



LIBERTY COUNTY

State of the Community

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1 INTRODUCTION

Liberty County, Texas is located in southeastern Texas and part of the Houston metropolitan area. The County is bisected by the Trinity River from North to South and US Highway 90 from East to West. The County has a very strategic location, along the Trinity River, allowing access to the Port to the South, and along US Highway 90, connecting Houston to Beaumont.

The County was officially formed in 1836 as part of the Republic of Texas. The City of Liberty was annexed in 1837 and made the county seat. Originally, the County was much larger, encompassing all of what is currently Tyler County and parts of what later became Hardin, Chambers, San Jacinto, and Polk counties. The County's early development focused on agriculture, especially timber production, since timber could be floated down the Trinity River to Houston-area ports. In 1901, oil production began and has continued since. Many other minerals are found within the County, including: lignite, iron ore, sulfur, brick clay, salt, lime, glass sand, and gas.

Soil within the County is very high quality and between 40 and 50 percent of the land is considered to be prime agriculture land. Soil types include sandy, sandy loam, black sandy, and black waxy, characteristics of being located near the Texas coast. The subtropical climate is also characteristic of the County's coastal location, with very high humidity levels and average rainfall around 51 inches. Temperature varies throughout the year from between about 40 to 94 degrees Fahrenheit.

Figure 1.1, Location of Liberty County within Texas (H-GAC).

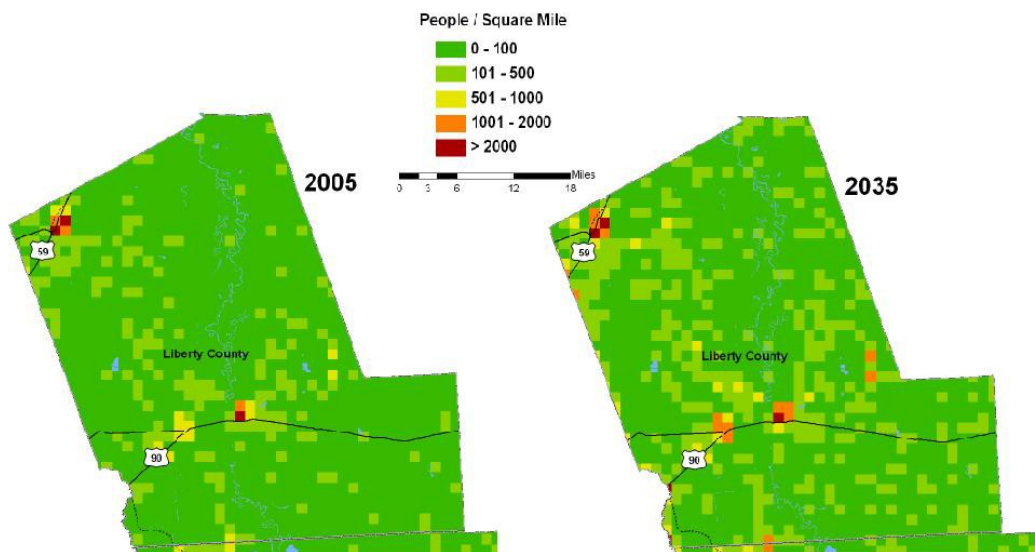


2 DEMOGRAPHICS

2.1 POPULATION DENSITY

The population of Liberty County is clustered around the two major cities: the City of Liberty in the central of the county, and in the City of Cleveland, in the northwest of the county. With the growth the population, according to the projected density in 2035, another city in Liberty County, Dayton, would become another residents' cluster. The population density of Liberty County in 2005 and 2035 (projected) can be observed in Figure 2.1.1. Although the county has 1,158.4 square miles of land area, most of the population resides in those two major cities¹ in 2005. The population density per square mile according to the 2010 Census was 63.5 people per square mile¹

Figure 2.1.1: Population Densities in Liberty County for 2005 and 2035 (Projected)



2.2 POPULATION GROWTH

Figure 2.2.1 shows the population growth for Liberty County, Houston and Galveston Council, and Texas from 2000 to 2010.

Figure 2.2.1: Population growth rate from 2000 to 2010, Liberty County, H-GAC, and Texas

| | Population in 2000 | Population in 2010 | Growth Rate |
|-----------------------|--------------------|--------------------|-------------|
| Liberty County | 70,154 | 75,643 | 7.82% |
| H-GAC Area | 4,854,454 | 6,087,133 | 25.39% |
| State of Texas | 20,851,820 | 25,145,561 | 20.59% |

The 2010 population for Liberty County is 70,154. That is 7.82% increase from its 2000 population of 70,154. The population for Houston and Galveston area is 4,854,454 in 2000 and 6,087,133 in 2010 showing a 25.39% raising tendency. Compared to the Liberty County, the population of the state of

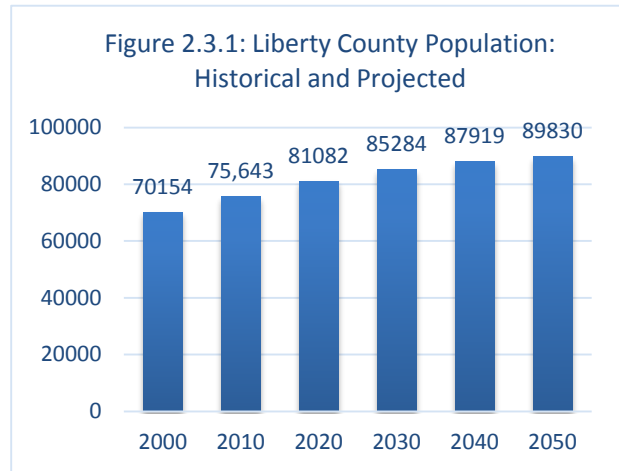
Texas grew at a higher rate over the time period which is 20.59% in increase (United States Census Bureau, 2000 & 2010 and Houston- Galveston Area council).

