics of the state's rural population. The history and current status of highways, roadways, public transit services, intercity buses, airports, and railroads serving rural portions of the state are examined. Case studies are presented on selected modes. Available information on future funding needs is reviewed. A multimodal approach needed to enhance the mobility and economic development in rural parts of Texas is presented and discussed.					
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**THE RURAL TRANSPORTATION NETWORK  
IN TEXAS**

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## **CHAPTER ONE—INTRODUCTION**

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Transportation is critical to the economic vitality of large metropolitan regions, smaller communities, and rural areas. Responding to the transportation needs in major urban areas has been a priority in many states, including Texas. Emphasis has been placed on addressing increasing levels of traffic congestion, declining mobility, and air quality concerns in these areas. Multimodal approaches and the application of advanced technologies are being used to improve the movement of people and goods in major metropolitan areas throughout the state and country.

An efficient multimodal transportation system is just as important for the economic and social vitality of rural areas. Transportation is especially critical in a large and diverse state like Texas. Although agriculture, ranching, and oil and gas still dominate the economies of many rural portions of the state, the nature of many areas is changing. Tourism, recreation, retirement living, high technology industries, and residential areas linked to long-distance commute trips have emerged recently as growing segments of the rural economy.

An effective and efficient system of freeways, roadways, public transit services, intercity buses, airports, and railroads is important to maintain and enhance the economic base of rural areas in the state. Ensuring that rural residents have access to jobs, schools, medical services, businesses, and social and recreational opportunities is critical, as is the efficient movement of agricultural produce, manufactured goods, and other commodities.

Recent federal and state legislation has placed more emphasis on the transportation needs in rural areas. There is still much to be learned about the roles of various modes, the interaction among modes, and their influence on the economic viability of rural areas. This research project helps address this void by examining the transportation system in rural Texas.

### **Research Objectives**

This research project explores elements of the rural transportation system in Texas. The project was designed to meet several objectives. The first was to document the demographic and economic characteristics of the state's rural population. Examining the status of the various modes serving rural areas of the state represents the second objective. Researchers explored the current system of highways, roadways, public transit services, intercity buses, airports, and railroads serving rural parts of the state. Reviewing funding needs for the various modes and the potential impact of additional resources on rural areas represents the final objective.

### **Research Approach**

The research team conducted a number of activities to accomplish these objectives. First, information from the U.S. Census Bureau, the U.S. Department of Commerce, and the Texas State

Data Center was examined. Recent data on population, per capita income, total personal income, earnings by industry group, and other economic variables were analyzed and mapped.

Second, information was obtained on the historical development and current status of freeways, roadways, public transit operations, intercity buses, airports, and railroads serving rural parts of the state. Available literature, reports, Internet sites, and other documents were used in this effort. In addition, a telephone survey was conducted to identify the current status of Rural Rail Districts in the state.

Researchers used this information to help identify the attributes of the various modes that enhance the economic and social viability of rural areas. The approach used in this analysis varied by mode, with the methodology matched to the characteristics of each mode and available data. Additional case studies were completed on rural transit systems and rural airports. Telephone interviews with representatives from selected systems were conducted to obtain additional insights into the nature of the services and the benefits to the local areas.

Finally, identified improvements or enhancements and available estimates of funding needs for the different modes were reviewed. The impact of additional resources was considered, along with the influence of these investments on rural parts of the state.

Four general types of economic impacts or benefits were considered in the assessment. The first three measures focus on the direct, indirect, and induced economic benefits of rural transportation, while the last examines community impacts. Elements included in each of these four categories are highlighted next.

**Direct Economic Benefits.** Direct benefits are realized by both the users and the providers of the mode. For example, companies that receive or ship goods by rail, air, or highway provide one example. Bus riders receive direct economic benefits by being able to access jobs, schools, medical resources, personal business needs, and social/recreational opportunities. Personnel employed by a transit agency, railroad, or airport represent another example.

**Indirect Economic Benefits.** Indirect benefits are realized by individuals affected by the direct beneficiaries of the mode. Employers of individuals using roadway or transit to get to and from work are one example of indirect beneficiaries, while businesses patronized by shoppers dependent on the bus for transportation represent another example.

**Induced Economic Benefits.** Induced benefits accrue to both direct and indirect beneficiaries over the long term. Examples of ways rural roadways, transit systems, railroads, and airports may induce economic benefits include businesses that come to value the service for workers and customers, attracting new businesses because of the availability

of a specific mode, attracting residents or visitors to a recreational area, and helping individuals maintain independent living conditions.

**Community Impacts.** Numerous benefits may be realized by a community or rural area from the various modes. Potential benefits include federal and state funding, reducing congestion on local roadways, helping attract or retain businesses, and contributing to the quality of life. Rural transportation modes also result in economic multipliers as additional economic activity is generated, thus contributing to the overall level of the economic activity in the area.

It is often difficult to measure all types of economic benefits due to the lack of available information. In many cases, the generalized impacts of rural transportation modes may be based on qualitative rather than quantitative data. Information from various sources is presented in this report to help provide a picture of the role the various modes play in rural parts of the state.

## **Report Organization**

The remainder of this report is divided into six chapters. [Chapter Two](#) examines the demographic and economic characteristics of rural counties. Individual elements of the rural transportation system — roadways, public transit services and intercity buses, general aviation airports, and railroads — are described in [Chapters Three](#) through [Six](#). These chapters provide a historical background of each mode in Texas, a summary of the current system, key elements contributing to the viability of the mode, an overview of future needs, and case study examples. The report [concludes](#) with a discussion of the multimodal transportation approach needed to enhance mobility and economic development in rural parts of the state.

## CHAPTER TWO—POPULATION AND ECONOMIC CHARACTERISTICS OF RURAL TEXAS

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This chapter summarizes the analysis of selected population and economic characteristics and trends in rural parts of the state. Information is presented on population, per capita personal income, total personal income, earnings, the general economy, farm and non-farm income, and predominant industry. These data were examined for 196 of the 254 counties in the state. The 58 counties that are classified by the U.S. Census Bureau as metropolitan statistical areas (MSA), the federal designation for major urban areas, were excluded from the analysis.

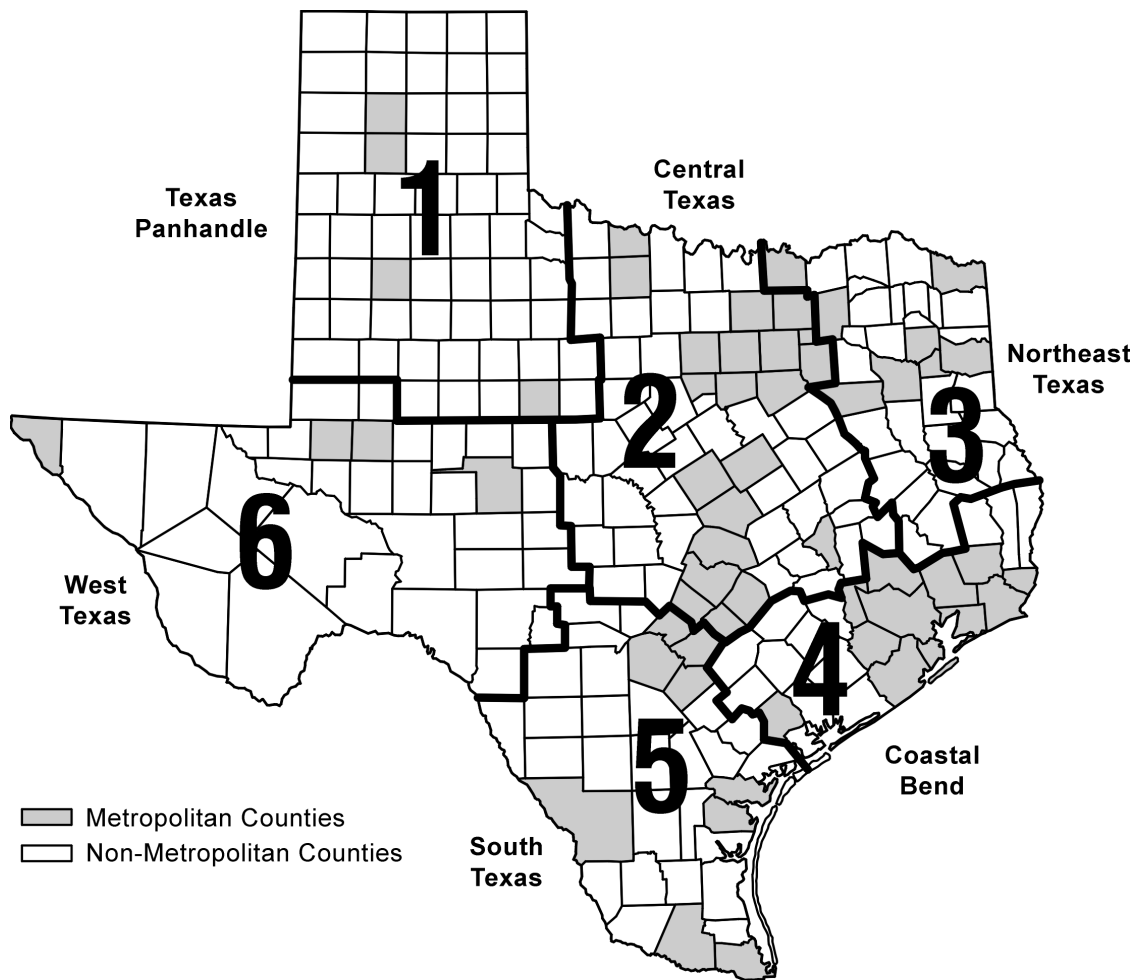
Information from the U.S. Census Bureau, the State Data Center, and other sources is presented in this chapter. The time and expense required to obtain and analyze statewide population and economic data often mean that available information is somewhat dated. The focus of this chapter is thus on providing a better understanding of the general characteristics of rural or non-metropolitan counties in the state. Although some data are from the early 1990s, the general trends appear to still be valid.

To facilitate the analysis, the 196 rural counties were grouped into six regions—Texas Panhandle, Central Texas, Northeast Texas, Coastal Bend, South Texas, and West Texas. The 25 TxDOT districts were used to help identify the boundaries of the six regions. [Figure 1](#) illustrates the six districts and the 196 rural counties included in the assessment, as well as the 58 metropolitan counties that are not examined.

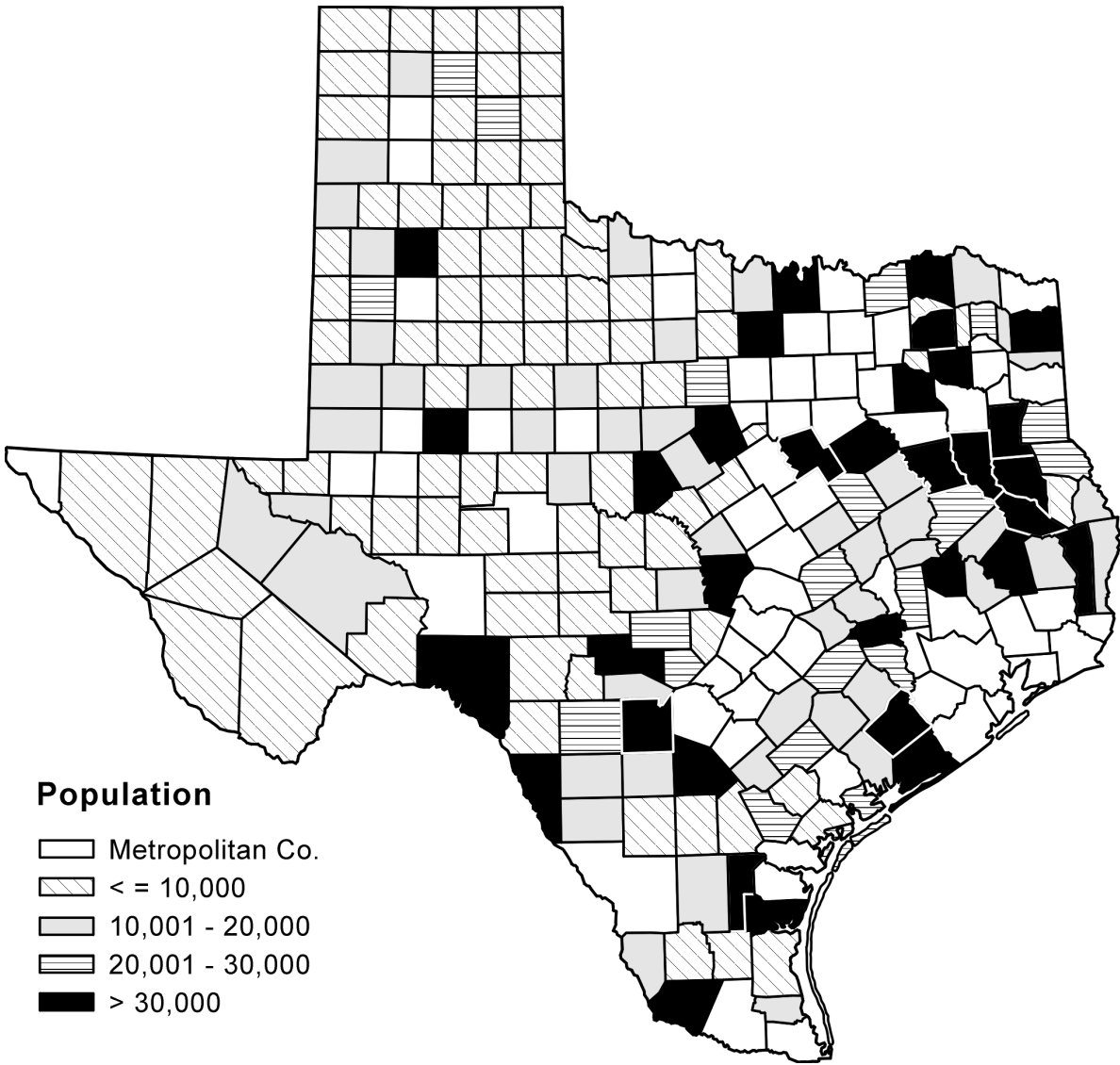
### Rural Population Trends

Texas ranks second to California as the most populous state in the country. The population of the state in 1996 was approximately 19.1 million. This figure represents an increase of 2.1 million people, or 12.8 percent, since the 1990 census. The population of the U.S. grew by only 6.7 percent over the same period. Texas experienced the largest increase in population of any state in the country over this six year period (1). Approximately 55 percent of the state's population growth is attributed to natural increases, while people moving into Texas from other states account for 22 percent, and immigration from other nations accounts for 23 percent (2).

The majority of the state's population is concentrated in the major metropolitan areas. The Austin, Houston, Dallas-Fort Worth, and San Antonio metropolitan areas account for approximately 58 percent of the total state population. Adding in all the MSAs in the state brings the total up to 84 percent (3). [Figure 2](#) illustrates the 1998 estimated population in rural counties. Ninety rural counties had 10,000 or less residents, while 52 counties averaged between 10,000 and 20,000; 21 had 20,001 to 30,000 inhabitants, and 33 had populations of 30,001 to 50,000. The Texas Panhandle and West Texas accounted for approximately 70 percent of the least populated



**Figure 1. Metropolitan and Rural Counties in Texas and Composite Regions.**



**Figure 2. 1998 Estimated Population by County.**

(3)

counties, while 60 percent of the counties with over 30,000 residents are in Northeast Texas and South Texas (3).

Although the out-migration trends of the 1980s have slowed, some rural counties in Texas have experienced population losses over the past decade. As highlighted in Figure 3, 46 counties, or 23 percent of the rural counties in the state, are estimated to have lost population between 1990 and 1998. Most of these counties are located in the Texas Panhandle and West Texas regions. Seventy-one percent of the rural counties experienced population increases of 1 to 20 percent, and 12 counties had population increases of over 20 percent. Most counties experiencing higher levels of population growth are located in Northeast, Central, and South Texas (3, 4).

In 1990, Texas had the fifth largest elderly population—individuals 65 years of age or older—among states in the country. Further, between 1980 and 1990, Texas had the third largest growth in elderly population, trailing only California and Florida. During the 1980s, the elderly population in Texas increased at a faster rate than the overall population. In 1990, approximately 10 percent of the state’s population was 65 and older. Texas’ elderly population is predominately female, with 68 elderly males per 100 females. Minority elderly account for some 23 percent of individuals 65 and older in the state. The elderly population in Texas is also among the poorest in the country, with the state ranking as the tenth highest in the number of elderly individuals at or below the poverty level (5).

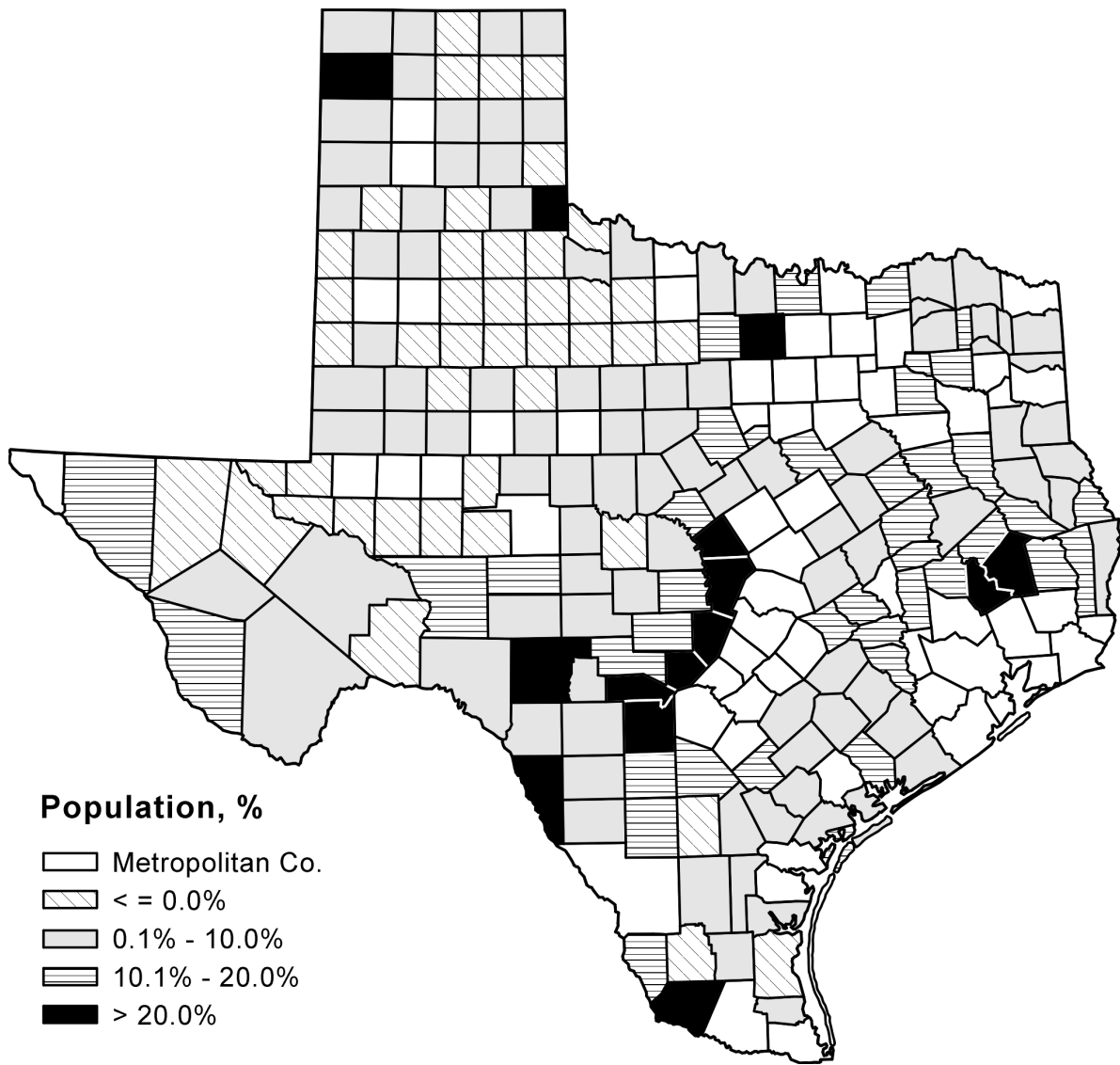
Although 70 percent of the elderly population resides in metropolitan areas, that group accounts for a larger share of the population in rural areas. Approximately 16 percent of the population in rural areas was elderly in 1990, compared to 9 percent in metropolitan regions. Further, rural areas exhibited different patterns related to the elderly population than metropolitan counties. In 55 rural counties, individuals 65 and over comprised at least one-fifth of the population. As highlighted in Figure 4, counties where the elderly comprise 20 percent or more of the population are found mostly in the Panhandle and Central regions (5).

The growth in the state’s elderly population is forecasted to continue. The 65 and over age group may account for 16 to 20 percent of the total state population by 2030, rather than the current 10 percent. By the year 2010, it is likely that Texas will have the fourth largest elderly population of states in the country (5).

### **Per Capita Personal Income Trends**

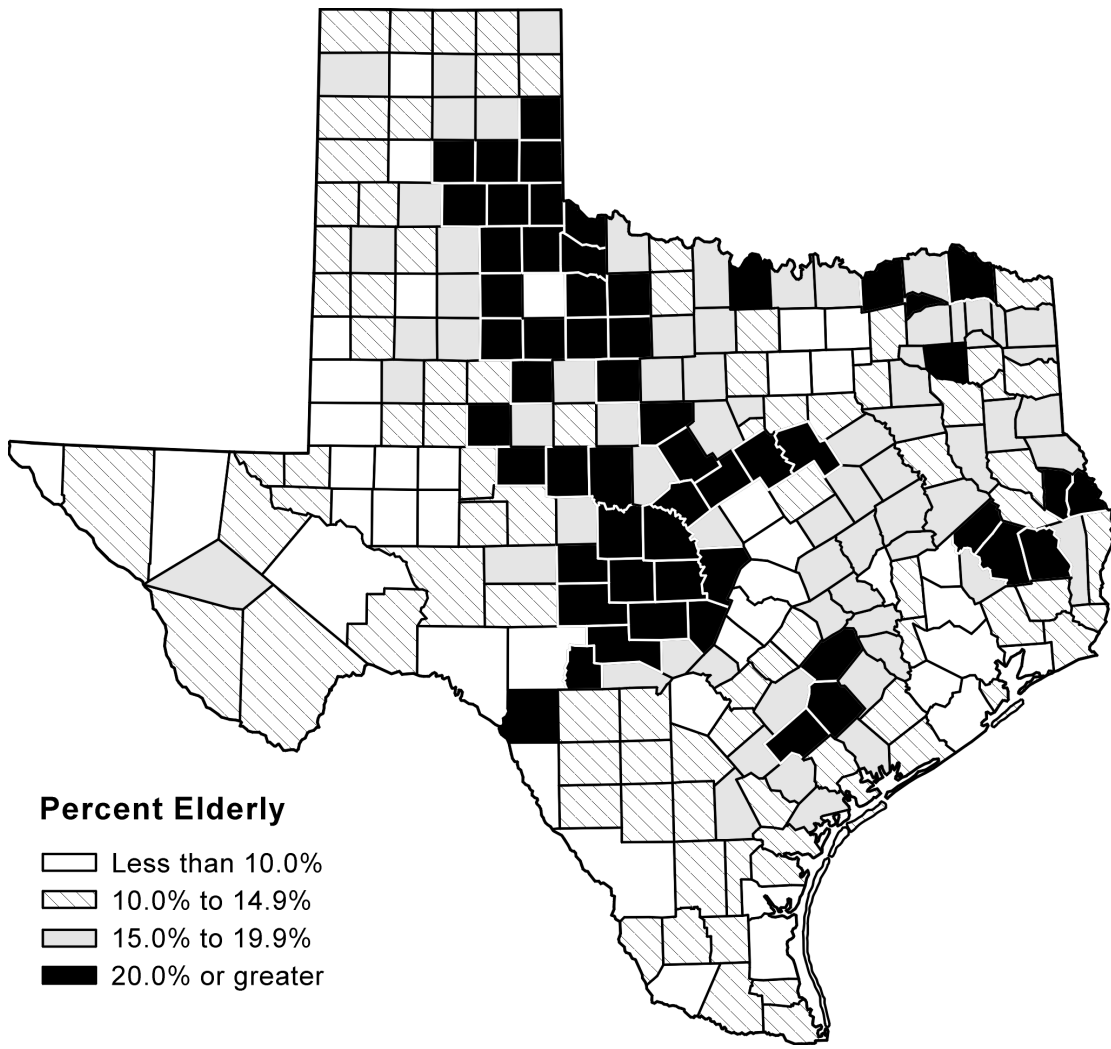
Per capita income is calculated by aggregating the income of all individuals in an area and dividing by the total population. It provides a general measure of the economic well-being of the population as a whole and a perspective on income distribution across all groups. Texas ranks in the lower half of all states in the country in per capita income, averaging approximately 92 percent of the national average (6, 7).





**Figure 3. Percent Change in Population by County — 1990-1998.**

(3)



**Figure 4. Percent of Elderly Population in Texas Counties, 1990.**

(5)

Within the state, the per capita income in rural counties is lower than in their urban counterparts. The 1992 per capita income for all rural counties was approximately \$16,561, or about 94 percent of the average for Texas metropolitan counties. [Figure 5](#) highlights the 1992 per capita personal income for rural counties. Overall, eight counties had average per capita incomes of \$10,000 or less; 50 fell within the \$10,001 to \$15,000 category; 115 were in the \$15,001 to \$20,000 group, and 23 recorded per capita incomes of over \$20,000.

As illustrated in [Figure 5](#), there is significant variation in per capita income by region. The average per capita income of \$19,376 in the Panhandle region was substantially higher than those in other regions. The Panhandle region accounts for 19 of the 23 counties with per capita incomes of over \$20,000. On the other hand, the South and West Texas regions had the lowest per capita incomes, averaging approximately \$14,000.

### **Total Personal Income Trends**

Total personal income provides a measure of the overall economy of an area. Total personal income includes wage and salary disbursements, other labor income, proprietor's income, rental income, dividend and interest income, and transfer payments less personal contributions for social insurance. Information on total personal income by county was examined in this study to provide a general indication of economic conditions in rural portions of the state.

