ARK-TEX COUNCIL OF GOVERNMENTS
SULPHUR RIVER BASIN AUTHORITY

Population Study

Northeast Texas Population Growth Evaluation

FINAL / September 2023

TBPELS No. F-882

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Abbreviations

ACS	American Community Survey
ATCOG	Ark-Tex Council of Governments
CQR	Count Question Resolution
DHC	Demographic and Housing Characteristics
EZP	Enterprise Zone Program
LRA	Local Redevelopment Authority
MSA	Metropolitan Statistical Area
OMB	Office of Management and Budget
PES	Post-Enumeration Survey
RWP	Regional Water Plan
SDF	Skills Development Fund
SRBA	Sulphur River Basin Authority
SWP	State Water Plan
TEF	Texas Enterprise Fund
TDC	Texas Demographic Center
TSDC	Texas State Data Center
USACE	United States Army Corps of Engineers
UTRWD	Upper Trinity Regional Water District

SECTION 1 STUDY GOALS AND DRIVERS

1.1 Study Goals and Drivers

This study was directed by the Ark-Tex Council of Governments (ATCOG) and the Sulphur River Basin Authority (SRBA) to investigate the long-term projection of population and housing for a ten-county region in Northeast Texas. The study area has experienced variations in growth over the past decades, with both accelerated and slowed periods of population growth. As a whole, the Texas economy is fast-growing, and population is rapidly increasing, driven by a business-friendly environment (Perryman Group, 2020). Planning for housing, infrastructure, and water resources can take a significant number of years, and even decades, so anticipating growth is essential for the services provided by the ATCOG and SRBA.

The Texas Demographic Center (TDC) produces county-level population projections on a biennial basis. These projections are relied upon by local, regional, and state planning agencies for long-term planning purposes, including the State Water Plan (SWP) and Regional Water Plans (RWPs), where the TDC population projections are used for estimating water demands and resulting supply and infrastructure needs. Historically, the TDC projections have been the primary source of population estimates for the region. The TDC projections for the region have varied significantly over the last decade. These swings plus with recent changes to growth patterns, some of which are thought to be related to the pandemic, prompted a closer look at population trends and future growth potential for the region resulting in alternative population and housing projections.

This study reviews factors that could influence short-, mid-, and long-term population growth in Northeast Texas, such as economic factors, key Texas incentive programs, and the COVID-19 pandemic. Historical growth and population trends for the study area are characterized. There are several methodologies typically employed in projecting population and housing at the county scale, each with pros and cons. Discussion is provided on the methodology and limitations of these approaches, including the method used by the TDC. Then, the 2004 vintage (i.e., year it was released) and most recent population projections developed by the TDC are presented and evaluated with discussion, including statistical estimates that characterize model error between the state's projections and actual historical growth in the mid and long term. Two growth projections for the study area are presented to represent valid alternative outcomes and to explore the uncertainties inherent in estimating long-term projections of population growth.

1.2 Study Area Delineation

The study area covers the nine Texas counties served by the ATCOG and SRBA, which include Bowie, Cass, Delta, Franklin, Hopkins, Lamar, Morris, Red River, and Titus Counties, as well as Hunt County served by the SRBA. The study area is a subsection of Region D, an area of Northeast Texas established for the purposes of regional water planning that covers 19 counties - including the 10 counties in the study area. A map of the study area is shown in Figure 1.1 including major cities, highways, and water bodies.

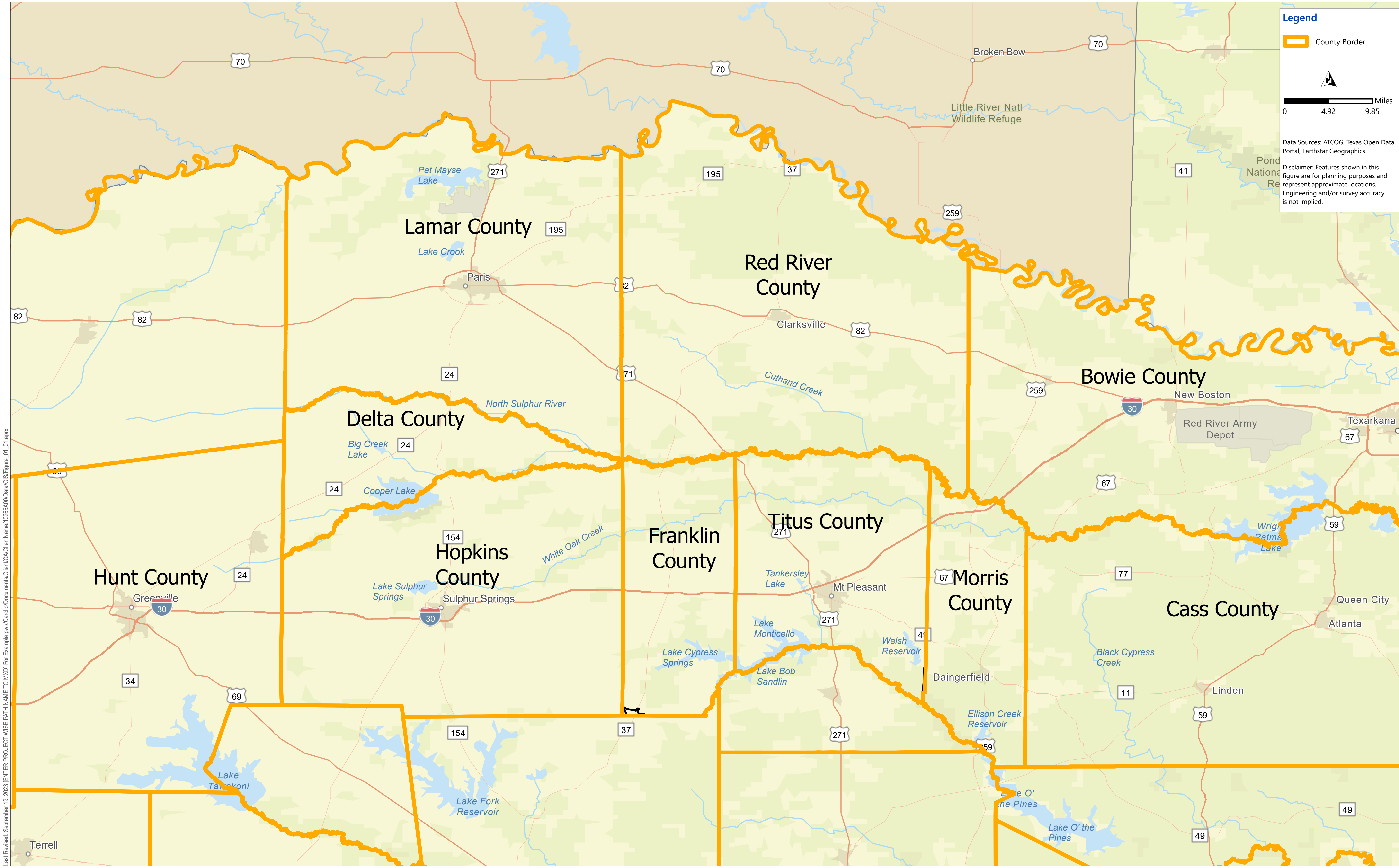

Figure 1.1 Study Area

ARK-TEX COUNCIL OF GOVERNMENTS, SULPHUR RIVER BASIN AUTHORITY
POPULATION STUDY

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SECTION 2 STUDY AREA DESCRIPTION

2.1 Political Subdivisions

The study area has both urban and rural counties. The federal Office of Management and Budget (OMB) delineates urban areas into metropolitan and micropolitan areas. Metropolitan Statistical Areas (MSAs) are associated with an urbanized area having a population of 50,000 or greater. Adjacent counties largely socially and economically integrated with the core urban area are also included within the MSA (OMB, 2010). Micropolitan Statistical Areas include at least one urban cluster with a population between 10,000 and 50,000. Counties containing the core urban cluster and other counties that are highly socially or economically integrated with the urban cluster are included in the Micropolitan Statistical Area.

Based on the OMB delineations, Hunt County is a part of the Dallas-Fort Worth-Arlington combined statistical area. The cities of Paris (Lamar County), Sulphur Springs (Hopkins County), and Mount Pleasant (Titus County) are all separate Micropolitan Statistical Areas. The Texarkana region, including the portion of the city in Arkansas, is another MSA. No areas within Cass, Delta, Franklin, Morris, and Red River Counties are considered within a MSA or Micropolitan Statistical Area. Table 2.1 shows the 2022 population estimates from the U.S. Census for each MSA and Micropolitan Statistical Area within the study area.

Table 2.1 2022 Population Estimates for Metropolitan and Micropolitan Statistical Areas within the Study Area

Metropolitan Statistical Area	2022 Population Estimate (2)	Study Area Counties
Texarkana (1)	146,408	Bowie
Dallas-Fort Worth-Arlington	7,943,685	Hunt
Micropolitan Statistical Area	2022 Population Estimate (2)	Study Area Counties
Mount Pleasant	43,924	Titus, Camp
Paris	50,484	Lamar
Sulphur Springs	37,804	Hopkins

Notes:
(1) MSA is partially located in Arkansas.
(2) Data from U.S. Census Vintage 2022 Metropolitan and Micropolitan Statistical Areas Population Totals: 2020-2022.

2.2 Key Demographics

Key demographics for each county are provided in Table 2.2. Red River County has the highest percentage of population over 65 years of age while Titus County has the highest percentage of population under 18 years of age. Of residents 25 years or older, all counties have over 86 percent of residents with a high school diploma or greater education attainment. Franklin County has the greatest percentage of residents with a bachelor's degree or higher, reaching nearly 1 in 3. Titus county has the highest percentage of residents identifying as Hispanic or Latino while Cass County has the lowest percentage.

Table 2.2 Demographics by County

County	Bowie	Cass	Delta	Franklin	Hopkins	Hunt	Lamar	Morris	Red River	Titus
Gender (1)										
Male	50.6%	48.6%	49.1%	49.8%	49.4%	49.5%	48.5%	48.3%	48.7%	49.2%
Female	49.4%	51.4%	50.9%	50.2%	50.6%	50.5%	51.5%	51.7%	51.3%	50.8%
Age (1)										
Under 5	5.9%	5.5%	6.7%	5.6%	6.2%	6.1%	6.3%	5.8%	5.1%	7.2%
Under 18	23.7%	22.5%	23.6%	23.2%	24.3%	24.0%	24.1%	23.3%	19.9%	28.7%
65 and Older	17.1%	22.4%	21.7%	21.9%	18.5%	16.0%	18.9%	21.9%	25.3%	14.6%
Education (1,2)										
High School Graduate or higher	89.8%	86.9%	87.3%	90.3%	86.2%	87.3%	87.4%	89.9%	87.8%	79.2%
Bachelor's or higher	22.9%	17.3%	22.3%	29.2%	21.0%	21.3%	19.5%	12.9%	14.7%	16.9%
Race (1)										
White alone (3)	68.9%	79.8%	85.9%	90.5%	88.5%	86.3%	80.4%	72.1%	79.4%	84.3%
Black or African American alone (3)	25.9%	16.7%	6.9%	4.8%	7.3%	8.2%	13.5%	22.6%	16.1%	10.1%
American Indian alone (3)	1.2%	1.0%	2.8%	1.3%	1.1%	1.3%	1.9%	1.5%	1.8%	2.4%
Asian alone (3)	1.3%	0.7%	0.8%	1.1%	0.8%	1.6%	0.8%	0.8%	0.5%	1.3%
Native Hawaiian and Other Pacific Islander alone (3)	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.2%	0.1%	0.2%
Two or More Races	2.6%	1.9%	3.6%	2.2%	2.1%	2.3%	3.3%	2.8%	2.2%	1.7%
Hispanic or Latino	8.4%	5.6%	10.0%	15.7%	18.2%	19.5%	9.2%	11.5%	7.9%	45.6%
Land use										
Population per square mile, 2020	105.0	30.4	20.4	36.4	47.9	118.9	55.2	47.5	11.1	77.0

Notes:
(1) All data from U.S. Census QuickFacts. Race, Gender, and Age data from June 2022. Education data from December 2022.
(2) Education numbers correspond to the percent of people aged 25 years or older and looks at data from 2017-2021.
(3) Percentage includes persons reporting only one race.

Housing stock data, organized by the year the structure was built, is shown by county in Table 2.3. This table looks at housing built from 1939 through 2021. Over this period, Bowie and Hunt Counties had the largest total number of housing units built.

Table 2.3 Housing Stock by County

County	Built 1939 to 2009	Built 2010 to 2021	Total
Bowie	36,091	3,416	39,507
Cass	12,865	1,086	13,951
Delta	2,176	247	2,423
Franklin	4,725	448	5,173
Hopkins	13,649	1,983	15,632
Hunt	35,589	4,662	40,251
Lamar	20,841	1,800	22,641
Morris	5,623	199	5,822
Red River	5,706	514	6,220
Titus	11,083	946	12,029
TOTAL	**148,348**	**15,301**	**163,649**

Note:
(1) All data from U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates.

2.3 Land Use

The study area includes several rural counties with low population density, although some have more populous cities. The Texarkana metro area contains the TexAmericas Center which is one of the largest mixed-use industrial parks in the country with 12,000 acres and 3.5 million square feet of property (TexAmericas Center, n.d.). TexAmericas Center is a Local Redevelopment Authority (LRA) sanctioned by the State of Texas with the goal to take former military land and buildings and transform them into a privately held industrial park. Referring to Figure 1.1, the TexAmericas Center has three campuses within Red River Army Depot. The Central Campus is 765 acres and has a mix of existing office and manufacturing spaces (TexAmericas Center, n.d.). At 8,900 acres, the Eastern Campus consists of multiple separate business parks. Finally, the West Campus is 2,900 acres and considered an area for future expansion.

There is some oil production throughout the study area, with Cass County having the most oil production in the study area (Railroad Commission of Texas, 2023). A large portion of the study area is agricultural land including land for timber production, with the most significant timber production occurring in Bowie, Cass, Franklin, Morris, Red River, and Titus Counties (North East Texas Regional Water Planning Group, 2020). There are also several state parks including Cooper Lake State Park (Delta and Hopkins Counties), Atlanta State Park (Cass County), Pat Mayse and Sam Bell Maxey State Parks (Lamar County), Lake Bob Sandlin State Park (Titus County), and Daingerfield State Park (Morris County). Additionally, the White Oak Creek Wildlife Management Area covers portions of Bowie, Cass, Morris, and Titus Counties.

2.4 Water Resources

All ten counties within the study area have lakes or reservoirs (North East Texas Regional Water Planning Group, 2020). The Sulphur River Basin covers all or portions of Bowie, Cass, Delta, Franklin, Hopkins, Lamar, Morris, Red River, and Titus Counties. The Cypress Creek Basin covers portions of Titus, Franklin, and Morris Counties as well as other counties in Region D that are not within this study area. Portions of Lamar, Red River, and Bowie Counties are within the Red River Basin, and the Sabine River Basin covers a portion of Hunt County. Table 2.4 includes the lakes and/or reservoirs within each county and is organized by basin. See Figure 1.1 for the locations of these lakes and reservoirs.

Table 2.4 Lakes/Reservoirs by County

Lake/Reservoir	County	Built	Conservation Pool Area (acres)
Red River Basin			
Lake Crook	Lamar	1923	1,060
Pat Mayse Lake	Lamar	1967	5,638
Sulphur River Basin			
Big Creek Lake	Delta	1986	520
Cooper Lake	Delta, Hopkins	1991	17,958
River Crest Lake (1)	Red River	1953	555
Lake Sulphur Springs	Hopkins	1966	1,557
Lake Wright Patman	Bowie, Cass	1974	17,907
Elliott Creek Lake (2)	Bowie	1956	1,892
Cypress River Basin			
Lake Bob Sandlin	Titus, Franklin	1975	8,703
Cypress Springs	Franklin	1971	3,252
Ellison Creek Reservoir	Morris	1943	1,516
Lake Monticello	Titus	1973	2,001
Tankersley Lake	Titus		N/A
Welsh Reservoir	Titus	1975	1,269
Sabine River Basin			
Greenville Lakes (3)	Hunt		N/A
Lake Tawakoni	Hunt	1960	37,325

Source: 2021 Region D Water Plan Volume 1 (2020)
Notes:
(1) Includes permitted diversion from Sulphur River
(2) Elliott Creek Lake is within the Red River Army Depot area.
(3) The Greenville Lakes are within the Greenville city limits.