2.3 POPULATION PROJECTION

The projected population from 2020 to 2050 (Figure 2) is from the Texas Population Projections Program which produces biennial projections of the population of the state and all Counties in the state. Every 2-3 years, the program produces state and county level projections for every year from 2015 through 2050.

In the projection, the population is calculated by the zero migration scenario which assumes that immigration and outmigration are equal (i.e., net migration is zero) resulting in growth only through natural increase¹.

We select the population information by 10-year period, which project the population to be 81,082 in 2020, 85,284 in 2030, 87,919 in 2040, and 89,830 in 2050.



Note: Population in 2000 and 2010 is from American Census. The population in 2020, 2030, 2040 and 2050 is from Texas Population Projections Program.

2.4 EDUCATION

According to the U.S. Census Bureau's data, 75.1% of the county's population over 25 has completed High School or higher, compared to 81.2% of the Texas state. The education level of Liberty County concentrates on *Some College* and *High School graduate and GED* which accounts for 24.6% and 37.2% separately, higher than the share of that in the state Texas. Liberty County has a lower percentage of its population attaining an *associate's degree* or higher. Those with an associate's degree or higher is 13.2% for the county, and 33.1% for the State. We can conclude that the educational attainment of Liberty County is lagging behind that of Texas State.

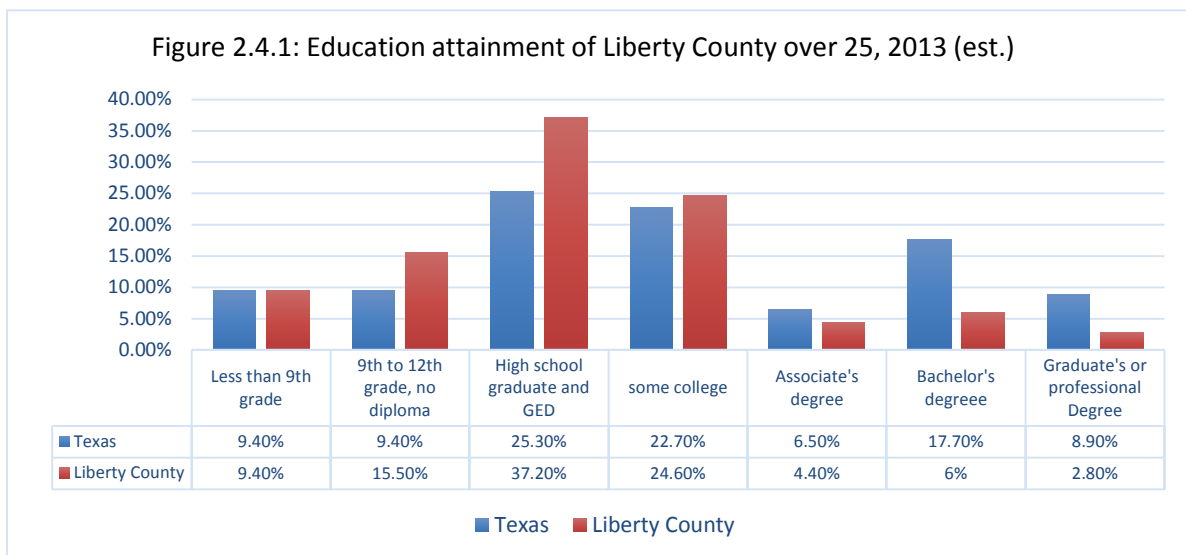
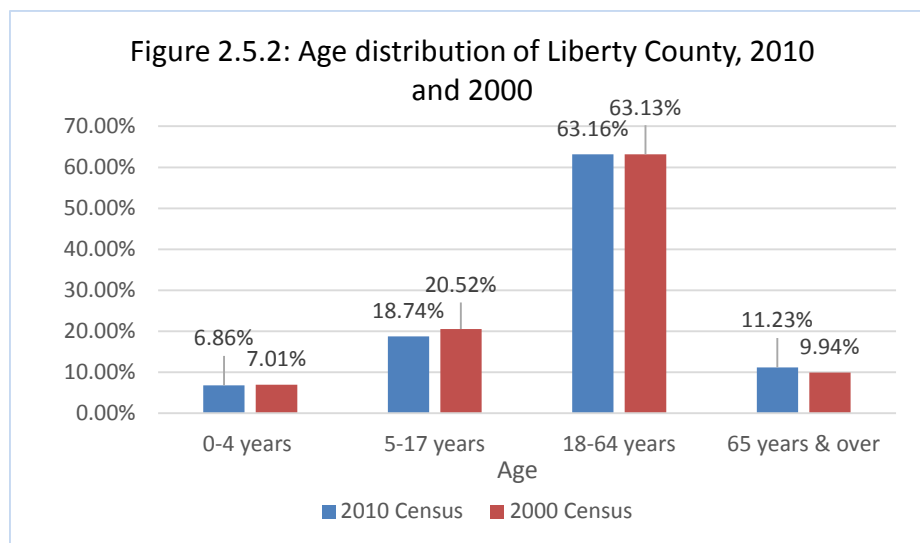
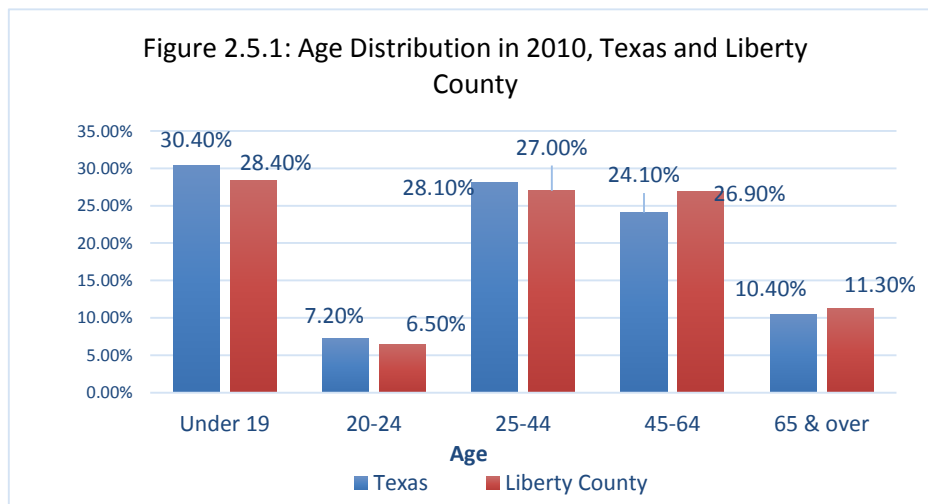