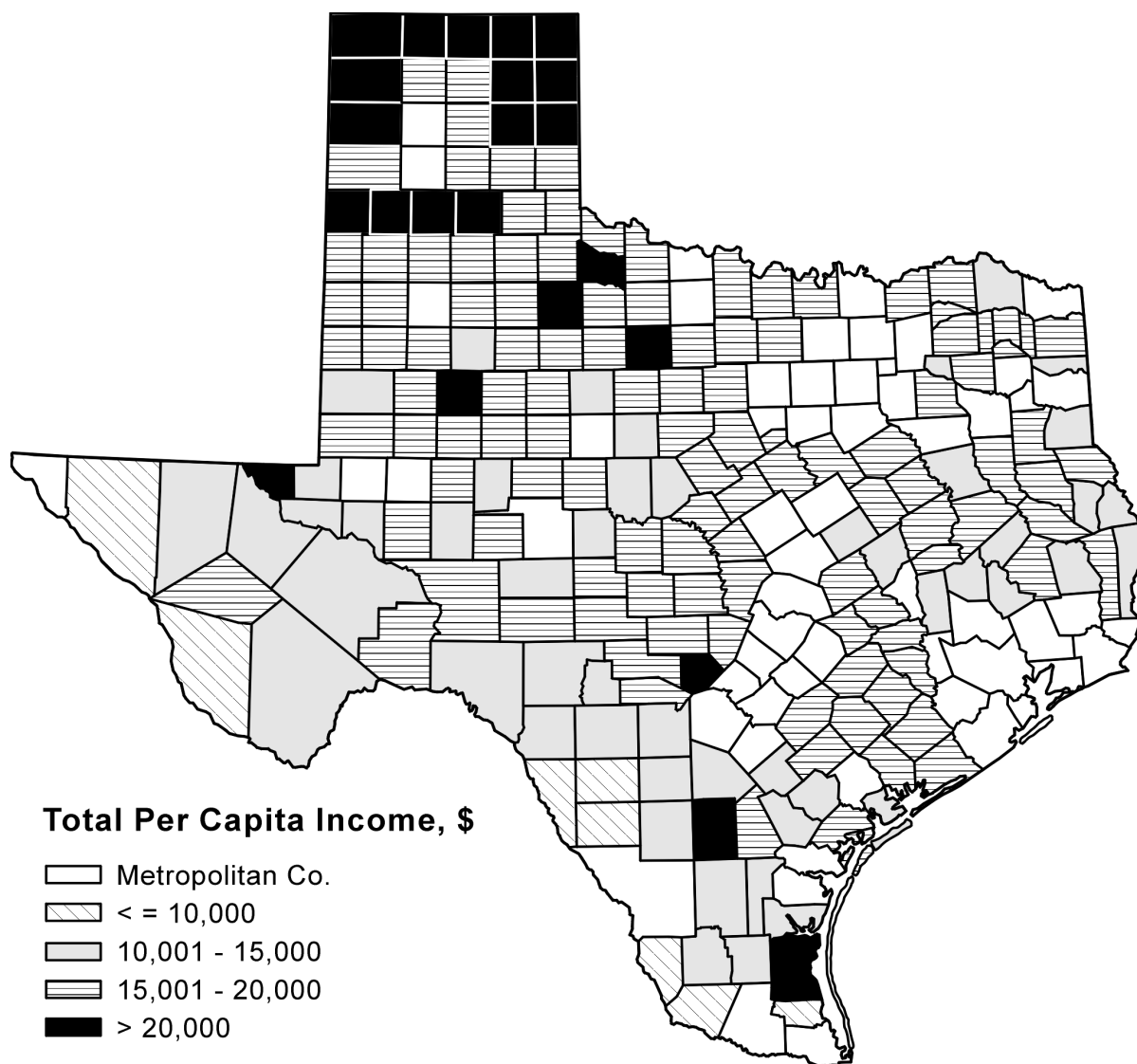
In 1992, the total personal income for the 196 rural counties was approximately \$44.8 billion, compared to \$295.7 billion for the 58 metropolitan counties. Thus, residents in the metropolitan counties account for 87 percent of the total personal income in the state, while rural residents account for 13 percent. In general, total personal income was lower in counties in the Texas Panhandle and West Texas regions, and higher in counties in Northeast Texas ([6](#)).

### **Earnings**

Earnings provide another economic indicator. Earnings include wage and salary disbursements, other labor income, and the income of proprietors. The 1992 total earnings for all counties in Texas were approximately \$259 billion. Rural counties accounted for about 10 percent of this total, or \$26 billion. The Northeast Texas region had the highest overall earnings, followed by the Coastal Bend, South Texas, Central Texas, and Texas Panhandle regions. The total earnings for the West Texas region were well below those of the other five. For example, the total earnings for the West Texas region were approximately \$55 million, compared to \$231 million for the Northwest Texas region ([6](#)).

### **General Economic Trends**

Texas has a very vibrant and diverse economy. The 1998 gross state product was estimated at \$632.4 billion, representing the third highest among the 50 states. In 1998, Texas accounted for 7.1 percent of total U.S. employment and led all states in net job creation during



**Figure 5. 1992 Per Capita Personal Income by County.**

(6)

the 1990s (8). Agriculture, ranching, and oil and gas represent traditionally strong industries in the state. Manufacturing, banking, construction, government, the service industry, tourism, and recreation are all important elements of the state's economy. The basic industries and businesses in the state, especially those important in rural areas, are highlighted next (8, 9, 10).

**Agriculture and Ranching.** Texas is one of the leading agricultural states in the country. In 1997, Texas ranked second behind California in cash receipts from farm and ranch produce. The market value of agricultural products sold in 1997 was approximately \$13.8 billion. Texas normally ranks first in number of farms and ranches, farm and ranch land, cotton production, and many livestock categories. In 1997, some 131.3 million acres were under cultivation in the state at 83,284 full-time farms. The top five agricultural commodities in the state were cattle and calves, cotton and cottonseed, poultry and poultry products, dairy products, and corn for grain. The top five crops were cotton, hay, wheat, sorghum for grain, and corn for grain.

**Oil, Gas, and Mining.** Although the oil and gas industry declined during the 1990s, it is still an important component of the state's economy, representing about 10 percent of the total gross state product in 1997. The Permian Basin of West Texas is the largest oil and gas producing area, but wells are found throughout the state and offshore. Coal, limestone, uranium, basalt, and other minerals are also mined throughout the state. Texas ranked sixth nationally in total mineral output.

**Manufacturing.** Durable-goods manufacturing in Texas includes electronics, computers, building materials, furniture and fixtures, and transportation equipment. Nondurable goods produced in the state include apparel and textile, food processing, plastics, and other products. Recent trends vary by type of commodity, with growth in electronics, computers and other electrical machinery, and building materials, and some decline in aircraft-related manufacturing, furniture, apparel, and food processing. Many of the state's manufacturing facilities are concentrated in urban areas, but some are also located in smaller communities and rural areas.

**Service Industries.** This category, which includes a diverse mix of service sectors, including health services, has grown significantly over the past few years. Services comprise the largest sector of the state's economy, providing some 2.2 million jobs.

**Transportation, Communications, Utilities.** Employment in the telecommuting industries in the state has increased over the past few years. Two transportation industries—air and trucking—have also experienced modest job growth, with some declines in rail employment.

**Finance, Insurance, and Real Estate.** Trends in the finance, insurance, and real estate industries have been volatile in the 1990s. Annual increases in employment in all three sectors have occurred only twice in the last 10 years due to bank mergers, changes in interest rates, and other factors.

**Public Sector.** Federal, state, and local government employment has generally increased during the 1990s, even with reductions in military personnel in the state. Although much of the government employment is concentrated in major urban areas, public sector workers are found throughout the state.

### **Farm and Non-Farm Income**

The average farm and non-farm income was examined to obtain a better understanding of the importance of agriculture and industry on the economic base of rural counties in Texas. Overall, farm income represents only about 7 percent of the total personal income of residents in rural counties. The importance of income from agriculture sources varies by region, however. For example, farm income is a relatively important component of total personal income in the Panhandle region. In this region, farm income averaged approximately 18 percent of total personal income, compared to about 5 percent in the West Texas region, and 3 to 4 percent in all other regions (6).

### **Predominant Industry**

Examining earnings by industry group provides another indication of the economic base in rural counties. The industry with the highest earnings was identified for each county. Earnings include wages and salaries, other labor income, and farm and non-farm proprietor's income. The 11 industrial categories examined were farm, agricultural services, mining, construction, manufacturing, transportation and public utilities, wholesale trade, retail trade, services, government, and finance, insurance, and real estate. For this analysis, the four categories of wholesale trade, retail trade, transportation and public utilities, and finance, insurance, and real estate were combined into one grouping called transportation, finance, and trade industries.

The transportation, finance, and trade industries category was the dominant industry in 34 percent of the rural counties. This grouping was followed by farming, 24 percent; government, 21 percent; manufacturing, 11 percent; mining, 7 percent; and services, 3 three percent.

As highlighted in Table 1, the predominant industry group varies by region. Farming is more important in the Panhandle region, while transportation, finance, and trade represent the most significant industry grouping in the Central Texas, Northwest Texas, and Coastal Bend regions. Government is the most important industry group in the South Texas and West Texas regions.

**Table 1. Percent of Counties with Predominant Industry by Region, 1992.**

Industry Group	Texas Panhandle	Central Texas	Northeast Texas	Coastal Bend	South Texas	West Texas
Farming	57%	12%	7%	8%	11%	16%
Government	9%	12%	15%	23%	48%	35%
Manufacturing	5%	10%	33%	31%	0%	3%
Mining	11%	0%	0%	0%	4%	23%
Services	0%	10%	0%	0%	7%	0%
Transportation, Finance, and Trade	18%	56%	45%	38%	30%	23%
Total	100%	100%	100%	100%	100%	100%

(6)

## **CHAPTER THREE—RURAL ROADWAY SYSTEM IN TEXAS**

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### **Historical Overview of Rural Roadway System in Texas**

The early roadway network in Texas evolved from the trails used by Native Americans, explorers, and settlers. Responsibility for building and maintaining dirt roads in the 1800s was left primarily to local groups. Under the direction of road overseers appointed in each county, adult males contributed five days a year to work free on local roadways. Conscript labor was also used on roadway projects.

Although early legislation called for first class roads linking county seats, it was not until the 1890s that counties and cities were granted the power to issue road bonds and to levy taxes to support road construction and maintenance. The introduction of automobiles in the state in 1899 generated interest in better roads, and automobile owners became vocal supporters of roadway improvements. This interest was reflected in the formation of the first Texas Good Roads Association in 1903.

State legislation in 1907 set the first speed limit of 18 miles an hour, required automobiles to stop when signaled to do so on meeting horse-drawn vehicles, and made automobile registration by county mandatory. By 1910, some 14,286 automobiles were registered in 180 counties, and by 1917 there were 194,270 automobiles in the state. A second Texas Good Roads Association was formed in 1910 to promote road building at both the local and state levels.

Formal state involvement in funding and constructing roadways followed passage of the Federal Aid Highway Act of 1916. The Act provided \$75 million to be apportioned to states over a five-year period for highway construction. The Act required state matching funds and mandated that road construction be supervised by an organized state highway department. To allow the state to receive federal funding, legislation was approved in 1917 establishing the Texas Highway Department. A three-member commission appointed by the governor and a registered professional engineer appointed by the commission headed the department.

In order to fund the required state match, the legislation transferred responsibilities for vehicle registration from the counties to the Highway Department, and in 1923 legislation was approved levying a tax of one cent per gallon on gasoline and allocating three-fourths to the State Highway Fund. One of the first activities of the Department was to identify a preliminary state highway network comprised of some 8,865 miles. The current Interstate system follows many of these roads. The roles and responsibilities of the Department, the sources of state funding, and the urban and rural highway system continued to evolve during the 20<sup>th</sup> Century (11).

The Department's responsibilities expanded to include maintenance in the 1920s, the State Highway Patrol from 1929 to 1935, tourist information stations in the 1930s, and the intracoastal waterway, two ferry systems, public transportation, rural airports, and elements of rail and bicycle planning from the 1970s through the 1990s. The changes in the Department's name from the State



Highway Department to the State Department of Highways and Public Transportation to the Texas Department of Transportation reflect these additional responsibilities.

A 20-mile, 16-foot wide roadway in Brooks County was the first facility built by the Department between 1918 to 1920. Construction of the Farm-to-Market (FM) and Ranch-to-Market (RM) road system began in the late 1930s, and by 1940, the state roadway network totaled some 22,600 miles. Development of the current extensive FM roadway and Interstate highway system did not begin in earnest, however, until after World War II.

The Federal Aid Highway Act of 1956 included the National System of Interstate and Defense Highways. This program significantly changed both the highway system and the development patterns in Texas and in states throughout the country. By 1967, Texas had some 1,800 miles of Interstate freeways. The current Interstate system in the state comprises some 3,233 miles. As discussed in the next section, Texas has the largest road network of the 50 states.

### State-Maintained Roadway System in Texas

The state-maintained roadway system in Texas comprises 77,145 centerline miles. As highlighted in [Table 2](#), the FM network, which includes both FM and RM roads, comprises slightly over half of the centerline miles, and the combination of FM and state highways accounts for 74 percent of the system total. Additional components of the state-maintained system are shown in [Table 3](#). Texas leads the country with the most bridges, 32,200, on the state system. Approximately half of these bridges are on U.S. and State Highways; 27 percent are on FM roads, and 23 percent are on the Interstate system ([12](#), [13](#)). [Figure 6](#) highlights the Texas Highway Trunk System, which includes the Interstate, U.S., and state highways.

**Table 2. State-Maintained Roadway System.**

Roadway Classification	Centerline Miles	Percent of System
Interstate Highways	3,233	4%
Interstate Frontage Roads	4,514	6%
U.S. Highways	12,114	16%
State Highways	16,388	21%
Farm-to-Market Roads	40,896	53%
<b>Total</b>	<b>77,145</b>	<b>100%</b>

(12)

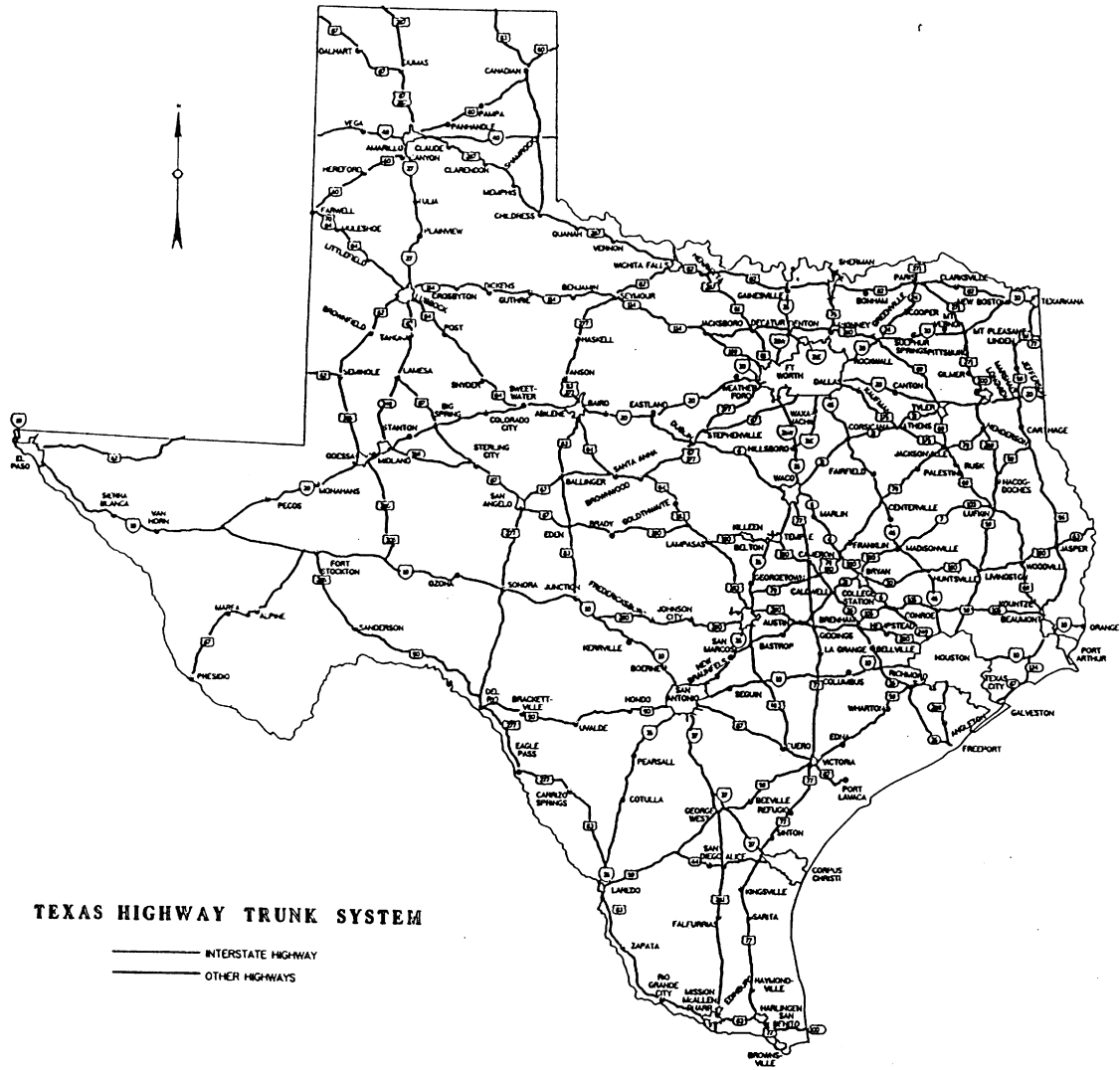


Figure 6. Texas Highway Trunk System.

(13)

**Table 3. Other Components of the State-Maintained Roadway System.**

Component	Number
Bridges	
On-State System	32,200
Off-State System	16,300
Total	48,500
Rest Areas	110
Picnic Areas	790
Acres within Right-of-Way in State System	1.3 million

(12)

In addition to the state-maintained roadway system, city, county, and township roads comprise important components of the rural transportation system. According to the Highway Performance Monitoring System (HPMS), there are some 141,000 miles of local roads in rural portions of the state (14). Less is known about the physical condition of these roadways.

### **Funding the State-Maintained Roadway System**

Funding for the state-maintained roadway system comes from a mix of federal and state sources. The Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) provides funding authorization for federal highway, highway safety, public transportation, and other surface transportation programs for the six-year period from 1998 through 2003. The policies and programs contained in TEA-21 continue those established in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The major program elements, especially those related to rural facilities, are highlighted below (15). TEA-21 continues the flexible funding provisions of the ISTEA, allowing states to shift resources among programs to better respond to local needs.

**National Highway System (NHS).** NHS is composed of 163,000 miles of rural and urban roads serving major metropolitan areas, international border crossings, and other key travel destinations. NHS includes the Interstate system and key urban and rural principal arterials. NHS in Texas is comprised of 10,500 miles. The funding split for NHS projects is 80 percent federal and 20 percent state.

**Interstate System/Interstate Maintenance.** Although the Interstate system is part of NHS, a separate category is provided for funding continued maintenance and improvements. The funding split for this program is 90 percent federal and 10 percent state.

**Surface Transportation Program (STP).** This category, which was established under ISTEA, provides flexible funding for a wide range of eligible projects. These include federal-aid highways including NHS, bridge projects on public roads, transit capital projects,

and public bus terminals and facilities. There are requirements on the allocation of some STP funds, but the program provides flexibility to address local needs. The funding split used in Texas for STP projects varies from 90 percent federal/10 percent state to 80 percent federal/20 percent state or local. The 80/20 split is used on rural mobility and rehabilitation projects, urban and rural rehabilitation projects, and enhancement projects.

**Bridge Replacement and Rehabilitation.** This category provides funding for bridge replacement and rehabilitation projects on any public road. The funding split for bridge projects on the state-maintained system is 80 percent federal and 20 percent state, while an 80 percent federal, 10 percent state, and 10 percent local allocation is used for off- system projects.

**Federal Lands Highway Program.** This program provides funding for three existing categories of Federal Land Highways—Indian Reservation Roads, Park Roads and Parkways, and Public Lands Highway—and adds Refuge Roads, which are federally owned public roads providing access to or within the National Wildlife Refuge System as a new element.

A variety of other federal funding sources are also used to support small portions of the roadway system in the state. These include federal receipts for the State Infrastructure Bank (SIB) and programs administered by other federal agencies.

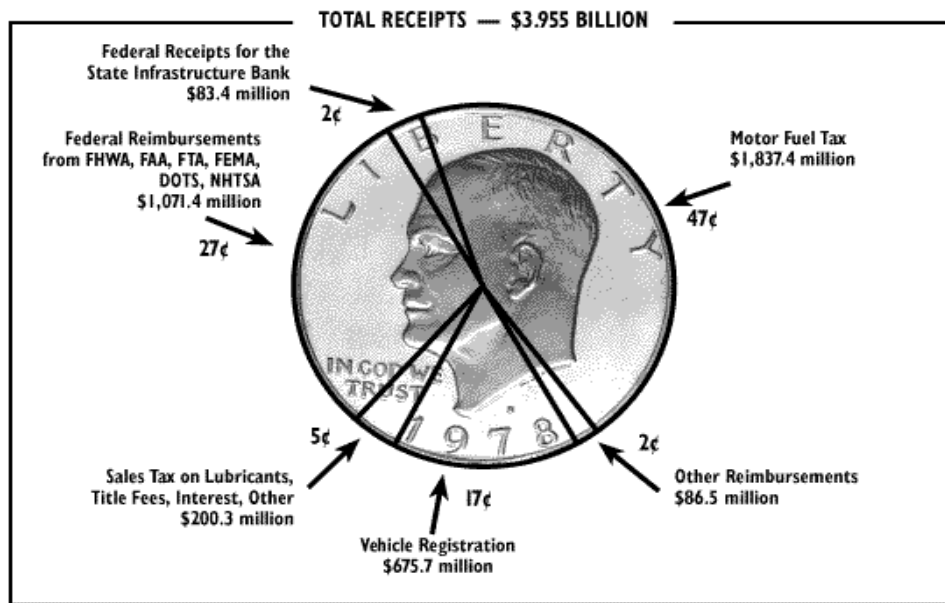
As highlighted in [Figure 7](#), state funding for the roadway system comes primarily from four sources. These are taxes on the sale of motor fuels; vehicle registration fees; sales tax on lubricants, title fees, interest, and other elements; and other reimbursements. Revenues generated from these sources and federal funds comprise State Highway Fund Number 6. The basic components of these four sources are highlighted next ([16, 17](#)).

**Motor Fuels Tax.** Legislation approved in 1923 levied a tax of one cent per gallon on gasoline and allocated three-fourths of the revenues collected to the State Highway Fund. By 1986, the state fuel tax had increased to 15 cents per gallon and had been expanded to include diesel and other motor fuels through legislative actions, with 11¼ cents dedicated to highway purposes. In 1991, the state legislature raised the tax by 5 cents, for a total tax of 20 cents, and allocated one-quarter to public education. The current tax rates are 20 cents per gallon on gasoline and diesel fuel and 15 cents per gallon on liquified gas. In Fiscal Year 1997, approximately \$1.8 billion was generated through the Department’s share of the motor fuel tax, or approximately 47 percent of the total receipts.

**Motor Vehicle Registration Fees.** The annual motor vehicle registration fee is based on the model year for automobiles. The annual fee for trucks is \$25 plus an amount based on the empty weight of the vehicle and its net carrying capacity. Approximately \$1.3 billion was collected in motor vehicle registration fees in Fiscal Year 1997. Sixty-five percent of this total, or some \$675 million, went to TxDOT, while 35 percent, or \$358.6 million, was returned to the counties.

**Fees, Interest, and Other Sources.** Elements within this category include sales tax on motor lubricants, motor vehicle title certificate fees, sale of machinery and equipment, interest income, and other miscellaneous sources. In Fiscal Year 1997, approximately \$200 million in revenues was generated from these sources.

**Other Reimbursements.** This category includes reimbursements to the state for a variety of purposes. In Fiscal Year 1997, some \$86.5 million in revenues was generated from these sources.



(16)

**Figure 7. Distribution of Total TxDOT Receipts - Fiscal Year 1997.**

Revenues from these sources provide the state match for the federal programs described previously. In addition, these funds are used to finance state-sponsored programs. These programs include the State Preventative Maintenance, State Farm-to-Market Road System Expansion, State Farm-to-Market Road Rehabilitation, State Park Roads, State Rehabilitation, and North American Free Trade Agreement (NAFTA) Discretionary Programs. All of these fully state funded programs are important to rural areas in Texas.

## **Rural Roadways and Population and Economic Characteristics**

Researchers used a number of analysis techniques to compare the population and economic characteristics presented in [Chapter Two](#) with the roadway information described in this chapter. Regression and correlation analyses were performed to help identify the influence of selected socioeconomic variables on roadway characteristics and roadway use in rural portions of the state. The following trends emerged from this assessment. While some of these elements are intuitive, others are not.

- Population and population density are related to many rural transportation system characteristics. As might be expected, the lane miles of roadways are lower in less densely populated areas and higher in more densely populated areas. Vehicle miles of travel (VMT) are also lower in less populated areas. The average mile per capita decreases as population increases.
- The intensity of roadway use, as measured by the average vehicle-mile traveled per lane mile, varies by region. The Coastal Bend region had the highest intensity of use, while the Texas Panhandle region had the lowest.
- The density of road networks is highest in the Northeast Texas region and least dense in the West Texas, South Texas, and Texas Panhandle regions.
- The West Texas and Texas Panhandle regions had the lowest number of commuters traveling into and out of counties on a daily basis, while the Northeast Texas region had the highest.
- Counties and regions with earnings from farming had lower population levels and lower total personal incomes but higher per capita incomes. Counties with high levels of mining activities exhibit similar trends. Farming- and mining-dominated counties tended to have lower lane miles per square mile and lower VMT. Manufacturing-dominated counties had larger populations and higher total personal incomes. They also had higher lane miles per square mile and higher VMT.

## Rural Roadway Conditions and Needs

Data available from HPMS provide an indication of the condition of rural roadways in the state. HPMS is maintained by the Federal Highway Administration (FHWA) based on data provided by the states. Each state collects inventory and condition information on a sample of highway sections selected to represent the roadway network in the state. Data on geometric and alignment elements, physical condition, and operational performance are collected on a regular basis and reported to FHWA. All public roads, except those classified as local roadways, are included in HPMS.

Although HPMS data are based on a sample, the roadways included do provide a representative mix of those found in the state. The HPMS computer program was used to analyze the current condition of rural roadways in the state and future needs. Researchers used the four models available in HPMS—the needs model, the composite index model, the investment performance model, and the impact assessment model—in this study. A special database was created for the 196 non-metropolitan counties in the state, and roadways not on the state highway system were eliminated. Data from the 1993 HPMS were used in the analysis. HPMS data from 1996 were also reviewed to determine if major changes had occurred in the three-year period. Key results from the analysis are summarized next.

- **Pavement Conditions.** Pavements on Interstate highways, principle arterial, minor arterial, and major collectors in rural portions of the state are in relatively good condition. HPMS uses a numerical rating system for pavements where a value of 2.5 or less is considered poor; 2.6 to 3.4 is mediocre to fair, and 3.5 to 5.0 is good to very good. The pavement conditions for most of the rural Interstate system in Texas fall within the good to very good category. Pavement conditions on 1 to 3 percent of the principal arterial, 4 percent of the minor arterial, and 18 percent of the major collector are mediocre, and the rest are good to very good. Rural minor collectors are not included in this sample.
- **Volume to Capacity Ratio.** The volume to capacity (VC) ratio for the rural highway system indicates that reoccurring traffic congestion is not a major problem in most areas. Certainly, some rural roadways experience significant congestion during special events or certain times of the year, and even on a regular basis in some areas, but not to the level of urban areas.
- **Future Needs.** The HPMS analysis package was used to estimate the 20-year state-maintained roadway needs in rural counties. The model estimated \$23.2 billion in new projects, along with \$9 billion in backlogged projects, for a total 20-year funding need of \$32.2 billion. The model was rerun based on current funding levels to determine the impact on the roadway system if this level of investment were not possible. The results from this analysis indicated a dramatic deterioration in pavement conditions and an increase in congestion levels. The analysis indicated that

the current funding level met only about 36 percent of the estimated needs. The results of this analysis are in line with periodic forecasts made by TxDOT, which estimate that available funding would cover only 30 percent of the total transportation needs in the state. Funding for rural mobility roadway projects was anticipated to cover only 28 percent of the identified needs.

A good roadway system is critical for maintaining the economic viability of rural portions of the state. Adequate and well-maintained roadways are important to support the wide range of rural economic activities—from transporting agricultural products, manufactured goods, and other commodities to moving residents, visitors, tourists, and business travelers.

Studies have identified transportation, including the roadway network, as an important criterion in retaining current business, as well as attracting new companies. Since cost is a driving factor for all types of businesses, elements of the transportation system that can reduce costs will improve the competitive advantage of a company. Further, since location decisions are usually made on a comparative or competitive basis, areas with better roadways will have an advantage over areas lacking adequate facilities.