SECTION 3 STUDY AREA GROWTH TRENDS

3.1 Population

Historical population growth from 1970 to 2022 for the study area is shown in Figure 3.1. This figure includes a combination of Decennial Census data, intercensal data, and postcensal data (see inset). As of the time of this writing, the intercensal data for the period from 2010 to 2020 has not been released by the Census Bureau. Throughout the observed historic period, the overall population in the study area has increased consistently, with growth slowing in the late 1980s and early 2010s following periods of recession. According to postcensal data, population in the study area increased significantly in 2021 and 2022.

U.S. Census Bureau Surveys and Programs

Decennial Census – Mandated by the U.S. Constitution, this is a full count of all people residing in places across the nation. Occurs every ten years.

Population Estimates Program – Produces estimates of annual population by county using a combination of administrative records, vital statistics, and survey data to estimate population changes. For the years following the decennial census, these data are referred to as "postcensal". Following the next decennial census, the existing time series of postcensal estimates are adjusted to smooth the transition from one decennial census count to the next. These data are referred to as "intercensal".

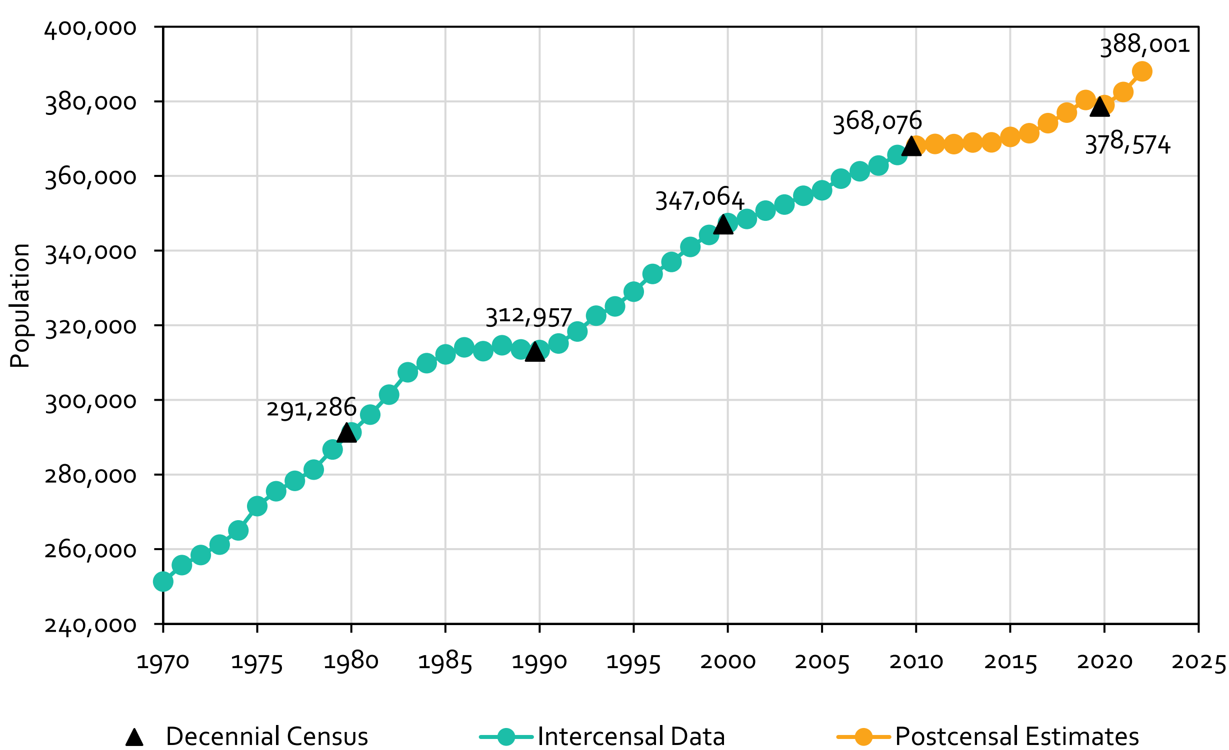

Figure 3.1 Historical Population Trend for 10 County Region

Individual counties have experienced varying rates of population growth in recent decades. Table 3.1 shows the historical population, population growth, and cumulative growth rate observed in each county for three 10-year periods beginning in 1990. Growth and growth rates were calculated using populations for each county from the Decennial Census. As a whole, the combined growth was highest between 1990 and 2000. Morris and Red River Counties had population declines in all three periods. Between 2010 and 2020, six of the ten counties saw population declines; however, the combined population increased overall. The combined growth is attributable to Hopkins, Hunt, and Lamar Counties. Over this three-decade period, Hunt County experienced the largest sustained population growth. Generally, based on data from the Census Bureau and looking over this 30-year period, population growth has been seen in counties with larger populations while consistent population declines have been observed in counties with smaller populations.

Table 3.1 Historical Population Change by County

County	1990 Population	2000 Population	1990-2000 Growth	2010 Population	2000-2010 Growth	2020 Population	2010-2020 Growth
Bowie	81,665	89,306	9% (7,641)	92,565	4% (3,259)	92,893	0% (328)
Cass	29,982	30,438	1% (456)	30,464	0% (26)	28,454	-7% (-2,010)
Delta	4,857	5,327	9% (470)	5,231	-2% (-96)	5,230	-0% (-1)
Franklin	7,802	9,458	18% (1,656)	10,605	11% (1,147)	10,359	-2% (-246)
Hopkins	28,833	31,960	10% (3,127)	35,161	9% (3,201)	36,787	4% (1,626)
Hunt	64,343	76,596	16% (12,253)	86,129	10% (9,533)	99,956	14% (13,827)
Lamar	43,949	48,499	9% (4,550)	49,793	3% (1,294)	50,088	1% (295)
Morris	13,200	13,048	-1% (-152)	12,934	-1% (-114)	11,973	-8% (-961)
Red River	14,317	14,314	-0% (-3)	12,860	-13% (-1,454)	11,587	-11% (-1,273)
Titus	24,009	28,118	15% (4,109)	32,334	13% (4,216)	31,247	-3% (-1,087)
TOTAL	**312,957**	**347,064**	**10% (34,117)**	**368,076**	**6% (21,022)**	**378,574**	**3% (10,508)**

Notes:
(1) Values in red denote population declines.
(2) Growth and growth rates were calculated using populations for each county from the Decennial Census.
(3) Historical population values correspond to April 1st of the year shown.

3.1.1 2020 Decennial Census Undercounts

The 2020 Decennial Census was particularly challenging due to complications related to the COVID-19 pandemic. This may have resulted in a large undercount for the state of Texas. The Census Post-Enumeration Survey (PES) measures the accuracy of the Decennial Census by independently surveying a sample of the population and estimating the proportion of people and housing units potentially missed or counted erroneously in the Decennial Census. The findings released in 2022 estimate that Texas was one of six states with significant undercounts. Texas' undercount was estimated at 1.92 percent or about 540,000 people (U.S. Census Bureau, 2022).

The 2020 Census Count Question Resolution (CQR) operation gives states the ability to request a review of boundary and count cases to identify errors that may have occurred during the 2020 Decennial Census. If a CQR review results in a change, the Census Bureau will issue official revised counts that will be used by the government for future programs that require official 2020 Decennial Census data. This includes programs like the American Community Survey (ACS). It is important to note that the CQR corrections do not impact apportionment counts, redistricting data, or other 2020 Decennial Census data products but any revised recounts will be used to calculate subsequent population estimates. As of the time of this writing, no 2020 Decennial Census correction has been released for Texas or areas within the study area.

Corrections to population counts and boundaries can be crucial for state and federal funding opportunities throughout the coming decade. Additionally, inaccurate Decennial Census counts impact the estimate of population residing within a county and the trajectory or trend of population projections developed by entities that forecast population, such as the TDC.

3.1.2 Adjustment for 2020 Decennial Census Undercount

To account for the known undercount in the 2020 Decennial Census, a new historical population series was created using the 2020 vintage estimates from the Census Bureau for 2010 to 2020 and the annual net increase in population measured in the 2022 vintage estimates from the Census Bureau from 2020 to 2022. The results are provided in Figure 3.2. The resulting undercount using this method is 4,742 persons or 1.24 percent, which is less than the 1.92 percent undercount estimated for the state of Texas in the PES. **This new "adjusted" population series is used in the remainder of this study.**

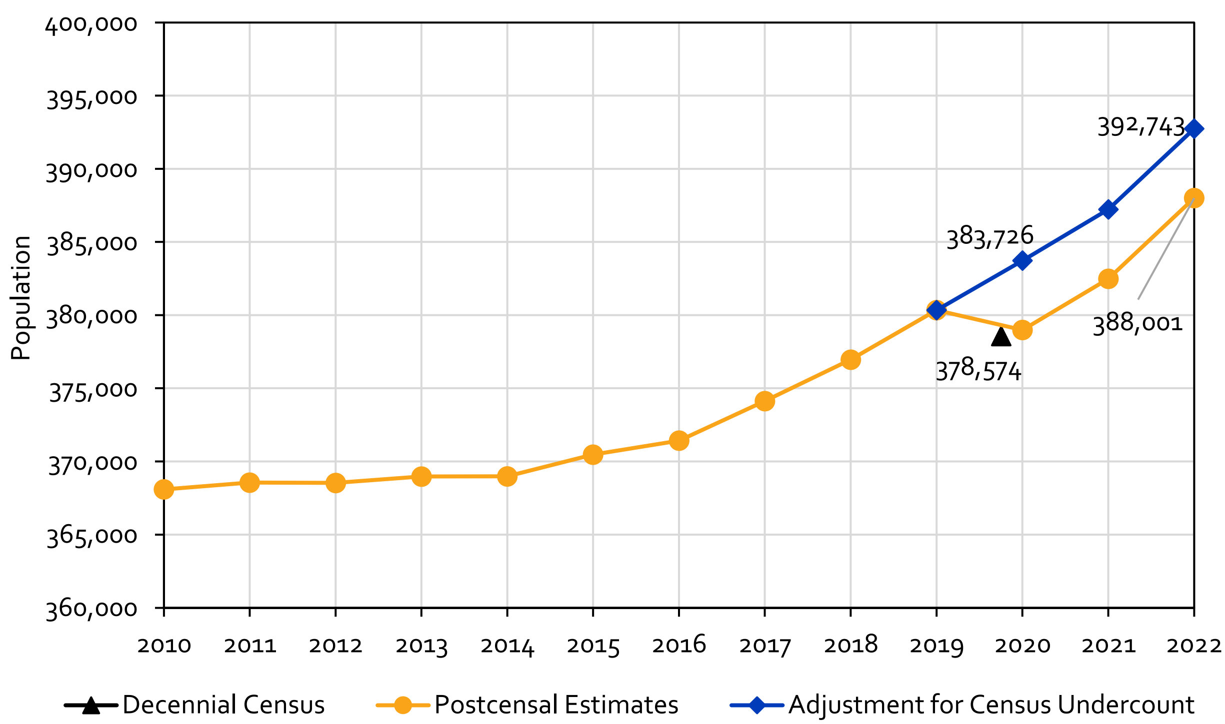

Figure 3.2 Historical Population for 10 County Region with Undercount Adjustment

3.2 Housing

Historical housing unit data from the Census Bureau from 1970 to 2022 for the study area are shown in Figure 3.3. This includes the Decennial Census, intercensal data, and postcensal data, as well as an adjustment for the Decennial Census undercount using the same methodology as the population data. Similar to the approach with population, the U.S. Census Bureau uses various surveys of building permits, estimates of non-permitted construction, mobile home shipments, and estimates of housing loss to estimate the annual change in the housing stock. During the period from 2010 to 2020, growth in the number of housing units slowed, likely due to the recession. Following the population trend, housing has grown steadily since around 2015.

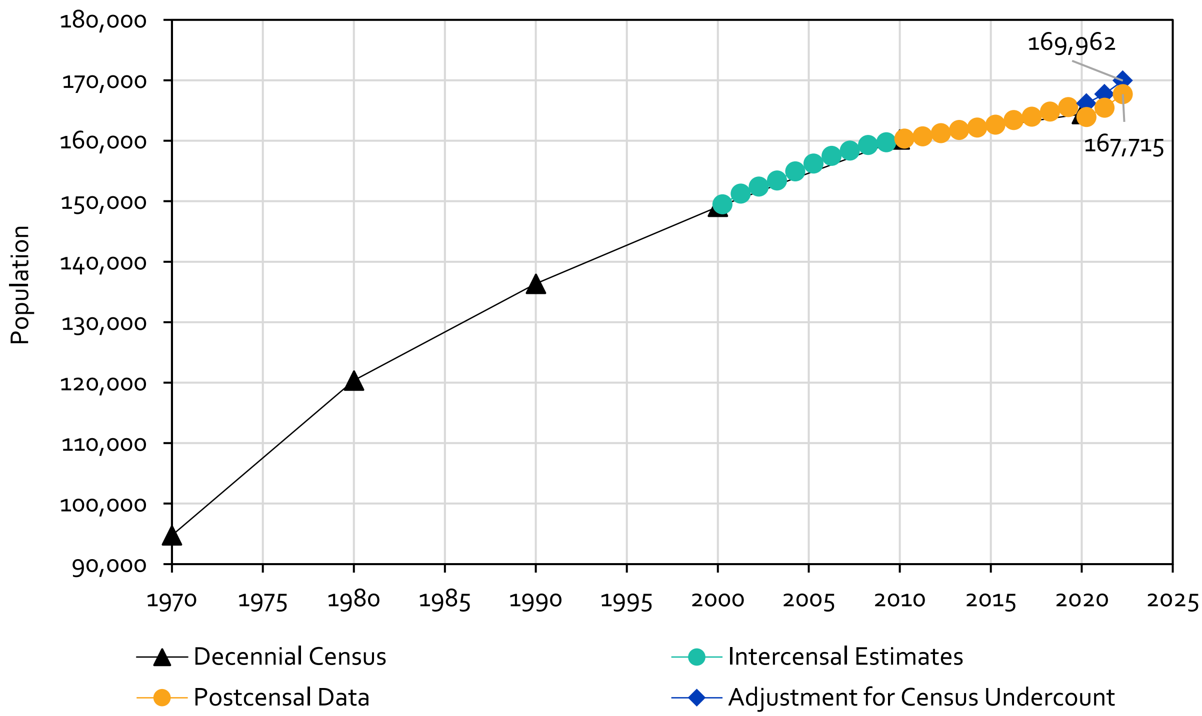

Figure 3.3 Historical Housing Unit Data for 10 County Region

Table 3.2 provides the housing unit growth and calculated growth rate for each county for three 10-year periods beginning in 1990. Between 1990 and 2000, positive growth in housing units occurred for all ten counties. Slow growth in housing units was seen during the next decade with Red River County seeing a negative housing unit growth rate. Between 2010 and 2020, half of the counties in the study region have experienced declines in housing units. Over the three-decade period, Hunt County has maintained a relatively consistent housing unit growth rate.

Table 3.2 Historical Housing Unit Growth and Growth Rates by County

County	1990 Housing	2000 Housing	1990-2000 Growth	2010 Housing	2000 – 2010 Growth	2020 Housing	2010-2020 Growth
Bowie	34,234	36,460	2,226 (7%)	38,493	2,033 (6%)	39,536	1,043 (3%)
Cass	13,191	13,885	694 (5%)	14,379	494 (4%)	13,870	-509 (-4%)
Delta	2,305	2,407	102 (4%)	2,458	51 (2%)	2,420	-38 (-2%)
Franklin	4,219	5,122	903 (21%)	5,770	648 (13%)	5,089	-681 (-12%)
Hopkins	12,676	14,019	1,343 (11%)	15,029	1,010 (7%)	15,671	642 (4%)
Hunt	28,959	32,476	3,517 (12%)	36,704	4,228 (13%)	40,570	3,866 (11%)
Lamar	18,964	21,109	2,145 (11%)	22,481	1,372 (6%)	22,644	163 (1%)
Morris	5,800	6,014	214 (4%)	6,024	10 (0%)	5,789	-235 (-4%)
Red River	6,650	6,916	266 (4%)	6,826	-90 (-1%)	6,826	0 (0%)
Titus	9,357	10,675	1,318 (14%)	12,054	1,379 (13%)	12,013	-41 (0%)
TOTAL	**136,355**	**149,083**	**12,728 (9%)**	**160,218**	**11,135 (7%)**	**164,428**	**4,210 (3%)**

Notes:
(1) Values in red denote population declines or negative population growth.
(2) Growth and growth rates were calculated using housing units for each county from the Decennial Census.
(3) Historical housing values correspond to April 1st of the year shown.