Figure 2.4.1 shows the educational attainment of the population over 25 for the county compared to the State.

2.5 AGE DISTRIBUTION

The age structure of the population of Liberty County has remained constant. From 2000 to 2010, the proportion of the age 65 years and over goes up slightly while the school-age group goes down slightly (Figure 2.5.2). When compared to the State of Texas, the percentage of group over age 45 in Liberty County is a little higher (Figure 2.5.1).



2.6 POPULATION ECONOMICS

Based on the figure 2.6.1, it is obvious that the unemployment of Liberty County is far behind that of Texas. However, the poverty rate of Liberty County and the State in 2013 is close. Figure 3.6.2 tells us that the poverty of Liberty County increases slightly while that of Texas vibrates. In the lasted data, the poverty rate of Liberty is only a little more than that of Texas but the slope is less than Texas. If the poverty develops following the current slope, the Texas's poverty rate will exceed that of Liberty County.

Based on the poverty rate in different ethnicities presented in figure 2.6.3, poverty rate of Hispanic or

Latino origin is much higher than that of White alone, in both Texas and Liberty County. The rate of Hispanic or Latino origin in Liberty County is higher than that of Texas.

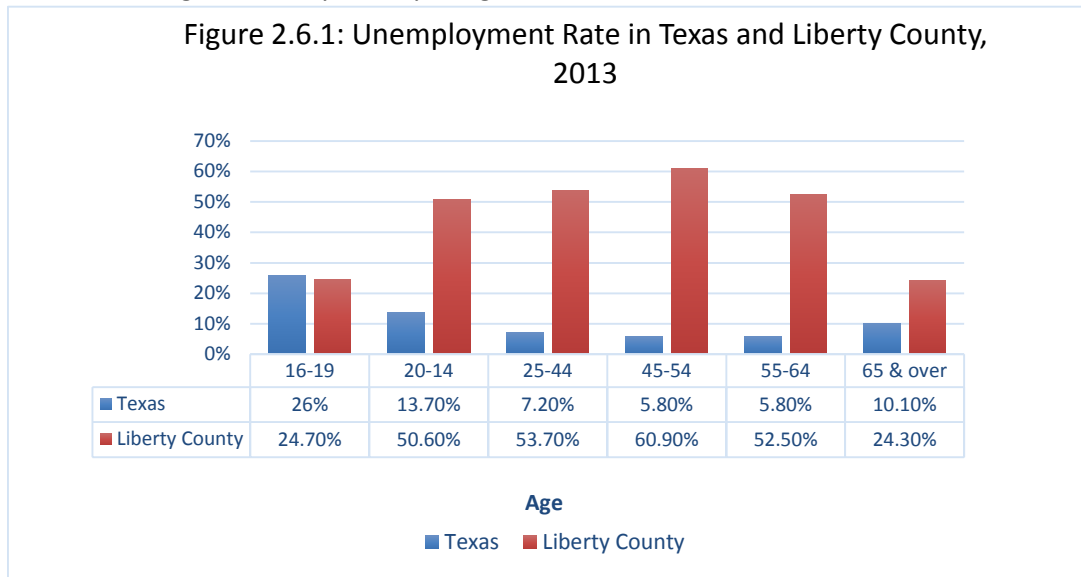


Figure 2.6.2: Poverty rate history in Texas and Liberty County

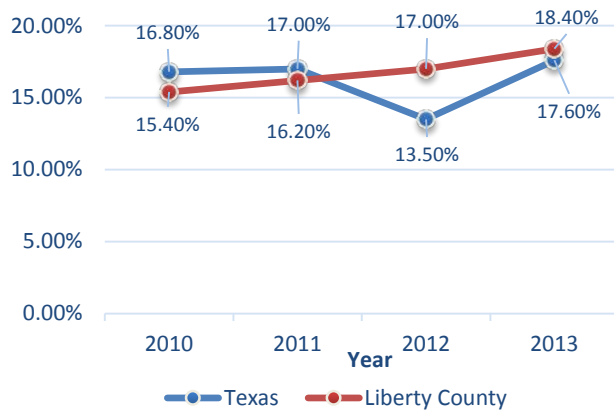
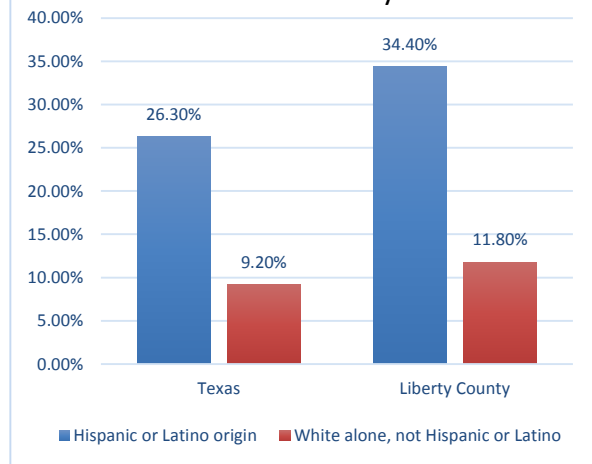