Some states have developed special programs to fund transportation improvements needed to attract or retain businesses. For example, Wisconsin has established a quick response economic development fund that can be used to finance transportation improvements identified as critical parts of negotiations with new or existing companies. In another example, the Iowa legislature in 1989 dedicated half of a 2 cent increase in the state fuel tax to transportation improvements needed to retain existing businesses or attract new companies to the state (18).

The presence of four-lane roadways connecting to the 36 economic development centers in Texas was identified as an important factor in a recent study examining techniques to promote economic diversification in the state. Currently, 30 of these 36 centers are served by four-lane divided highways. TxDOT's Phase I Trunk Corridor program, which has been adopted by the commission, should provide four-lane access to all 36 economic development centers by 2010.



## CHAPTER FOUR—RURAL TRANSIT AND INTERCITY BUS SERVICES IN TEXAS

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### Historical Overview of Rural Transit Services in Texas

The horse-drawn omnibus represents the earliest form of mass transportation. Introduced in France in the 1820s, the use of the omnibus spread to communities throughout the United States in the 1830s and 1840s. The horse-drawn street car or street railway soon followed, providing a smoother ride, more efficient use of horsepower, and greater capacity. In Texas, horse- or mule-drawn streetcars were first introduced in Houston in 1868, followed by Dallas in 1871. By the 1890s, horse-drawn street cars were operating in 13 Texas communities.

Electric streetcars, trolleys, and cable cars began appearing in cities throughout the world in the 1880s and 1890s. The first electric streetcars in the state were introduced in Laredo in 1889. Electric streetcar or trolley systems were operating in 19 Texas communities in the early 1900s. Motor buses began to replace streetcars in the 1920s, and by the 1950s, bus systems were operating in 25 cities in the state (19).

For the most part, the early streetcar and bus systems were privately owned and operated. The continued decline in ridership and revenue experienced by private operators after World War II resulted in most transit services changing from private to public ownership and operation during the 1960s and 1970s. Factors contributing to this change included the construction of the Interstate Freeway system, the rapid suburbanization of American cities, increases in automobile ownership, and the lack of investment in private transit companies. Although specific factors varied by community, the end result of these trends was that many private transit systems were on the verge of financial collapse or had gone out of business by the 1950s and 1960s.

In order to maintain a basic level of transit service, most communities responded first by subsidizing private operators, and ultimately purchasing the companies and creating public transit systems. On a national basis, this trend is reflected by the fact that public transit systems accounted for approximately 4 percent of all transit operators in 1940, compared to 55 percent in 1980 (20). The movement toward public ownership and operation was accelerated by the availability of federal funding for capital expenses and later for operational support. Federal legislation in 1968 created the U.S. Department of Transportation and the Urban Mass Transportation Administration within it. The same legislation provided funding for local transit systems. Federal support for public transportation services has continued in subsequent reauthorizations, including ISTEA of 1991 and TEA-21 of 1998.

During the 1960s and 1970s, many states and local areas established mechanisms for funding transit services. In some cases, these efforts reflected the need to match federal programs, while in other instances they represented local, regional, or state initiatives to ensure the ongoing operation of transit systems.

Many of the initial federal, state, and local programs focused on transit services in large urban areas and medium-sized communities. For example, the Urban Mass Transportation Act of 1964 provided federal funds for construction, reconstruction, and acquisition of transit facilities in cities. In Texas, state legislation providing for the creation of Metropolitan Transit Authorities and the dedication of a portion of the local sales tax upon voter approval was passed in the 1970s.

Transit services in most rural areas in Texas and throughout the country did not emerge until the late 1960s and 1970s. Many of these systems were implemented to respond to the mobility needs of elderly and low income residents in rural areas, as well as individuals with special needs. The Older Americans Act of 1965 and the Office of Economic Opportunity's Community Action Program were the first federal funding sources for these types of services. The 1973 Federal-Aid Highway Act included a rural transportation demonstration program, and the 1978 Surface Transportation Assistance Act established the Section 18 program, providing capital and operating assistance for transit services in non-urbanized areas. The Texas Legislature created the Public Transportation Fund in 1975 to help support transit services in smaller communities and rural areas.

The number of rural transit systems in Texas and the areas served by these operators have grown significantly over the past 25 years. By 1982, there were 10 rural systems receiving federal and state funds, and by 1986, there were 31 systems providing service in rural areas of Texas. In 1998, 41 rural transportation systems operated almost 1,000 vehicles and provided 4.3 million one-way passenger trips (21, 22, 23, 24, 25). In addition, 319 private non-profit agencies provide service to the elderly and individuals with special needs using vehicles purchased with federal and local funds. More detailed information on rural transit service is provided in this chapter after the following overview of metropolitan and small urban systems.

## **Metropolitan and Municipal Transit Systems in Texas**

The discussion of rural transit services can best be presented within the larger context of transit operations in all areas of the state. This section briefly highlights public transportation systems in the large metropolitan areas and medium-sized communities.

The seven large metropolitan areas in Texas—Austin, Corpus Christi, Dallas, El Paso, Fort Worth, Houston, and San Antonio—are served by Metropolitan Transit Authorities (MTAs). State legislation allows for the creation of MTAs by approval of citizens in the service area and the authorization of a dedicated sales tax to support the development and operation of transit services and facilities.

Legislation passed in 1973 provided for the creation of regional MTAs. This legislation was amended in 1977 to allow voters to approve up to a 1 percent sales tax to fund the MTAs. These two statutes provide broad powers to the authorities to plan, design, construct, and operate a wide range of transit services and support facilities. Voters in San Antonio and Houston were the first to approve the creation of MTAs in 1978, followed by the other metropolitan areas.

MTAs currently operate a range of transit services, including regular route bus systems, light rail transit (LRT), park-and-ride lots, transit centers, high-occupancy vehicle (HOV) lanes, specialized transportation services for individuals with special needs, and carpool and vanpool programs. Most MTAs provide funding for street improvements, and many operate motorist assistance or courtesy patrols, advanced transportation management centers, and emergency response services in cooperation with TxDOT and other agencies.

A mix of local, state, and federal funds is used to support the capital and operating expenses of MTAs. Local sources include the dedicated sales tax—which ranges from .50 percent in Fort Worth, El Paso, Corpus Christi, and San Antonio to the full 1 percent in Houston, Dallas, and Austin, fare box revenues, advertising revenues, and interest income. No state funding is provided for operating assistance, but funding from TxDOT may be used to support the costs of fixed facilities such as HOV lanes and park-and-ride lots. Federal funding for capital elements and operating support is appropriated to each MTA through the Federal Transit Administration (FTA).

Currently, there are 24 municipal transit systems in Texas. These systems are located in communities with populations of 50,000 or more. Of these, eight provide only specialized services for elderly and disabled individuals, while 15 provide services to all residents. The cities with municipal transit systems are shown in [Table 4](#).

Municipal transit systems receive funding from local, state, and federal sources. City general funds, fare box revenues, and income from advertising represent possible methods of local financing. State funding is administered by TxDOT based on a formula which considers the population and population density of each area. Federal funds come primarily from the Section 5307 program administered by FTA.

### **Existing Rural Transit Systems in Texas**

When most people think of public transportation, commuter rail, heavy rail, light rail transit (LRT), and fixed route buses in metropolitan areas usually come to mind. The types of services and vehicles operated in rural areas are much different from these images. In addition, the organizational structures, funding sources, and operating environments for rural transit services vary from those found in urban regions. This section highlights the general characteristics of rural transit services in Texas, including the types of organizations, services, vehicles, and operating environments.

**Table 4. Municipal Transit Systems in Texas.**

<b>City</b>	<b>Transit Agency</b>
Abilene	City Link
Amarillo	Amarillo Transit
Arlington*	Handitran
Beaumont	Beaumont Municipal Transit (BMT)
Brownsville	Brownsville Urban System (BUS)
Bryan/College Station	Brazos Transit (Interurban)
Denton	SPAN
Galveston	Island Transit and Island Trolley
Grand Prairie*	The Grand Connection
Laredo	El Metro
Lewisville*	Lewisville Dial-A-Ride
Longview*	City of Longview Transportation (COLT)
Lubbock	Citibus
McAllen	McAllen Express
Mesquite*	Mesquite Transportation for the Elderly & Disabled (MTED)
Northeast Tarrant County *	Northeast Transportation Services (NETS)
Port Arthur	Port Arthur Transit (PAT)
San Angelo	San Angelo Street Railway Company
Sherman-Denison*	TAPS
Temple*	Temple Transit
Texas City/LaMarque	The Gulf Coast Center Connect Transportation
Tyler	Tyler Transit
Waco	Waco Transit System
Wichita Falls	Wichita Falls Transit

\*Elderly and Disabled or Special Events Services Only

(23)

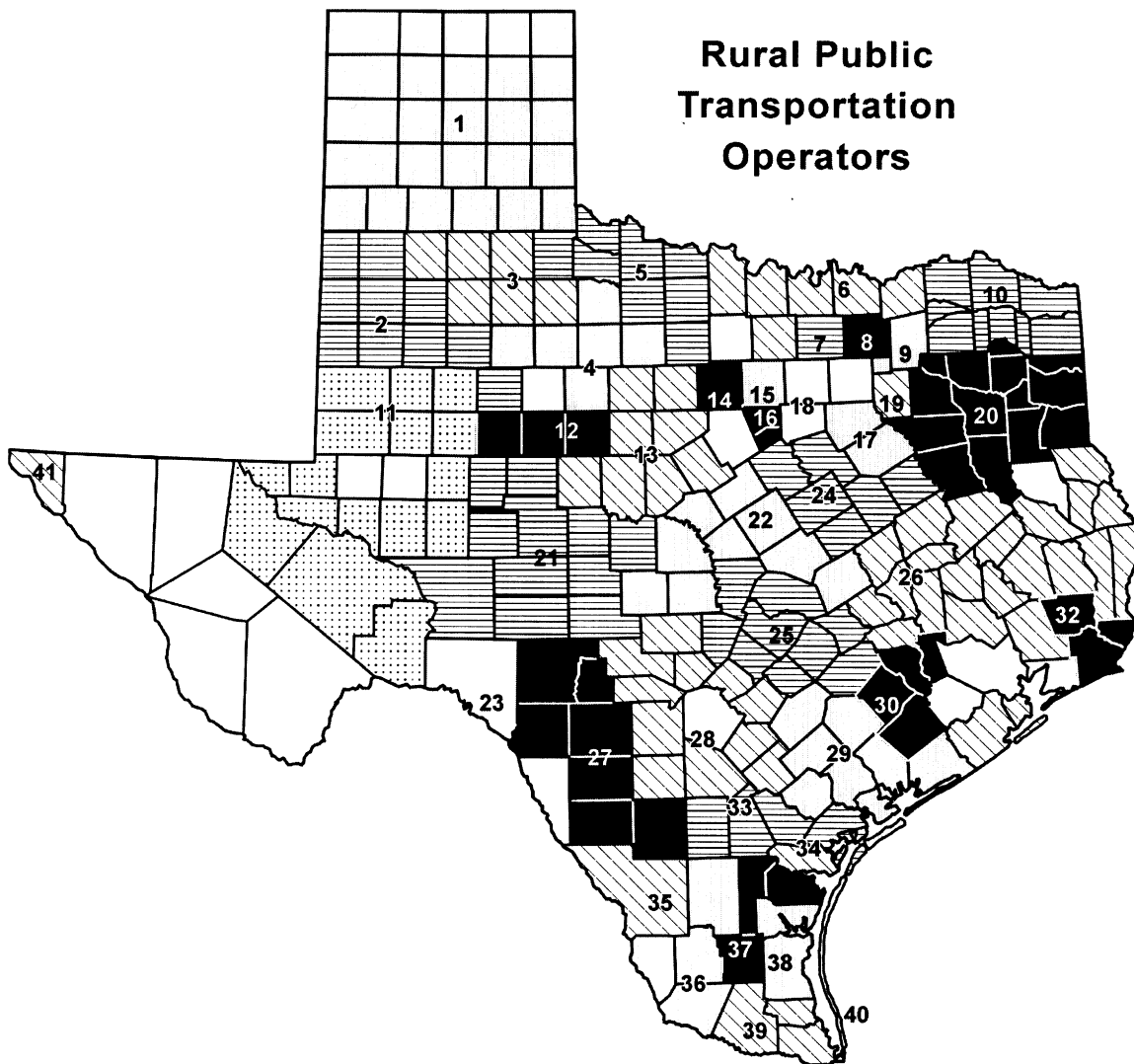
Texas has the largest rural service area of any state in the country. Currently, 41 transit systems provide services to rural areas and cities with populations under 50,000. The systems and service areas are illustrated in [Figure 8](#) and identified in [Table 5](#). Based on state legislation passed in 1995, rural transportation providers receiving funds from TxDOT were established as rural transit districts. The legislation further provides guidance for creating new districts and requires that no non-urbanized portion of a county be excluded from a rural transit district.

Rural transit districts and services are provided using a variety of organizational structures. Currently, rural transit systems in Texas are operated by towns, cities, counties, Councils of Government, Community Action Associations, and private and public nonprofit organizations. The agencies and service areas range from the Town of South Padre Island to 26 counties served by Panhandle Community Services, Inc. The various approaches, which are described next, build on the institutional strengths in each area.

**City, Town, or County.** Five rural transit systems are operated by a local unit of government. These include the Cities of Cleburne and Del Rio, the Town of South Padre Island, and the Counties of El Paso and Kleberg. In these cases, the transit system is a separate department or part of a multipurpose department. The city, town, or county governmental units and policy boards make the decisions related to services and funding levels.

**Community Action Agency.** Community Action Agencies are public, nonprofit organizations providing a range of services and programs focused primarily on economically disadvantaged groups, elderly individuals, and people with special needs. Programs frequently offered by these agencies include elderly nutrition and supportive services, outreach and home visitations, energy conservation and home repairs, emergency food distribution, adult protective services, services to the homeless and homeless prevention programs, and educational, medical, and nutritional services to children in low income households. Transit represents an important service provided by some Community Action Agencies. Currently, 15 Community Action Agencies operate rural public transit services in the state.

**Councils of Government and Regional Planning Commissions.** These are multi-county organizations with specific responsibilities based on federal and state legislation for conducting and coordinating transportation planning and carrying out other programs. Councils of Government and Regional Planning Commissions are often the federally designated Area Agency on Aging. Other programs and responsibilities may focus on senior employment, criminal justice, emergency communication, community and economic development, solid waste management, and tourism. Seven Councils of Government or Regional Planning Commissions in the state are also rural transit districts.



**Figure 8. Rural Public Transit Operators in Texas.**

(24)

**Table 5. Rural Public Transit Systems in Texas.**

<b>Map Number*</b>	<b>Agency (System Name)</b>
1	Panhandle Community Services, Inc. (Panhandle Transit)
2	South Plains Community Action Association, Inc. (SPARTAN)
3	Caprock Community Action Association, Inc. (CAP-TRANS)
4	Aspermont Small Business Development Center, Inc. (Double Mountain Coach)
5	Rolling Plains Management Corporation (Sharplines Public Transportation)
6	Texoma Area Paratransit System, Inc. (TAPS)
7	Services Program for Aging Needs in Denton County (SPAN)
8	Collin County Committee on Aging (CCART)
9	Hunt County Committee on Aging (The Connection)
10	Ark-Tex Council of Governments (TRAX)
11	West Texas Opportunities, Inc.
12	People for Progress (Stage Transit)
13	Central Texas Opportunities, Inc. (City and Rural Rides - CARR)
14	Palo Pinto County Transportation Council (Palo Pinto County Transit)
15	Parker County Transportation, Inc.
16	The Transit System, Inc.
17	Community Transit Services, Inc. (Corsicana)
18	City of Cleburne (CLETRAN)
19	Kaufman County Senior Citizens Services, Inc. (KART)
20	East Texas Council of Governments (TRAX)
21	Concho Valley Council of Governments (Thunderbird Transit)
22	Hill Country Community Action Association, Inc. (Hill County Transit)
23	City of Del Rio (Southwest Transit)

**Table 5. Rural Public Transit Systems - Continued.**

<b>Map Number*</b>	<b>Agency (System Name)</b>
24	Heart of Texas Council of Governments
25	Capital Area Rural Transportation System (CARTS)
26	Brazos Valley Community Action Agency (Brazos Transit System)
27	Community Council of Southwest Texas, Inc. (Southwest Transit)
28	Alamo Area Council of Governments (Alamo Coordinated Transit - ACT)
29	Golden Crescent Regional Planning Commission (R Transit)
30	Colorado Valley Transit, Inc.
31	Gulf Coast Center (Connect Transportation)
32	Southeast Texas Regional Planning Commission (South East Texas Transit)
33	Bee Community Action Agency
34	San Patricio County Community Action Agency (SPARTS)
35	Laredo-Webb County Community Action Agency (El Aquila Rural Transportation)
36	Community Action Council of South Texas (Rainbow Lines)
37	Rural Economic Assistance League, Inc. (REAL)
38	Kleberg County Human Services (Paisano Express)
39	Lower Rio Grande Valley Development Council (Rio Transit)
40	Town of South Padre Island (The Wave)
41	County of El Paso

**\*Number corresponds to number on Figure 8**  
(24)



**Private and Public Nonprofit Organizations.** Private and public nonprofit organizations may be formed to address a wide variety of issues and needs. Fourteen nonprofit agencies currently provide rural transit services in the state. Some of these, such as Colorado Valley Transit, Inc., were formed solely to operate public transportation services. Others, like the Collin County Committee on Aging, were established to meet the needs of specific groups, with transportation being just one of the many services offered.

## **Characteristics of Rural Transit Services in Texas**

The types of transit services operated in rural areas differ from those commonly found in metropolitan regions. Rural transit tends to be oriented toward demand-response services, with some regularly scheduled trips, rather than the fixed-route services common in urban areas. The services offered reflect the lower population densities, dispersed origins and destinations, and lower demand levels in rural areas. Four general operating strategies are frequently found with rural services in the state—demand-responsive, standing orders or semi-fixed routes, fixed routes, and commuter routes—and are highlighted next.

**Demand-Responsive.** This is the most common type of service provided by rural transit districts. Rather than buses operating on fixed routes and fixed schedules, demand responsive service is provided only in response to specific requests. Individuals call the transit agency, usually 24 hours in advance, and request service for a trip. The individual indicates the trip origin and the destination and the desired pick-up times at both locations. The agency then matches the trip request with available vehicles and either fills the request or works with the individual to accommodate the trip within available resources.

**Standing Orders or Semi-Fixed Routes.** Some agencies allow passengers to make regular trips without calling in each day. Commonly called standing orders, these trips are usually made on a daily or regular basis for school or work. These become regularly scheduled trips, with vehicles operating on the same route and the same schedule. Other trips may be added as appropriate. In other cases, regularly scheduled trips following the same general route may be operated on a daily basis or once or twice a week.

**Fixed Routes.** Some rural transit systems operate service on fixed routes and set schedules. Fixed routes, often with high levels of service, are common in urban areas. This approach is used less in rural areas due to lower population densities and dispersed population. Fixed-route service is provided in some areas, however, although the frequency of service may be only one or two trips a day.

**Commuter Routes.** A few rural systems located adjacent to larger metropolitan areas operate regular service into and out of the central business district (CBD) or other major activity center. For example, the Capital Area Rural Transportation System (CARTS) operates service to and from Austin in cooperation with the Capital Metropolitan Transit Authority; Brazos Transit System operates service from the Woodlands in Montgomery

County into Houston in Harris County, and Parker County Transportation operates services to Lockheed and work sites in Fort Worth.

Other services may be provided by rural transit systems in addition to these four general operating scenarios. These may include group trips, shuttle services, and responding to special requests. As an example, Parker County Transportation provides shuttle service on request to the Dallas/Fort Worth and Love Field airports, and can accommodate group trips.

Further, some rural transit agencies have implemented or are in the process of initiating access to jobs or welfare-to-work programs with grants from the Texas Workforce Commission or other groups. Examples of these efforts include the Alamo Area Council of Governments' *Voyage to Vocations*, the Ark-Tex Council of Governments' *Choices Program*, and the South Plains Community Action Association, Inc.'s (SPARTAN) *Job Routes*. These programs provide transportation and other services to individuals looking for jobs or to the newly employed. A more detailed examination of these programs and activities is being conducted by TTI in a Southwest Region University Transportation Center (SWUTC) funded project.

The vehicles operated by rural transit providers also differ from those used by their urban and metropolitan counterparts. Rather than regular 40-foot buses, articulated buses, and various rail vehicles commonly found in major cities, rural transit services are provided using vans and minibuses. [Figure 9](#) illustrates buses operated by Brazos Transit District. These vehicles are better matched to the lower passenger volumes and the operating environments found in rural areas.

Many Texas rural transit systems operate in remote and isolated environments. The condition of local roadways and the long distances between areas place extra demands on both vehicles and operating personnel. Maintaining vans, minibuses, and buses is more difficult under these conditions, and vehicles often need to be replaced more frequently than those in urban areas.

For example, a van used by a rural operator may easily travel 60,000 miles or more a year. Operating on dirt roads or roadways in poor condition places additional demands on these vehicles. A 1994 study by FTA indicated that half the rural transit fleet in the country was past its realistic life-expectancy, based on a four-year or 100,000 mile life for light-duty vehicles carrying less than 26 passengers, five years or 150,000 miles for medium-sized light-duty buses, seven years or 200,000 miles for medium-sized medium-duty buses, and 12 years or 500,000 miles for large heavy-duty buses [\(26\)](#).

The fare structures and fare levels vary greatly among the 41 rural operators in the state. Some charge a flat fare, while others use a distance-based fare. For example, Brazos Transit charges a flat fare of \$0.25 to \$0.50 for fixed-route service and \$1.00 for demand-responsive service. On the other hand, fares on City and Rural Rides (CARR) operated by Central Texas Opportunities, Inc., are based on the distance traveled, starting at \$1.00 and increasing by \$1.00 for every five miles traveled.



**Figure 9. Brazos Transit District Buses.**

### **Section 5310 Program**

In addition to these rural transit operators, federal funding is available through the FTA Section 5310 Program for 80 percent of the capital costs of vehicles, radios, and computer equipment used by private non-profit organizations and some public transportation agencies providing services to the elderly and to individuals with special needs. Purchase of service and preventative maintenance recently became eligible expenses under this program. Previously called the Section 16(b)(2) Program, this category has been in existence since 1970. Funding is not available for operating expenses, however, and in Texas no additional state funds are provided. The 20 percent local match, as well as the ongoing operating expenses, must come from local sources. TxDOT is responsible for administering this program.

As of 1998, 319 private non-profit organizations and transit agencies in Texas were operating 1,335 vehicles purchased through the Section 5310 Program. A wide range of agencies and organizations have received vehicles through this program. These organizations include social service agencies, community organizations, elderly care facilities, and other groups. These groups provide the elderly and individuals with special needs with access to day activity centers, schools, jobs, medical facilities, recreation opportunities, and personal business needs (25).

Of the 319 organizations operating Section 5310 vehicles in 1998, 44 percent had one vehicle; 38 percent operated two to five vehicles; 10 percent had six to 10 vehicles, and 6 percent owned 10 or more vehicles. The number of vehicles purchased on an annual basis through this program has declined slightly over the past few years. In 1997, 104 vehicles were purchased,

compared to 83 in 1998 and 71 in 1999. Although federal funding has increased over this time period, the policy that all vehicles now be wheelchair accessible, except in unique situations, has resulted in higher costs per vehicle and thus fewer vehicles purchased per year.

The Section 5310 Program has been successful at meeting the needs of a wide range of groups and organizations. [Figure 10](#) illustrates the counties that are headquarters to organizations with at least one Section 5310 funded vehicle. As can be seen, this program supports transportation needs in large urban regions, smaller communities, and rural areas. Currently, there are 57 counties without a Section 5310 vehicle. Most of these are rural counties. Approximately half are in the Panhandle and West Texas regions, although counties without any Section 5310 vehicles are found throughout the state.

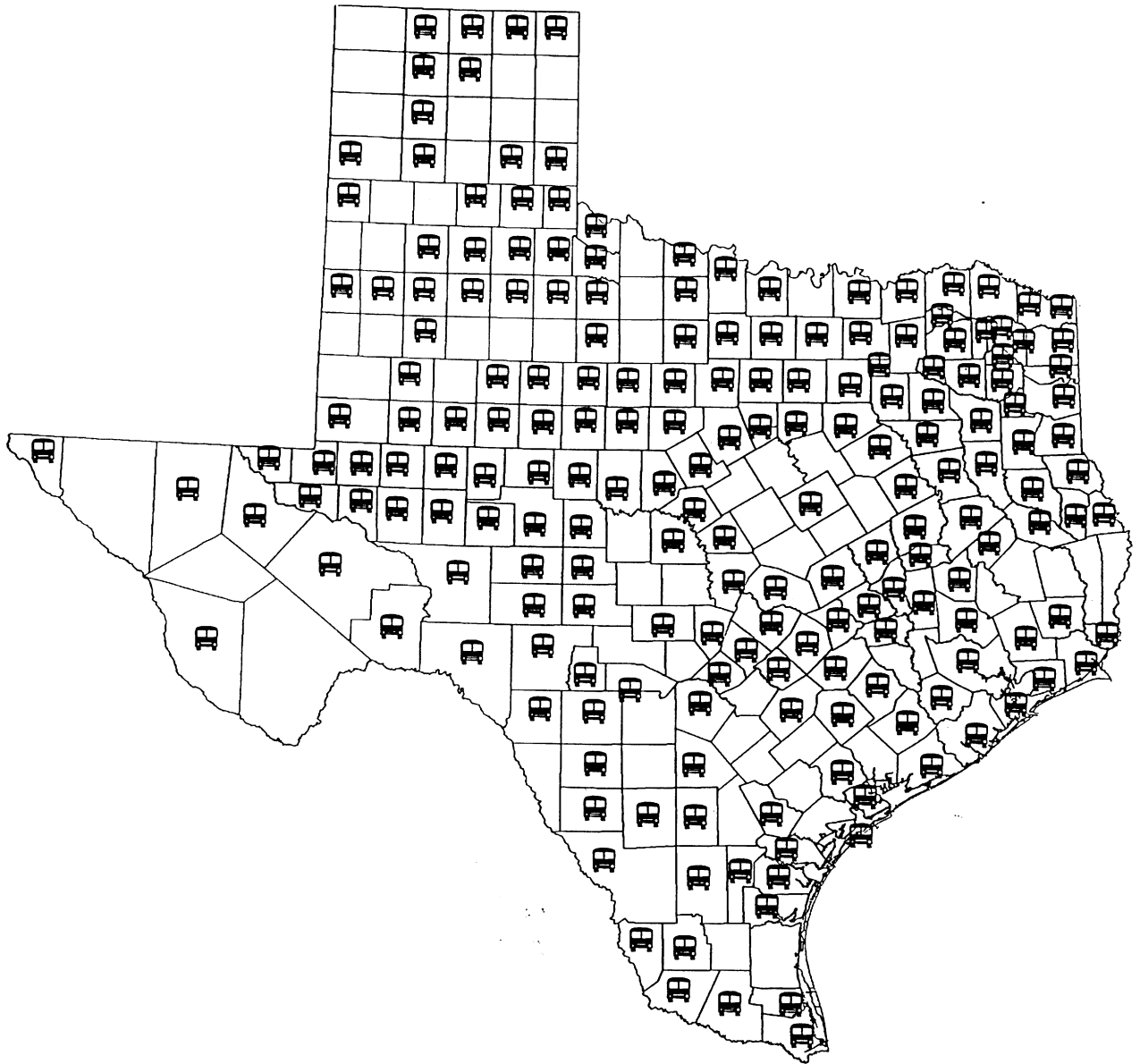
### **Funding Rural Transit Services in Texas**

Funding for the capital and operating needs of rural transit services in Texas comes from a mix of federal, state, and local sources. These sources include federal funds authorized through TEA-21 and obligated on an annual basis, state funds, and local sources. Funding mechanisms for different types of rural transit capital and operating expenses are highlighted next. TxDOT acts as the administrator for federal funds and state funds.