Table 3.3 provides the housing unit growth and growth rate for each county from 2010 to 2020 using 2020 housing values that are adjusted for the census undercount. After adjusting for the census undercount, all ten counties have positive growth in housing units between 2010 and 2020.

Table 3.3 2010 to 2020 Housing Growth and Growth Rates by County Adjusting for the Census Undercount

County	2010 Housing (1)	2020 Housing (2)	2010-2020 Growth
Bowie	38,493	40,245	1,752 (5%)
Cass	14,379	14,785	406 (3%)
Delta	2,458	2,506	48 (2%)
Franklin	5,770	5,859	89 (2%)
Hopkins	15,029	15,520	491 (3%)
Hunt	36,704	38,683	1,979 (5%)
Lamar	22,481	22,942	461 (2%)
Morris	6,024	6,054	30 (0%)
Red River	6,826	6,993	167 (2%)
Titus	12,054	12,602	548 (5%)
TOTAL	**160,218**	**166,189**	**5,971 (4%)**

Notes:
(1) The 2010 historical housing value corresponds to April 1st, 2010.
(2) The 2020 housing value corresponds to July 1st, 2020, and adjusts for the census undercount.

3.3 Migration

Each year, the Census Bureau releases migration flow tables for select geographic summary levels based on the ACS 5-year dataset. The ACS is an ongoing survey that collects information on demographic, social, economic, and housing characteristics of the U.S. population. The ACS asks respondents about the location of their previous residence from one year ago and the questions are used to create county-to-county migration flows, which measure net migration between two counties.

County-to-county migration flow estimates have been produced for every 5-year ACS dataset beginning with the ACS 5-year 2005-2009 estimates. The data are collected continuously over a five-year period, resulting in flow estimates that resemble the annual average number of movers between counties for a five-year period. Figure 3.4 shows net migration from the ACS by county from 2006 to 2020. Six of the ten counties had positive net migration in the 2006-2010 period, while only three of ten counties had a positive net migration in the 2016-2020 period. Bowie County has seen the greatest out migration over the entire period while Hunt and Morris Counties had positive net migration over the entire period.

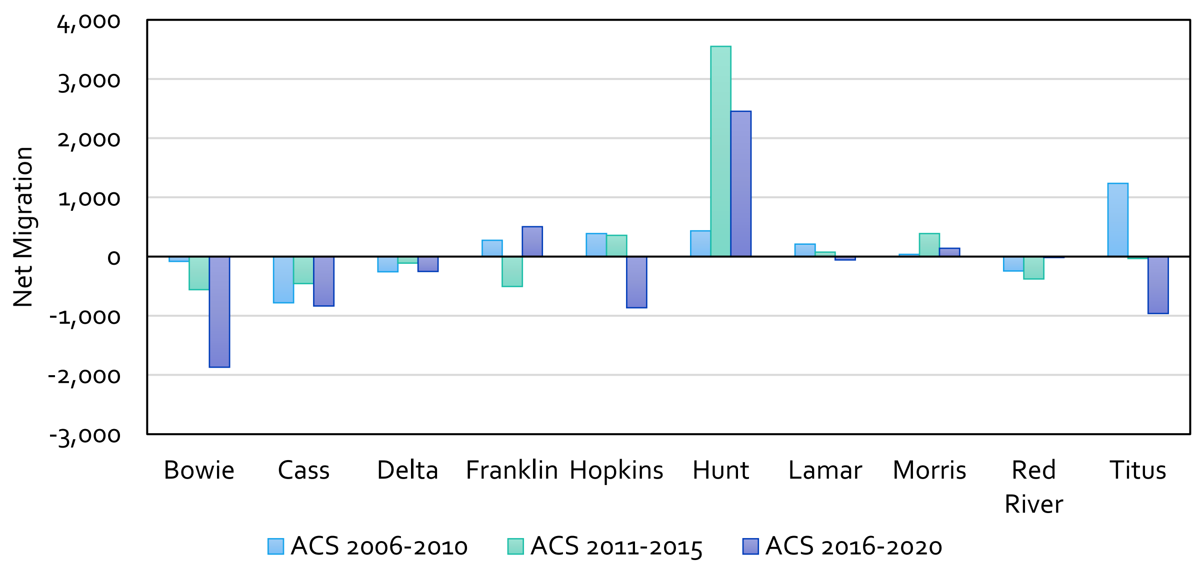

Figure 3.4 Net Migration for 10 County Region from ACS Between 2006 – 2020

For the 1990 and 2000 Decennial Census, the long-form version of the Decennial Census included a question on the respondent's previous residence from five years ago. Using this information, a data record was produced for every combination of county-to-county migration flows in the U.S. of at least one person from 1985-1990 and from 1995-2000. Figure 3.5 includes net migration from the 1990 and 2000 Decennial Census by county. Seven of the ten counties had positive net migration in the 1985-1990 period, while nine of ten counties had a positive net migration in the 1995-2000 period. Seven of the ten counties had positive net migration over both time periods with only Morris County seeing negative net migration over the entire period. The greatest net migration was seen in Hunt County.

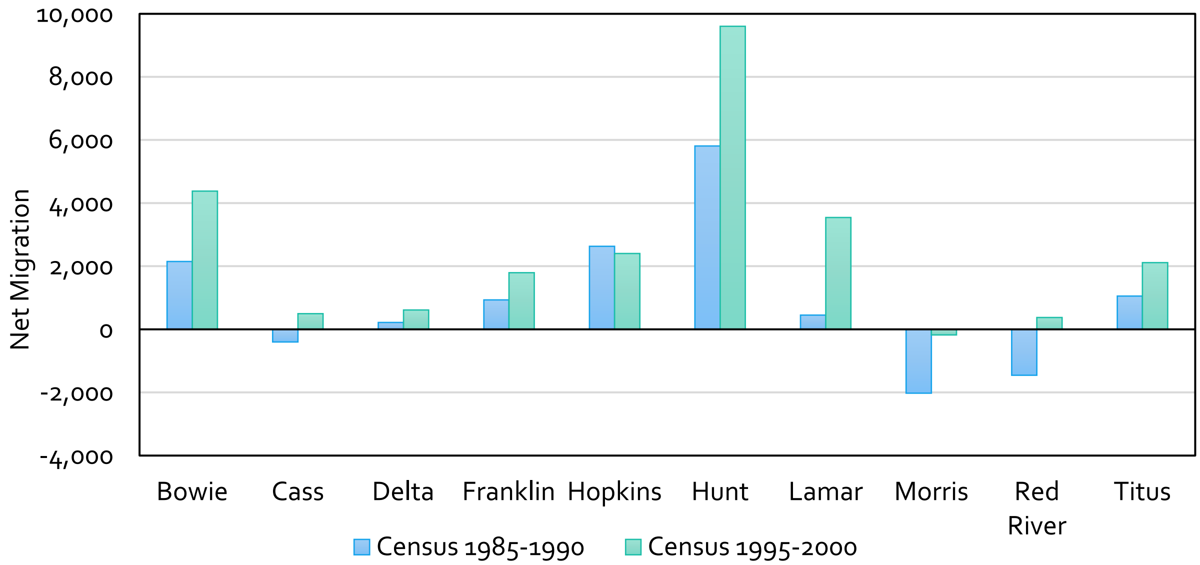

Figure 3.5 Net Migration for the 10 County Region from the 1990 and 2000 Decennial Census

SECTION 4 KEY DRIVERS IN POPULATION CHANGE

Population growth and decline is dependent on many interconnected factors, from the economy of an area and its location to the age of the population. This section includes a discussion of some of the key drivers of population change for the country and growth drivers specific to Texas counties and communities.

4.1 Natural Changes

Population growth is dependent on numerous factors, but the main drivers are births, deaths, domestic migration, and immigration to and from the county. These population growth dynamics are impacted by the community type and location with urban, suburban, and rural communities having differing population growth trends and drivers. The net in natural population increase occurs from the difference between births and deaths within a community. A current key demographic trend in the U.S., on both a local and national level, is the increasing number of older Americans (Pew Research Center, 2018). U.S. birth rates have also been declining since 2007 (Johnson, 2018). The number of births in 2020 showed a 4 percent decrease compared to total births in the U.S. in 2019 (Osterman et al., 2022). These two demographic trends have compounding impacts on the natural population changes. Additionally, migration can play a key role in population growth because high levels of domestic migration into or out of an area can overshadow population changes from natural growth.

A 2018 report from the Pew Research Center based on intercensal counts between 2000 and 2016 found that the population growth factors are impacting urban, suburban, and rural communities differently. While the U.S. population may have increased, the populations in a majority of individual rural counties have not, with 52 percent of rural counties declining in population (Pew Research Center, 2018). In many cases, rural population declines are attributable to a combination of continued out migration and death rates higher than birth rates (Johnson & Leichter, 2019). A larger aging population in rural counties contributes to the disparity between birth and death rates (Pew Research Center, 2018). Based on analysis of data from between 2010 and 2020, the overall rural population declined for the first time in the 2020 Decennial Census (Johnson, 2022a). However, this trend was disrupted during the COVID-19 pandemic, as described in Section 4.5.

4.2 Economic Factors

The economic profile of an area also impacts growth. Rural counties adjacent to metropolitan areas have different economic drivers compared to rural counties surrounded by other rural areas. Texas specifically has a wide number of economic sectors throughout the state. Growth in specific sectors could influence population growth patterns. The Perryman Group, an economic forecasting consultant, ranked Texas' 26 MSAs based on projected economic growth from 2022 to 2027. The Perryman Group assessment is based on a 5-year projection. This analysis looked at both economic indicators and growth in specific industry sectors. Texarkana, located within the study area, ranked seventh for growth in the construction sector, second for growth in education services, and seventh for growth in the real estate and rental sector (Perryman Group, 2023).

The 2008 recession and its aftermath impacted economic opportunities throughout the country which impacted population trends, specifically domestic migration rates. For example, domestic migration traditionally seen to rural counties with amenities and recreation opportunities decreased considerably during the recession (Johnson, 2018).

Texas has a number of statewide incentive programs that are aimed at promoting economic development and increasing skill levels and wages within the Texas workforce. The following sections discuss the Texas Enterprise Fund (TEF), the Texas Enterprise Zone Program (EZP), and the Skills Development Fund (SDF). These programs have greatly impacted growth in Texas and are a driving force behind the state's population growth.

4.2.1 Texas Enterprise Fund

The TEF aims to incentivize companies to develop new operations within Texas as opposed to another state. This fund provides grants to companies for new projects when a Texas site is competing with out-of-state locations. TEF projects must meet several eligibility criteria to be considered for an award including significant capital investment from the company, projected job creation, a significant rate of return on investment, and the community must be involved in the project (Texas Economic Development, n.d.). Award amounts are impacted by the projected number of jobs to be created, average wages, and the timeframe for job development.

Since the program began in fiscal year 2004, there have been almost 200 TEF projects across the state with the bulk of the projects located in counties with or near large urban areas such as San Antonio, Houston, Dallas, and Fort Worth (Texas Economic Development, 2023). Within the study area, there have been four TEF projects since the program began: two in Lamar County, one in Titus County, and one in Hopkins County. A summary of the TEF projects within the study area including the fiscal year the project began, the county where the project is located, the direct number of jobs, and the total investment is included in Table 4.1.

Table 4.1 Study Area Texas Enterprise Fund Projects

County	Company Name	Project Fiscal Year	Total Investment	TEF Award Offer	Direct Jobs	Community
Lamar	James Skinner Company	2012-2013	$ 25,000,000	-	393	Paris
Lamar	American SpiralWeld Pipe Company	2019-2020	$ 91,906,929	$402,000	60	Paris
Titus	Newly Weds Foods	2009-2010	$ 27,000,000	$450,000	115	Mount Pleasant
Hopkins	D6	2022-2023	$ 27,000,000	$1,438,200	231	Sulphur Springs

Note:
(1) Data summarized from Texas Economic Development, Office of the Texas Governor (2023, June).

4.2.2 Texas Enterprise Zone Program

The Texas EZP is a state sales tax and use tax refund program that focuses on promoting private development, investment, and job creation within state enterprise zones. Enterprise zones are block groups that have a 20 percent or greater poverty rate as determined by the Census Bureau during each Decennial Census (Texas Economic Development, 2019). Enterprise Zone designations are updated after each Decennial Census. Additionally, distressed counties, as determined by poverty rates, education level, and unemployment in the most recent Decennial Census, are also considered enterprise zones. EZP communities must nominate companies and projects in their jurisdiction to receive an EZP distinction (Texas Economic Development, 2019). Each community has a limited number of designations available for every two-year period where the number of designations is based on the municipality or county's population in the most recent Decennial Census. Refund amounts depend on the level of capital investment from a company and the number of jobs projected to be created through the project.

A project receives a project designation depending on the capital investment and job allocations with half, single, double, and triple designations available (Texas Economic Development, n.d.). From the EZP's start in 2005 to 2022, there have been a total of 900 designations. Within the study area there have been 16 EZP projects with half in Lamar County. The remaining projects within the study area were in Bowie, Cass, Hopkins, and Titus Counties. A summary of the EZP projects within the study area including the project approval and expiration date, the community the project is in, the total announced number of jobs, and total investment is included in Table 4.2.

Table 4.2 Study Area Texas Enterprise Zone Program Projects

County	Company Name	Project Approved	Project Expired	Total Investment	Total Announced Jobs	Community
Bowie	Brim Healthcare of Texas, LLC	03-Jun-13	03-Jun-18	$26,810,000	399	Texarkana
Cass	International Paper Company	02-Dec-13	02-Dec-18	$250,000,000	766	Cass County
Cass	Graphic Packaging International, LLC	01-Sep-21	01-Sep-26	$260,000,000	500	Cass County
Hopkins	Saputo Dairy Foods USA, LLC	02-Sep-14	02-Sep-19	$10,000,000	370	Sulphur Springs
Hopkins	BEF Foods, Inc.	01-Sep-17	01-Sep-22	$13,000,000	156	Sulphur Springs
Titus	Newly Weds Foods, Inc.	01-Dec-05	01-Dec-10	$27,300,000	115	Mount Pleasant
Titus	Sweet Shop Candies, Inc.	02-Jun-08	02-Jun-13	$4,400,000	90	Mount Pleasant
Titus	Pilgri''s Pride Corporation	01-Dec-15	01-Dec-20	$8,000,000	500	Mount Pleasant
Lamar	We Pack Logistics LP	01-Sep-05	01-Sep-10	$5,000,000	160	Paris
Lamar	Kimberly-Clark Corporation	01-Dec-05	01-Dec-10	$152,000,000	882	Paris

County	Company Name	Project Approved	Project Expired	Total Investment	Total Announced Jobs	Community
Lamar	Campbell Soup Supply Company LLC	01-Jun-06	01-Jun-11	$17,700,000	731	Paris
Lamar	Kimberly-Clark Corporation	01-Sep-11	01-Sep-16	$150,000,000	771	Paris
Lamar	JS Baking LLC	03-Jun-13	03-Jun-18	$25,000,000	400	Paris
Lamar	Campbell Soup Supply Company LLC	03-Sep-13	03-Sep-18	$36,800,000	740	Paris
Lamar	Potters Industries, LLC	03-Mar-14	03-Mar-19	$18,170,100	37	Paris
Lamar	Kimberly-Clark Corporation	01-Dec-16	01-Dec-21	$100,000,000	500	Paris

Note:
(1) Data summarized from Texas Economic Development, Office of the Texas Governor (2023, June)

4.2.3 Skills Development Fund

Established in 1995, the SDF provides grants to Texas businesses for customized training and site-specific skill development programs (Texas Workforce Commission, n.d.). Through the SDF, private companies work with public community or technical colleges, a local Workforce Development Board, or the Texas Engineering Extension Service for their training needs. This program fosters relationships between private partners within a community and local community and technical colleges.

4.3 Amenities and Recreation

The non-economic characteristics of an area, or amenities, such as climate, cultural attractions, and crime rates, can have a substantial impact on the quality of life and migration patterns. Amenities available within an area can be crucial for growth, especially for rural counties. Between 2000 - 2016, recreation based rural counties were the only rural county type to see positive rates of domestic migration (Pew Research Center, 2018). More recent research has found that growth over the last decade in nonmetropolitan counties has occurred in areas with high amenity recreational areas and in retirement areas (Johnson, 2022b). These amenity rich counties typically experience faster population growth among rural counties (Johnson, 2012).