Figure 2.6.3: Poverty rate of different ethnicity

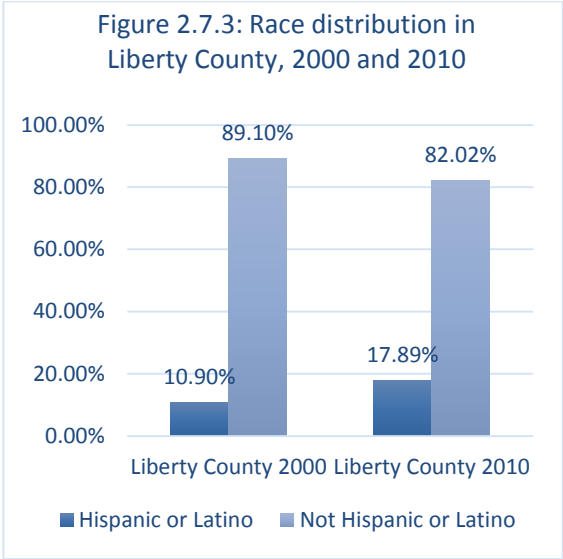
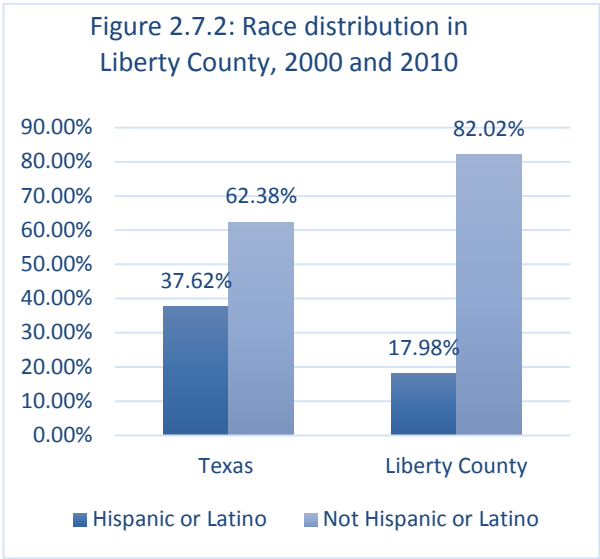


2.7 RACE AND ETHNICITY PROFILE

Compared the percentage of Hispanic or Latino in Liberty County in 2000 and 2010, the Hispanic or Latino identity raised much according to the data of Figure 2.7.2. Although the Hispanic or Latino identity raised much, Liberty County still has a quite lower percentage in 2010 than that of the state with 17.89% in Liberty County and 37.62% in the state. Based on figure 2.7.1 and figure 2.7.3, the population of Hispanic or Latino goes up from 2000 to 2010 for both Texas and Liberty County, but the growth rate of Liberty County far exceeds Texas.

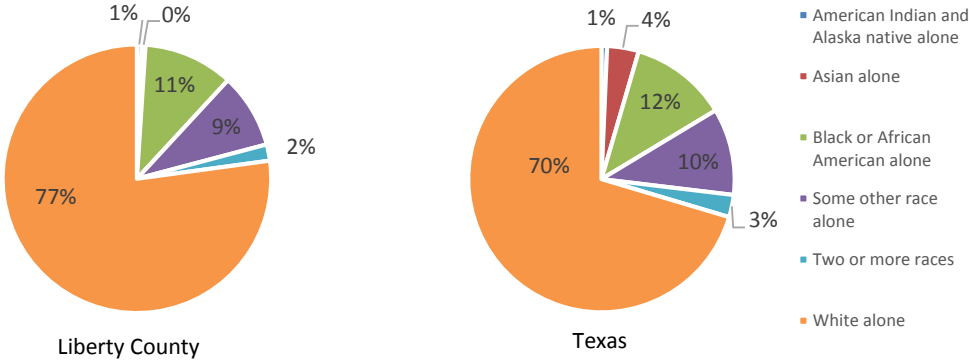
Figure 2.7.1: Growth rate of Hispanic or Latino in Texas and Liberty County from 2000 to 2010

| | Hispanic or Latino population in 2010 | Hispanic or Latino population in 2000 | Growth Rate |
|-----------------------|---------------------------------------|---------------------------------------|-------------|
| Texas | 9,460,921 | 6,669,666 | 48.85% |
| Liberty County | 13,602 | 7,660 | 77.57% |



In terms of race, the white alone race has an absolutely advantage in both Texas and Liberty County. From the most to last, the races are White alone, Black or African American alone, and some other race alone. (Figure 2.7.4)

Figure 2.7.4: Race distribution in Texas and Liberty County, 2010



3 HOUSING

Liberty County has developed slowly, over the course of many generations. The housing stock has grown at a similar rate to population, with expedited growth following World War II. Housing growth peaked in the 1990's and since has slowed significantly. Overall residential growth trends are in line with patterns for the state of Texas, with slight variations in the 1990's. In the 1990's, there was a large increase in both the number of housing units being built and the number of occupants moving into housing units, as can be seen in Figures 3.1 and 3.2. The number of occupants moving into housing units peaked in the period from 2000 to 2009.

The County has a total of 28,910 housing units, with an occupancy rate of 85.9 percent. This is slightly below the Texas and United States rates of 88.2 and 87.5 percent, respectively. The average household size is the same for Liberty County and Texas at 2.82 occupants per household, slightly above the national average of 2.63.