**FTA - Section 5311.** The Section 5311 Program, formerly the Section 18 Program, provides federal funding for rural public transportation systems in areas with populations of less than 50,000. The level of federal funding is based on the rural population of the state. Texas, which has the largest rural population of any state in the country, has traditionally received the highest funding level of any state. TxDOT administers the Section 5311 Program and acts as the primary applicant. The Section 5311 Program also includes the Rural Transit Assistance Program (RTAP) and the Intercity Bus Set-Aside Program. TxDOT is responsible for administering both these elements of the Section 5311 Program.

**FTA - Section 5310.** The Section 5310 Program provides federal funding for wheelchair lift accessible vehicles, other equipment, purchase of service, and preventative maintenance for non-profit organizations and some public agencies operating transportation services for the elderly and individuals with special needs. Federal funding is available for 80 percent of the capital costs, with the remaining 20 percent coming from local sources. No federal funding is provided for operating expenses. TxDOT administers the Section 5310 Program. Project selection responsibilities are focused at the district level, with the Public Transportation Division coordinating the overall program.

**State Funding.** State funding was established in 1975 to provide financial assistance to local governments and non-profit groups for the local match required for federal funding programs. The legislature allocates state funds each biennium, with TxDOT acting as the



**Figure 10. Counties with Section 5310 Vehicles.**

(24)

grant administrator. State funds may be used for capital and planning activities at a 13 percent state, 7 percent local, and 80 percent federal ratio; rideshare vans at 80 percent state and 20 percent local ratio; and non-federally financed capital projects at a 50 percent local and 50 percent state ratio. In 1995, the legislature removed the matching requirement, except for McAllen and a few cities in the Dallas-Fort Worth Metroplex.

**Oil Overcharge Program.** Funding from the Oil Overcharge Program has been used to finance transit systems in Texas and to support elements such as park-and-ride lots and marketing. Initially, funding from this program ended after FY 1995, but some unspent resources have been allocated for the bienniums starting in FY 1998 and 2000. This program is administered by TxDOT on behalf of the state.

Historically, public funding has not been available for intercity bus service. ISTEA of 1991 provided the opportunity to use Section 18 (now Section 5311) funds to support intercity bus service. The Act required that not less than 5 percent of a state's Section 18 allocation be spent on intercity bus service in 1992, not less than 10 percent in 1993, and not less than 15 percent in 1994 and after, unless certified by the governor that intercity service in the state is adequate. These provisions are continued in TEA-21.

In response to this program, TxDOT accepts two types of intercity bus proposals. The first category is for construction, rehabilitation, or purchase of multimodal terminals. The second type is for modifying intercity over-the-road coaches and facilities to serve individuals with special needs. Approximately \$1.5 million was allocated to fund eight projects in FY 1999.

The Rural Transportation Accessibility Incentive Program in TEA-21 provides funding of at least 15 percent of each state's appropriation to assist public and private operators in meeting the accessibility requirements for over-the-road buses. The incremental capital and training costs of complying with these regulations can be funded through this program. Intercity fixed-route over-the-road bus service and other over-the-road service such as local fixed-route, commuter, charter, and tour service are eligible (15). This program is administered directly by FTA.

### **Economic Impacts of Rural Transit Services and Case Studies**

Examples of the economic impacts of rural transit systems in the state are highlighted in this section. The direct, indirect, induced, and community benefits from rural transit services are highlighted, and case study examples are provided. In 1997, rural transit operators in the state employed approximately 1,220 workers. As shown in Table 6, this number included 770 full-time employees and 450 part-time workers (24). In addition, some 155 volunteers provided ongoing assistance to rural transit systems.

**Table 6. 1997 Rural Transit Employment Levels.**

<b>Job Category</b>	<b>Full-Time Employees</b>	<b>Part-Time Employees</b>	<b>Volunteers</b>
Administration	113	127	5
Operations	604	308	150
Maintenance	31	14	-
Other	22	1	-
<b>Total</b>	<b>770</b>	<b>450</b>	<b>155</b>

(25)

More importantly, rural transit services in the state provide individuals with access to jobs, education, medical needs, shopping, recreation, and other activities. In providing these services, transit operators help maintain the economic health and vitality of small communities and rural areas. Some rural transit agencies have initiated new programs to help individuals obtain and/or retain jobs with funding from the Texas Workforce Commission's Local Innovations/Job Retention and Reemployment Grants. Although it is difficult to place specific dollar values on many of these elements, the following case studies highlight a few impacts of rural transit systems in the state (23, 24, 25, 26, 27, 28, 29, 30, 31).

**Alamo Area Council of Governments.** The Alamo Area Council of Governments (AACOG) operates Alamo Coordinated Transit (ACT) in the 11 counties surrounding San Antonio. The 1996 population of the 10,145 square mile service area, excluding San Antonio and Bexar County, was approximately 371,545. VIA Metropolitan Transit Agency provides service to San Antonio and Bexar County.

Service levels and passenger volumes have increased since 1979 when the system was implemented. In 1990, ACT operated some 184,533 annual miles and carried 122,252 one-way passengers trips, averaging \$4.43 per passenger trip and \$1.14 per vehicle mile. In 1998, 652,296 annual miles were operated, and 119,458 one-way passengers trips were made. The 1998 cost per vehicle mile was \$1.65, and cost per passenger was \$9.01. ACT operates fixed-route and demand-responsive service weekdays from 8:00 a.m. to 5:00 p.m. Weekend paratransit service during the same hours may be scheduled as needed. Fares range from \$1.50 to \$4.00, depending on the type of service and passenger characteristics. Service is provided with 36 vehicles. Major trip destinations include medical facilities, employment locations, retail centers, schools, senior citizen facilities, and recreational areas.

AACOG recently initiated *Voyage to Vocations* with a Local Innovations/Job Retention and Reemployment grant from the Texas Workforce Commission. The program is managed by the Alamo Area Development Corporation, which is part of AACOG. *Voyage to Vocations*

provides alternatives and new opportunities for welfare recipients through a coordinated effort involving AACOG, local communities, employers, and Workforce Centers. Examples of the types of service offered include child care, GED training, life skills classes, job coaching, job training, and placement assistance.

AACOG transit service is an important element of the *Voyage to Vocations* program. The transit system provides travel options for program participants, and service can be tailored to the needs of specific training sites or employers, including connecting to VIA fixed-route buses.

**Capital Area Rural Transportation System (CARTS).** Started as a federal demonstration project in 1978, CARTS was one of the first rural transit operators in the state. Initially, CARTS served the seven counties of Bastrop, Burnet, Caldwell, Fayette, Hays, Lee, and the non-urbanized portion of Travis County. Blanco and Williamson counties were later added to the service area, which now comprises approximately 7,534 square miles. The population of the nine counties, excluding the City of Austin, is slightly over 1 million.

CARTS is one of the largest rural transit systems in the state, operating some 74 vehicles and providing fixed routes, demand-responsive service, commuter routes, and feeder services to Capital Metro. An interlocal agreement with Capital Metro was implemented in the 1980s providing connections between the two systems. Service is also coordinated with intercity bus operators in three communities. Fares range from \$.25 to \$9.00 based on the type of service and passenger characteristics.

Ridership on CARTS has grown from some 22,140 during the first year of operation in 1978 to approximately 350,000 in 1998. Some 1.6 million vehicle miles were operated in 1998, with a cost per vehicle mile of \$1.73 and a cost per passenger trip of \$8.69.

Ridership surveys conducted in 1978 indicated that senior centers and nutrition sites were major trip destinations, followed by shopping, social/recreation, and medical sites. Work and school trips have increased over the years. The services operated by CARTS provides rural residents with access to jobs, schools, medical facilities, and personal business needs.

**Central Texas Opportunities - City and Rural Rides (CARR).** CARR serves the eight-county region to the southeast of Abilene. The service area is approximately 7,840 square miles, and the population in 1997 was close to 119,407. CARR operates 18 vehicles and provides fixed-route and demand responsive service weekdays between 7:30 a.m. and 5:30 p.m. Fares start at \$1.00 and increase by \$1.00 for every five miles traveled. Ridership has grown from some 6,000 passengers in 1993 to 36,000 in 1998.

CARR serves primarily elderly residents of the area who have either stopped driving or never acquired a driver's license. Medical care accounts for many of these trips, with people from the rural areas of the county traveling to doctors and medical facilities in the major



communities. Numerous trips are also made for shopping and personal business, and work travel is becoming more significant. Commuters using the transit service include nursing home workers, teenagers working summer jobs, and Mental Health Mental Retardation (MHMR) participants who ride to jobs, workshops, and training.

**Lower Rio Grande Valley Development Council (Rio Transit).** The Lower Rio Grande Valley Development Council (LRGVDC) provides fixed-route and demand-responsive transit services in Hidalgo, Willacy, and Cameron Counties. Approximately 874,700 people reside in the three counties, which comprise some 3,000 square miles. The fixed route service is operated by Valley Transit Company, and the demand responsive service is contracted to Valley Adventures, Inc. The Council also contracts with Amigos del Valle, a social service agency for transportation of elderly individuals.

Fixed-route service operates weekdays and holidays between 8:00 a.m. and 5:00 p.m., and demand-responsive service is provided weekdays and holidays from 7:00 a.m. to 6:00 p.m. Fares range from \$.50 to \$1.00 for fixed-route service, while fares for demand-responsive service are based on distance traveled. In 1998, LRGVDC operated 17 vehicles and carried some 55,226 annual riders.

The transportation program is aimed at supporting economic growth in the region by providing transportation to workers as well as to shoppers and students. Additionally, LRGVDC provides medical transportation, especially to people who need to make frequent and regular trips to doctors or treatment facilities. Youth programs and other social events are also served by the transit system. The Council maintains partnerships with Tropical Texas Centers, the Texas Rehabilitation Commission, the Texas Migrant Council, the Valley Association for Independent Living (VAIL), Lockheed Martin, and Case Management Rehabilitation Services.

**Webb County Community Action Agency (El Aguila Rural Transportation).** El Aguila Rural Transportation operates fixed-route and demand-responsive transit services in Webb County and the town of Encinal in LaSalle County. Approximately 180,000 residents live in the service area, which encompasses some 3,360 square miles. Webb County has one of the lowest per capita income levels of all counties in the state, ranking 245<sup>th</sup> of the 254 counties. Service is provided with 19 vehicles. Both fixed-route and demand-responsive services are oriented toward work, school, medical, and personal business trips. Service is also coordinated with El Metro Urban Transit in Laredo.

Ridership has grown steadily over the past few years from approximately 131,000 annual passengers in 1993 to 173,800 in 1998. The average cost per trip was \$3.36 in 1993 and \$3.71 in 1998.

Providing low income residents with transportation to jobs is one of the major economic benefits realized from the Webb CAA service. Estimates indicate that at least 150 individuals are able to access jobs due to the service, contributing some \$1.7 million in wages to the local economy. In addition, the service operated by the Webb CAA provides a critical link to basic life needs, such as grocery shopping, medical appointments, and personal business for low income residents.

**West Texas Opportunities, Inc.** West Texas Opportunities, Inc. (WTOI), a community service agency, has been operating rural public transit since the mid-1980s. WTOI serves 17 counties in the Permian Basin region. Ector and Midland Counties are not included in the operating area, but service is provided into and out of Midland and Odessa. WTOI provides a wide range of community services in addition to transportation.

The 17 counties comprise approximately 21,600 square miles and had a 1997 population of some 148,300. Demand-responsive service is operated from 8:00 a.m. to 5:00 p.m. on weekdays using 39 vehicles. Annual ridership has grown from approximately 125,400 passenger trips in 1993 to 158,000 in 1998.

WTOI uses two fare structures. Eligible fares range from \$0.50 to \$7.50 depending on the distance traveled, and ineligible fares range from \$2.50 to \$50.00. Eligible fares are paid by riders who meet 100 percent of current poverty guidelines and are not subsidized by any other program. Ineligible fares are charged to riders with incomes above 100 percent of the poverty levels or those whose fare is paid by a program, such as Medicaid.

Medical and dental appointments represent the major trip purpose of WTOI riders. Other common destinations include Head-Start schools, day-care facilities, senior centers, and shopping areas. WTOI provides transportation for nine Head-Start schools and for deliveries of Meals-on-Wheels. Although work trips are not currently a major portion of WTOI's ridership, the agency is working with various access-to-jobs programs in the area.

## **Intercity Bus Service in Texas**

Intercity bus service in Texas was introduced in the early 1900s. By the 1920s, intercity bus lines crisscrossed the state. Many operators went bankrupt or reduced service during the Depression, but the industry rebounded strongly during the 1940s due to the location of numerous military bases in the state and the rationing of gasoline and rubber tires for personal automobiles during World War II.

Following national trends, intercity bus service in Texas has declined significantly over the past 40 years. The number of locations served by intercity buses in the state declined from 1,106 in 1970 to 596 in 1992 (32). Two factors appear to have contributed to this decline. The first was the federal Bus Regulatory Reform Act of 1982, which relaxed requirements for both entering and existing markets. The second was the restructuring of service by Greyhound Lines in the early 1990s, which resulted in the elimination of routes in many parts of the state.

Historically, the Texas Railroad Commission has been responsible for regulating intercity bus service in the state. The Commission's involvement declined since the passage of the Bus Regulatory Reform Act in 1982, however, and some responsibilities for intercity bus services were transferred to TxDOT in the 1990s.

A more detailed assessment of the status of the intercity bus industry in the state, areas without service, connections with rural transit providers and other public transportation services, and future needs was conducted by TTI in 1992 and 1993 (32). Additional information on the current intercity bus lines and companies operating in the state was obtained from representatives with the Texas Bus Association (TBA) and the 1999 *Russell's Official National Motor Coach Guide* (33). The findings from the early study and the updated information are presented in this section, as well as the next section on future needs.

Figure 11 illustrates the intercity bus routes operating in Texas. It is difficult to obtain exact information on all the intercity bus operators in the state. Intercity bus companies are required to register equipment and to file evidence of insurance with TxDOT, but they are not required to indicate the exact type of service—charter or fixed-route—or to file route maps or other service information. As a result, it is difficult to know the exact number of intercity companies operating in the state and the routes or service they provide.

As of 1999, 11 intercity bus companies are listed by the Texas Bus Association and *Russell's Guide* as operating in the state. TBA is comprised of representatives from motor bus carriers providing scheduled intrastate and interstate passenger service. TBA was formed partially in response to provisions of ISTEA, which provided funding for assisting interstate over-the-road coaches to meet the federal accessibility requirements. TBA's main goals are to promote public awareness of intercity bus services, to increase the use of these services, and to support the ongoing safe, reliable, and comfortable operation of motor coach transportation at a reasonable cost. The association meets on a regular basis and interacts with TxDOT staff and other groups. The 11 bus companies and their home offices are:

- All Aboard America (Odessa)
- Arrow Trailways of Texas (Killeen)
- Central Texas Trailways (Waco)
- Concho Coaches, Inc. (San Angelo)
- Greyhound Lines, Inc. (Dallas)
- Jefferson Lines, Inc. (National)

- Kerrville Bus Company, Inc. (San Antonio)
- Panhandle Trailways (Amarillo)
- Sun Set Stages, Inc. (Abilene)
- Texas, New Mexico & Oklahoma (T.M.N. & O.) Coaches, Inc. (Lubbock)
- Valley Transit, Inc. (Harlingen)

Three general categories can be used to characterize these companies and the services offered. The first category is national companies that operate extensive service throughout Texas and the U.S. Greyhound Lines, Inc., and Jefferson Lines, Inc., fall within this category. The second grouping is regional operators which provide service from smaller to larger markets. Country carriers, which provide service between smaller communities or within rural areas represent the last classification. This last group is especially important to the mobility of rural residents in Texas.

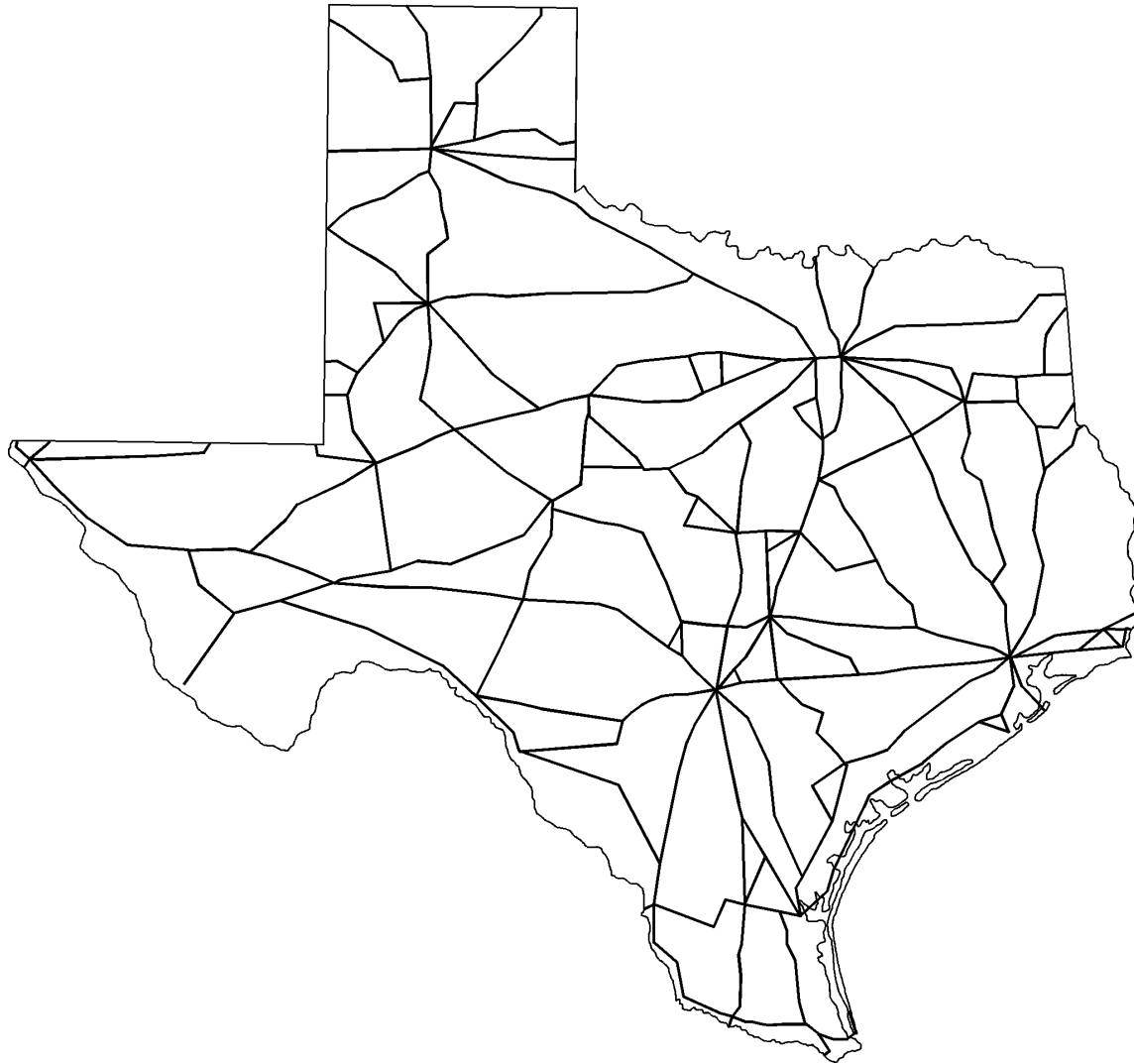
Some intercity bus lines also operate rural transit service under contract to local agencies. Valley Transit, Inc., provides one example of this approach. Valley Transit, Inc., operates fixed route transit service in Hidalgo, Willacy, and Cameron Counties under contract to the Lower Rio Grande Valley Development Council.

In addition to these 11 intercity bus companies, a number of Mexico-based carriers operate in Texas. The exact number of Mexican companies currently providing service in the state is not known, although six carriers were operating in Texas in the late 1980s (30).

The current intercity bus network covers much of the state although, as discussed later in this chapter, there were 23 communities with populations over 5,000 that did not have intercity bus service in 1993. In 1999, scheduled intercity buses served approximately 424 locations in the state. The vast majority of these stops are in small communities and rural areas. Only about 60, or 14 percent, are in urban areas, with the remaining 364, or 86 percent, in small communities and rural areas (32,33).

Bus stations or other types of facilities are found primarily in large and mid-sized counties. Nine bus companies own and operate bus terminals or stations in the state. Most of the bus stops in small communities and rural parts of the state are located at existing businesses, such as gas stations/convenience stores, restaurants, and motels. The condition and management of these facilities vary considerably. The challenge to motor bus companies is to find a business willing to serve as an agent for a relatively small commission.

A survey of intercity bus riders was conducted in 1992. A total of 2,213 surveys, which were printed in both English and Spanish, was distributed on intercity buses throughout the state; 1,253 surveys, or 57 percent, were returned. The following points highlight the characteristics of intercity bus riders in Texas as obtained from the surveys (32).



**Figure 11. Intercity Bus Routes in Texas.**

(31)

## **Demographic and Socio-Economic Characteristics**

- Fifty-eight percent had graduated from high school, while 29 percent had less than a high school education, and 13 percent had a college degree or beyond.
- Students comprised the largest group, with 21 percent of respondents, followed by homemakers (16 percent), technicians/laborers (16 percent), unemployed (13 percent), and retired (13 percent).
- Thirty percent reported household incomes of under \$10,000; 42 percent had incomes between \$10,000 and \$20,000; 15 percent were between \$20,001 and \$30,000, and 13 percent were over \$30,000. These percentages are much different than the population as a whole, indicating intercity bus riders are more likely to be from lower income groups.
- Fifty-three percent did own a car, compared to 47 percent who did not. Sixty-seven percent responded that they had a valid driver's license.
- Fifty-nine percent of the respondents were residents of Texas, while 41 percent were from other states and other countries.
- Most respondents lived in large urban areas, with 11 percent from areas with fewer than 5,000 people and 27 percent from cities with 5,000 to 50,000 inhabitants. The remaining 62 percent lived in areas with over 50,000 people.

## **Travel Characteristics**

- Most passengers began and ended their trips in the same region of the state. The exception to this trend was riders from outside of Texas. Most of these individuals had destinations in South Texas and East Texas.
- Most travelers were dropped off (62 percent) at bus stops and picked up (64 percent) at their destinations. Other access modes—city bus, walk, taxi, drove self—accounted for between 11 and 4 percent.

## **Trip Purpose**

- The primary reported trip purpose was visiting friends or relatives (57 percent), followed by vacation (11 percent), other (11 percent), business trip (10 percent), commute to work (5 percent), medical (4 percent), and school (2 percent).

### **Alternative Mode and Reason for Use**

- If the intercity bus had not been available, 29 percent of the respondents indicated they would have had someone drive them; 29 percent would have flown; 15 percent would have driven themselves; 13 percent would not have made the trip; 8 percent would have taken the train, and 6 percent would have used another mode or made other arrangements.
- Half the respondents identified the low fare as the primary factor influencing their decisions to use the bus. Other major reasons cited included fear of flying, others paid for ticket, only form of transportation available, and wanted to see countryside.

### **Annual Use of Intercity Buses**

- The average number of intercity bus trips the previous year by all respondents was 8.3. However, when the 13 very frequent riders were excluded, the average fell to 5.1 trips.

### **Satisfaction with Service**

- Most respondents were satisfied with the service. Thirty-four percent of the respondents reported finding the service “very satisfactory;” 53 percent found it “satisfactory;” 9 percent found it “not satisfactory;” and 4 percent had no opinion.

### **Assessment of Rural Transit Services and Future Needs**

A number of measures can be used to assess public transportation, including rural services. The four general categories of service efficiency, service effectiveness, cost effectiveness, and service areas and market served are examined in this section. A 1990 TTI study examined rural transit performance measures in more detail (34). In addition, this section reviews areas in the state without transit services and explores future needs.

As highlighted in Table 7, the number of rural transit operators, service levels, and passengers have grown significantly since the 1970s. In 1982, 10 agencies operating 86 vehicles were providing services to rural residents in 32 counties in the state. In 1998, 985 vehicles operated by 41 agencies were providing service in all but 13 counties. Annual vehicles miles of service increased from approximately 1.3 million to 20.9 million, and annual one-way passenger trips grew from 378,600 to 4.3 million over this same period (21, 23, 24, 25, 31).

The cost per vehicle mile is often used as an indication of service efficiency. Costs include all administrative and operating expenses excluding capital costs. The 1998 cost per vehicle mile among rural operators in the state ranged from \$0.67 to \$4.73. The 1998 average cost per mile for all systems was \$1.42, a slight decrease from the \$1.44 average in 1997. The cost effectiveness of

transit services is usually measured by the cost per passenger. In 1998, the cost per passenger trip among rural transit systems ranged from \$2.06 to \$24.00. The average was \$6.80. Passengers per vehicle mile in 1998 ranged from 0.05 to 1.08, with a system average of 0.21 (25).

These measures are influenced by a number of factors, including miles of service operated, frequency of service, administrative and operating costs, system size, fares, and service area size. No specific trends emerge related to these factors, however, in examining these measures for the various operators in the state.

The majority of rural transit passengers are elderly (over 65 years of age) or have special needs. Thus, rural transit operators provide critical service to individuals without other means of transportation or with very limited options. In addition, rural transit provides service to younger individuals who are not yet able to drive as well as “choice riders” who do have access to an automobile but elect to use public transit.

Passenger surveys conducted at a few rural systems in the 1980s indicated that trips to senior centers, nutritional sites, medical appointments, and shopping comprised the majority of travel needs (21). Although these trip purposes continue to predominate today, telephone interviews with representatives from selected systems also indicate that work and school trips are growing in importance.

The current combination of metropolitan, small city, and rural operators provide service to all but 13 counties in the state. When the Section 5310 Program vehicles are added, only four counties lack some type of service. Figure 12 highlights the 13 counties without metropolitan, small city, or rural public transportation, and Figure 13 illustrates the four counties without some combination of rural service and agencies with Section 5310 vehicles. As can be seen from these figures, the existing network covers the vast majority of the state.