4.4 Reservoirs

Reservoirs can impact a region in ways beyond drinking water supply availability. The development of large reservoirs can create economic development opportunities that impact population growth in surrounding communities. In the U.S., the majority of large dams were constructed in the 1900s as a means to manage river basins for generating hydropower, controlling floods, storing water for usage, and reducing natural hazard risks. During this period, dam capacity was growing faster than the population these dams were supporting, which enabled urban, industrial, and agricultural expansions. Importantly, Di Baldassarre et al. (2021) found that building reservoirs and increasing water supplies is a predictor of overall regional growth and also increasing water use.

Beyond supporting urban, industrial, and agricultural development, reservoirs also provide water supply, boating, diving, fishing, and related recreation opportunities. The U.S. Army Corps of Engineers (USACE) publishes annual data on the impact of the nation's water supply projects. In Texas alone, USACE estimates that its water supply projects provided $2.8 billion in economic benefits in 2021, or an average of $893 annual dollars in benefits per acre-feet of storage space developed (USACE, 2021a). These reservoirs created significant direct and indirect jobs, brought in visitor spending, and were a sizable component of the many communities around the lakes (USACE, 2022). For example, Lake Wright Patman, located in Bowie and Cass Counties, had nearly 520,000 visitors in 2021 that spent $19.8 million within 30 miles of the lake (USACE, 2022).

No new lake or reservoir is under construction within the study area. However, Lake Ralph Hall is under construction in Fannin County which borders Lamar, Delta, and Hunt Counties with an estimated completion date of 2026 (UTRWD, n.d.). Marvin Nichols is a proposed new reservoir in the Sulphur River Basin that, if constructed, would lie in Red River and Titus Counties. Marvin Nichols has been a water supply alternative strategy for Region C RWP for many iterations. The 2021 Region C RWP projected a 2050 impoundment date for Marvin Nichols. Of note, the development of Marvin Nichols Reservoir has been historically contentious, as there is both support and opposition for the reservoir both locally and otherwise. George Parkhouse North and South reservoirs are presented in the Region C RWP as alternatives to Marvin Nichols, and would lie in Delta, Lamar, and Hopkins Counties. While construction of these reservoirs would likely reduce existing jobs in the paper industry, per evidence of post reservoir analysis, construction would ultimately spur local growth in population and water use (Di Baldassarre et al. 2021).

4.5 COVID-19 Pandemic

Population growth dynamics are complex and based on a host of interrelated factors. Large economic or societal events can have significant impacts and disrupt historical population trends. The COVID-19 pandemic that began in 2020 impacted almost every key driver of population change. The pandemic caused major disruptions to the economy, existing natural growth patterns, and the work force. During the early months of the pandemic, there was a rapid shift to remote work. Domestic migration out of large urban centers spiked during the first year of the pandemic (Whitaker, 2021). The Census Bureau population estimates for July 2020 to July 2021, show a decrease in the size of the country's 56 major metropolitan areas (Fry, 2022). Conversely, smaller metro areas saw population increases during this same period. This domestic out migration from major urban areas was seen during the main months of the COVID-19 pandemic and contributed to or increased out migration trends that were already being observed prior to the pandemic (Fry, 2022; Whitaker, 2021). Analysis of Census Bureau data for the first year of the pandemic showed population growth in non-metropolitan areas, suggesting rural populations began growing again (Johnson, 2022). In over two thirds of U.S. counties, natural decreases occurred where there were more deaths than births. Even still, domestic migration was a primary factor impacting demographic change during the height of the pandemic (Fry, 2022).

SECTION 5 METHODOLOGIES FOR FORECASTING POPULATION

The following section summarizes methods for forecasting population and provides a comparison for each, including typical uses, strengths, and weaknesses. These descriptions are broadly adapted from *A Practitioner's Guide to State and Local Population Projections* (Stanley et al., 2013). The four general approaches described below include the cohort-component method, econometric models, economic-demographic models, and urban system models.

5.1 Cohort-Component Method

The cohort-component method is a method for projecting population size and composition by breaking the population into separate age cohorts and accounting for differences in mortality, fertility, and migration rates among them. Cohorts are defined as groups of people who experience the same demographic event during a particular period. The components of population change (births, deaths, and migration) are analyzed separately to understand the demographic causes of population change and to develop assumptions about future population trends. Demographic composition (age, sex, race, and other characteristics) is also important as overall birth, death, and migration patterns are strongly affected by these characteristics.

The cohort-component method is widely used and a good representation of the actual population process. A key limitation of this method is that it can be highly inaccurate if incorrect assumptions are made about fertility, mortality, and migration. Moreover, the cohort-component method does not provide any underlying insights into the assumptions that go into making the forecasts or account for changes in patterns. For example, migration can follow the patterns observed over the last 10 years or revert to the patterns observed during the previous 10 years. The method also neglects economic drivers. This method is typically used in statewide approaches for forecasting population in the short-, mid-, and long-term as it is easily transferable to cover all counties within a state. The Census Bureau utilizes this method to project county-level population across the Nation. This method is also utilized by the TDC and the TDC’s use of this method is discussed in detail in Section 6.

5.2 Econometric Models

Econometric models are used to project population growth using historical data and statistical regression techniques. There are many different approaches to econometric models, but they are generally built on an economic theory of how different factors in the economy interact with one another and attempt to construct equations that accurately portray the influence of the independent variables on the dependent variables. For population projections, the independent variables are typically economic variables such as changes in employment and wages, and the dependent variables are typically demographic characteristics, including migration rates. Economic factors tend to be the most dominant determinants of migration. This approach can be time-intensive, often requiring a large investment in data collection, model building, and testing. Within econometric models, population is usually included as a part of a broader economic forecast of a region.

5.3 Economic-Demographic Models

Economic-demographic models, or balancing models, are designed to simulate the relationship between demographic change and economic activity. These models balance the supply and demand for jobs to determine migration. These models are often two-part models where labor supply is determined using a traditional cohort-component model, and labor demand is determined by economic forecasts. These models are used to project migration that results from changes in employment opportunities. Balancing models do not require formal statistical equations or time series data to project future levels of migration, making them less costly to implement and easier to use than econometric models.

5.4 Urban Systems Models

Urban systems models simulate the complex dynamics of urban areas, including population, housing, land use, economic activities, and transportation patterns across small geographic areas. These models typically incorporate jobs, unemployment rates, and income, and well as land use (e.g., land use planning, land costs, development costs) and transportation characteristics (e.g., travel costs, times, and distances). These models are used to predict the spatial and temporal patterns of urban expansion based on factors such as population growth, land availability, and transportation infrastructure. Urban systems models vary widely in their approaches, data requirements, and ease of implementation, but typically require more time and resources to implement than alternative approaches. Urban system models are used in urban and regional planning applications, including transportation planning and housing needs assessments.

5.5 Comparison and Discussion

The cohort-component method is a widely used method that includes the individual components of growth and can be used at almost any level of geography, from the entire nation down to the county or city level. On the other hand, the limited sources of data can hide the trends in mortality rates, fertility rates, and migration patterns that are impacting the current population's growth trends (Canudas-Romo et al., 2020). This method also lacks guidance on choosing assumptions about future changes in mortality rates, fertility rates, migration patterns, or factors that could alter demographic trends. Other models can be developed that incorporate explanations of the determinants of population growth directly into the projection model. These models can be applied within the framework of the cohort-component method, greatly increasing its usefulness for a variety of purposes.

Migration is a highly influential and volatile component of population growth, affected by various factors like economic conditions and housing patterns. Empirical evidence suggests that both economic opportunities and amenities influence migration with economic variables being more important to working-aged people, and amenities being more important as people age and retire. Despite this, models used for population projections generally focus primarily on economic factors. The volatility makes migration rates more difficult to forecast accurately than either mortality or fertility rates. Because of its potential volatility and its impact on total population growth, migration contributes more to the uncertainty of cohort-component projections for states and local areas than either mortality or fertility. Incorporating explanatory models into the cohort-component method can increase its usefulness and flexibility. The cohort-component method can accommodate different functional forms, application techniques, and data sources, which is why it remains the most widely used population projection method.

SECTION 6 TEXAS DEMOGRAPHIC CENTER POPULATION PROJECTIONS

The TDC, formally the Texas State Data Center (TSDC), develops and releases statewide and county specific population projections for Texas. These projections are used as the basis for many statewide planning efforts and policy decisions including the SWP and the accordant RWPs.

6.1 General Methodology

The TDC uses the cohort-component method to develop population projections. These projections are based on the most recent Decennial Census. See Section 5.1 for additional information about the cohort-component method. Data from the Census Demographic and Housing Characteristics File (DHC) are used to establish the baseline cohorts for the projections. Birth data are estimated using rates obtained from the Texas Department of State Health Services. Survival rates are estimated using death data from the Texas Department of State Health Services. Finally, migration rates are calculated using a residual migration formula. This is an indirect way of measuring net migration based on a comparison of the historical population with the projected population, assuming all other components are correctly measured. Multiple migration scenarios are developed for most vintages, typically based on estimates of migration rates from the previous 10-year period. The following sections describe the data sets and methodologies used to develop baseline population cohorts and migration scenarios for the various vintages of population projections.

6.1.1 2022 Vintage

The 2022 TDC projections are the most current projection series. **This vintage utilizes the 2020 Decennial Census count for Texas counties without any adjustment for the known Census undercount** (discussed in Section 3.1.1). This means that the 2022 Vintage starting point for projecting population is artificially lower than actual population for Texas counties. Because of delays in the release of the 2020 Decennial Census data products, the 2020 Decennial Census DHC was not released in time to be included in the projections. The baseline cohorts in this vintage are based on 2010 race and ethnic distribution data. The 2022 vintage projections include two different migration scenarios based on the 2010 to 2020 migration rates. The 1.0 migration scenario assumes the entire 2010 to 2020 migration rate while the 0.5 migration scenario assumes half of the 2010 to 2020 migration rate. **Note that the migration rates were also calculated using information from the 2020 Decennial Census, which implies that the slope of the migration rate would be negatively impacted (i.e., lower than actual) due to the undercount. Further, these migration rates were held constant throughout the projection period.** On the county level, detailed migration rates were deemed unreliable for some counties and in those cases, county total migration rates were used instead of age-sex-and race/ethnicity specific migration rates.

6.1.2 2018 Vintage

The 2018 vintage projections looked at county and state level population projections between 2010 to 2050. Data from the 2010 Decennial Census was used for the baseline cohorts. The 2018 vintage projections include a single migration scenario based on the 2010 to 2015 migration rates.

6.1.3 2012 and 2014 Vintages

The 2012 vintage projections provided county-level projections between 2010 to 2050. Data from the 2010 Decennial Census was used for the baseline cohorts. Three migration scenarios were developed for the 2012 vintage projections. The 1.0 scenario assumed the migration rates from the 2000 to 2010 period. The 0.0 migration scenario assumed zero net migration meaning population growth was completely dependent on natural increases. The 0.5 scenario assumed half the net migration rate seen between 2000 to 2010 and is considered an approximate average of the other two migration scenarios (TSDC & TSD, 2012).

The 2014 vintage projections again looked at county and state level population projections between 2010 to 2050. These projections included revised data for baseline cohorts such as birth and death rates (TSDC & TSD, 2014). These projections also included the same three overarching migration scenarios as the 2012 vintage. In some counties there were notable differences in the 2012 and 2014 vintage projections.

6.1.4 2004, 2006, and 2008 Vintages

The 2004, 2006, and 2008 vintages provided state and county wide projections between 2000 to 2040. Data from the 2000 Decennial Census was used for the baseline cohorts. Four migration scenarios were developed and used in each vintage. The 1.0 scenario assumed the migration rates seen in the 1990 to 2000 period. The 0.0 migration scenario assumed zero net migration meaning population growth was completely dependent on natural increase. The 0.5 scenario assumed half the net migration for the 1990 to 2000 period. The fourth migration scenario varied for each of the three vintages. For the 2004 vintage, the fourth migration scenario was net migration rates from 2000 to 2004. Similarly, the fourth migration scenario for the 2006 and 2008 vintage projections were based on 2000 to 2006, and 2000 to 2007 migration rates, respectively.

6.2 Comparison of Vintages

Figure 6.1 shows the 2004, 2012, 2018, and 2022 vintage projections from the TDC for the study area. Historical population counts from 1970 to 2020 based on data from the U.S. Census Bureau are also included. The historical population counts from 2020-2022 include the adjustment for the Census undercount as discussed in Section 3.1.2. For the 2004, 2012, and 2022 TDC data sets, the 1.0 migration scenario is shown. As seen in Figure 6.1, there have been wide variations in the population projections for the 10-county region over the past 20 years. The earlier vintages, from 2004 and 2012, projected large population growth. Compared to population in 2020 adjusted for the Census undercount, these vintages over-projected the region's population. Conversely, the 2018 and 2022 vintages show little population growth within the region over the coming decades. Recent population estimates from the Decennial Census show the region's population as greater than the most recent TDC vintage projections. Overall, the historical population data falls in between the range of estimates from the TDC. **The wide range of projections indicates uncertainty in the TDC methodology, likely due to the yearly and decadal variations in migration rates coupled with the selection of a short-term trend (10-year) to project long-term population and the most recent Decennial Census undercount not being adjusted by TDC.**

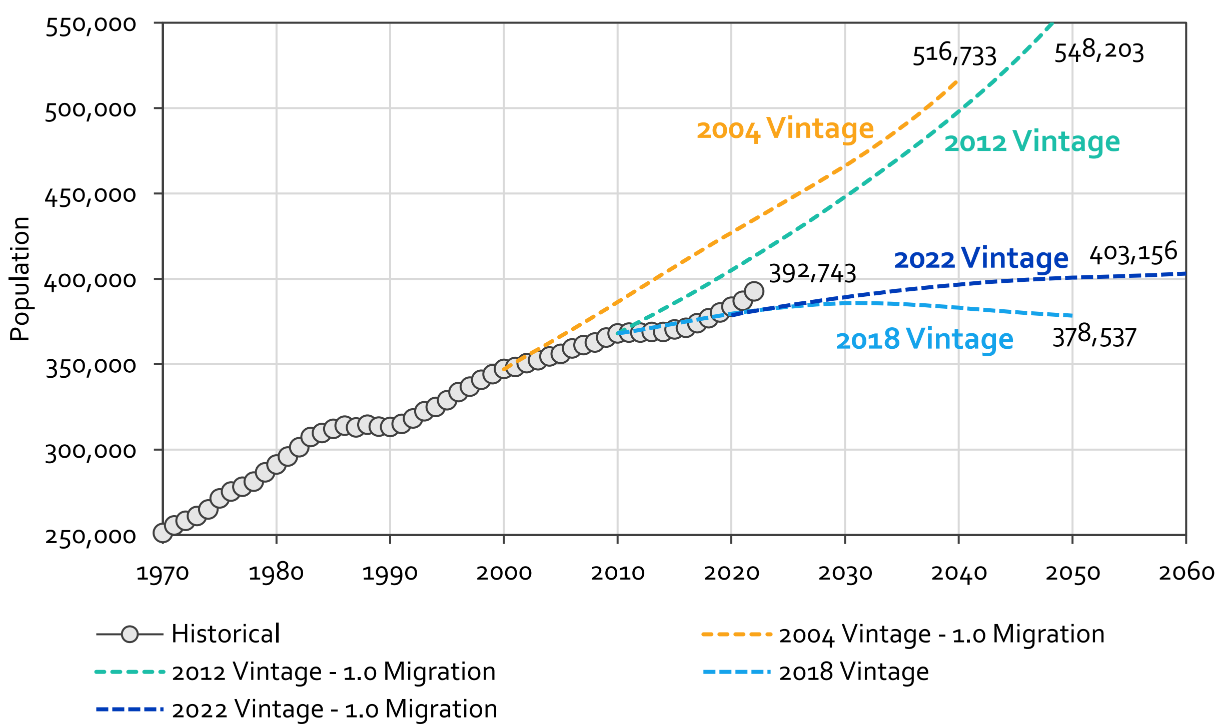

Figure 6.1 Comparison of Texas Demographic Center Projections for 10 County Region

6.3 Mid-term Accuracy

The 2004 vintage projections were developed almost two decades ago and included population projections through the year 2040. The accuracy of these projections can be explored by comparing the 2004 vintage projections (1.0 migration scenario) in the year 2022 to the estimated population in 2022 from the postcensal estimates produced by the Census Bureau. This comparison was done for all Texas counties to understand the broader accuracy of the TDC methodology.