As stated before, a large amount of the housing stock was built in the 1990's. Just over 40 percent of the County's housing stock has been built since 1990. This trend does vary from city to city within the County. For example, the City of Liberty experienced heightened growth from the 1950's through the 1980's, but then it slowed. Dayton experienced a much higher rate of growth during the 1990's, just above 30 percent. Overall trends for the County and cities within the county point to growth of the housing stock during the 1980's and 1990's, followed by an influx of occupants during the 2000's (see Figure 3.2).

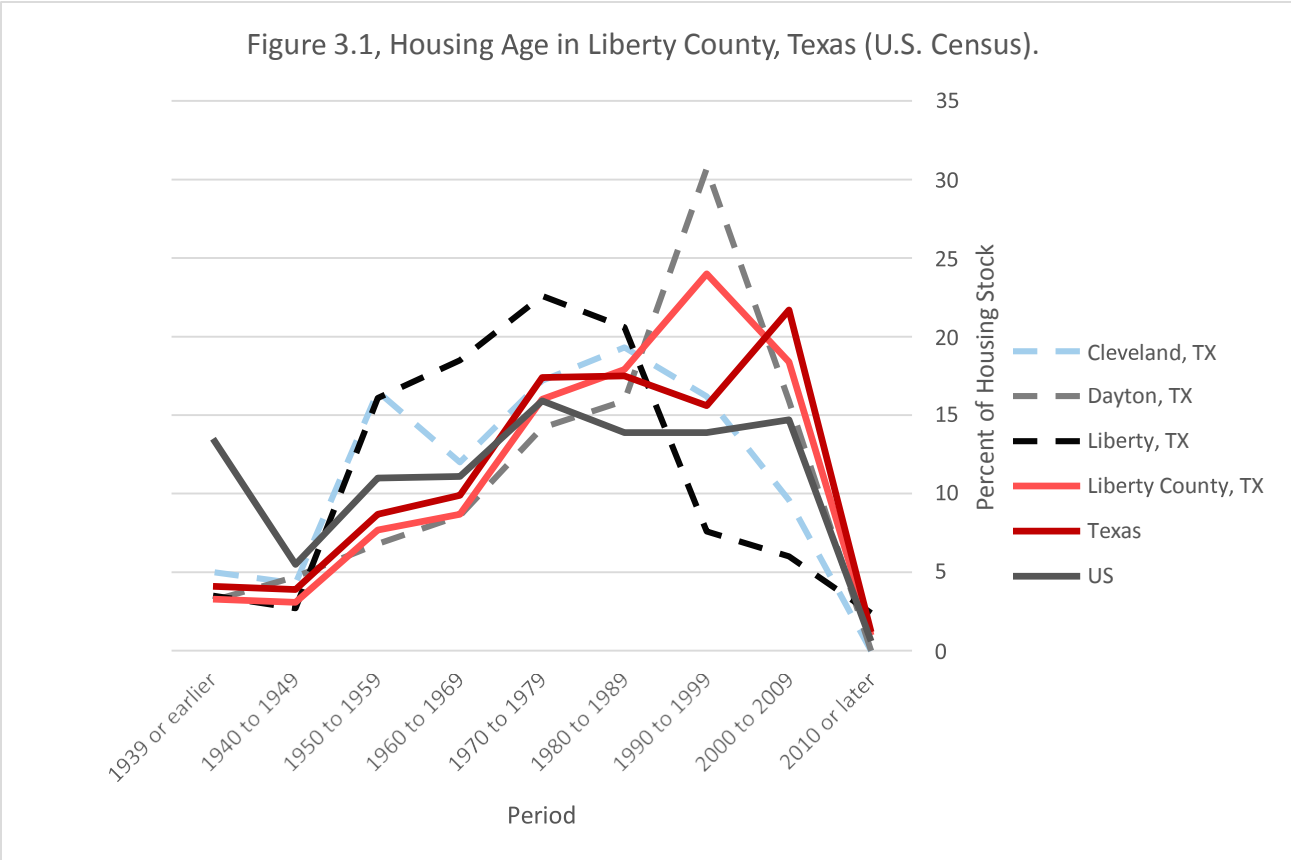
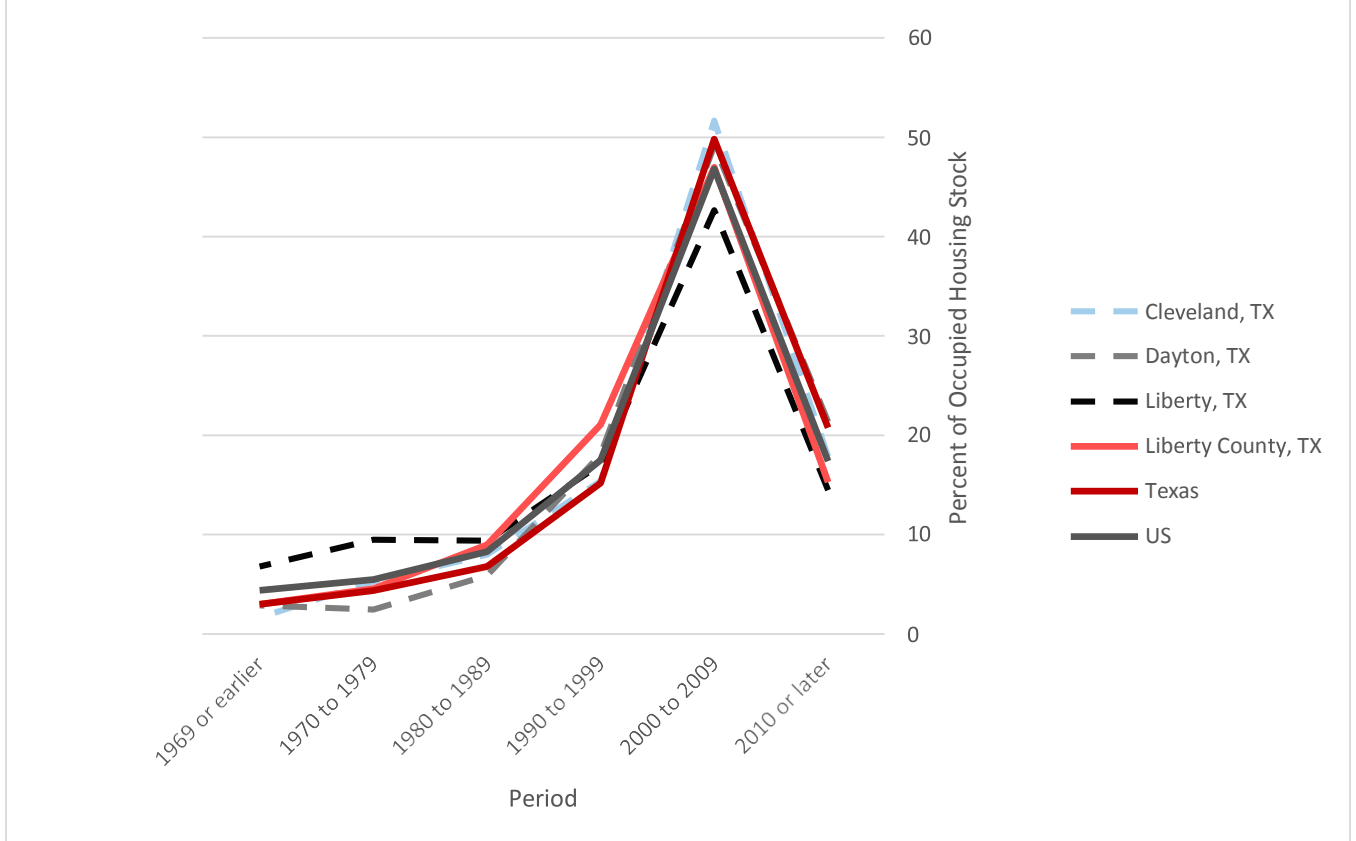