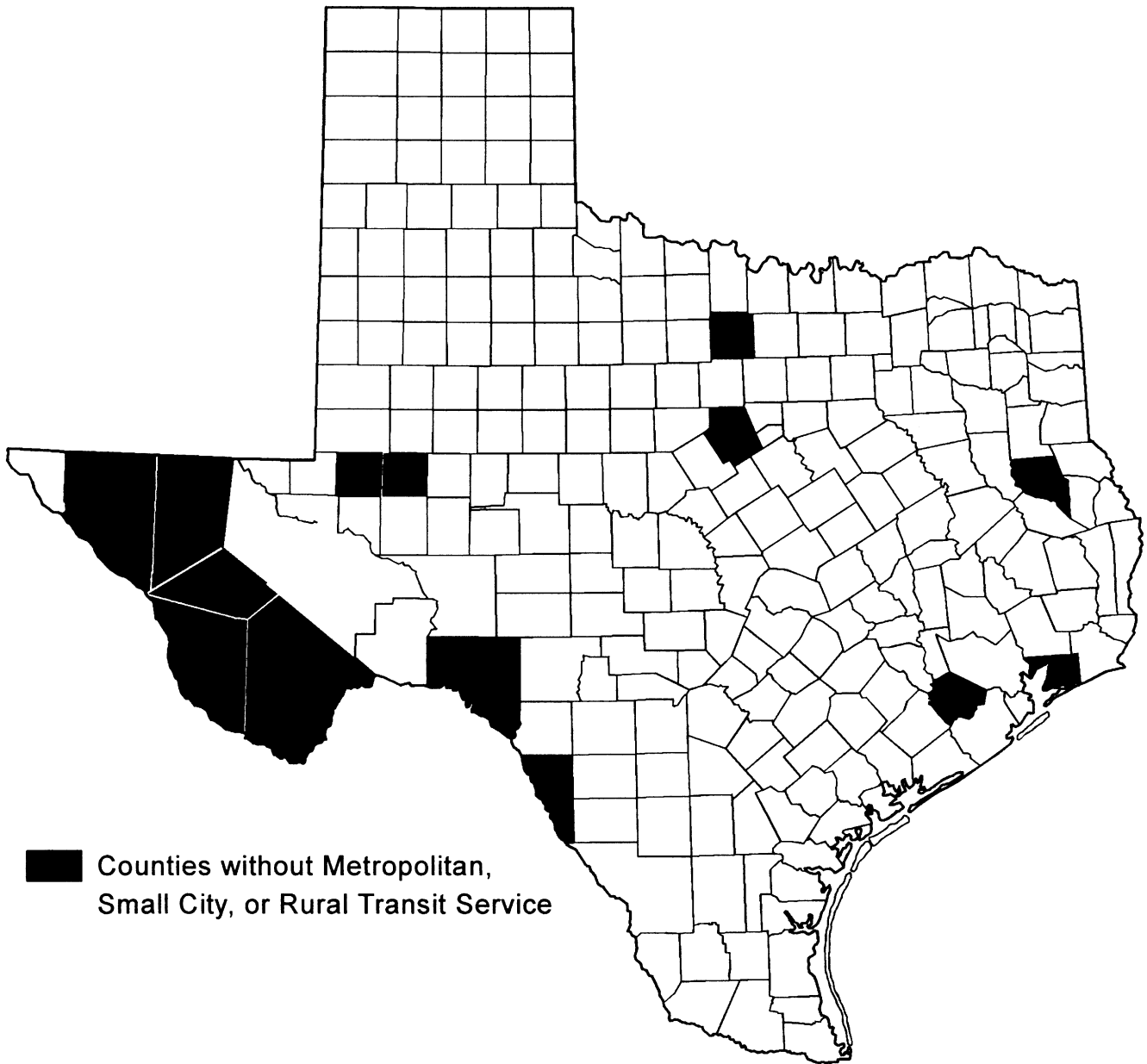
The 1992 study of the intercity bus industry in the state included an assessment of areas without service. Figure 14 and Table 8 highlight the cities with populations of over 5,000 without intercity bus service in 1993. The location and distance to the nearest service is also provided in Table 6. Residents in 15 of the 23 unserved cities have to travel between 10 and 20 miles to reach the nearest intercity bus route, while individuals in eight cities live 21 to 38 miles from the nearest service. Although unserved communities are found throughout Texas, most are located in the northeast portion of the state.



**Table 7. Rural Transit Service in Texas - Operating Statistics.**

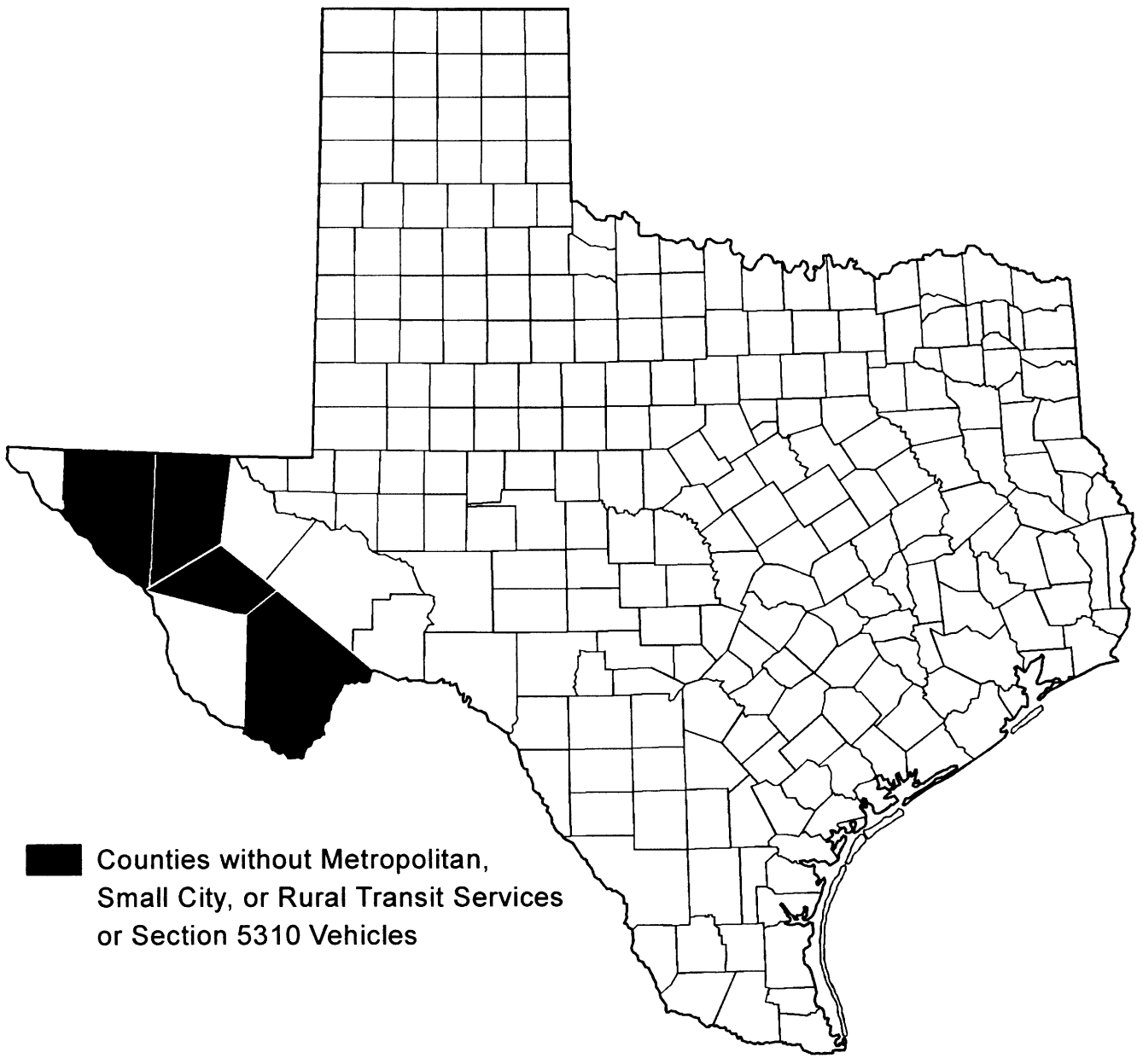
<b>Year</b>	<b>Number of Providers</b>	<b>Average Number of Vehicles</b>	<b>Annual One-Way Passenger Trips (million)</b>	<b>Annual Vehicle Miles (million)</b>	<b>Annual Operating Expenses<sup>1</sup> (million)</b>
1982	10	86	0.4	1.3	NA
1990	40	765	3.4	12.0	\$18.0
1992	40	962	3.9	14.7	\$22.6
1993	40	980	4.1	16.1	\$22.2
1994	41	979	4.6	18.4	\$25.4
1995	41	998	4.7	19.7	\$27.6
1997	41	968	4.2	20.2	\$29.1
1998	41	985	4.3	20.9	\$29.6

<sup>1</sup> Dollars in reporting year.  
(21, 23, 24, 25, 27, 30, 31)



**Figure 12. Counties with Metropolitan, Small City, or Rural Transit Service.**

(25)



**Figure 13. Counties without Metropolitan, Small City, Rural Transit Services, or Section 5310 Vehicles.**

(25)

**Table 8. Places with Populations Greater than 5,000 Further than Ten Miles from Intercity Bus Service.**

City	County	1996 Population	Nearest Service	Miles to Service
Grapevine	Tarrant/Dallas	37,092	Lewisville	11
De Soto	Dallas	35,173	Dallas	12
Socorro	El Paso	28,219	El Paso	15
Lancaster	Dallas	25,556	Dallas	13
Cedar Hill	Dallas/Ellis	25,541	Grand Prairie	23
Paris	Lamar	25,215	Sulphur Springs	38
Keller	Tarrant	19,323	Fort Worth	15
Universal City	Bexar	14,636	San Antonio	15
Frisco	Collin/Denton	14,020	McKinney	11
Rockwall	Rockwall	13,727	Mesquite	13
Schertz	Guadalupe/ Comal/Bexar	13,584	San Antonio	15
Gatesville	Coryell	12,245	Evant	26
Azle	Tarrant/Parker	10,617	Weatherford	16
Converse	Bexar	10,594	San Antonio	13
Seagoville	Dallas/Kaufman	9,970	Dallas	20
Graham	Young	8,857	Breckenridge	34
Commerce	Hunt	7,130	Greenville	14
Iowa Park	Wichita	6,941	Wichita Falls	12
Bonham	Fannin	6,927	Sherman	24
Mexia	Limestone	6,835	Fairfield	24
Midlothian	Ellis	5,819	Waxahachie	11
Boerne	Bexar	5,754	San Antonio	34
Gilmer	Upshur	5,355	Longview	23

(32)



**Figure 14. Cities with Populations Greater than 5,000 without Intercity Bus Service.**

(32)

A further analysis was conducted to identify areas without public transit and intercity bus service. The areas unserved by intercity lines were compared with the service areas of rural, municipal, and metropolitan transit operators in 1993. An updated assessment was conducted as part of this study using the 1997 rural transit districts. This analysis indicates that all of the 23 communities without an intercity bus line are served by some type of rural public transportation service or agency with Section 5310 vehicles.

The TBA, under contract to TxDOT, is conducting a statewide assessment of intercity bus services and facilities. The study is being funded by TxDOT through the FTA Section 5311(f) Program, with TBA providing the local match. The project will document current intercity bus services and facilities in the state, identify future needs and opportunities for new intermodal facilities, and develop a long range 20-year plan for addressing these needs.

The areas unserved by existing rural transit operators or agencies with Section 5310 vehicles have different characteristics. The following assessment of potential alternatives to serve these areas is provided based on information from previous studies and the analysis conducted for this project (28, 32)

**Hudspeth, Culberson, Jeff Davis, Presidio, and Brewster Counties.** These five counties are located in West Texas, just to the east of El Paso. The area is one of the most sparsely populated portions of the state. The 1998 combined population of the five counties was approximately 25,600. The population density of the five counties averages only about one person per square mile, one of the lowest in the state. Big Bend National Park in Brewster County, Fort Davis and the McDonald Observatory in Jeff Davis County, and the Guadalupe Mountain National Park in Hudspeth and Culberson Counties are important visitor destinations in the area. Ranching, farming, and oil and gas represent the major economic activities in the five counties.

Although there is no rural transit system operating in the five counties, other transit services are available. Both Greyhound and T.M.N.&O. Coaches operate intercity bus service in the region. Routes link Presidio, Marfa, Van Horn, and Sierra Blanca with El Paso to the west, Del Rio and Laredo to the southeast, and San Antonio to the east. Intercity buses also operate on U.S. Highway 180 between El Paso and Carlsbad, New Mexico, serving Cornudas, Salt Flat, and Pine Springs in Northern Hudspeth and Culberson Counties.

Two of the five counties also have an organization with Section 5310 vehicles. The Big Bend Community Action Committee, Inc., in Marfa has four Section 5310 vehicles. In 1997, some 1,620 one-way passenger trips were provided using these vehicles, which operated approximately 57,078 miles. The Pecos Senior Center, located in Pecos in Reese County east of Culberson County has three Section 5310 vehicles. Service is provided in Culberson County.

Rural transit service was operated in Brewster County in the past. Big Bend Community Action Committee, Inc., sponsored Big Bend Transit, a rural transit system, for a two-year period from 1984 to 1986. Unresolved audit questions resulted in the termination of the service.

A previous study suggested limited potential for serving these counties due to the low population densities and lack of major activity centers. These conditions still exist, indicating that it would be difficult to provide cost-effective rural transit service in the five counties. Using existing Section 5310 vehicles, funding new Section 5310 vehicles at current and additional agencies, and coordinating with intercity bus lines could all be explored to address unmet needs in the area.

**Ector and Midland Counties.** The estimated 1998 population was 124,139 for Ector County and 119,576 for Midland County. Both counties have experienced population increases since 1990, with Ector averaging 4 percent and Midland 12 percent. The city of Odessa in Ector County and the city of Midland in Midland County represent the major activity centers for the two county area. The oil industry and agriculture, represent the major economic activities in the region.

Intercity bus service is operated in both counties linking Midland, Odessa, and other communities with cities throughout the state. All Aboard America, Concho Coaches, Inc., Greyhound Lines, and T.M.N. & O. Coaches all serve the area. Both cities have intercity bus stations, and the headquarters of All Aboard America are located in Odessa. In addition, five organizations operate Section 5310 vehicles in the two counties. Three of these organizations have one Section 5310 vehicle each, while one has five vehicles, and one has eight. Combined, these organizations operated 155,320 miles of service in 1996, providing 55,379 one-way passenger trips with the 16 vehicles.

West Texas Opportunities, Inc., operates rural transit service in the 15 counties surrounding Ector and Midland Counties. Although Midland and Odessa are major destinations for passengers, service has not been provided within the two counties. A new welfare-to-work program offers travel options to participants in the two counties. A study sponsored by the Permian Basin Regional Planning Commission examined transit alternatives for Midland-Odessa and the rural portions of the two counties, but no service has been initiated.

The intercity bus routes, the Section 5310 agencies, and the new welfare-to-work initiative provide a basic level of service for some groups within the two counties. Given the close proximity to WTOI, current operations to and from Midland and Odessa, and the new welfare-to-work program, one option to serve the two counties would be for them to join WTOI.

**Val Verde County.** Val Verde County, located along the Texas/Mexico border, had an estimated 1996 population of 42,813. This figure represents an 11 percent increase from

1990. The city of Del Rio operates a rural transit system within the city limits. In addition, the county is surrounded by three other rural transit systems—West Texas Opportunities, Inc., to the west, Concho Valley Council of Governments to the north, and Community Council of Southwest Texas to the east.

Intercity bus service is provided in the county with routes to Del Rio, Eagle Pass, Uvalde, Sonora, and Alpine. Two organizations, Middle Rio Grande Development Foundation and Hill Country MHMR Center Del Rio, operate Section 5310 vehicles in Val Verde and the surrounding counties. In 1997, these organizations operated some 108,815 miles of service, providing 66,096 one-way passenger trips with 18 Section 5310 vehicles.

The combination of the city of Del Rio system, the two Section 5310 organizations, and the intercity bus services appears to cover some of the public transportation needs in the county. Expanding the city system or extending service from the three providers in adjacent counties may provide the best alternatives for addressing any unmet needs.

**Maverick County.** Eagle Pass is the largest city in Maverick County, which is located along the Texas/Mexico border. The county had an estimated 1996 population of 45,763, a 26 percent increase from 1990. Intercity bus service is provided by Greyhound Lines and the Kerrville Bus Company, and Kerrville operates a depot in Eagle Pass. Del Rio Outreach MR Services, which has one Section 5310 vehicle, services clients in the county.

Previous studies have identified Maverick County as a gap in the current system which should be considered for service due to the approximately 15,000 individuals residing outside of Eagle Pass and the low median household income of these residents. Two potential approaches could be examined to service the county. The first would be to expand the service area of Community Council of Southwest Texas, Inc., which covers the seven counties to the east and north, to include Maverick County. The second would be to implement a new system based in Eagle Pass that would serve the whole county. Eagle Pass had a rural transit system funded through the 5311 Program, but the service was stopped in 1996. Given the costs associated with initiating a new service, coordination with Community Council of Southwest Texas, Inc., may represent the most feasible option for addressing any unmet needs.

**Jack County.** The estimated 1996 population of Jack County was 7,730, an increase of some 645 residents since 1990. No intercity buses currently serve the county, but Concerned Citizens of Jack County, located in Jacksboro, operates two Section 5310 vehicles. In 1997, this organization provided some 8,689 one-way passenger trips and operated 22,898 vehicle miles.

Jack County was not considered a service gap in previous studies due to the existing Section 5310 organization and low population levels. The county is surrounded by four other rural transit operators—Rolling Plains Management Corporation to the west, Texoma Area



Paratransit System, Inc., to the north and east, and both Palo Pinto County Transportation Council and Parker County Transportation Services, Inc., to the south. Expanding service from one of these existing systems into the county may be the most appropriate alternative to address any unmet transit needs.

**Erath County.** An estimated 31,680 individuals resided in Erath County in 1996, an increase of approximately 13 percent from 1990. Intercity bus routes serve Stephenville and other communities in the county. Three organizations, with one Section 5310 vehicle each, provide service to individuals over 65 or with special needs. In 1997, some 6,563 one-way trips were provided using these three vehicles, which operated a total of 28,781 miles.

Erath County was identified previously as unlikely to generate sufficient demand to warrant rural transit service. It is surrounded by five existing rural transit systems, however, and expanding one of these to include the county may be the most feasible alternative if the future needs warrant.

**Nacogdoches County.** Nacogdoches County had an estimated population of almost 60,000 in 1996, an 8 percent increase from 1990. The city of Nacogdoches is home to Stephen F. Austin State University and is the major activity center in the county. Kerrville Bus Company operates intercity bus service along U.S. 59 through the county and has a bus station in Nacogdoches. In addition, four organizations in the county have Section 5310 vehicles. The groups operated a total of 53,342 miles with four Section 5310 vehicles in 1997, providing 7,499 one-way passenger trips.

The city of Nacogdoches has previously examined the possibility of starting a transit system, but no effort has been undertaken to date. Given the costs associated with starting new service, the most feasible approach may be to expand either of the two adjacent systems in the county.

**Chambers County.** Located to the west of the city of Houston and Harris County, Chambers County had an estimated 1996 population of 25,401, a 26 percent increase from 1990. Intercity bus service is provided between Houston and Port Arthur but does not stop in the county. Two organizations, one in Anahuac and one in Beaumont in Jefferson County, operate Section 5310 vehicles in Chambers County. The organization in Anahuac, which has one Section 5310 vehicle, provided 3,302 one-way passenger trips in 1997.

Chambers County was identified previously as having a low demand for transit services based on relatively low population levels, medium income levels, and the existing Section 5310 providers. The three adjacent counties all have rural transit operators, however, and the potential to extend one of these systems to cover Chambers County could be considered if future demand warrants.

## **CHAPTER FIVE—GENERAL AVIATION SYSTEM IN TEXAS**

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### **Historical Overview of Aviation in Texas**

The 1903 Wright Brothers flight in Kitty Hawk, North Carolina, is usually credited as the start of modern aviation in the United States. Texas has a rich history of early experimentations with flying machines, military air bases, commercial airlines, major airports, and general aviation airfields. The first documented attempts at flight in the state date back to the 1860s. By the early 1900s, Texas was home to numerous pilots, airfields, air shows, and fledgling aviation companies.

The state's role in aviation became firmly established in World War I when the U.S. military established production, testing, and training facilities at Fort Sam Houston, Kelly Field, and other bases in the state. Charles Lindbergh's historic solo Trans-Atlantic flight in 1927 captured the imagination of the nation. Texans were caught up in this enthusiasm, and the period between the two World Wars was characterized by air shows, distance and endurance competitions, and other promotional events. A number of Texas pilots won races and held world records during this time.

The 1920s and 1930s also saw the start of the commercial aviation industry, spurred in part by actions of the U.S. Post Office Department. The Department promoted transporting mail by air, first by the War Department and later by its own pilots and planes. The Air Mail Act of 1925, known as the Kelly Bill, further encouraged the development of commercial airlines by turning over governmental airmail routes to private firms. The Air Commerce Act of 1926 further supported civil aviation. The Act required registration of common-carrier air services, certification of aircraft and pilots, and gave the Secretary of Commerce authority to establish air traffic rules and to establish, operate, and maintain lighted civil airways.

In 1928, the Texas Aero Corporation in Temple became the first company in the state licensed to manufacture and sell airplanes. National Air Transport was the first commercial airline to serve the state, with flights in and out of Love Field in 1926. Southern Air Transport System of Fort Worth, Southwest Air Fast Express (SAFE) of Dallas, and Standard Air Airlines were all early companies that eventually became part of American Airlines. Amarillo Airport Corporation, Weddell-Williams Air Service, Western Air Express, and Reed Airlines are just a few examples of fledgling airlines that did not survive (35).

The Civil Aeronautics Act of 1938 helped define the federal role related to the economic phases of air transportation. The Act created the Civil Aeronautics Authority and charged it with fostering and regulating commercial aviation. The Act also authorized the federal government to establish, operate, and maintain the airways, and provided limited funding for landing areas. The organizational structure of the Authority was modified during the Roosevelt administration, and two separate agencies were established. The new structure included the Civil Aeronautics Board and Civil Aeronautics Administration within the Department of Commerce.

The military aviation presence in Texas expanded during World War II and remains strong today. Randolph, Kelly, and Brooks air bases were the major pilot training facilities, while Sweetwater's Avenger Field was used to train women pilots. Other air bases throughout the state were used in the war effort, and Texas was home to major aircraft manufacturing facilities. Even with the closing of numerous air bases over the past 40 years, military aviation is still important in the state.

The Airport Act of 1946, the Airways Modernization Act of 1957, and the Federal Aviation Act of 1958 all expanded the federal role in regulating the aviation industry and funding airport development and operation. In 1967, the Federal Aviation Administration (FAA) became part of the newly created U.S. Department of Transportation. The Act creating the Department also established the National Transportation Safety Board (NTSB) and charged it with investigating accidents associated with all modes of transportation. At the state level, the Texas Aeronautics Commission was legislatively established in 1945.

Commercial aviation activities expanded in the state throughout the second half of the century. In 1934, Braniff Airways established its operations and maintenance base at Love Field, and in 1942, the company's home office was moved there. The widespread introduction of jet aircraft in the late 1950s and 1960s combined with the robust economy fueled growth in the commercial aviation industry. The first commercial international flights from Texas were introduced in 1957, and domestic and international service expanded in the 1960s and 1970s (35).

The Federal Airline Deregulation Act of 1978 resulted in further competition in the industry. Today, Texas is the corporate home to three airlines—American at Dallas/Fort Worth Airport, Continental at Houston's George Bush International Airport, and Southwest Airlines at Dallas' Love Field. As described in this chapter, the airports in the state are critical to the economic vitality of major metropolitan areas, small communities, and rural areas. Currently, some 98 percent of the state's population is located within a 25-mile radius of an airport, and some 90 percent of Texas' property tax, retail sales, employment, oil and gas, and agricultural activity occurs within the same distance of an airport (36, 37).

## **Aviation System in Texas**

Texas has the largest air transportation system in the continental U.S. The Texas Airport System Plan (TASP) uses four service levels to describe airports in Texas. These are primary and nonprimary commercial service airports, reliever airports, and general aviation airports. The characteristics associated with airports in each of these categories are summarized next (36). As noted, commercial service and reliever airports are located primarily in larger metropolitan areas, while general aviation airports are located in rural parts of the state. More detailed information on general aviation airports is presented in the next sections of the chapter.

**Primary and Nonprimary Commercial Service Airports.** Commercial service airports provide scheduled service by major, national, and regional airlines. Primary commercial service airports enplane at least 10,000 passengers annually, mostly by large and medium aircraft. Nonprimary commercial service airports enplane more than 2,500 but less than 10,000 annual passengers, mostly by medium and small aircraft. As highlighted in [Table 9](#), there are 27 primary commercial airports in the state. No airports currently fit into the nonprimary category. In addition, the airport in Brownwood has scheduled commercial air service but fewer than 2,500 annual enplanements. All of the commercial service airports also provide access to business jets and commercial jet transport aircraft. Although located in the state’s major urban areas, commercial airports serve travelers with origins and destinations in rural parts of the state and transport goods to and from rural areas.

**Reliever Airports.** As the name implies, reliever airports provide general aviation users with alternatives to commercial service airports in major metropolitan areas. As a result, reliever airports help increase the capacity of commercial service airports. As shown in [Table 10](#), there are 23 reliever airports in the TASP: three in Austin, eleven in the Dallas-Fort Worth Metroplex, eight in Houston, and one in San Antonio.

**General Aviation Airports.** The term general aviation refers to all air travel that is not scheduled commercial service or military flying. There are 250 general aviation airports listed in the TASP. Three categories—transport, general utility, and basic utility—are used to further subdivide general aviation airports. Transport airports have moderate to high levels of business turboprop and turbojet service. General utility airports are smaller facilities accommodating single and light twin piston-engined aircraft. Basic utility airports are located within the service area of a commercial service, reliever, general aviation transport, or general utility airport and have relatively low use.

## **Current General Aviation Airports in Texas**

As noted in the previous section, there are 250 general aviation airports included in the TASP, accounting for 83 percent of all the public airports in Texas. These facilities serve business travel, agricultural uses, medical needs, flight instruction, recreational flying, and tourist travel in small communities and rural areas throughout the state. The basic characteristics of the state’s general aviation airports are summarized in this section.

The counties that are home to the 57 transport general aviation airports are illustrated in [Figure 15](#). Transport airports are located in areas with population levels and economic activities high enough to support at least moderate business jet traffic and/or provide additional airport capacity near metropolitan areas. Transport airports are designed and operated to serve turboprop and turbojet business aircraft. A benchmark of at least 500 annual business jet operations is typically associated with transport airports. Other common measures for transport airports are a service area population of at least 10,000 and a local economy generating \$100 million or more.