Figure 6.2 shows a histogram of the comparison while Figure 6.3 provides a map of the percentage difference. A negative percent difference represents an undercount by TDC projection. For the 254 counties in Texas, the 2004 vintage projections tended to overestimate the 2022 population, with 68 percent of counties having an overestimation that was 16 percent or greater. More than 40 percent of counties were overestimated by 35 percent or greater. Only 12 percent of counties had projections that ended up being ± 5 percent of the actual population. The overall range of error was -25 percent to 85 percent. Referring to Figure 6.3, the error was widespread with no strong spatial correlation. To some degree, larger overestimation errors occurred in counties near the border. There was no discernable trend seen between the percent difference and the size of the county.

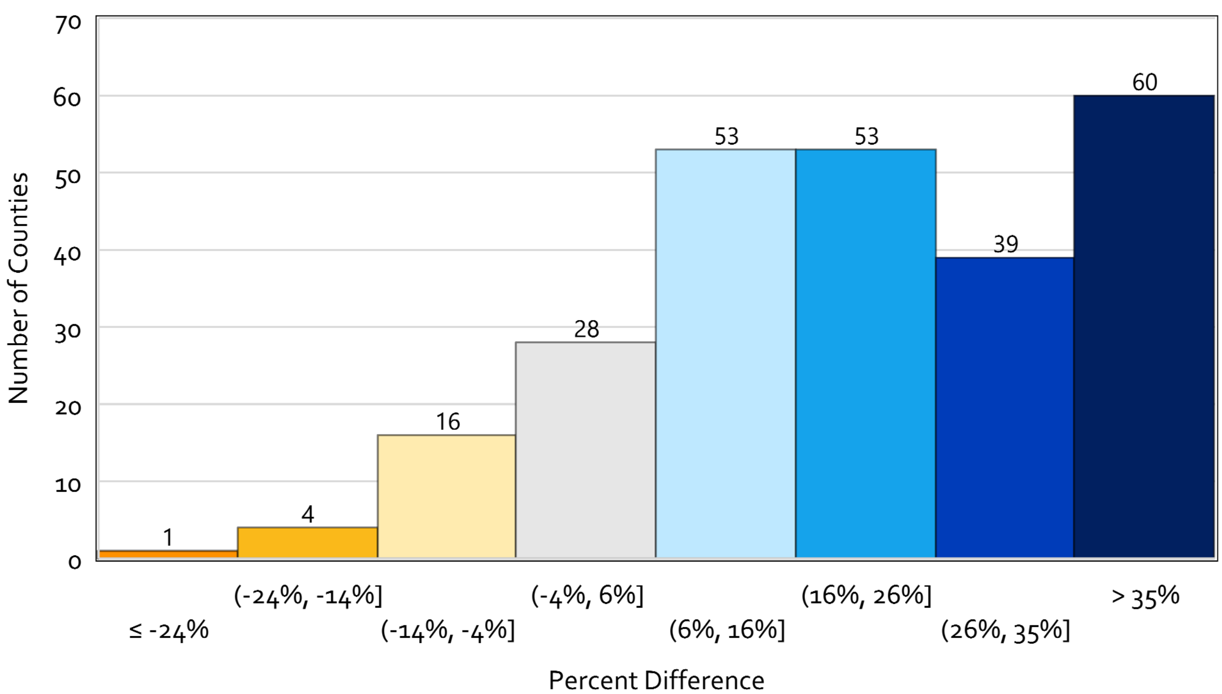

Figure 6.2 Histogram of 2004 TDC Vintage Projection Accuracy for All Texas Counties

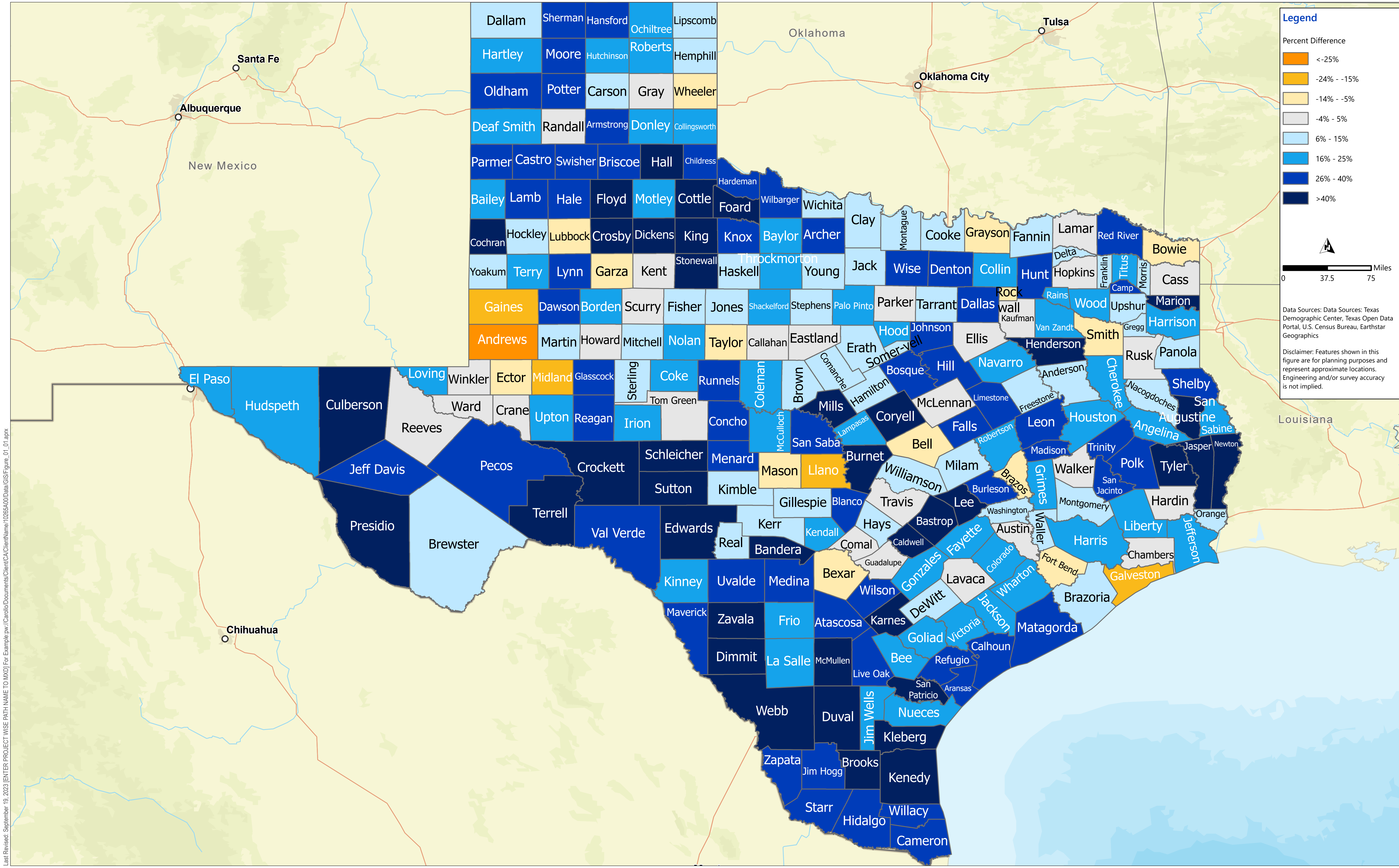

Figure 6.3 Map of 2004 TDC Vintage Projection Accuracy

6.4 Short-term Accuracy

The exercise was repeated using the 2018 vintage projections, again comparing the 2022 projection to the actual population in 2022. Figure 6.4 shows a histogram of the number of counties within each range of percent difference. Figure 6.5 shows a map of the percentage difference between the two population values for each county. Roughly 45 percent of the county projections were within ±5 percent. However, this indicates that even in the 5 years since those projections were released, the TDC methodology is producing projections that are generally inaccurate for the remaining 55 percent of counties. Referring to Figure 6.5, there was no strong spatial correlation seen in the estimation error.

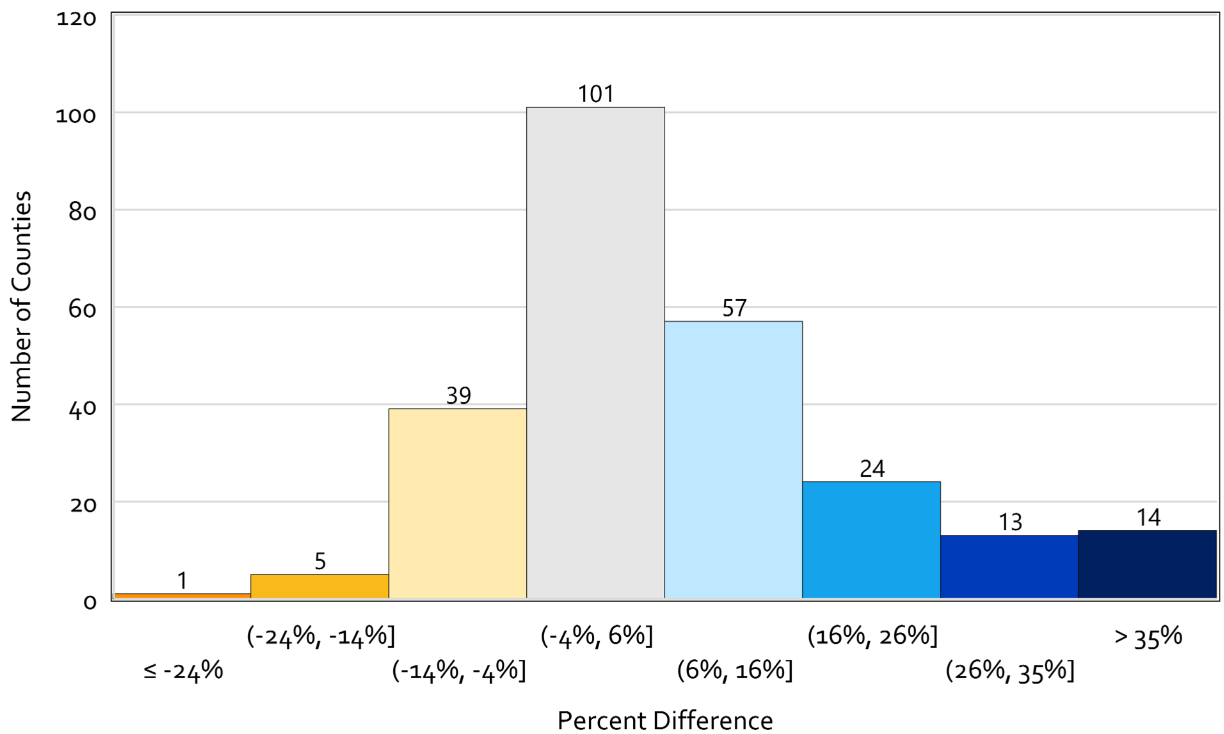

Figure 6.4 Histogram of 2018 TDC Vintage Projection Accuracy for All Texas Counties

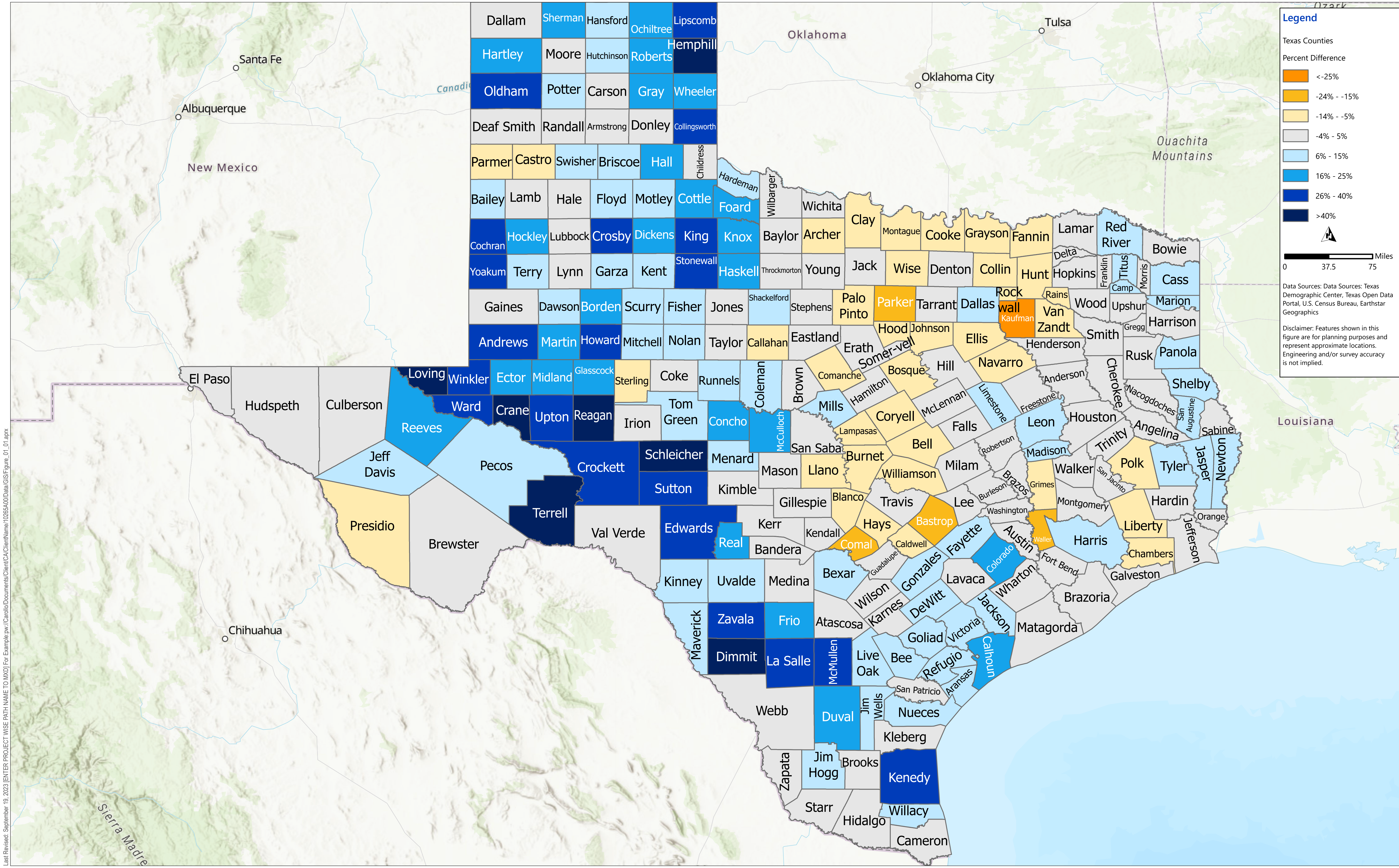

Figure 6.5 Map of 2018 TDC Vintage Projection Accuracy

6.5 2022 Vintage Projections by County

Table 6.1 shows the projected population and population growth rate by county from the TDC 2022 Vintage Projections. The 2022 Vintage Projections result in a total population increase for the study area of 24,582 by 2060. This equates to a considerably low net increase of 615 people each year over the next 40 years for the entire 10 county region. While the overall population is projected to increase within the study area, under these projections, eight of the ten counties are projected to have continued declines in population. The net increase in population within Hunt and Hopkins Counties accounts for the overall positive population growth projected in the study area. As previously mentioned, these projections assume a ten-year recent history of migration patterns held constant to 2060. The projections begin with the 2020 Decennial Census estimate without any adjustment for the undercount.