Figure 3.2, Year Housing Occupant Move In in Liberty County, Texas (U.S. Census).



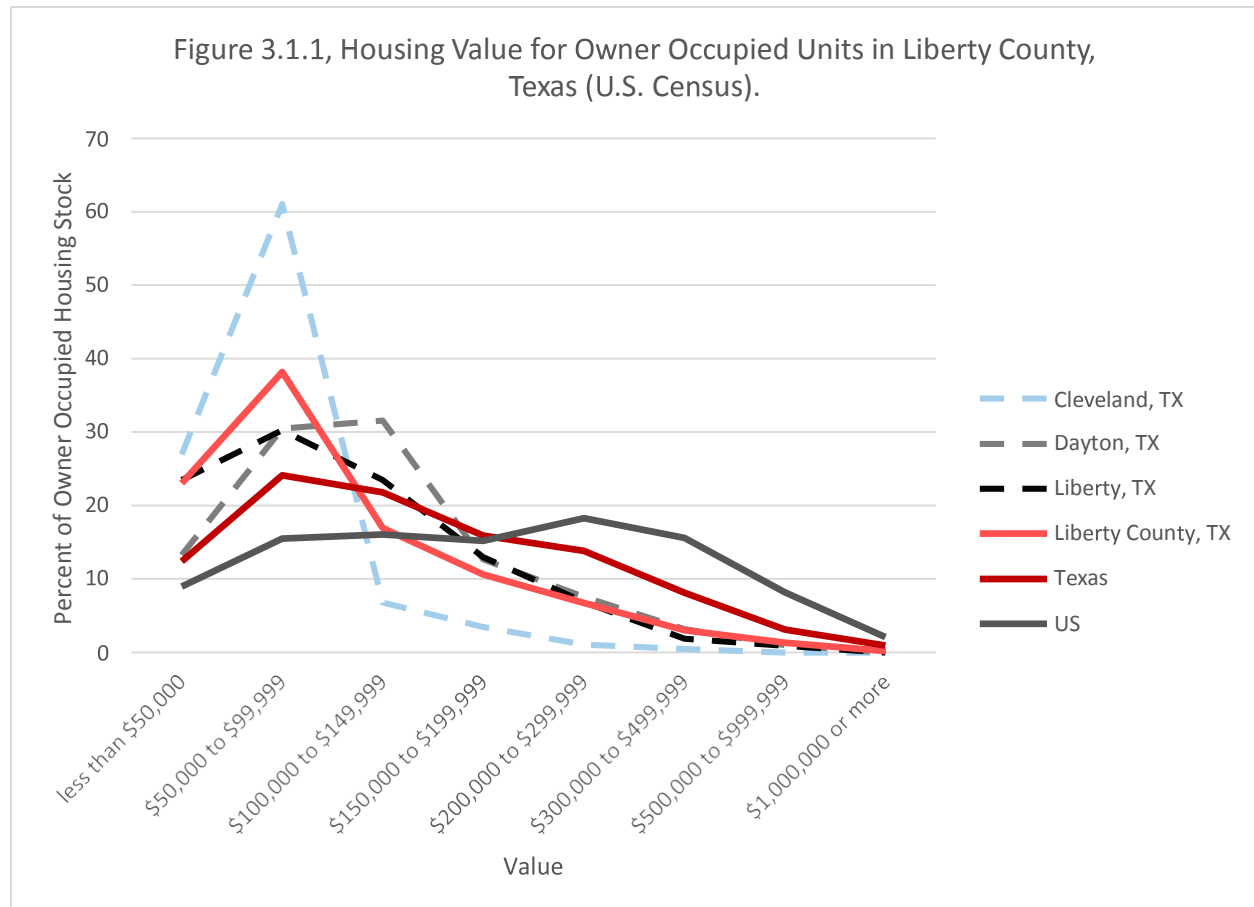
3.1 OWNER OCCUPIED HOUSING

Liberty County’s housing stock has 19,400 owner occupied housing units, or about 80 percent of the housing stock. This is about 15 percent higher than both the state and national rate. The average household size is slightly larger overall for the County for owner occupied housing units, as compared to both the rate for the entire housing stock and for rental housing. This does, however, vary from city to city within the County. For example, Dayton’s average household size for owner occupied housing is 3.13, the highest in the County. The vacancy rate is very low at one percent for the County, below Texas’ rate of two percent and the national rate of 2.2 percent. This signifies that owner occupied housing units are in high demand within the County.