**Table 9. Primary Commercial Service Airports in Texas.**

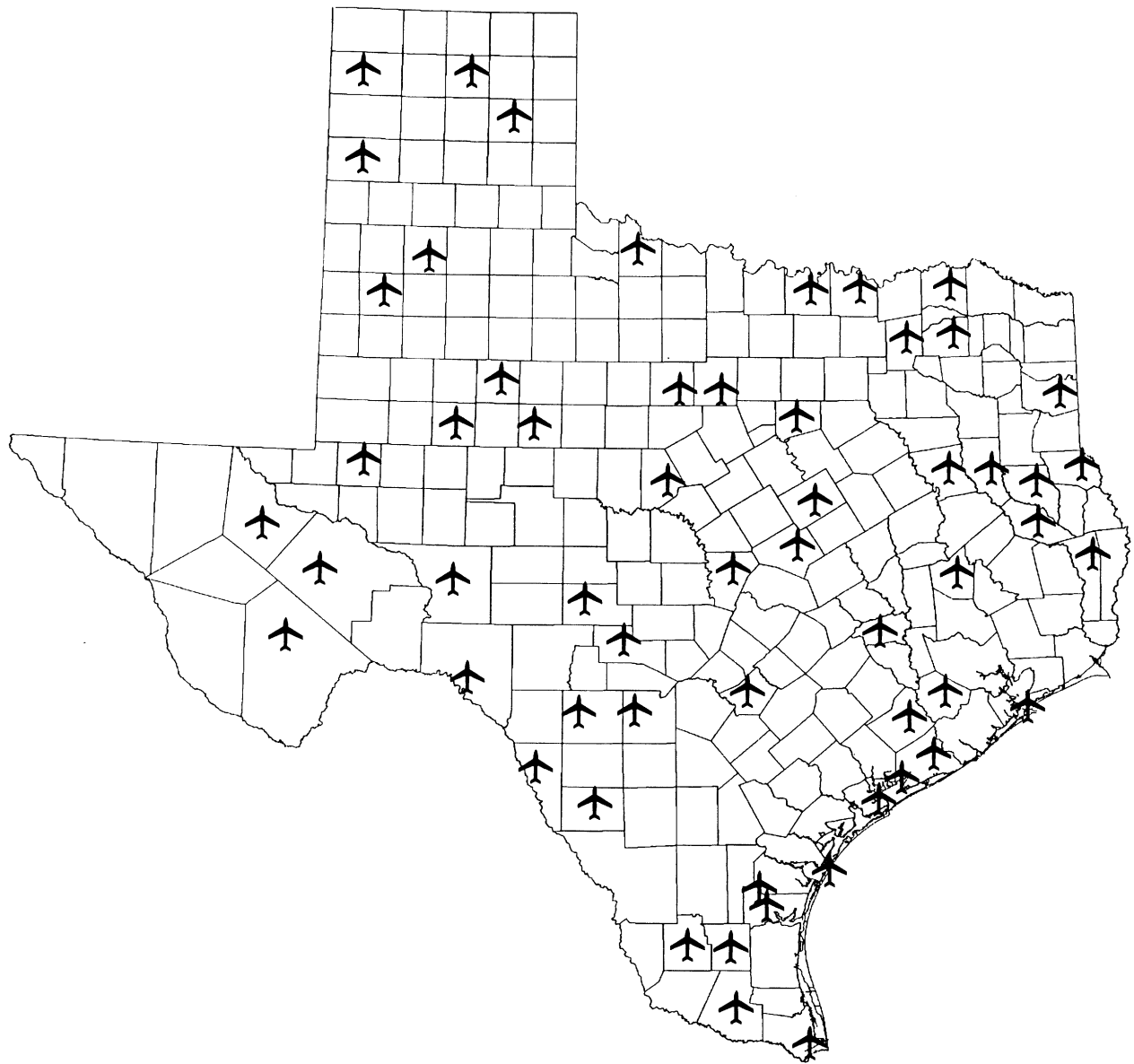
<b>Associated City</b>	<b>Airport Name</b>
Abilene	Abilene Municipal
Amarillo	Amarillo International
Austin	Austin-Bergstrom International
Beaumont-Port Arthur	Jefferson County
Brownsville/South Padre Island	Brownsville/South Padre Island International
College Station	Easterwood Field
Corpus Christi	Corpus Christi International
Dallas	Love Field
Dallas-Fort Worth	Dallas-Fort Worth International
El Paso	El Paso International
Harlingen	Rio Grande Valley International
Houston	Ellington Field
Houston	George Bush Intercontinental
Houston	Hobby
Killeen	Killeen Municipal
Laredo	Laredo International
Longview	Longview International
Lubbock	Lubbock International
McAllen	McAllen Miller International
Midland	Midland Regional
San Angelo	Mathis Field
San Antonio	San Antonio International
Texarkana	Texarkana Municipal/Webb Field
Tyler	Tyler Pounds Field
Victoria	Victoria Regional
Waco	Waco Regional
Wichita Falls	Sheppard AFB/Municipal

(36)

**Table 10. Reliever Airports in Texas.**

<b>Associated City</b>	<b>Airport Name</b>
Austin	Georgetown Municipal
Austin	San Marcos Municipal
Austin	Austin-Pflugerville (new)
Dallas-Fort Worth	Arlington Municipal
Dallas-Fort Worth	Mesquite Metro
Dallas-Fort Worth	Addison
Dallas-Fort Worth	Denton Municipal
Dallas-Fort Worth	Grand Prairie Municipal
Dallas-Fort Worth	Lancaster Municipal
Dallas-Fort Worth	McKinney Municipal
Dallas-Fort Worth	Redbird
Dallas-Fort Worth	Fort Worth Alliance
Dallas-Fort Worth	Fort Worth Meacham
Dallas-Fort Worth	Fort Worth Spinks
Houston	Brazoria County
Houston	David Wayne Hooks Memorial
Houston	La Porte Municipal
Houston	Clover Field
Houston	Montgomery County
Houston	Sugar Land Municipal
Houston	Houston-Waller County (new)
Houston	West Houston
San Antonio	Stinson Municipal

(36)



**Figure 15. Transport Airports in Texas.**

(36)



[Figure 16](#) highlights an example of a general utility airport in the state, and [Figure 17](#) illustrates the location of the 126 general utility airports in Texas. These airports serve smaller community and rural areas, accommodating single engine and light twin piston-engine aircraft. General utility airports support agricultural, mineral, and other businesses, as well as recreational travel and local flight schools.

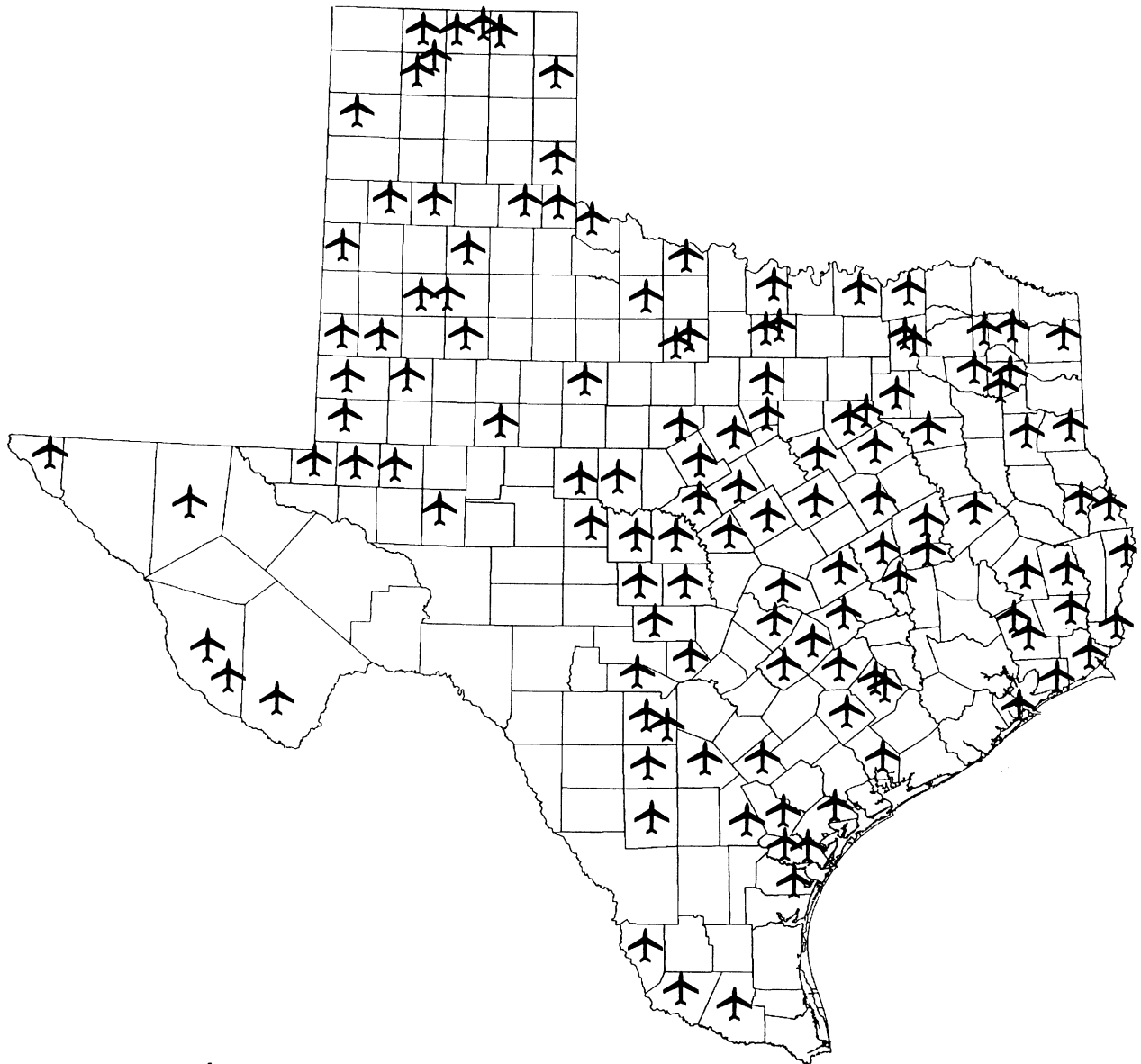
Basic utility airports are located within a half hour drive of commercial, reliever, transport, or general utility airports, and/or support essential but low level air activity. The locations of the 67 basic utility airports in the state are shown in [Figure 18](#). These facilities provide alternatives for clear weather flying and flight training in areas with other large airports.

The vast majority of general aviation airports in the state are owned and operated by local governments. Cities or counties are responsible for 242 of the 250 general aviation airports in Texas. Five general utility airports, two basic utility airports, and one transport airport are in private ownership.

The number of enplanements at all airports in Texas increased significantly during the 1980s and 1990s. In 1980, there were approximately 26 million enplanements in the state. This figure had increased to almost 50 million by 1990 and has continued to grow in the 1990s. Greater fluctuation has been seen in general aviation in the state, partially reflecting general economic trends. The economic recessions in the 1980s saw a corresponding decline in general aviation activity.

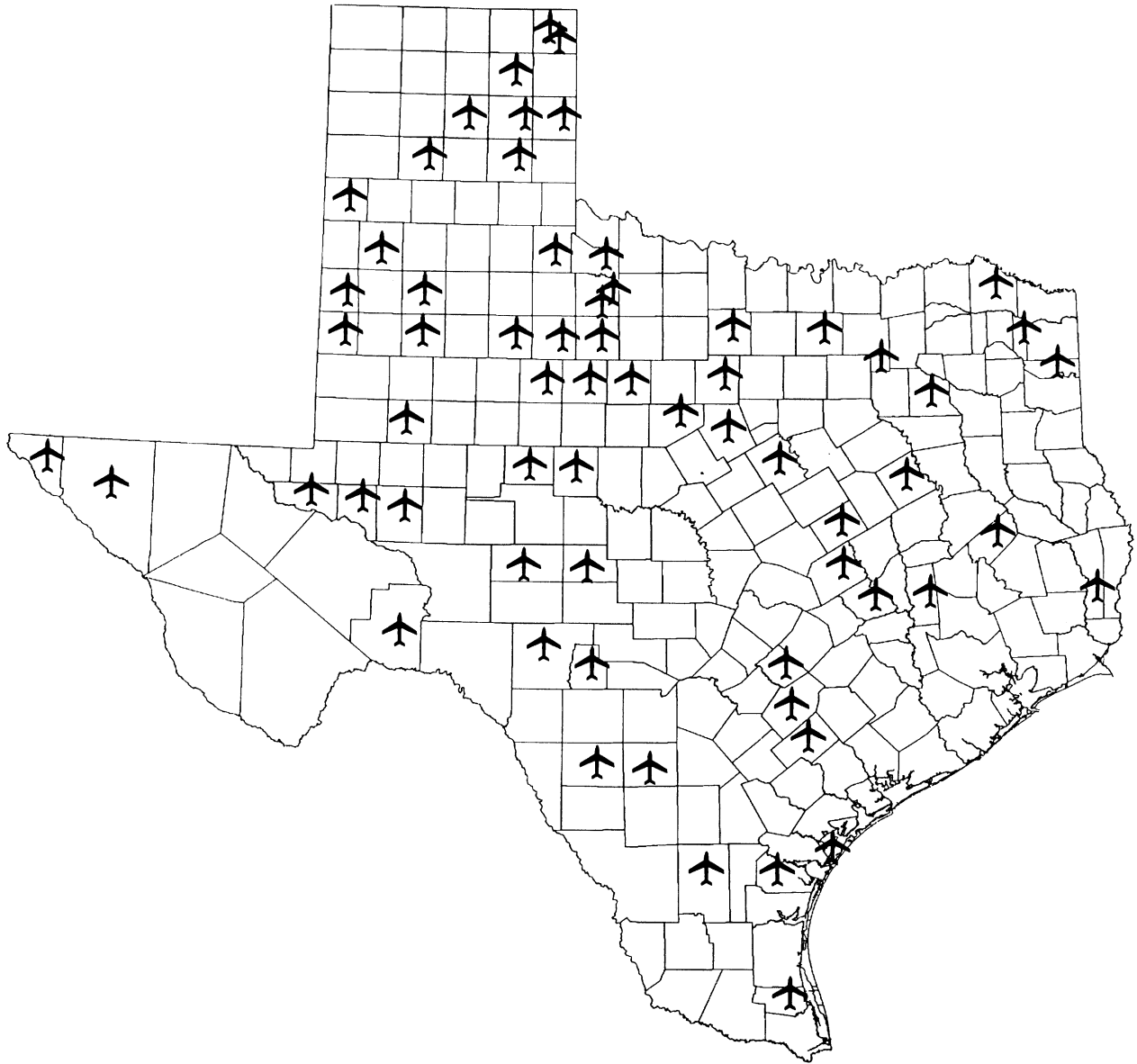


**Figure 16. Example of General Utility Airport in Texas.**



**Figure 17. General Utility Airports in Texas.**

(36)



**Figure 18. Basic Utility Airports in Texas.**

(36)

## Funding General Aviation Airports in Texas

Funding for developing, operating, maintaining, and upgrading general aviation airports comes from a mix of federal, state, and local sources. At the federal level, the Airport and Airway Development Act of 1970 created the Aviation and Airways Trust Fund. Aviation user fees support the Trust Fund, and improvements to airports and the airway system are financed through the fund. Taxes on passenger tickets, taxes on waybills, international departure fees, and aviation fuel taxes comprise the user fee revenues allocated to the Trust Fund.

The 1982 Airport and Airway Improvement Act established the Airport Improvement Program (AIP) to fund aviation needs throughout the country. Subsequent acts continued federal funding, expanded elements of the AIP, and provided block grants to selected states, of which Texas was one. The AIP provides grants to eligible airports through the FAA for various types of projects. An airport must be included in the National Plan of Integrated Airport Systems (NPIAS) to be eligible for AIP funds. NPIAS is prepared by the FAA and includes those airports identified by the agency as most essential to the national air transportation system.

All of the Texas primary commercial, reliever, and transport general aviation airports are included in the NPIAS and are eligible for AIP grants. Only 100 of the 126 general utility airports and 10 of the 67 basic utility airports in the state are included in the NPIAS. Thus, some of the state's general utility and most of the basic utility airports are not currently eligible for AIP funds. Further, being included in the NPIAS does not guarantee that an airport will receive AIP funds. From 1971 to 1992, two-thirds of the eligible general airports in the state received AIP grants, leaving one-third that did not receive grants. The amount of AIP funding available each year is determined by federal appropriations and FAA priorities.

Primary commercial airports receive the majority of AIP funds on both a national and state basis. For example, 68 percent of 1991 AIP funds allocated on a national basis and 64 percent of the grants to Texas went to primary commercial airports. Within Texas, reliever airports accounted for 20 percent of the available funds, and general aviation airports received 16 percent. These percentages equated to approximately \$60.8 million to primary commercial airports in the state, \$18.8 million for reliever airports, and \$14.6 million to general aviation airports (36).

Funding availability and requirements differ by airport classification. Commercial service airports with at least 10,000 annual passenger enplanements are entitled to grants related to the actual number of enplanements, with a minimum annual allocation of \$500,000 and a maximum of \$22 million. Funding is also available based on the airport's share of total U.S. freight tonnage for facilities with at least 100 million pounds of freight annually.

The largest airports in the country—those with at least 25 percent of the total national annual enplanements—receive 75 percent of eligible project costs. Other primary commercial service airports receive 90 percent of eligible costs. Non-primary commercial service airports enplaning between 2,500 and 10,000 annual passengers do not receive AIP entitlement funds. A portion of the

Trust Fund allocation is designated for general aviation airports, including relievers, within each state's apportionment. Texas has received approximately \$23 million annually for projects at general aviation and reliever airports.

State involvement in planning, developing, funding, and operating airports has been very different than the experience with other modes, especially highways and roadways. The early development of municipal airports and the national interest in aviation safety and regulation resulted in the establishment of close working relationships between local governments and federal agencies, with little state participation. Although Oregon established a state level aviation agency in 1921, most states, including Texas, did not become involved in airport-related activities until much later.

The 1945 legislation creating the Texas Aeronautics Commission represents the first official state involvement in aviation. Legislation passed in 1966 initiated state funding of approximately \$1 million annually to support projects at smaller general aviation airports. This program was canceled in 1987, however, during the state budget crisis. Funding was reestablished in 1989, and the name of the Texas Aeronautics Commission was changed to the Texas Department of Aviation. The same legislation also strengthened the role of the new Department in developing the air transportation system in the state. Legislation passed in 1991 creating the Texas Department of Transportation (TxDOT) also incorporated the Department of Aviation into TxDOT as the Aviation Division.

Currently, the small amount of state funding designated for airports is appropriated by the Legislature on a biannual basis from the Highway Fund. Texas and Connecticut are the only two states in the country that do not receive some aviation funding from state sales and excise taxes on aviation fuels. Currently, 29 states dedicate all or part of their aviation fuel tax revenues toward airport needs, and 36 states have dedicated funding for aviation.

As the owners and operators of the vast majority of airports in Texas, local governments play an important role in funding needed improvements, as well as ongoing maintenance and operation. Commercial service airports generate revenues from airline user fees, terminal concessions, parking fees, property leases, and other programs. Revenues from these sources are used to match federal programs, to fund specific projects, and to back the issuance of revenue bonds for major improvements.

General aviation airports do not have the same revenue generation capabilities and opportunities as commercial service airports. The limited revenues generated by these airports usually go to support ongoing operations and maintenance. City or county general funds or general obligation bonds are frequently used to match federal and state programs.

## Attributes of Viable Rural Airports in Texas

Researchers examined the factors that appear to contribute to the success of rural airports. Level of aircraft activity, operating characteristics, location and role, and physical condition of the airport were all examined, along with community demographic and economic conditions. The specific elements analyzed within these general categories are highlighted in [Table 11](#).

Information on these variables was obtained from a variety of sources for 153 of the general aviation airports classified as rural. These included the FAA, TxDOT, and U.S. Census, and the County and City Data Book. In addition, the professional judgement of the researcher, who has made numerous visits to rural airports in the state since 1970, was used to assess the vitality measures.

Numerical values were assigned to each of the airport and community attributes, and a series of correlation analyses were performed to help identify the characteristics associated with active, viable rural airports. The number of based aircraft, annual landings and take-offs, and the vitality measures were treated as dependant variables, while the other elements were treated as independent variables. Possible correlations were examined between each dependent and each independent variable. Groups of two or three independent variables were also tested against each independent variable. This analysis helped identify a predictive model for viable rural airports based on multiple measures.

The independent variables highly correlated with each other were identified and not grouped together in subsequent regression tests. For example, the independent variables of jet fuel and aviation gasoline were highly correlated. That is, an airport selling one type of fuel will also sell the other. Selling fuel or providing on-site maintenance and repair were strongly correlated with an attended airport.

The results of this analysis identified four attributes that were highly correlated with the success of rural airports in the state. The four factors that appear to have the greatest influence on the vitality of rural general aviation airports are the number of registered aircraft in the county, that the facility is developed to general utility or transport standards, the availability of services at the airport, and the presence of on-site personnel. Figure 19 provides an example of on-site aviation fuel at one rural airport in the state. Transport and general utility airports are more likely to meet some or all of these measures and thus offer the potential for greater economic viability and influence than basic utility airports. The ten airports that emerged as the most successful based on the analysis were Aransas County, Stephens County, Dalhart Municipal, Graham Municipal, Pecos County Gillespie County, Gaines County, Terry County, Panola County, and Fayette Regional Air Center.

**Table 11. Elements Influencing the Success of Rural Airports.**

<b>General Category</b>	<b>Specific Elements</b>
Airport Activity	<ul style="list-style-type: none"> <li>• Number of registered aircraft in county</li> <li>• Number of based-aircraft</li> <li>• Number of annual take offs and landings</li> </ul>
Airport Operations	<ul style="list-style-type: none"> <li>• Attended/Unattended</li> <li>• Residence at airport</li> <li>• Terminal Building</li> <li>• Availability of jet A fuel or aviation gasoline</li> <li>• Availability of operator services (airplane maintenance and repair, airplane rental, flight instruction)</li> </ul>
Airport Role/Location	<ul style="list-style-type: none"> <li>• Design standard</li> <li>• Distance to nearest General Utility Stage II or Transport airport</li> </ul>
Airport Condition	<ul style="list-style-type: none"> <li>• Runway pavement rating</li> </ul>
Financial Condition	<ul style="list-style-type: none"> <li>• Capital grants received 1990 to 1995</li> <li>• Inclusion in TxDOT's five-year Capital Improvement Program</li> </ul>
Community Demographic and Economic Factors	<ul style="list-style-type: none"> <li>• County population</li> <li>• County employment</li> <li>• County employment in agriculture, manufacturing, wholesale, and retail trade</li> <li>• County employment in finance, insurance, and real estate</li> <li>• County employment in public sector</li> <li>• Income from farming and oil/gas</li> </ul>



**Figure 19. On-Site Aviation Fuel at Rural Airport in Texas.**

### **General Aviation Case Studies**

The characteristics associated with successful rural general aviation airports in Texas can be further illustrated through two case study examples—the Fayette Regional Air Center in La Grange and the Stephens County Airport in Breckenridge. The Fayette Regional Air Center highlights the importance of cooperation and financial commitment among three cities and one county in the development and operation of the facility. The Stephens County Airport illustrates the influence of the vision and ongoing commitment of the local elected leadership on the development of the facility, the ability to attract and retain businesses, and establishing the area as a base for recreational aviation. The general characteristics associated with each area are presented first, followed by a description of the airport.

**Fayette Regional Air Center.** The Fayette Regional Air Center represents a multi-jurisdictional effort involving Fayette County and the cities of La Grange, Schulenburg, and Flatonia. The population of Fayette County is approximately 21,000. La Grange, Schulenburg, and Flatonia are the largest communities in the county, with populations of approximately 4,000, 3,000, and 1,350, respectively. The local economy is focused on agribusiness and food processing, tourism, electricity production, small manufacturing, and mineral production. Oil, gas, sand, and gravel are found in the area, and beef, dairy cows, corn sorghum, wheat, peanuts, and pecans contribute to the local economy. In 1997, employment levels were approximately 10,300, and the unemployment rate was 2.7 percent.



The Fayette Regional Air Center was constructed in 1992 to replace the outdated Gunther Field. FAA funding for the facility included \$600,000 for land acquisition and \$1.25 million for construction. The Air Center is currently classified as a general utility, stage one airport. The facility encompasses 194 acres and includes a terminal, 10 t-hangars, and a 4,000 foot long and 75 foot wide runway constructed to general utility design standards. The Air Center has a fixed base operator, with flight instruction services and 24-hour fueling. It is located two miles from La Grange and 12 miles from Schulenburg. The local roadway system provides one good access road to the airport.

Ten aircraft are based at the Air Center, which had some 3,000 operations in 1997. Three corporations—J Bar B Foods, International Muffler Company, and Double B Foods—use the airport on a daily basis, accounting for over 500 annual flights. All three businesses either have or are building hangars at the Air Center. J Bar B Foods also built an office at the airport in addition to a hangar. The Air Center is also used by recreational flyers. The airport is featured in the county's efforts to promote economic development.

A number of improvements are planned for the Air Center. First, the runway will be extended 5,000 feet in late 1999. Second, funding is being sought to construct a new hangar for aircraft maintenance and possibly aircraft painting. Further, the County Economic Development Office continues to use the Air Center to promote new industry in the area.

The Fayette Regional Air Center illustrates many of the attributes associated with successful rural airports. These attributes include runways meeting the general utility design standards, a terminal and hangars, on-site personnel and fixed base operations, and fueling services. The flight instruction services and 24-hour fueling capabilities represent services not available at other nearby airports. The development and operation of the Air Center have been accomplished through the coordinated and cooperative efforts of three communities and the county.

**Stephens County Airport.** The Stephens County Airport is located in Breckenridge. The county population is approximately 9,800, with Breckenridge accounting for some 5,600 of these. The local economy is based primarily on oil, agribusiness, recreation, and a small amount of manufacturing. Natural resources found in the county include oil, natural gas, and stone. Agricultural products include cattle, hogs, sheep, goats, wheat, oats, hay, peanuts, grain sorghums, cotton, and pecans. Hubbard Creek Reservoir and Lake Daniel both offer recreational activities. In 1997, employment levels were approximately 4,270, and the unemployment rate was 3.7 percent.

The airport is located approximately two miles from Breckenridge and is classified as a transport airport. In 1974, federal and state funds were used to reconstruct and lengthen the main runway to 3,800 feet long and 100 feet wide. Further improvements were made in 1986 and 1987 to lengthen the primary runway to 5,000 feet, again with the use of federal and state funds. Pavement overlays were completed on the other two runways; the taxiway was

expanded, and the apron area was extended. The airport is attended and fuel service is available.

In 1997, 53 aircraft were based at Stephens County Airport, and the facility has almost 16,000 annual operations. Several aviation businesses are located at the airport, including the Breckenridge Aviation Museum and Ezell Aviation. The museum attracts a large number of state, national, and international visitors each year. Ezell Aviation is nationally known for refurbishing World War II airplanes.

Key elements to the ongoing success of the Stephens County Airport include the runways meeting transport design standards, other infrastructure elements, on-site operations personnel, and fueling services. The Breckenridge Aviation Museum, Ezell Aviation, and other air-related businesses greatly add to the economic viability of the airport area. The county commissioner, the county judge, local governments, and other groups have actively promoted and supported the development and ongoing operation of the airport.

### **General Aviation Economic Impacts and Future Needs**

General aviation airports in Texas support a wide range of economic activities. Rural airports play important roles in agriculture, oil exploration and production, mining, and fishing. Corporations use general aviation airports for business travel. Rural airports provide critical links for medical emergencies. General aviation airports also support tourist travel and recreational flying. Finally, airport employees, construction activities, and revenues generated from various functions add to local economies.

It is estimated that general aviation airports are responsible for creating between 5,350 and 7,000 jobs on a statewide basis. This employment generates an annual payroll of some \$166 million to \$218 million. Further, the statewide impact from the sale of general aviation products and services is estimated to be in the range of \$1.4 billion to \$1.8 billion a year (38).

The two case studies in the previous section provide an indication of the impact general aviation airports have on local communities. Additional examples are summarized in this section to highlight the importance of general aviation airports on the economic vitality of rural areas in the state (36, 37, 38, 39). The future needs associated with rural airports are also highlighted, along with funding levels necessary to maintain and improve the facilities.

Business access to general aviation airports continues to grow in importance to both corporations and local communities. Daily use of the Fayette Regional Air Center by J Bar B Foods, International Muffler Company, and Double B Foods, noted in the case studies, provides one important example of the link between airports and economic development. Other examples are highlighted here.

- Lengthening the runway at the Palestine Municipal Airport helped attract two major Walmart Distribution Centers to the area, as well as a fiberglass manufacturing firm and a beef processing facility.
- Brownwood Municipal Airport serves employees and clients of the 3M and Kohler companies, is home to two Federal Express planes and eight employees, is served by Lone Star Airlines, and provides fuel for helicopters based at Fort Hood.
- At least 10 of the major corporations in the Plainview area—Cargil, Excel, Walmart, Pioneer HiBred, Azteca, ADM Milling, Koch Industries, Peterson Farms, McCoy’s Building Supplies, and United Supermarkets—all have planes at the Plainview/Hale County Airport. It is estimated that the presence of the airport contributes \$10 million annually to the local economy.
- What started as a small one person business at Garner Field in Uvalde is now Sierra Industries, a company that refurbishes aircraft. The airport was also a key factor in attracting South Star Interiors and Jim Miller Aircraft Painting. In 1980, two people were employed at the airport. In 1995, 200 people worked at Garner Field, providing a one-stop aircraft repair and repaint center and serving clients throughout the world.
- Clients using the Mexia-Limestone County Airport come from diverse sources including the Mexia State School, Houston Lighting and Power, law enforcement agencies transporting out-of-state prisoners, Walmart, HEB, and Dow Chemical.

General aviation airports play important roles in the agricultural, mining, and oil and gas industries in the state. Crop dusting, aerial surveying, and business travel are just a few services operated out of some airports.