Table 6.1 2022 Vintage Projection Results by County

County	2020 (1)	2030	2040	2050	2060	Growth 2020-2060 (2)	% Growth 2020-2060 (2)
Bowie	92,893	93,746	93,256	92,580	91,309	-1,584	-2%
Cass	28,454	26,634	24,679	22,518	20,582	-7,872	-28%
Delta	5,230	5,244	5,218	5,182	5,114	-116	-2%
Franklin	10,359	10,324	10,184	9,942	9,789	-570	-6%
Hopkins	36,787	38,576	39,833	40,770	41,593	4,806	13%
Hunt	99,956	111,474	122,936	133,004	141,857	41,901	42%
Lamar	50,088	50,716	50,560	49,747	48,689	-1,399	-3%
Morris	11,973	11,295	10,590	9,811	9,142	-2,831	-24%
Red River	11,587	10,519	9,383	8,205	7,143	-4,444	-38%
Titus	31,247	30,777	30,064	28,978	27,938	-3,309	-11%
TOTAL	**378,574**	**389,305**	**396,703**	**400,737**	**403,156**	**24,582**	**6%**

Notes:
(1) 2020 values do not include any adjustments for the Decennial Census undercount.
(2) Values in red denote projected negative population growth.

SECTION 7 ALTERNATIVE GROWTH PROJECTIONS

This section includes a discussion of two alternative projections developed as part of this present effort for the study area. Population and housing were estimated by county from 2022 to 2060 for both alternatives. For each alternative projection, new net housing units are estimated using the persons per household and vacancy rates from the 2021 ACS 5-year estimates. The number of persons per household for the study area is 2.62 and the vacancy rate is 14.2 percent. For each projection, housing estimates were done at the county level and summed to find the estimated new net housing units in the study area.

7.1 Linear Trend Projection

The linear projection assumes that the population will change by the same number of persons in the future as it did in the past, based on the historical change in population. The linear trend projection approach also assumes that the factors influencing population dynamics will remain relatively stable over the projection period. For this projection series, the 25-year trend was deliberately selected (1998 to 2022) to smooth out ups and downs in migration and growth over the past decades. The use of a longer-term trend also averages out short-term volatility in the historical dataset, such as recessions. The trend was applied at the county level and then summarized for the 10-county region.

Figure 7.1 shows the linear trend over a 25-year period as well as the extrapolation of that trend to 2060. The growth over this period corresponds with an increase of 1,812 persons per year. Projected forward, this rate of growth results in a regional population of approximately 460,000 by 2060. This trend line has a 95 percent confidence interval of ±7,136 persons by 2060, as calculated from the historical data.

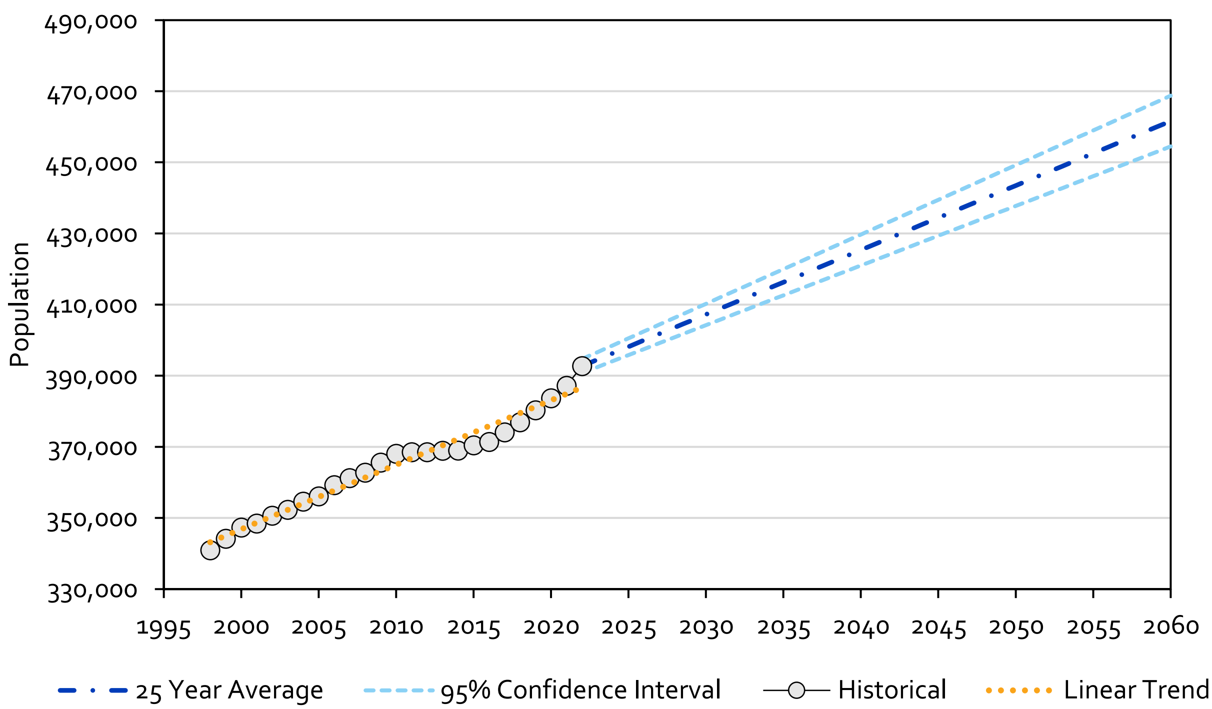

Figure 7.1 Linear Trend Projection Results for Region

Table 7.1 shows the population growth rate by county using the 25-year linear trend projection. Without significant changes to historical patterns and trends, Cass, Morris, and Red River Counties are projected to experience continued declines in population. The largest net increase in population is within Hunt, Hopkins, Titus, and Bowie Counties.

Table 7.1 Linear Trend Population Projection Results by County

County	2020[1]	2030	2040	2050	2060	Growth 2020-2060	% Growth 2020-2060
Bowie	93,481	94,566	97,033	99,501	101,968	8,487	9%
Cass	29,879	29,877	29,746	29,616	29,485	-394	-1%
Delta	5,349	5,542	5,553	5,565	5,576	227	4%
Franklin	10,821	11,580	12,220	12,861	13,501	2,680	25%
Hopkins	37,170	40,232	42,833	45,435	48,037	10,867	29%
Hunt	99,807	116,473	127,274	138,075	148,876	49,069	49%
Lamar	49,905	50,813	51,501	52,189	52,877	2,972	6%
Morris	12,393	12,186	11,789	11,391	10,994	-1,399	-11%
Red River	11,995	11,136	10,084	9,032	7,980	-4,015	-33%
Titus	32,926	34,837	37,330	39,823	42,316	9,390	29%
TOTAL	**383,726**	**407,242**	**425,365**	**443,488**	**461,611**	**77,885**	**20%**

Notes:
(1) 2020 values include adjustments for the Decennial Census undercount.
(2) Values in red denote projected negative population growth.

Table 7.2 shows the housing projections, by county, through 2060 using the 25-year linear trend projection. Total and percent growth between 2023 and 2060 is also shown. The Linear Trend projection results in a housing unit increase of 27,893 by 2060.

Table 7.2 Linear Trend Housing Unit Projection Results by County

County	2023	2030	2040	2050	2060	Growth 2023-2060	% Growth 2023-2060
Bowie	40,811	41,592	42,708	43,824	44,940	4,130	10%
Cass	14,915	14,871	14,809	14,746	14,684	-231	-2%
Delta	2,535	2,538	2,544	2,549	2,554	20	1%
Franklin	5,921	6,146	6,467	6,788	7,109	1,187	20%
Hopkins	15,844	16,629	17,749	18,870	19,991	4,147	26%
Hunt	41,664	44,828	49,348	53,868	58,388	16,724	40%
Lamar	23,130	23,351	23,668	23,984	24,300	1,171	5%
Morris	6,066	5,930	5,735	5,540	5,345	-722	-12%
Red River	7,004	6,607	6,039	5,471	4,904	-2,100	-30%
Titus	12,826	13,501	14,465	15,429	16,393	3,567	28%
TOTAL	**170,716**	**175,993**	**183,531**	**191,070**	**198,608**	**27,893**	**16%**

Note:
(1) Values in red denote projected negative housing growth.

7.2 Modified Perryman Group Projection

The Perryman Group, an economic forecasting consultant, releases regular updates to its long-term forecasting model for Texas. The Perryman Group utilizes a *Multi-Regional Econometric Model*, an econometric model that projects population as well as economic indicators such as personal income, retail sales, nominal and real gross product by industry sector, and employment by industry sector. Essentially, the Perryman Group method utilizes an economic approach that places jobs first and then persons to fill those jobs. Projection data are available by region, but not by county. For this study, projections were obtained for the ATCOG and North Central Texas Council of Governments (NCTCOG), as Hunt County lies with the NCTCOG. The Perryman Group projections go to 2050 but were extended to 2060 using linear extrapolation to align with other projections discussed in this report. All data shown within the remainder of the report shows this Modified Perryman Group projection.

Figure 7.2 shows the Modified Perryman Group projections for the full 10 county study area. The Modified Perryman Group projections result in a 2060 population of just under 500,000, representing an average annual increase of 0.6 percent. Interestingly, the Modified Perryman Group projections follow the long-term historical trend line even though the projection methodology is much more complex and detailed.

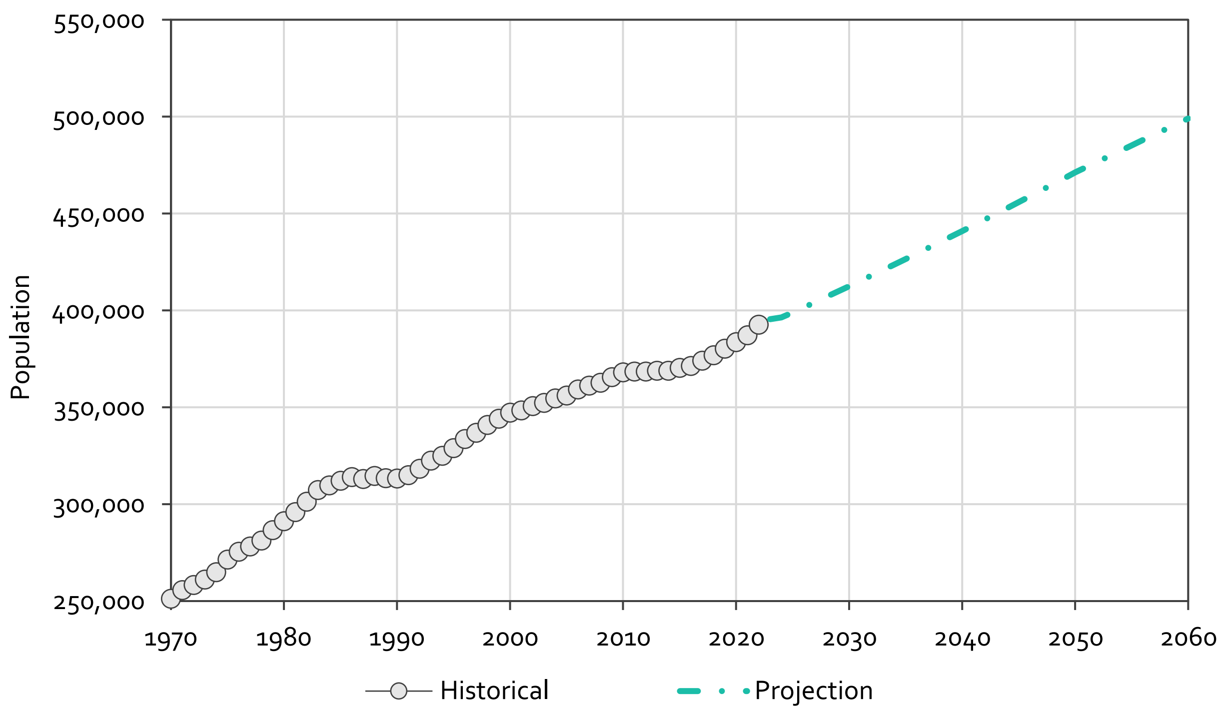

Figure 7.2 Modified Perryman Group Projection for 10 County Region

Table 7.3 shows the population projections by county through 2060 using the Modified Perryman Group projection for the 10-county region. Here regional projections by the Perryman Group were further disaggregate into county level projections using historical growth rates. Historical growth rates were determined using annual population counts from the Census Bureau in the twenty-year period from 2003 to 2022. The actual population growth for each county and the total growth in the region for that period were calculated.

Then, the share of the total growth in the region seen for each county was determined and was used to determine the projections by county. A proportional adjustment procedure was used to differentiate between counties with negative and positive growing rates. This procedure avoids unrealistically low projections for counties with negative historical growth rates that can occur with simple allocations methods. Total and percent growth between 2020 and 2060 are shown. This projection results in a population increase of 114,667 by 2060.

Table 7.3 Modified Perryman Population Projection Results by County

County	2020(1)	2030	2040	2050	2060	Growth 2020-2060	% Growth 2020-2060
Bowie	93,481	94,605	97,483	100,234	102,963	9,482	10%
Cass	29,879	29,957	29,933	29,906	29,879	0	0%
Delta	5,349	5,653	5,824	5,987	6,149	800	15%
Franklin	10,821	11,857	12,985	14,063	15,133	4,312	40%
Hopkins	37,170	41,113	45,351	49,400	53,418	16,248	44%
Hunt	99,807	119,598	136,374	155,503	172,368	72,561	73%
Lamar	49,905	50,855	51,702	52,511	53,314	3,409	7%
Morris	12,393	12,310	12,128	11,925	11,719	-674	-5%
Red River	11,995	11,449	10,956	10,404	9,843	-2,152	-18%
Titus	32,926	34,931	37,918	40,773	43,606	10,680	32%
TOTAL	**383,726**	**412,328**	**440,654**	**470,708**	**498,393**	**114,667**	**30%**

Notes:
(1) 2020 values include adjustments for the Decennial Census undercount.
(2) Values in red denote projected negative population growth.

Table 7.4 shows the housing projections, by county, through 2060 using the Modified Perryman Group projection for the 10-county region. The Modified Perryman projection results in a housing unit increase of 43,431 by 2060.

Table 7.4 Modified Perryman Housing Unit Projection Results by County

County	2023	2030	2040	2050	2060	Growth 2023-2060	% Growth 2023-2060
Bowie	40,810	41,610	42,912	44,156	45,391	4,581	11%
Cass	14,919	14,909	14,898	14,885	14,872	-47	0%
Delta	2,541	2,590	2,669	2,745	2,821	280	11%
Franklin	5,937	6,285	6,850	7,391	7,927	1,990	34%
Hopkins	15,887	17,008	18,834	20,578	22,309	6,422	40%
Hunt	41,959	46,136	53,156	61,162	68,219	26,260	63%
Lamar	23,131	23,370	23,760	24,132	24,501	1,370	6%
Morris	6,074	5,991	5,902	5,802	5,701	-373	-6%
Red River	7,024	6,776	6,510	6,212	5,909	-1,115	-16%
Titus	12,828	13,538	14,693	15,797	16,892	4,064	32%
TOTAL	**171,110**	**178,212**	**190,183**	**202,859**	**214,541**	**43,431**	**25%**

Note:
(1) Values in red denote projected negative housing growth.

SECTION 8 DISCUSSION

The ATCOG and SRBA are responsible for planning for the future of the 10 counties included in this study. As preparing for growth can take decades, local decision-makers need a good understanding of the strengths and weaknesses underpinning the estimates of future growth in their area. The region has historically relied upon the TDC projections for planning purposes. With the uncertainty in long-term projections exhibited by the variability in the TDC projections identified herein, additional projection methods have been developed and analyzed.

A comparison of the population projections included in this study is presented in Figure 8.1. The four scenarios from the TDC vary significantly, from higher projections in the 2004 and 2012 vintages to lower projections in the 2018 and 2022 vintages. These variations are the result of the methodology used by the TDC including the reliance on short-term migration patterns, which can be volatile, to construct the cohort component model. Additionally, the most recent vintage relies on the 2020 Decennial Census results and was not adjusted for the known undercount. The TDC methodology and assumptions are typically used by state agencies and are deemed appropriate for consistent planning at the county level across the state. However, at the local or regional level, other methodologies that capture local drivers can be more informative and indicative of potential growth, particularly in the long term. Further, historical net migration patterns in a region are not always accurate predictors of the future as migration patterns are influenced by a number of complex, interrelated factors. These limitations highlight the need to consider alternative approaches to better inform decision-makers about the uncertainties of such projections.

Based on the analysis of available datasets and forecasting methodologies, the 25-year linear trend projection and the Modified Perryman Group's forecast offer viable alternative estimates of growth in the study area when considering the TDC's population projections. The 25-year linear trend projection assumes a consistent rate of population change based on historical data, providing a simplified yet stable approach. Alternatively, the Perryman Group's U.S. *Multi-Regional Econometric Model* incorporates economic indicators and industry-specific factors to produce comprehensive regional projections. Those projections were the basis of the Modified Perryman Group projections, which simply allocated growth from the region to the counties. As projections are relied upon for future resource planning, understanding growth potential for a region can be crucial for local communities, agencies, and industry. This model offers valuable insights into population growth, employment trends, and economic dynamics.