The median housing value for owner occupied units is about \$85,000. This is below both the state and national medians of about \$130,000 and \$175,000, respectively. Figure 3.1.1 on the following page shows housing value for owner occupied units. Liberty County has a higher number of units valued on the lower end of the scale, with the majority (61.2 percent) of its owner occupied housing stock valued at less than \$100,000. In the City of Cleveland, almost 90 percent of the owner occupied housing stock is valued at less than \$100,000, with about 60 percent falling in the \$50,000 to \$99,999 range.

Due to the affordable cost of housing, only about a quarter of owner occupied households with a mortgage are consider to be housing cost burdened, which is below the national rate but above the state’s. The US Department of Housing and Urban Development defines a household as being housing

cost burdened with 30 percent or more of the monthly total household income is spent on housing costs. Only about 13 percent of owner occupied household without a mortgage are considered to be housing cost burdened. This shows that the housing market in Liberty County is affordable for owner occupied housing units.

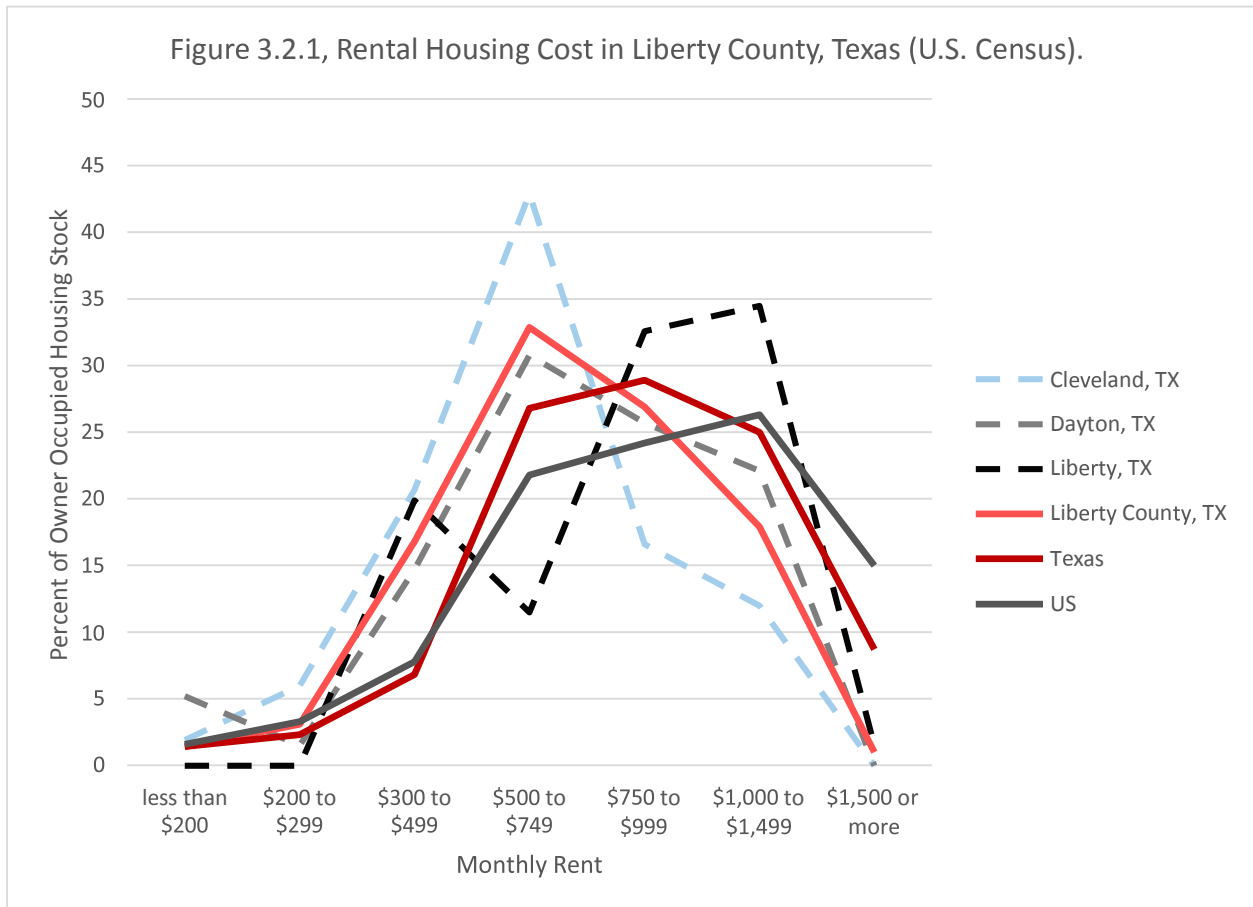


3.2 RENTER OCCUPIED HOUSING UNITS

The rental portion of the housing market contains about 22 percent of the total number of occupied housing units. That is a significantly smaller portion of both the state’s and the national rental market’s size of 36.7 and 35.1 percent, respectively. The vacancy rate for renter occupied housing units is higher than for owner occupied housing units, but still lower than both state and national rates, at 7.2 percent. Similar to other statistics for the County, the rental vacancy rate varies greatly from city to city within the County, with Cleveland reaching 10.9 percent and Dayton at zero percent.