- Arledge Field Airport in Jones County has three aerial applicator planes based at the facility year round. The planes are used for pesticide and fertilizer applications, and training is provided on the use of the planes. A multi-year boll weevil eradication program was operated out of the airport, involving 20 aircraft flying on a daily basis over a three month period. Arledge Field is also used by companies that check petroleum pipelines.
- The Dell City Municipal Airport is used to bring in farm and ranching equipment and parts from Odessa and Lubbock. Farmers also use it to fly produce, such as chili peppers, to market.
- The Seymour County Airport supports the local farming and ranching economy in a number of ways. An aerial applicator plane based at the airport is used extensively throughout the year. Ranchers make periodic flights out of the facility to check on cattle. Air traffic increases on the first Tuesday of every month when the farm

implement auction is held at Montgomery Tractor. The airport also supports medical trips to Dallas and Lubbock, as well as local business trips.

General aviation airports support recreation, tourism, and visitor travel throughout the state. As highlighted in the following examples, these activities contribute to the economic health and vitality of rural areas.

- Panhandle Eastern has a hunting and fishing lodge near Ingleside. The company typically makes four weekly flights in and out of T.P. McCampbell Airport to bring staff and clients to the lodge.
- Hillsboro Municipal Airport sponsors an annual air show every October. The Saturday event attracts 2,000 to 3,000 visitors. Other airports also sponsor fly-ins, fly markets, air shows, and other events that contribute to the vitality of the airport and the local economy.
- Athens Municipal Airport serves visitors to the Texas Freshwater Fisheries and Visitors Center, which includes a museum, the Texas large-mouth bass display, and a casting pond.

Estimates by TxDOT and other studies conducted by TTI indicate that current funding levels from all sources are not adequate to meet the identified future needs for general aviation airports in the state. For example, approximately 25 percent of the runways at general aviation airports are in fair or poor condition. Current projections by TxDOT indicate that general aviation airports in TASP need \$600 million in development funds for the five year period from 1999 through 2003. This estimate equals annual funding of some \$120 million (38).

Current federal and state funding levels provide approximately \$37 million annually for these airports. If funding continues at this rate, an annual shortfall of \$83 million can be expected. The inability to provide needed funding may result in deteriorating runways and infrastructure, closing airports, and losing business and recreational travel. All of these possible outcomes will negatively impact the economy of local communities and the state.

## **CHAPTER SIX—RURAL RAILROAD SYSTEM IN TEXAS**

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### **Historical Overview of Railroads in Texas**

Railroads in Texas date back to the 1850s. Although the first railroad charter was granted by the Republic of Texas in 1836, early attempts to finance and construct railroads were hindered by lack of capital and difficult terrain. Rail service started in the state in 1853 with the opening of 20 miles of rail between Harrisburg and Stafford by the Harrisburg Railroad and Trading Company (40).

Railroads fostered the development and settlement of many parts of the state. To encourage railroad companies to build new lines, the state and some local counties offered incentives such as land grants, bond issuances, and loans. By 1860, there were almost 400 miles of track in operation in the state. The Civil War slowed the development of railroads throughout the country, including Texas.

The railroad industry began a boom period after the War, and major sections of rail were built in the state during the late 1860s and 1870s. For example, the Texas and Pacific Railway opened a 251 mile line from Texarkana to Sherman and from Longview to Eagle Ford in 1873. By 1891 there were approximately 8,700 miles of rail lines in the state. Railroading reached its peak in Texas in the 1930s, with the operation of some 17,500 miles of track (40).

During the late 1800s and early 1900s, railroads were the primary means of intercity transportation for not only freight, but also people. Most railroads provided both passenger and freight service, although freight was the major source of rail revenues. Rail passenger service reached a peak in 1920 when 30 million passengers were carried (41).

The advent of the Interstate system and the emergence of trucking after World War II started the decline in the railroad industry. For example, in 1940 approximately 61 percent of intercity freight ton miles were by rail, compared to 37 percent in 1975 (42). The abandonment of rail lines became widespread during this period throughout the country, including Texas. By 1976, there were eight major railroads and additional unaffiliated carriers operating service on approximately 13,200 miles of track in the state (43).

Rail passenger service and ridership also declined during this period. In 1945, some 23 million passengers were carried by rail compared to less than 400,000 in 1970. With the passage of Federal Rail Passenger Service Act of 1970, which created the National Rail Passenger Corporation or AMTRAK, private rail companies stopped operating passenger service in Texas (43).

The 1980 Federal Staggers Rail Act, which deregulated the rail industry, also contributed to the abandonment of unproductive lines. Between 1981 and 1993, some 1,670 miles of track were abandoned in the state. Many of these lines served smaller communities and rural portions of the state. Today, railroads operate approximately 14,400 miles of track in Texas (44).

The 1980s and 1990s were characterized by numerous mergers of Class I railroads. In the late 1970s, there were eight Class I railroads operating in the state. By 1994, mergers resulted in reducing this number to five. The recent merging of the Burlington Northern and the Santa Fe railroads and the Union Pacific purchase of the Southern Pacific leaves three Class I Railroads in the state.

State and federal legislation has addressed railroad practices over the decades. In 1853, the Texas Legislature passed an act to regulate railroad companies, which included requirements for annual reports, regulation of rates, liability for debts, requirements for crossings and facilities, and authorization for the state to purchase railroads. The monopolistic pricing employed by the railroad industry in Texas and throughout the country in the late 1800s led to further measures, including the establishment of the TRC in 1891. This legislation, and subsequent amendments, granted the Commission powers to administer laws relating to railroads, determine passenger fares and freight rates, maintain records associated with railroad revenues and expenses, address rail safety issues, and examine fiscal issues, fixed facilities, and traffic services. In response to provisions of the 1980 Federal Staggers Rail Act, the Texas Railroad Commission discontinued its rate setting role in 1984 (40, 41).

In 1976, the TRC was designated by the governor as the rail planning agency for the state for the purpose of the 4R Act. A Rail Planning section was established within the Transportation Division and charged with developing the Texas State Rail Plan. The Rail Planning group also oversees the Federal Railroad Administration (FRA) sponsored Local Rail Freight Assistance (LRFA) Program, which provided funds for track rehabilitation projects on deteriorated low volume rail lines that are considered essential for the preservation of local rail freight service. The Texas Railroad Commission completed a state rail plan in 1979, which was updated in 1984. Rail is also one of the modes included by TxDOT in the current statewide Transportation Plan.

### **Freight Rail Services in Texas**

Rail services in Texas can be divided into the two broad categories of freight railroads and passenger trains. The Surface Transportation Board (STB), and its predecessor agency, the Interstate Commerce Commission (ICC), apply three categories—Class I or large railroads, Class II or small railroads, and Class III or short line railroads—to classify freight lines based on annual operating revenues. The Association of American Railroads (AAR) currently uses the four categories of Class I Railroads, Regional Railroads, Local Railroads, and Switching and Terminal Railroads to classify rail systems.

[Table 12](#) highlights the number of railroads and miles of track in the state based on the three categories used by the STB. [Table 13](#) lists the individual railroads and the corresponding track mileage for each within these categories, with the Class III lines subdivided by local railroads and switching and terminal railroads. Information from the TRC, AAR, and additional telephone calls to some railroads was used to compile the list in [Table 13 \(44, 45\)](#).

Figure 20 illustrates the Class I railroad lines in the state, and Figure 21 shows the Class II and Class III railroads. Given the dynamic nature of the rail industry, it is difficult to obtain current information on the number of railroads operating in the state and the miles of track. The characteristics associated with the railroads in each of these categories are summarized briefly below. More detailed information on the rail lines serving rural areas in the state is provided in the following sections.

**Class I Railroads.** Class I railroads are classified as having annual revenues of at least \$250 million for three consecutive years. The three Class I railroads currently operating in Texas are the Burlington Northern and Santa Fe Railway Company (BNSF), the Kansas City Southern Railway Company (KCS), and the Union Pacific Railroad Company (UP). Figure 17 highlights the track systems operated by these railroads, which primarily serve major metropolitan areas, ports, and other key industrial and commercial locations. UP is the largest railroad in the state with some 6,339 miles of track, followed by BNSF with 4,689, and KCS with 381. Combined, the three railroads operate a total of 11,409 miles of track in the state. These railroads impact rural parts of the state through stops in some areas, links with Class II and Class III railroads, and the movement of commodities by truck to major rail terminals.

**Class II Railroads.** Class II railroads are usually characterized as having annual operating revenues of \$20 million to \$250 million. The Texas Mexican (Tex Mex) Railway and the South Orient Railroad Company, Inc., are both listed as Class II Railroads. The South Orient has recently cut back service, however.

**Class III Railroads.** Class III railroads have annual system operating revenues of less than \$20 million for three consecutive years. Class III railroads include the subcategories of local railroads and switching and terminal railroads. There are 42 Class III railroads in the state, operating approximately 1,515 miles of track. These companies range in size from the Longhorn Railway Company, which operates 162 miles of track, to the Western Railroad Company with one mile of line. These railroads are oriented toward rural parts of the state and provide links to Class I railroads.

The rail network in the state is further supported by truck and port intermodal facilities. Major truck/rail connections are located in Amarillo, Dallas/Fort Worth, El Paso, Harlingen, Houston, Laredo, Marshall, and San Antonio. Rail/port connections are located in Beaumont, Brownsville, Corpus Christi, Freeport, Galveston, Houston, Port Lavaca, Orange, and Port Arthur (46).

**Table 12. Classification of Freight Railroads in Texas.**

	<b>Number of Freight Railroads</b>	<b>Miles of Railroad</b>	
		<b>Excluding Trackage Rights</b>	<b>Including Trackage Rights</b>
Class I	3	8,765	11,409
Class II	2	711	1,098
Class III	42	1,427	1,515
	47	10,903	14,022

(44, 45)



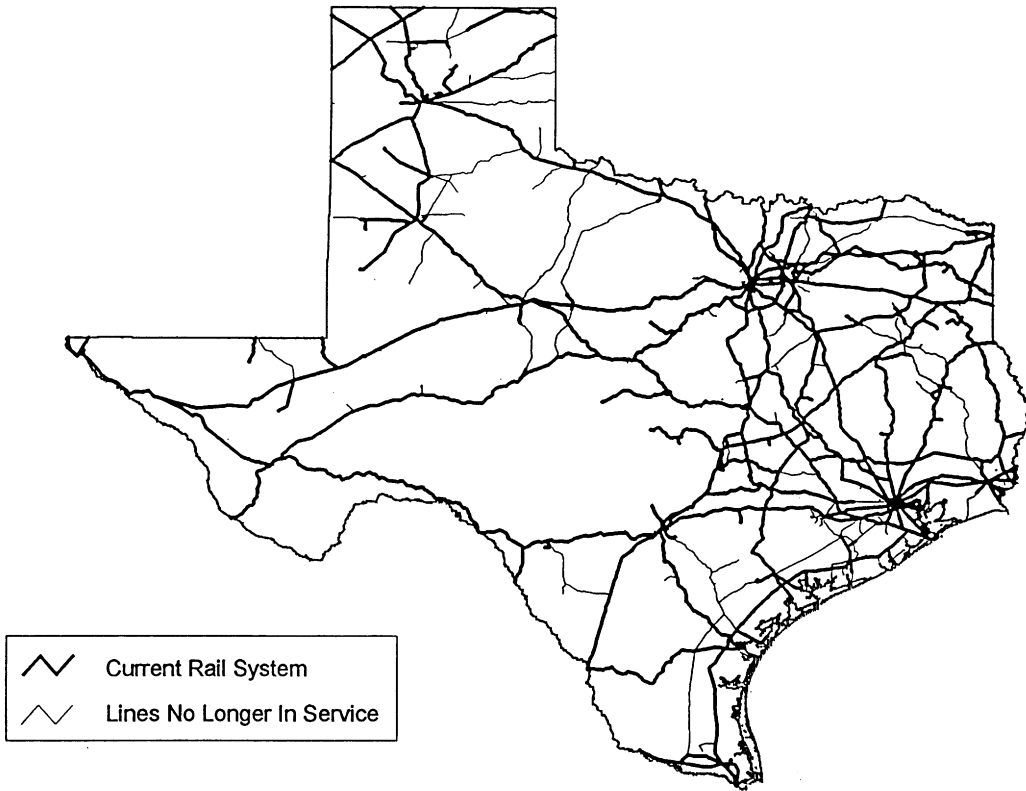
**Table 13. Freight Railroads Operating in Texas.**

Type	Name	Miles of Track <sup>1</sup>
<b>Class I Railroads</b>	Burlington Northern and Santa Fe Railway Company	4,689
	Kansas City Southern Railway Company	381
	Union Pacific and Southern Pacific Railroad Company	6,339
<b>Class II Railroads</b>	Texas Mexican Railway	544
	South Orient Railroad Company, Ltd	554
<b>Class III Railroads</b> Local Railroads	Angelina & Neches River Railroad	15
	Blacklands Railroad	30
	Border Pacific Railroad	32
	Georgetown Railroad	30
	Gulf, Colorado & San Saba Railway	68
	Kiamichi Railroad Company, L.L.C.	13
	The Longhorn Railway Company	162
	Panhandle Northern Railroad	31
	Pecos Valley Southern Railway	34
	Point Comfort & Northern Railway	16
	Rockdale, Sandow & Southern Railroad	10
	Sabine River & Northern Railroad	40
	South Plains Lamesa Railroad, Ltd.	55
	Texas & New Mexico Railroad	34
	Texas & Northern Railway Company	8
	Texas North Western Railway	43
Timber Rock Railroad, Inc.	44	
West Texas & Lubbock Railroad Company	104	
Western Rail Road Company	1	

**Table 13. Freight Railroads Operating in Texas - Continued.**

Type	Name	Miles of Track <sup>1</sup>
Switching & Terminal Railroads	Alamo Gulf Coast Railroad Company	10
	Brownsville & Rio Grande Intl. Railroad	41
	CMC Railroad, Inc.	5
	Corpus Christi Terminal Railroad, Inc.	23
	Dallas, Garland & Northeastern Railroad	98
	East Texas Central Railroad	38
	Fort Worth & Western Railroad Company	41
	Galveston Railway, L.P.	43
	Houston Belt & Terminal Railway	54
	Moscow, Camden & San Augustine Railroad	7
	Orange Port Terminal Railway	1
	Port Terminal Railroad Assoc.	37
	Rio Valley Switching Company	78
	South Plains Switching Ltd. Company	5
	Southern Switching Company	15
	Southwestern RR Company, Texas Division	76
	Texas City Terminal Railway	5
	Texas Northeastern Railroad	117
	Texas South-Eastern Railroad	12
	Texas Transportation Company	1
Texas, Gonzales & Northern Railway Company	12	
Texas Rock Crusher Railway Company	6	
Wichita, Tillman & Jackson Railway Company	20	

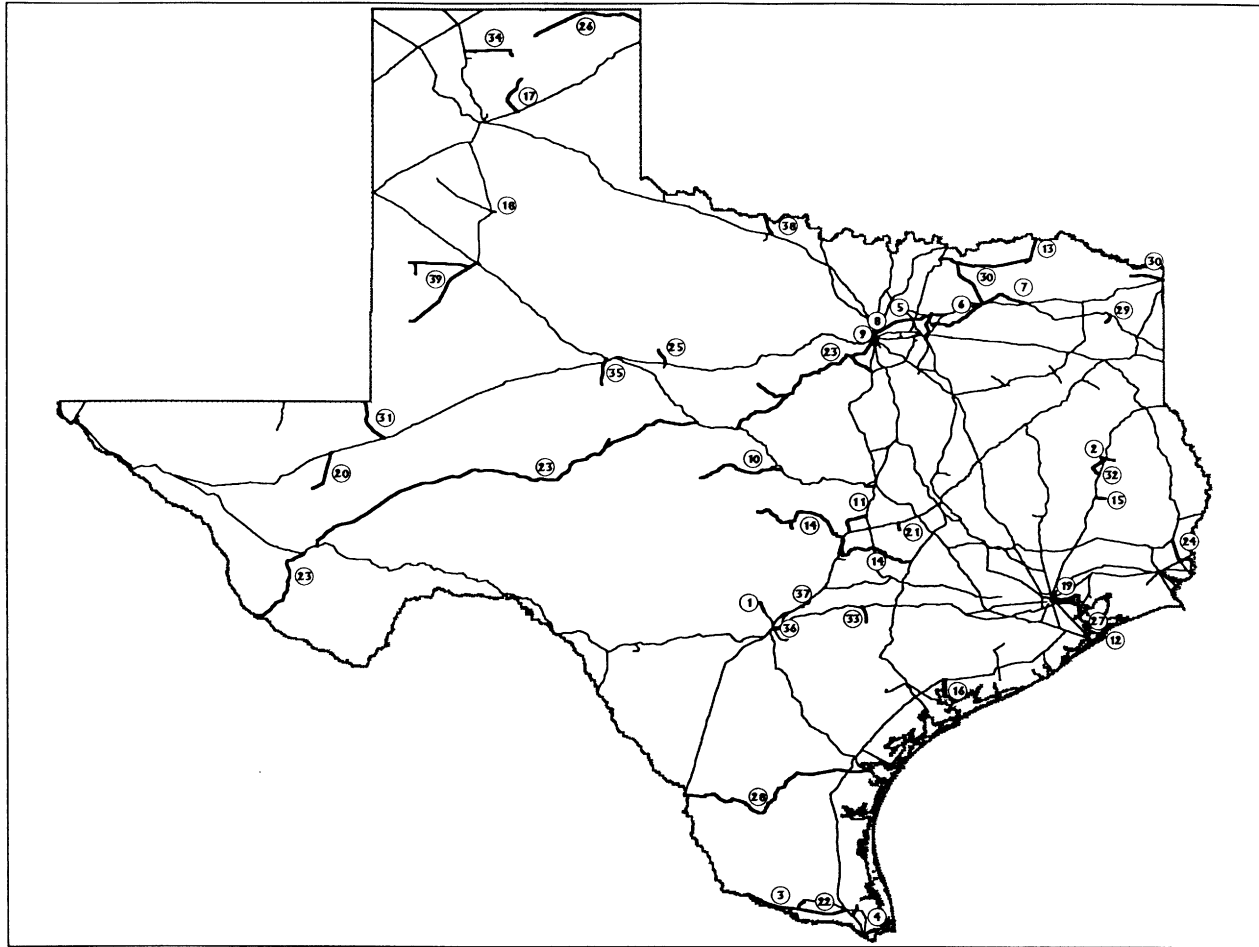
<sup>1</sup> Includes trackage rights.  
(44, 45)



**Figure 20. Class I Railroads in Texas.**

(44)

# Texas Shortlines



Reporting Name	
1. AGCR - Alamo Gulf Coast	20. PVS - Pecos Valley Southern
2. ANR - Angelina & Neches River	21. RSS - Rockdale, Sandow & Southern
3. BOP - Border Pacific	22. RVSC - Rio Valley Switching
4. BRG - Brownsville & Rio Grande International	23. SO - South Orient
5. DART - Dallas Area Rapid Transit	24. SRN - Sabine River & Northern
6. DGNO - Dallas, Garland & Northeastern	25. SSC - Southern Switching
7. ETC - East Texas Central	26. SW - Southwestern
8. FWDB - Fort Worth & Dallas Belt	27. TCT - Texas City Terminal
9. FWWR - Fort Worth Western	28. TM - Texas Mexican Railway
10. GCSR - Gulf, Colorado & San Saba	29. TN - Texas & Northern
11. GRR - Georgetown Railroad	30. TNER - Texas Northeastern
12. GVSR - Galveston Railroad	31. TNMR - Texas-New Mexico
13. KRR - Kiamichi	32. TSE - Texas South-Eastern
14. LHRR - Longhorn Railway	33. TXGN - Texas Gonzales & Northern
15. MCSA - Moscow, Camden & San Augustine	34. TXNW - Texas North Western
16. PCN - Point Comfort & Northern	35. TXOR - Texas Oklahoma
17. PNR - Panhandle Northern	36. TXTC - Texas Transportation
18. PTC - Plainview Terminal	37. WRRC - Western
19. PTRR - Port Terminal Railroad Association	38. WTJR - Wichita, Tillman & Jackson
	39. WTLR - West Texas & Lubbock

(44) **Figure 21. Class II and Class III Railroads in Texas.**

Note: The DART (5) reference is for the Trinity Express, the Commuter Rail in the Dallas/Ft. Worth Area.

## Rural Rail Transportation Districts

State legislation passed in 1981 and amended in 1997 allows for the creation of Rural Rail Transportation Districts (RRTD) by a single county or multiple counties acting together. The initial legislation was adopted in response to concerns over the negative economic impacts of railroad abandonments in rural portions of the state. The laws authorized one or more eligible counties to form a district. To be eligible, a rail line within the counties must have been abandoned or be in the process of being abandoned through a bankruptcy court or STB proceeding. Counties with any rail line carrying three million gross tons per mile per year or less were also eligible.

A district may be established based on approval of the commissioners' court in the county or counties. The legislation grants RRTDs relatively broad powers to purchase existing railroads, to develop new rail systems, and to finance, maintain, and operate these services. Districts may acquire needed property through eminent domain, may enter into agreements with other public and private entities, and may perform a variety of other functions. A board appointed by the county commissioners is responsible for overseeing the activities of the district.

As of July 1999, 11 RRTDs had been established in the state. [Table 14](#) highlights the name and county or counties included in each of the districts and [Figure 22](#) illustrates the location of these districts. A telephone survey was conducted to obtain current information on the status of Rural Rail Districts in the state. Researchers contacted representatives at eight of the 11 districts by telephone and discussed past actions, current activities, and anticipated future efforts. Researchers were unable to reach representatives at two districts due to a non-current telephone number and a non-returned call. The following summarizes the results from the telephone survey and recent information from the Texas Railroad Commission ([45](#)).

**Deep East Texas Rural Rail Transportation District.** Fifteen counties in East Texas formed this RRTD to protect and preserve the premature removal of track in the region. There were no plans to purchase any abandoned railroad lines at the time of the survey, but future activities may include buying available lines and operating short line railroads.

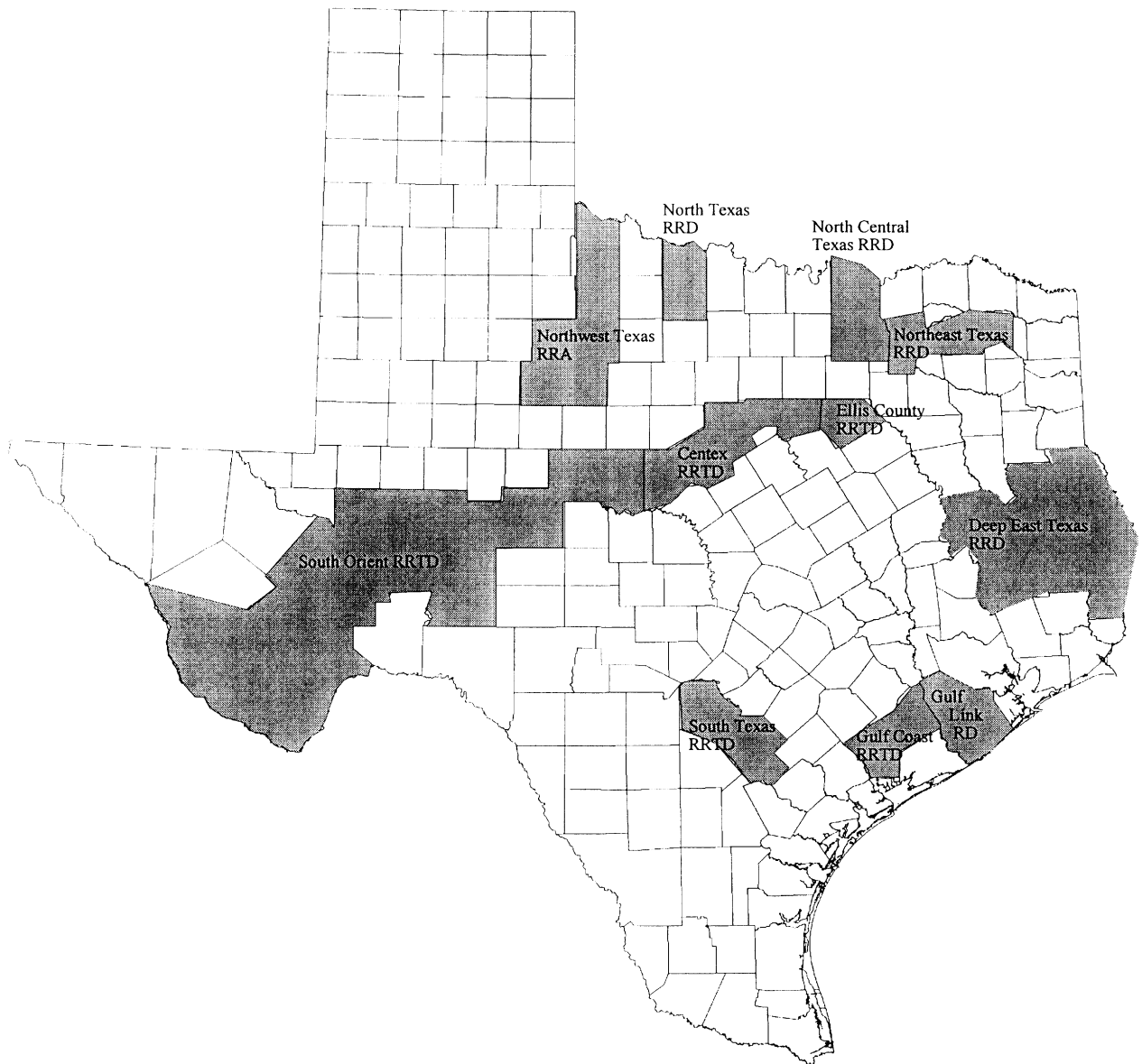
**Ellis County Rural Rail Transportation District.** This RRTD was established in response to concerns over potential rail abandonments within Ellis County. It is currently involved with RailPort, an industrial park served by a shortline railroad with connections to UP and BNSF lines, which is being developed by Texas Industries.

**Gulf Coast Rural Rail Transportation District.** This RRTD encompasses Jackson and Wharton Counties. The district has established a board of directors, elected a chairman, and adopted bylaws. The RRTD has been following the negotiations between KSC, owners of the Tex-Mex Railroad which runs through the two counties, and UP. KCS has been working to purchase a portion of track from the UP to enhance its operations.

**Table 14. Rural Rail Transportation Districts in Texas.**

Name of District	Counties Included in District
Centex Rural Rail Transportation District	Brown, Commanche, Erath, Hood, and Johnson
Deep East Texas Rural Rail District	Angelina, Houston, Jasper, Nacogdoches, Newton, Polk, Sabine, San Augustine, San Jacinto, Shelby, Trinity, and Tyler
Ellis County Rural Rail Transportation District	Ellis
Gulf Coast Rural Rail Transportation District	Jackson and Wharton
Gulf Link Rail District	Brazoria and Fort Bend
North Central Rural Rail District	Collin and Grayson
North Texas Rural Rail Transportation District	Archer and Wichita
Northeast Texas Rural Rail District	Hunt, Hopkins, Franklin, and Titus
Northwest Texas Rural Rail Authority	Hardeman, Foard, Knox, Fisher, Stonewall, Haskell, and Jones
South Texas Rural Rail Transportation District	Bexar, Karnes, and Wilson
South Orient Rural Rail Transportation District	Brewster, Coleman, Crane, Crockett, Irion, Pecos, Presidio, Reagan, Runnels, Tom Green, and Upton

**North Central Rural Rail Transportation District.** Grayson and Collin Counties comprise the North Central RRTD. The district is exploring alternatives for abandoned railroad lines within the two counties. It is also monitoring the operation of the line between Plano and Sherman by the Dallas Garland & Northeastern Railroad under lease from UP.