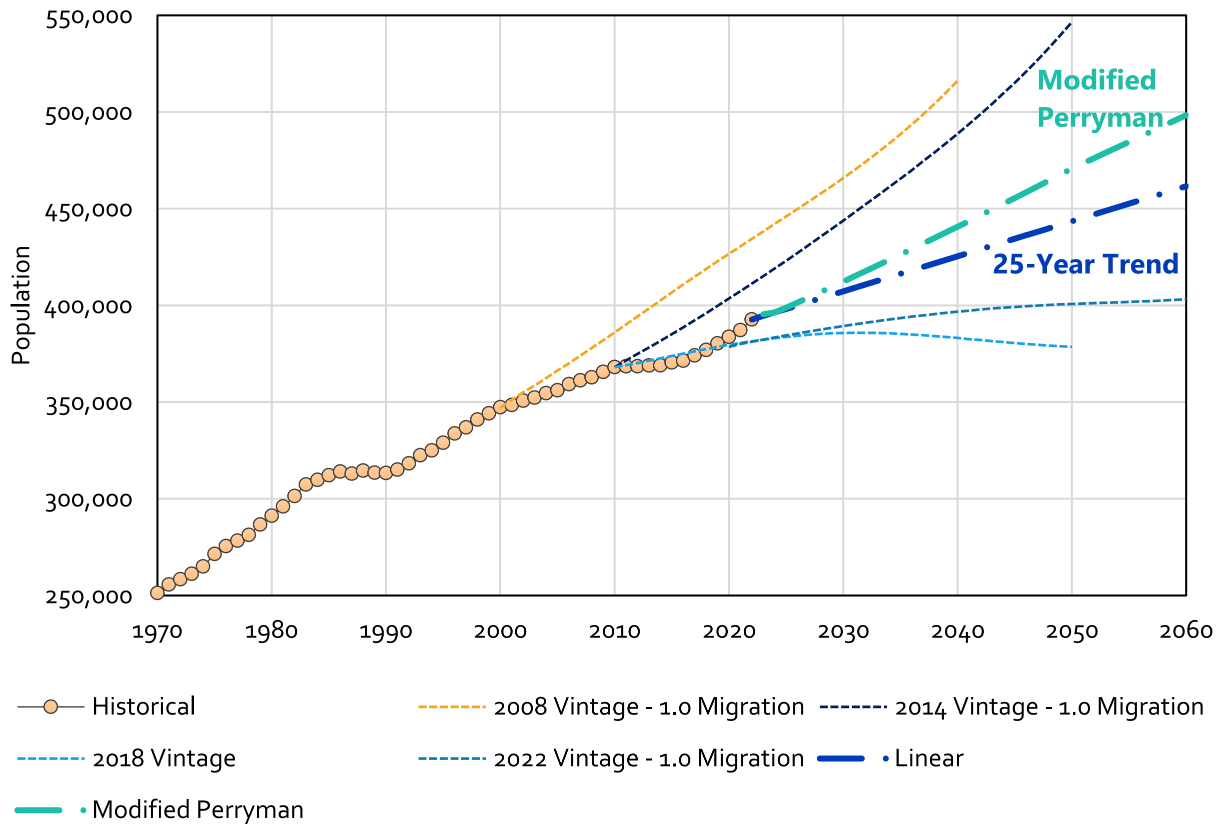

Figure 8.1 Summary of Population Projections for 10 County Region

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Broadband Planning Study

DESIGN NINE
broadband planners

Overview of the Work

- Review of existing infrastructure in all counties
- Market analysis
  - Residential and business surveys
- Gap analysis–benefits/risks, current and future needs
- Evaluate regional opportunities
- Engage with existing and potential providers
- Recommend broadband strategies
- Evaluate funding and financing options

Do the math for the region

	Households on dial-up	Households with "little" broadband	Cellphone or satellite Internet	Households with fiber Internet	No Internet
	2%	45%	43%	1%	9%
Number of households	2,094	47,123	45,028	1,047	9,425
Typical monthly telecom cost	Landline phone $60 TV $75 Dial up Internet: $25	Cellphone $110 TV $75 Broadband Internet: $80	Cellphone $60 Satellite TV / Internet: $150	Cellphone $60 Streaming TV $45 Broadband Internet: $75	Landline phone $45 TV $75
Total monthly cost	$159	$210	$210	$180	$120
Total annual cost	$1,908.00	$2,520.00	$2,520.00	$2,160.00	$1,440.00
30 year residential cost	$119,880,022	$3,562,472,340	$3,404,140,236	$67,856,616	$407,139,696
Total 30 year telecom cost	**104,717 households**	**$7,561,488,910**			

Residential Survey Results

85% of respondents are interested in faster and more reliable Internet service

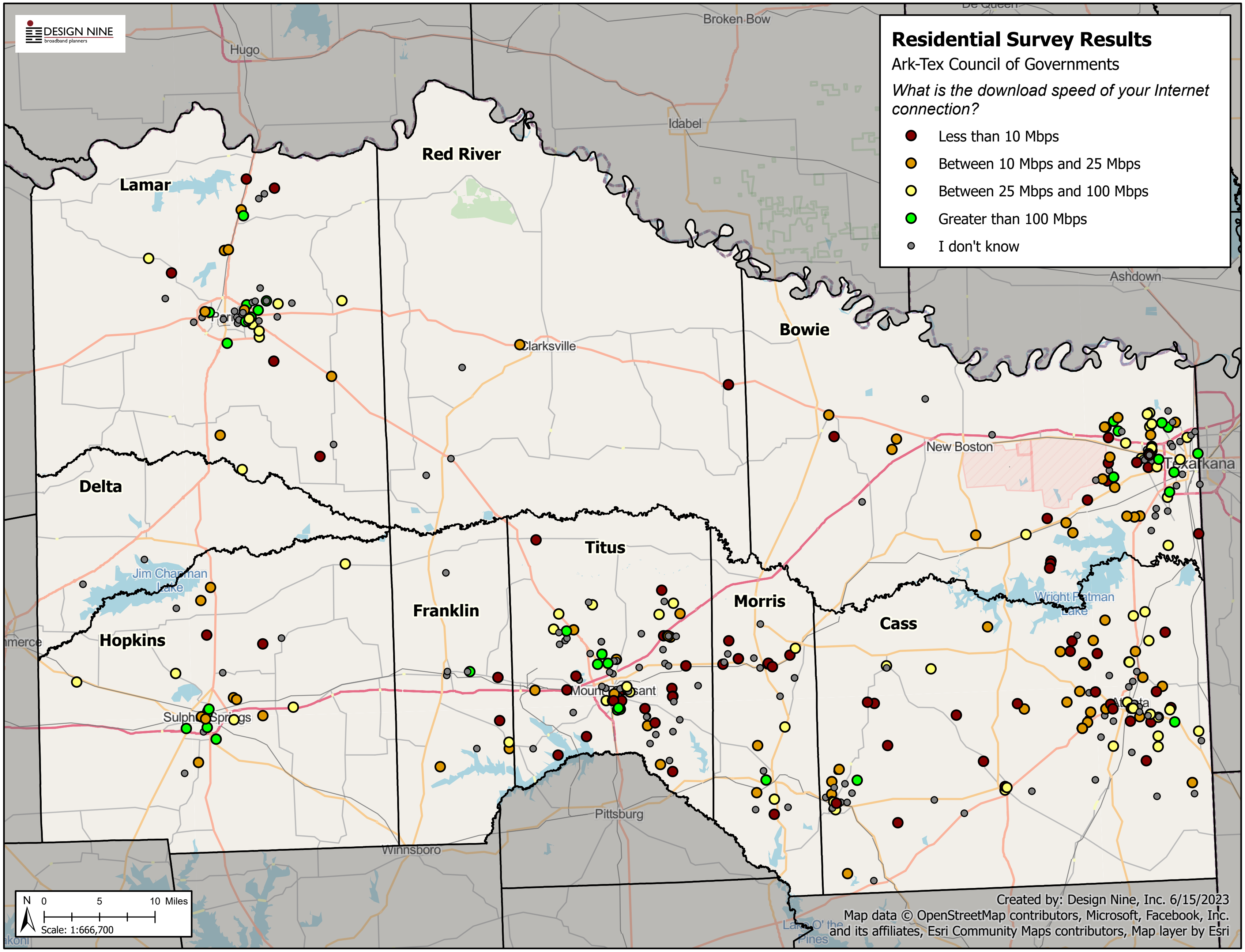
51% of residents are "dissatisfied" or "very dissatisfied" with current Internet speeds

97% of respondents said that they believe the County government should help facilitate better broadband

52% of residents have 7 or more Internet-connected devices in their home

37% of respondents have no other options for their Internet service

31% indicate that availability of broadband Internet is affecting where they choose to live



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Residential Survey Results
Ark-Tex Council of Governments
What is the download speed of your Internet connection?
Less than 10 Mbps
Between 10 Mbps and 25 Mbps
Between 25 Mbps and 100 Mbps
Greater than 100 Mbps
I don't know
Lamar
Red River
Bowie
Delta
Titus
Franklin
Morris
Cass
Hopkins
Hugo
Broken Bow
Idabel
Ashdown
Clarksville
New Boston
Texarkana
Jim Chapman Lake
Wright Patman Lake
Sulphur Springs
Mount Pleasant
Atlanta
Pittsburg
Winnsboro
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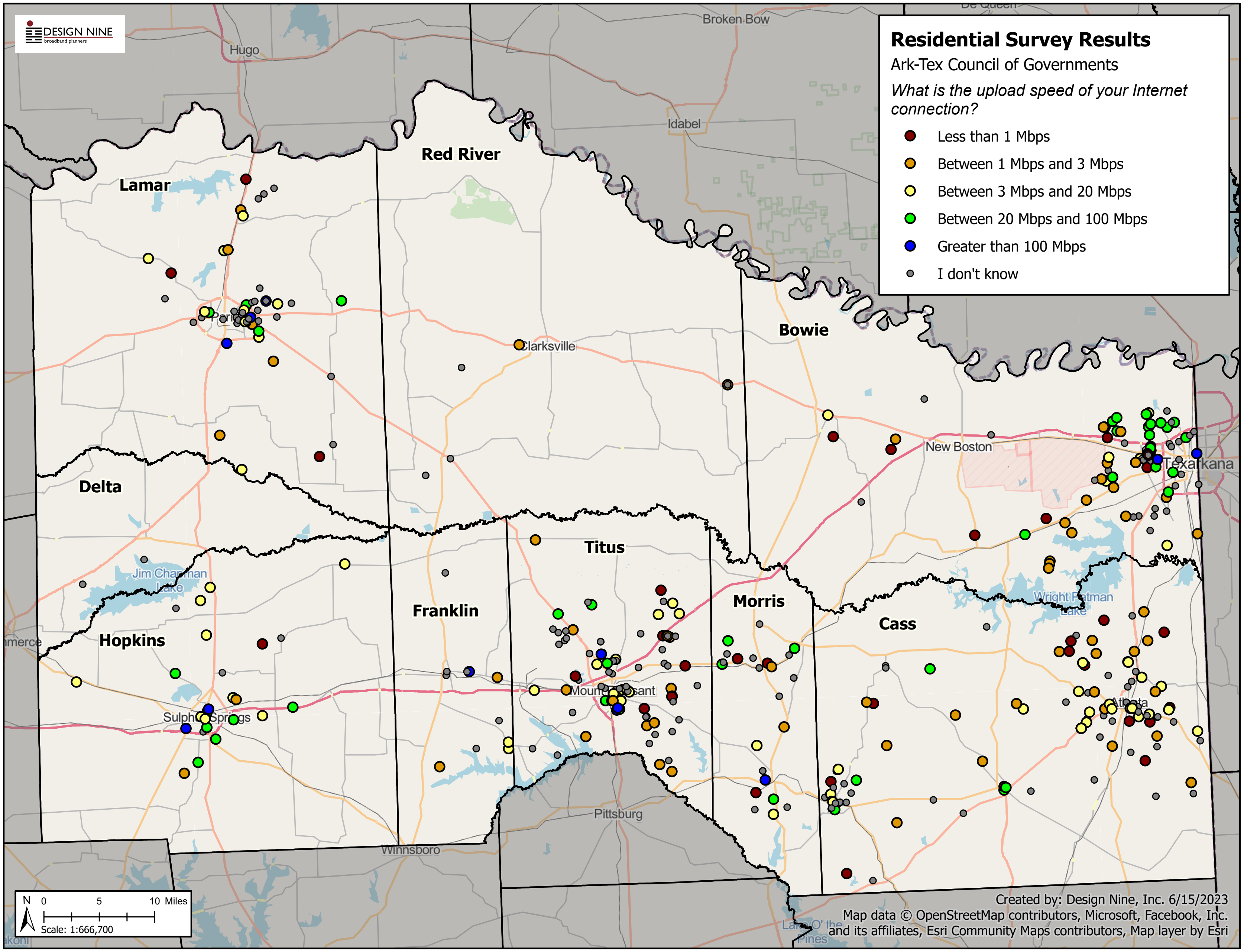
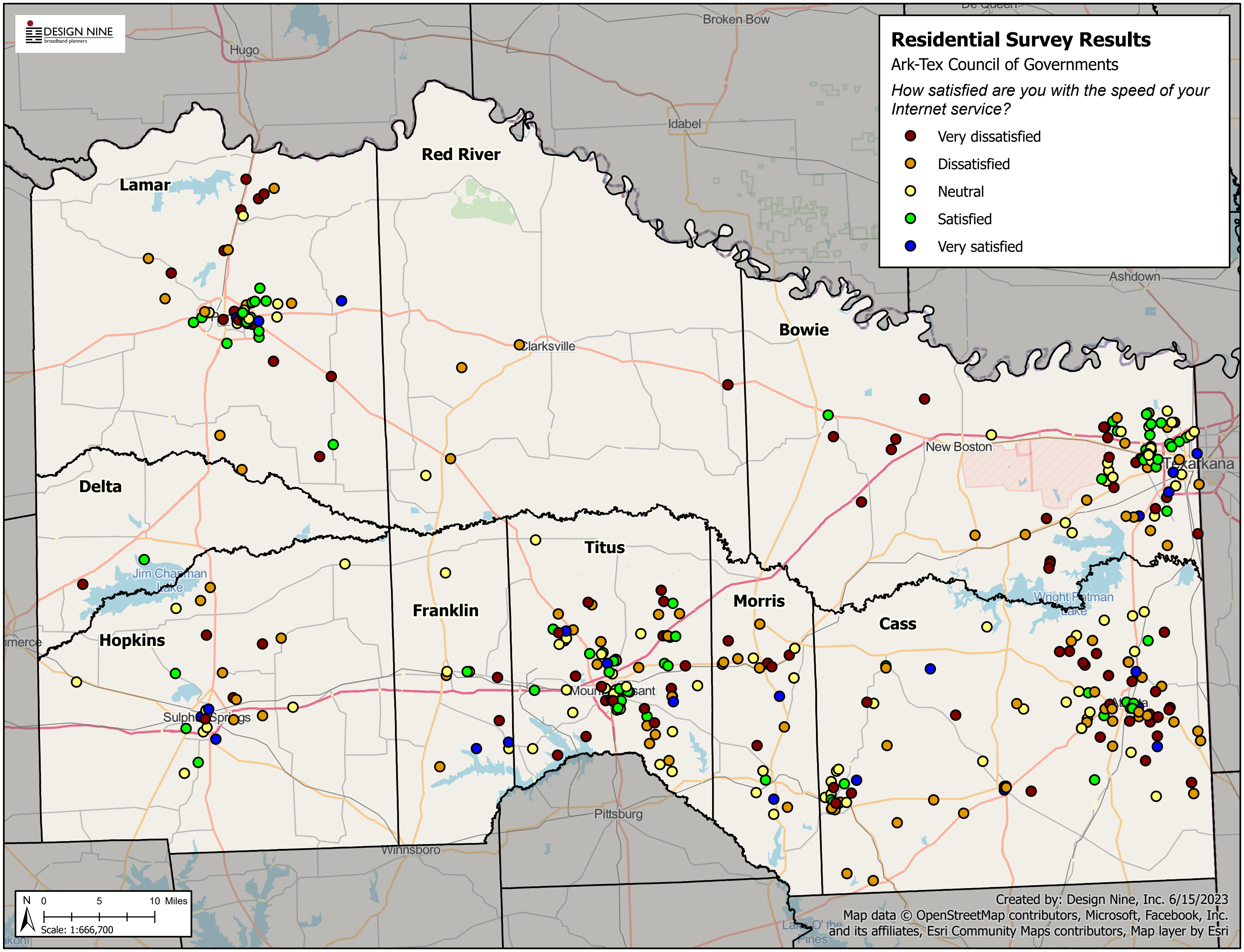
Scale: 1:666,700
Created by: Design Nine, Inc. 6/15/2023
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri


DESIGN NINE
broadband planners
Residential Survey Results
Ark-Tex Council of Governments
What is the upload speed of your Internet connection?
Less than 1 Mbps
Between 1 Mbps and 3 Mbps
Between 3 Mbps and 20 Mbps
Between 20 Mbps and 100 Mbps
Greater than 100 Mbps
I don't know
Lamar
Red River
Bowie
Delta
Titus
Franklin
Morris
Cass
Hopkins
Hugo
Broken Bow
Idabel
Clarksville
New Boston
Texarkana
Jim Chapman Lake
Wright Patman Lake
Sulphur Springs
Mount Pleasant
Atlanta
Pittsburg
Winnsboro
Lake O' the Pines
N 0 5 10 Miles
Scale: 1:666,700
Created by: Design Nine, Inc. 6/15/2023
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri



DESIGN NINE
broadband planners
Residential Survey Results
Ark-Tex Council of Governments
How satisfied are you with the speed of your Internet service?
Very dissatisfied
Dissatisfied
Neutral
Satisfied
Very satisfied
Hugo
Broken Bow
Idabel
De Queen
Ashdown
Lamar
Red River
Bowie
Clarksville
New Boston
Texarkana
Delta
Titus
Morris
Cass
Franklin
Hopkins
Jim Chapman Lake
Wright Patman Lake
Sulphur Springs
Pittsburg
Winnsboro
Lake O' the Pines
N 0 5 10 Miles
Scale: 1:666,700
Created by: Design Nine, Inc. 6/15/2023
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

ISP Ratings

Indicated That They Need better Internet Service		
	YES	No
Comcast/Xfinity	50.0%	50.0%
Hughesnet	100.0%	0.0%
Nextlink	100.0%	0.0%
Optimum	75.8%	24.2%
Sparklight	78.8%	21.2%
Starlink	90.0%	10.0%
T-Mobile	70.8%	29.2%
Verizon	96.0%	4.0%
Viasat	100.0%	0.0%
Windstream	86.1%	13.9%

ISP Ratings

Belief That the Two County Governments Should Facilitate Better Broadband		
	Yes	No
Comcast/Xfinity	100.0%	0.0%
Hughesnet	100.0%	0.0%
Nextlink	100.0%	0.0%
Optimum	98.3%	1.7%
Sparklight	96.7%	3.3%
Starlink	100.0%	0.0%
T-Mobile	100.0%	0.0%
Verizon	97.9%	2.1%
Viasat	100.0%	0.0%
Windstream	98.6%	1.4%

Business Survey Results

58% of business respondents want better Internet access

91% of respondents said that they believe the County government should help facilitate better broadband

100% indicated that the Internet is important to the success of their business over the next five years

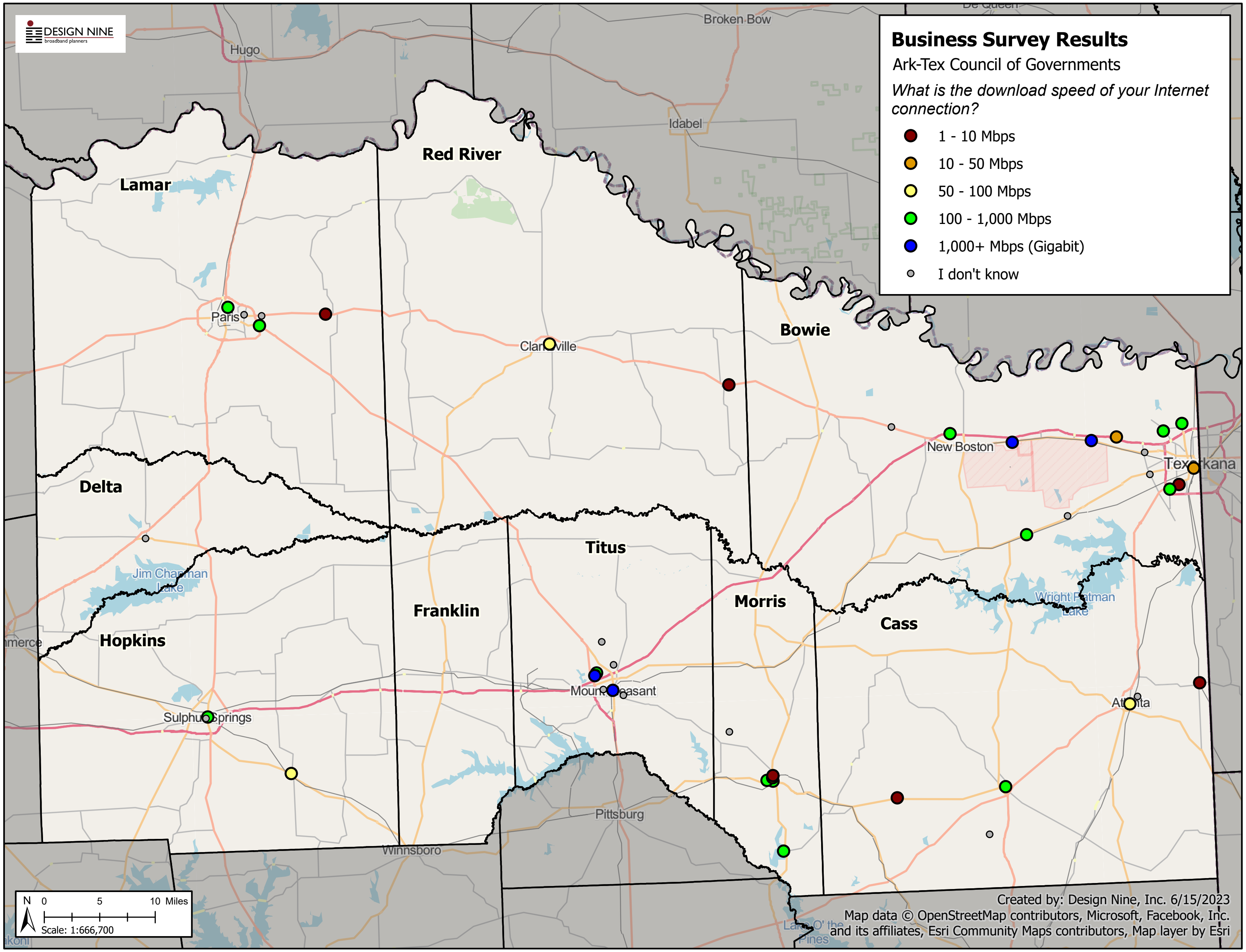
Only 57% of businesses are "satisfied" or "very satisfied" with the speed of their current Internet service

9% of the businesses that responded are home-based

55% of businesses that responded need employees to be able to work from home

Home-based workers and businesses need affordable Internet access

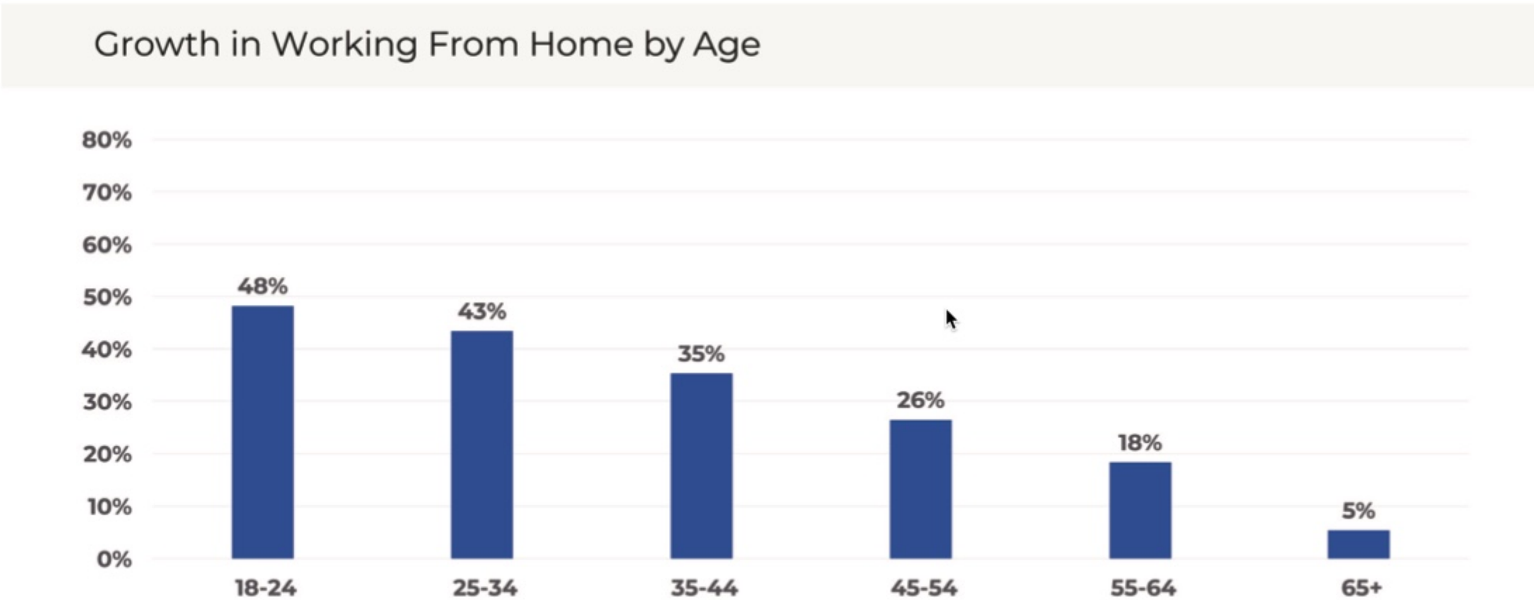
48 business responses received



Pandemic Impact

The pandemic impacted just about every aspect of life, including video and internet usage. The following data reveals some of that impact on rural consumers.

Does someone in your household work from home who did not prior to the pandemic? (n=726)
Note: Represents those answering yes.

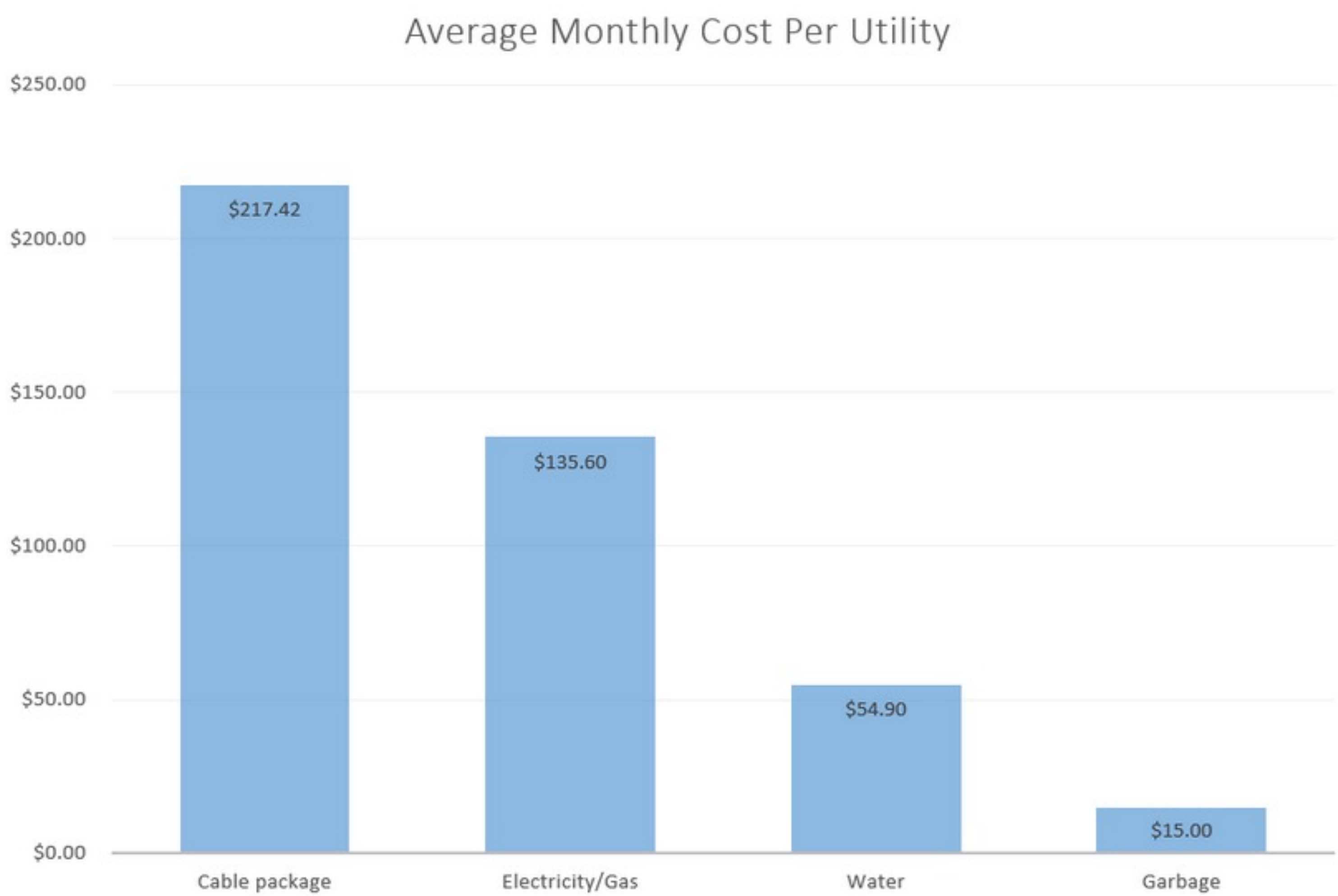


- For rural consumers, the younger you are, the more apt you are to have been working from home as a direct result of the pandemic.

Average cost of a high speed fiber connection is around $85.

Adding in an average of three streaming services and a phone line brings the total to $155, or a monthly savings of as much as $60

Sources: Municipal utility reporting, Consumer Reports 2019 study, Energystar.gov, Nationwide, Circle of Blue



Funding Opportunities

- Texas has been awarded more than $1 billion in BEAD funds (Broadband Equity Access and Deployment)
- The updated National Broadband Map continues to be a matter of debate
  - Arguments that address points in some areas are over-stated and/or understated
  - ISP estimates of service areas are optimistic
- Areas with less than 100/20 Mbps are eligible for grants
  - Virtually all cable Internet meets that requirement
  - Customer reports indicate upload speeds are often much lower
- Cable companies are getting expansion grants but are not lowering service cost (Comcast approaching $100 for Internet)

Digital Equity Strategy

- Biggest opportunity is the FCC ACP (Affordable Connectivity Program)
  - Will provide a discount of up to $30/month for eligible households, but funding may expire in early 2024
  - Likely to be renewed
- ISPs may participate, but not all ISPs promote the program
- County roles
  - Develop an awareness campaign to help LMI households apply for the subsidy
  - Work with ISPs to push them to make more effort (could easily be promoted in their own monthly billing statements

Working with ISPs

- BEAD grant challenges
  - ISPs must identify contractors and sub-contractors as part of the proposal–very difficult to do
  - Strongly encourages credentialed contractors and professional certifications
  - Letter of credit requirement for 25% of reward shuts out many smaller ISPs
- BEAD requirements seem to favor large (incumbent) providers, and makes developing market competition more difficult

Recommandations

- The counties should not become Internet Service Providers
  - Work with ISPs to obtain grant funds to improve service
- Given the rural nature of the region, there is not a single solution
  - Some fiber
  - Fixed point wireless is going to be important
  - Satellite, especially Starlink
- Manage expectations
  - Problem has taken 20+ years to develop, can’t be fixed in a year
- Work vigorously to pursue every possible grant opportunity