**Figure 22. Rural Rail Transportation Districts.**

**North Texas Rural Rail Transportation District.** This RRTD encompasses the two counties of Archer and Wichita. The district has completed a number of activities over the past few years. These activities include establishing a board of directors, adopting bylaws, and acquiring an abandoned rail line. The North Texas RRTD took legal action in an attempt to save the portion of the Wichita Valley line in the two counties. The case was settled for the railroad in Federal Court, however, and the operating line was abandoned. The North Texas RRTD purchased the rail right-of-way through the land-banking program and is planning to develop a hiking, biking, and equestrian trail.

**Northeast Texas Rural Rail Transportation District.** The Northeast Texas RRTD, which includes Hunt, Hopkins, Franklin, and Titus Counties, is one of the most active districts in the state. The Northeast Texas RRTD purchased the 32-mile segment of the Southern Pacific Railroad from Greenville to Sulphur Springs and is operating it as the East Texas Central Railroad. The district is in negotiations to purchase a further segment of the line to the east of Sulphur Springs. The short line has had a positive impact on the local economy. A 25 percent increase in employment at Sherwood Medical Industries in Commerce has been documented. The plastics manufacturing company uses the railroad for shipping. The district is also exploring other existing industries which could use the line, as well as attracting new firms to the area.

**South Orient Rural Rail Transportation District.** Eleven counties in Southwest Texas formed the South Orient RRTD to address concerns related to rail abandonments in the area. In 1991, the district purchased the track and operating freight easements on a section of line running from Coleman to Presidio Counties from the Santa Fe Railroad. TxDOT purchased the right-of-way for this section. The line was leased to the South Orient Railroad Company, Ltd. Currently, the railroad is operating only on the section between the City of San Angelo and San Angelo Junction. State legislation passed in 1999 provides \$6 million for the purchase of the rail located on the TxDOT-owned right-of-way.

**South Texas Rural Rail Transportation District.** The South Texas RRTD encompasses the three counties of Bexar, Karnes, and Wilson. The district attempted to purchase a portion of line being abandoned, but the rail was removed by the railroad before the district was able to obtain it. The South Texas RRTD has not been able to raise the funds needed to buy the abandoned right-of-way.

In addition to these RRTDs, at least one other district was formed and disbanded. The South Plains RRTD was formed in the late 1980s by eight counties in the Lubbock area. As discussed later in the West Texas and Lubbock Railroad case study, this RRTD was established to address possible rail abandonments in the region. The district examined options for purchasing and operating railroads in the eight counties but disbanded after some of the lines were purchased by shortline railroads.



## Economic Impacts of Freight Railroads and Case Studies

Freight railroads contribute significantly to the Texas economy, as well as the national economy, in a number of ways. Approximately 16,000 individuals in the state were employed by the freight rail companies in 1997, accounting for \$800 million in total wages. In addition, some \$400 million in retirement benefits were paid to the 38,800 retired railroad employees residing in the state (44).

Railroads play a vital role in transporting commodities between destinations within the state and into and out of Texas. In addition, Texas is the gateway for rail freight traffic into and out of Mexico, with five of the seven rail crossings located in the state. Currently, approximately 70 percent of rail freight traffic into Mexico goes through Texas. The major international gateways are located at El Paso, Eagle Pass, Laredo, and Brownsville, with Presidio providing a fifth rail port of entry. Railroads operating in the state link Mexico and Canada, as well as both the east and west coasts of the U.S.

In 1997, approximately 6 million carloads were transported by rail into and out of the state, accounting for some 277 million tons. As highlighted in Tables 15 and 16, chemicals and nonmetallic minerals, which include sand, gravel, crushed stone, and cement, accounted for the largest share of commodities originating in the state, while coal accounted for the single largest product transported into Texas (44). UP is the nation's largest hauler of chemicals, with most originating from the industries southeast of Houston. UP also transports coal from the Powder River Basin in Wyoming and other locations to power plants in Corpus Christi and other Texas cities. Non-metallic minerals and farm products are also shipped into the state by rail.

In addition, railroads reduce the demand on the roadway system in the state. Truck volumes on highways, roads, and bridges would increase significantly without the railroad network, placing additional demands on the infrastructure and increasing traffic congestion.

A survey of Class II and III railroads in the state was completed by TTI researchers as part of another research project. This survey obtained information on the number of employees, revenues, miles of rail, average length of haul, the volume and type of traffic, and the commodities carried. Questions relating to future capital plans, new business opportunities, the impact of recent Class I railroad mergers, and other issues were also included. Thirty-three, or 82 percent, of the 40 railroads in these categories at the time responded to the survey.

Additional telephone calls were made to selected railroads as part of this research project, and other information sources were reviewed to complete the case studies presented in this section. General information obtained through the surveys is presented first, followed by more detailed descriptions of two case studies.

Railroads in these three categories are all relatively small. Eight railroads have 10 miles of track or less, including three companies with just one mile of line. Twenty-one railroads operated between 11 and 50 miles of track; six own 51 to 100 miles, and four operate 101 to 200 miles.

Twelve of the railroads have 10 or fewer employees; 11 reported from 11 to 25 employees, and six have 26 to 50 employees. Four railroads did not respond to this question.

**Table 15. Railroad Traffic in Texas - Tons Originated in 1997.**

	<b>Tons</b>	<b>Percentage</b>
Chemicals	32,700,375	34%
Nonmetallic Minerals	17,633,301	18%
Petroleum Products	7,783,938	8%
Mixed Freight	6,637,797	7%
Food Products	4,257,968	4%
All Other	27,334,619	28%
	96,347,998	100%

(44)

**Table 16. Railroad Traffic in Texas - Tons Terminated in 1997.**

	<b>Tons</b>	<b>Percentage</b>
Coal	47,072,861	30%
Nonmetallic Minerals	20,992,089	13%
Farm Products	20,225,487	13%
Chemicals	19,217,427	12%
Food Products	9,922,114	6%
All Other	41,877,889	26%
	159,307,875	100%

(44)

The majority of Class II and III railroads are owned and operated as private businesses. The survey results indicate that 23 are in independent private ownership; five are owned by shippers; two are subsidiaries of other railroads; one is under local government control, and two listed other non-identified ownership.

Class II and III railroads carry a variety of commodities. The most frequently reported commodities and the number of responses were farm products (13); non-metal materials (11); food and kindred (9); petroleum and coal (6); waste and scrap materials (6); clay, glass, and stone (6); lumber and wood (5); primary metals (4); and chemicals (4). Four railroads reported shipping only one product. These were non-metal materials, rubber/miscellaneous, food and kindred, and farm products. Three railroads indicated carrying over 90 percent of one commodity, while 17 reported 50 percent of one product.

The survey also provided information on the development of the Class II and III railroads. Four railroads were established by or prior to 1925. These are the Galveston Railroad (1907), the Pecos Valley South Railway (1911), the Rockdale, Sandow & Southern Railroad (1923), and the Texas Transportation Company (1925). One railroad was established in the 1950s, one in the 1970s, eight in the 1980s, and 19 in the 1990s. Companies formed in the 1980s and 1990s were previously parts of larger railroads. Seven were formerly part of the Atcheson, Topeka, and Santa Fe system; six were owned by Union Pacific; three were part of the Southern Pacific; three were in the Missouri Pacific system; two were part of Burlington Northern; and one each was formerly with the Chicago Rock Island line and the St. Louis Southern.

In keeping with the relatively small amount of track operated by these railroads, the reported average length of haul was also short. Nine of the railroads have average hauls of five miles or less; 11 average between 6 and 20 miles; seven average between 21 and 50 miles, and five average over 50 miles.

The linking function of these railroads is supported by the reported interchanges with other railroads. All of the 33 railroads responding to the survey interchange with at least one other railroad. Twenty-two have connections with just one other railroad, while four connect with two other railroads, three with three railroads, one each with four and five other lines, and one with six other lines.

Case studies of two local railroads—the West Texas and Lubbock Railroad and the Texas Mexican Railway—are highlighted next. These case studies illustrate the importance of local support, links to other railroads, and strong parent companies in the success of local railroads.

**West Texas and Lubbock Railroad.** The West Texas and Lubbock Railroad provides a good case study of the impact of railroad mergers, rail abandonments, rural rail districts, and successful local railroads. The current West Texas and Lubbock Railroad was once part of an extensive system of lines known as the Lubbock Cluster.

The South Plains and Santa Fe Railroad constructed the first rail line between Lubbock and Seagraves in 1918, followed by the track from Doud to Bledsoe in 1925. Both lines were acquired by the Panhandle and Santa Fe Railroad in 1949. The Panhandle and Santa Fe was merged into the Atchison, Topeka, and Santa Fe Railroad in 1965. Other segments of the Lubbock Cluster owned and operated by the Santa Fe included lines between Lubbock and Crosbyton, Slaton and Lamesa, and Plainview and Floydada.

In a cost-cutting move, the Santa Fe began to sell and/or abandon line segments in the area in the 1980s. Amerail purchased the lines between Lubbock and Whiteface and Lubbock and Seagraves in 1990. Amerail began operating service on the 104 miles of track under the Seagraves, Whiteface, and Lubbock Railroad Company (SWLR) name. Another subsidiary of Amerail purchased the Plainview to Floydada line and operated the Floydada and Plainview Railroad until 1994 when it was abandoned (47).

The line from Lubbock to Crosbyton was sold and operated for a short time as the Crosbyton Railroad but was also abandoned. The South Plains Lamesa Railroad Ltd. purchased the segment between Slaton and Lamesa in 1994. This line and a short switching line near Plainview continue to operate.

In 1995, SWLR was acquired by RailAmerica, a diversified international transportation company that focuses primarily on acquiring and operating shortline railroads. Since its formation in 1986, RailAmerica has purchased a number of shortline railroads throughout the country and the world. RailAmerica currently owns and operates 11 shortline railroads in the United States, as well as railroads in Canada, Australia, and Chile. The company diversified its holdings further by acquiring Kalyn/Siebert, which manufactures speciality truck trailers and is headquartered in Gatesville, Texas, and Kalyn/Siebert Canada and RailAmerica Equipment Corporation, which provides short- and medium-term leasing and financing of transportation equipment (48, 49).

The South Plains RRTD was formed in the late 1980s in response to concerns that rail lines in the area would be abandoned. The district included eight counties—Floyd, Hockley, Lubbock, Crosby, Terry, Lynn, Gaines, and Dawson—impacted by the railroads. The district commissioned a study of the lines and possible alternatives for future operations (50).

The district was later disbanded as it was felt there was no need for it. A further assessment of SWLR was conducted for the TxDOT Lubbock District as part of the Environmental Impact Study (EIS) for upgrading U.S. Highway 82. TTI also examined the railroad for the district as part of the EIS process (47).

Information for these two studies, along with current data from RailAmerica, provides a good picture of the current operations of the railroad. In 1998, the West Texas and Lubbock Railroad moved approximately 4,400 carloads of cotton, sodium sulfate, chemicals, fertilizer, scrap iron, and steel. Also in 1991, industrial chemicals and agricultural chemicals

accounted for just over 50 percent of the carload traffic base. In 1991, the line between Lubbock and Whiteface served 10 businesses in five communities, while the segment from Lubbock to Seagraves served 29 customers in eight communities. Grain companies, fertilizer and chemical businesses, and manufacturing industries represented the primary clients along the two lines. Approximately 34 inactive and potential customers were identified along the routes.

The West Texas and Lubbock Railroad continues to be a vital part of the transportation system in the region and a major part of the local economy. The line between Seagraves and Lubbock will be relocated as part of the U.S. Highway 82 improvements. It is anticipated that the new line will be open and operating in the summer of 2001.

A number of elements appear to contribute to the ongoing successful operation of the West Texas and Lubbock Railroad. These include an active and supportive local community effort, the involvement of the Lubbock TxDOT District, promoting the line with local industries, and a strong and financially sound operating company.

**Texas Mexican Railway.** The Texas Mexican Railway (Tex Mex) owns 157 miles of track between Corpus Christi and Laredo. Tex Mex, which is part of the Kansas City Southern Rail network, also has operating rights over 400 miles of line between Corpus Christi, Houston, and Beaumont. As a result, Tex Mex is an important component of Kansas City Southern's *NAFTA* rail system linking Mexico and Canada.

Work on the railroad started in 1856, and the first 26 miles of track between Corpus Christi and Banquete were opened in 1877. The 162-mile line to Laredo was completed in 1881, and the railroad was the first to provide service to Mexico at this border crossing. A permanent bridge linking Laredo to Nuevo Laredo was opened in 1883, and in 1889 the railroad between Mexico City and Nuevo Laredo was completed, linking Mexico, the U.S., and Canada.

The Mexican government controlled the railroad between the early 1900s and 1982, when it was sold to Transportacion Maritima Mexicana (TMM), a Mexican shipping company. In 1995, Kansas City Southern Industries (KCSI), the parent company of the Kansas City Southern Railroad, purchased 49 percent of Tex Mex from TMM. Trackage rights through Houston to Beaumont were obtained in 1997, allowing Tex Mex to link with the Kansas City Southern rail network in Beaumont. Thus, the *NAFTA* railroad name. A new yard and intermodal facility were completed in 1998 at mile post 9 to the east of the Laredo border crossing. KCSI also owns part of the Northwest Railway, Ferrocarril de Noreste, the primary line between Mexico City and Nuevo Laredo (51).

Tex Mex represents an important link in the Canada, U.S., Mexico trade route. The Tex Mex fleet includes 38 locomotives and 905 freight cars. Annual freight movement and operating revenues have increased steadily over the past few years. For example, in 1996, 34,000 carloads were transported, and operating revenues were \$15.5 million. In 1998, 73,700 carloads were moved with operating revenues of \$49.2 million (49).

### **Passenger Rail Service in Texas**

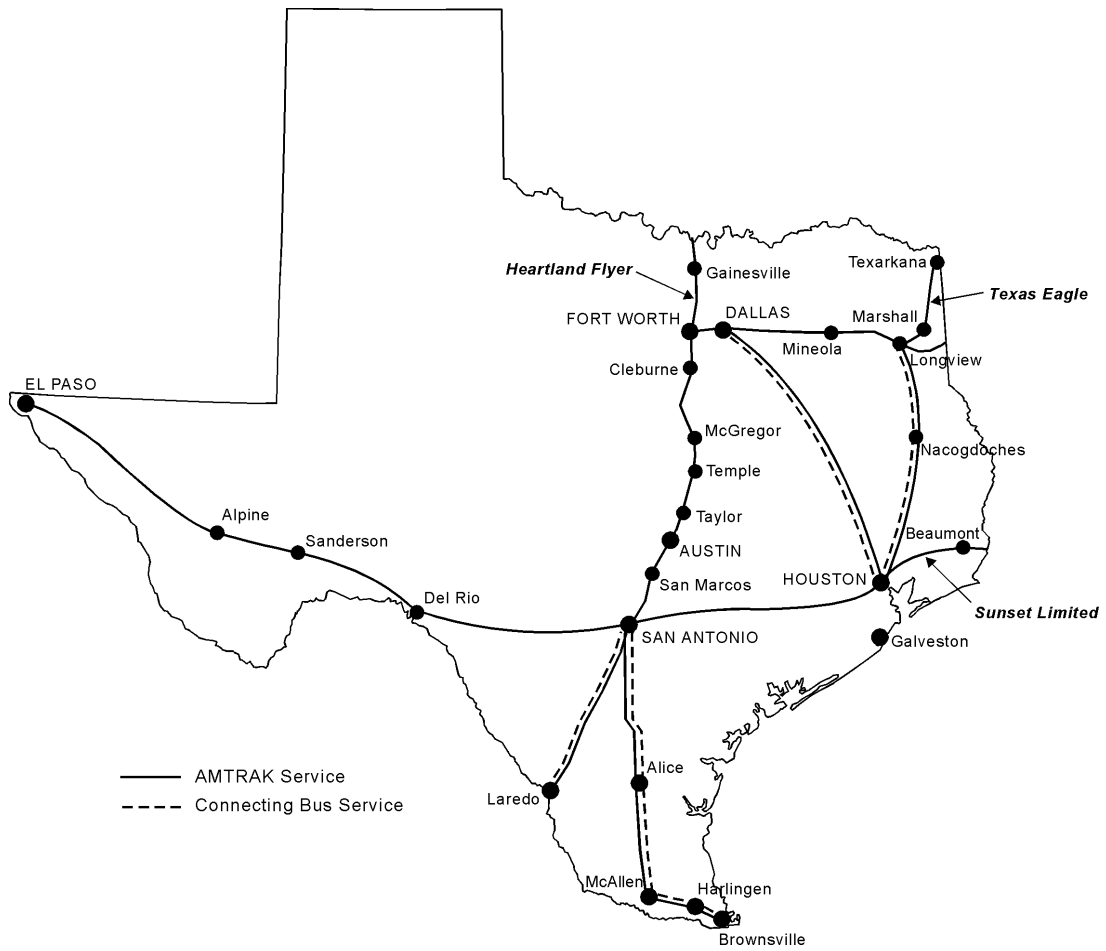
AMTRAK operates rail passenger service in the state. AMTRAK service in Texas has changed over the years. During the 1970s through the early 1990s, three routes were operated in the state. Rail service between San Antonio and Laredo was stopped in the 1980s, and service between Dallas/Fort Worth and Houston was discontinued in the 1990s. Motor coach connections are now provided to Houston and Laredo. A new route between Fort Worth and Oklahoma City was started in 1999. As highlighted in Figure 23, three AMTRAK lines—Texas Eagle, the Sunset Limited, and the Heartland Flyer—currently serve portions of the state.

AMTRAK's Texas Eagle provides service from Chicago to Los Angeles via St. Louis, Little Rock, Dallas, San Antonio, El Paso, and Tucson. Four trains a week operate in both directions. Service through Texas to Los Angeles operates on Wednesday, Friday, Saturday, and Sunday; trains from Los Angeles to Chicago are available on Tuesday, Wednesday, Thursday, and Sunday.

The Texas Eagle makes 16 stops in the state in addition to Texarkana. These stops include Marshall, Longview, Mineola, Dallas, Fort Worth, Cleburne, McGregor, Temple, Taylor, Austin, San Marcos, San Antonio, Del Rio, Sanderson, Alpine, and El Paso. In addition, thruway motorcoach connections are provided to Houston, Laredo, and Brownsville. Motorcoach links are operated from Bossier City, Louisiana, through Shreveport, Longview, and Nacogdoches to Houston; from San Antonio to Laredo; and from San Antonio through Alice and McAllen to Brownsville.

The Sunset Limited provides service between Los Angeles and Orlando. Three trips a week are provided in each direction. The Sunset Limited makes stops in Beaumont, Houston, San Antonio, Del Rio, Sanderson, Alpine, and El Paso. Motor coach connections are provided from Houston to Dallas and from San Antonio to Laredo.

Initiated in 1999, the Heartland Flyer links Oklahoma City and Fort Worth, with connecting service to Chicago and Los Angeles. Trains operate daily in both directions. In addition to Fort Worth, trains also stop in Gainesville on the almost five hour trip (52).



**Figure 23. AMTRAK Services in Texas.**

(52)

## Excursion Trains in Texas

In addition to AMTRAK, there are three excursion trains operating in Texas. These are the Tarantula Railroad in the Fort Worth area, the Texas State Railroad State Historical Park in Anderson and Cherokee Counties, and the Austin and Central Texas Railroad. These trains are oriented toward visitors and tourists, and are important elements of the local economy. The two historical railroads in rural areas are briefly described in this section, along with their impact on the local economy. The Tarantula Railroad, which operates from Grapevine to the historical stockyard area of Fort Worth, is not included.

**Texas State Railroad State Historical Park.** This 500 acre state park is located between Palestine and Rusk. The Texas State Railroad was acquired through state legislation in 1971. The railroad was restored by the Texas Parks and Wildlife Department, with assistance from the Texas Department of Corrections, and opened to the public in 1976. [Figure 24](#) illustrates the locomotive operated by the Texas State Railroad.



**Figure 24. Texas State Railroad.**

Construction of the Texas State Railroad was started in 1896 by inmates of the State Prison System. The railroad was built to transport iron ore and wood products to iron smelting furnaces at the East Texas State Penitentiary in Rusk. Iron products from the facility were used throughout the state, including in the columns and dome of the State Capital (R4). The line was extended to Palestine in 1909, and the railroad was operated by prison crews until 1921 when it was leased to the Texas & New Orleans Railroad (Southern Pacific Railroad). During the 1960s, it was leased to the Texas Southeastern Railroad.



Today, the Texas State Railroad is comprised of four steam engines, four antique diesel locomotives, 25 miles of track, 24 bridges, two train stations, and a steam engine restoration shop. Trains operate between the train stations in Rusk and Palestine (53).

**Austin and Central Texas.** In 1985, the city of Austin acquired 163 miles of track being abandoned by the Southern Pacific. The line runs from Giddings through Elgin and Manor to Austin and then west to Burnet, Llano, and Marble Falls. The city purchased the rail line primarily to preserve it for potential future mass transportation use. To help further this objective, the city sold the line to the Capital Metropolitan Transit Authority (Capital Metro) in 1997.

The line is currently being used for both freight and passenger service. After the city purchased the line, freight service was initially operated by RailTex, Inc., under the Austin & Northwestern Railroad name. In 1996, Longhorn Railway took over operation. The volume of freight has increased since this change.

The Austin Steam Train Association (ASTA), a community-based, non-profit group established in 1989, operates the Hill Country Flyer Weekend Excursion train on the 33-mile Cedar Park to Burnet route. ASTA also operates the Twilight Flyer, an occasional Saturday evening train, and a train in downtown Austin called the River City Flyer.

Service is provided using a restored 1916 Southern Pacific steam locomotive and renovated period passenger cars. Restoration of the locomotive and cars was accomplished through the voluntary efforts of ASTA, with supervision from a professional firm. The ongoing operation of the excursion trains is also a voluntary effort.

The Hill Country Flyer and other excursion trains currently attract some 22,000 passengers a year. The steam train has enhanced the economy of Burnet, where a depot, yard trackage, and other facilities have been provided. Passengers making the trip also visit local businesses before returning to Cedar Park (54).

## **Future Needs**

As highlighted in this chapter, freight railroads are a critical part of the transportation system in the state. Railroads transport chemical and petroleum products, nonmetallic minerals, agriculture produce, and other commodities from Texas. Freight railroads also bring coal and other goods into the state. Further, the rail network in Texas provides a vital international trade link, connecting markets in Mexico, the U.S., and Canada. In addition, intermodal facilities at Texas ports link the rail system with markets throughout the world.

Identifying and addressing the future needs of the railroad system in Texas is difficult. Unlike the roadway system, most railroads in the state are privately owned and operated. Given the highly competitive nature of the railroad industry, it is hard to obtain information from these companies on

current needs, future plans, and other issues. Institutional concerns relating to the movement of goods across the Texas/Mexico border, the role of TxDOT and the Railroad Commission in rail planning, and available funding also contribute to the difficulty in determining and addressing future improvements in the railroad system.

Elements that have been identified in other studies include addressing railroad grade crossing safety concerns, examining the impact of recent railroad mergers, enhancing intermodal connections, simplifying procedures at the Texas/Mexico border to reduce delays in rail shipments, infrastructure improvements, and preserving rail corridors for future rail or alternative uses (46, 47).

It is not possible to put a dollar figure on these needs. Many issues will require institutional changes, while funding for infrastructure improvements will be needed to address other problems. Maintaining an ongoing open dialog with the railroads, industries and shippers, local communities, the RRTDs, and other agencies will be important to future efforts.

## CHAPTER SEVEN—MULTIMODAL APPROACH TO RURAL TRANSPORTATION IN TEXAS

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The previous chapters have described the individual transportation modes operating in rural areas of Texas. Information on historical trends, current conditions, case studies, and future needs was presented for roadways, public transit and intercity bus services, general aviation airports, and railroads. As highlighted, each mode plays a critical role in moving people and goods in rural parts of the state and contributes to the economic health and vitality of rural areas.

While each mode is important individually, they become more significant when operated in a coordinated and compatible manner. Multiple modes are needed to meet the diverse transportation demands of residents and visitors, as well as transporting the wide range of raw materials, agricultural commodities, and products found throughout the state. Further, intermodal approaches involving more than one mode are often necessary. This chapter highlights a few examples of the multimodal and intermodal approaches currently used in the state and identifies future needs in these areas.

The exact modes, as well as the intermodal connections, depend on the characteristics of different parts of the state. Factors influencing the demand for various modes include the type of raw materials and commodities to be shipped, tourism and visitor attractions, the nature of local businesses, and other features. The roadway system is critical for individual travel as well as truck movements throughout the state. Roadways also provide key links to airports, rail terminals, and ports. Heavy and bulky commodities are transported by railroads in many parts of the state, while general aviation airports in these areas serve local business travel and transport high value, time-sensitive products. Rural transit operators and intercity buses provide mobility for individuals in these areas.

The following examples highlight multimodal and intermodal approaches currently in use throughout the state. Examples of multimodal and intermodal transportation linkage for travelers and for the shipment of raw materials and finished products are provided.

**Air and Truck Connections.** High value and time-sensitive products are frequently shipped by air, with local connections made by trucks or other delivery vehicles. Ellison Greenhouse, located in Brenham, grows and sells a wide range of flowers, plants, trees, and garden materials. Many of the plants are grown at the facility. Given the competitive global economy, however, many flowers and plants are purchased from growers in other parts of the country and world, and transported to Ellison's through a combination of air and truck. Products are flown into the Bush Intercontinental Airport in Houston by commercial airlines and shipped by truck to Brenham. Ensuring that the air to truck connections at Bush Intercontinental Airport occur in a rapid and efficient manner is important given the perishable nature of flowers and plants.

**Rural Transit Airports Links and Connections to Other Transit Systems.** Most rural transit systems provide service to local airports, and a few operate service to major airports, as requested, in the state. For example, Parker County Transportation provides on-request shuttle service to the Dallas/Fort Worth and Love Field Airports. In addition, other rural transit systems have coordinated service agreements with metropolitan transit authorities, allowing passengers to transfer between the two systems. CARTS and Capital Metro in Austin have a long standing agreement that provides links between the two systems.

**Truck and Rail Connections.** Intermodal truck and rail facilities are located in Amarillo, Dallas, Fort Worth, El Paso, Harlingen, Houston, Laredo, Marshall, and San Antonio. These facilities allow goods to be transferred between trucks and rail cars, maximizing the efficiency of both modes. Further, some industries use both rail and trucks to ship raw materials and finished products into and out of plants. For example, Hirschfeld Steel Company, Inc., in San Angelo brings in steel and other raw materials by rail and ships out finished products by truck.

**Rail and Port Intermodal Facilities.** Connections between railroads and water-borne ships are located at ports in Beaumont, Brownsville, Corpus Christi, Freeport, Galveston, Houston, Lavaca, Orange, and Port Arthur. These facilities provide access to worldwide markets for commodities from Texas and other parts of the country. They also bring goods, such as automobiles, into Texas which are moved by rail to locations throughout the state and North America.

Maintaining the existing individual modal infrastructures and intermodal facilities is critical to ensuring the safe and efficient operation of the transportation system in Texas. The future needs associated with the various modes were highlighted in the previous chapters. In addition to maintaining and enhancing each mode, improvements are also needed to the intermodal facilities and operations. A TxDOT study being conducted by the Center for Transportation Research (CTR) is examining the intermodal system in the state and needed enhancements. The results of that project can be used to better target needed physical improvements at existing facilities, new intermodal terminals, and changes in operating policies or institutional arrangements.

As discussed in this report, all elements of the transportation system are critical to the economic health and vitality of rural portions of the state. Overall, the general condition of all modes in the state—roadways, public transit and intercity buses, general aviation airports, and railroads—is good. Providing adequate funding to maintain each mode, to add needed infrastructure improvements, and to support ongoing operations is critical to ensure that the state continues to maintain its position in the U.S. and the global economy.

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