The median monthly rental costs are \$731, below the state rate of \$851 and well below the national rate of \$904. Just over 30 percent of renter occupied households pay between \$500 and \$749 per month in rent, as can be seen in Figure 3.2.1 below. Rental rates in the City of Liberty tend to be a little higher, while rates in Cleveland peak on the lower end. Overall for the County, just over 40 percent of renter occupied households are considered to be housing burdened, lower than the Texas rate of 49.1 percent and the national rate of 52.3 percent. This rate is, however, much higher in the cities of Cleveland and Dayton, jumping at just over 50 percent, similar to the state and national rates. This

shows that renter occupied housing is slightly more affordable overall for the county as compared to state and national levels, but there are certain areas where affordability is lower.



3.3 AFFORDABLE HOUSING

Housing assistance programs are available from the County and cities within the County. The Liberty County Housing Authority, as well as the Cleveland and Dayton Housing Authorities, offer both public housing and housing through the Housing Choice Voucher Program. Included in these programs are housing options for the elderly and persons with disabilities.

4 ECONOMY

4.1 ECONOMIC STRUCTURE

Using the data retrieved from the U.S. Census, we have a basic understanding of the state of the economy for Liberty County and its benchmark region, the State of Texas in terms of the employment by all industry sectors in the year 2005 and 2013. For the purpose of such analysis, we have opted to compare our community's economic structure with that of the State of Texas and the development of Liberty County from 2005 to 2013.

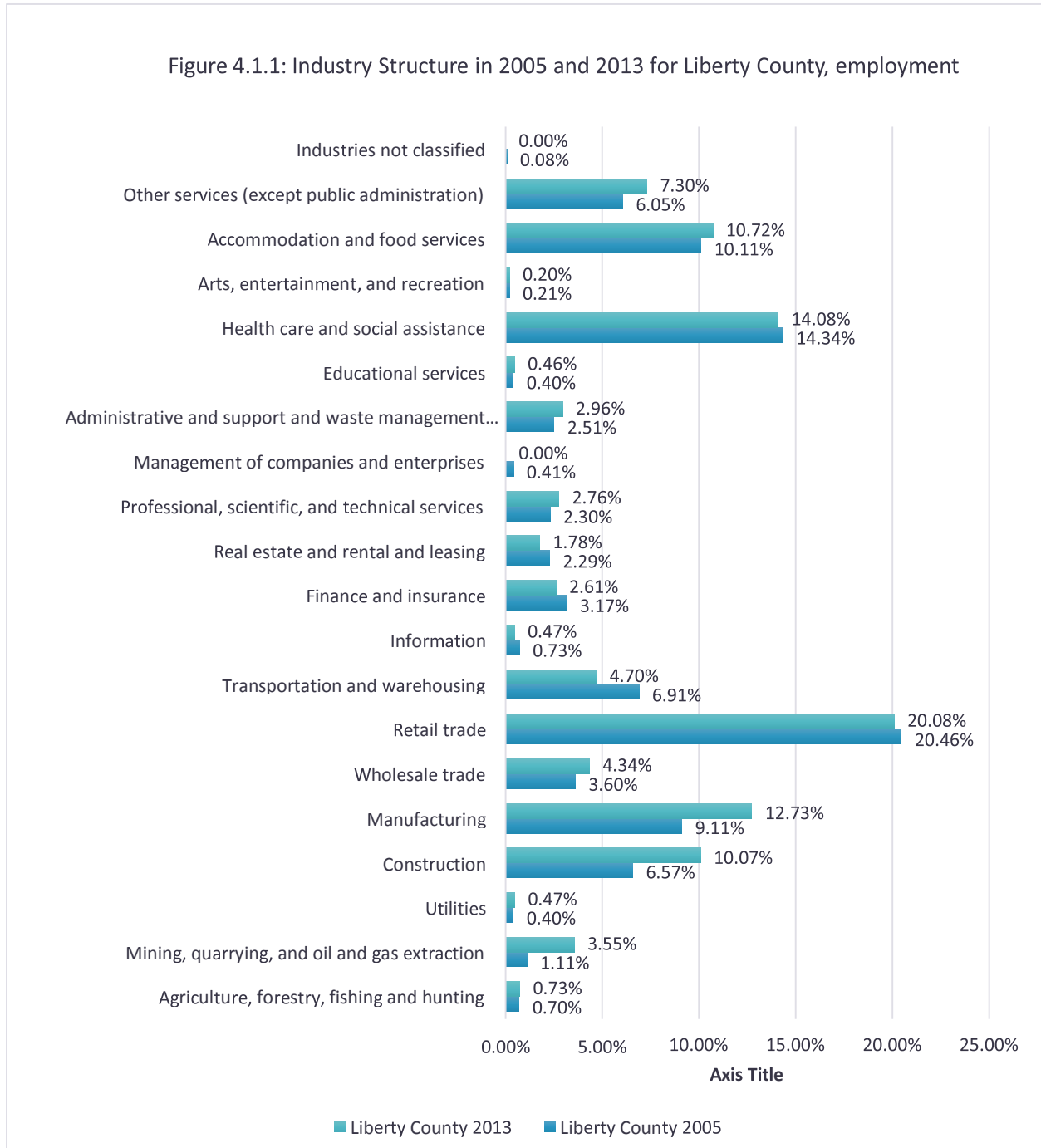


Figure 4.1.1 shows the distribution of workforce of Liberty County in different years, 2005 and 2013. There is no big change in employment distribution of Liberty County. The share of Construction, Manufacturing, and Mining, Quarrying, and Oil and Gas Extraction increase sharply while Transportation and Warehousing decrease most.

Figure 5.1.2: Industry Structure of Texas and Liberty County in 2013, employment

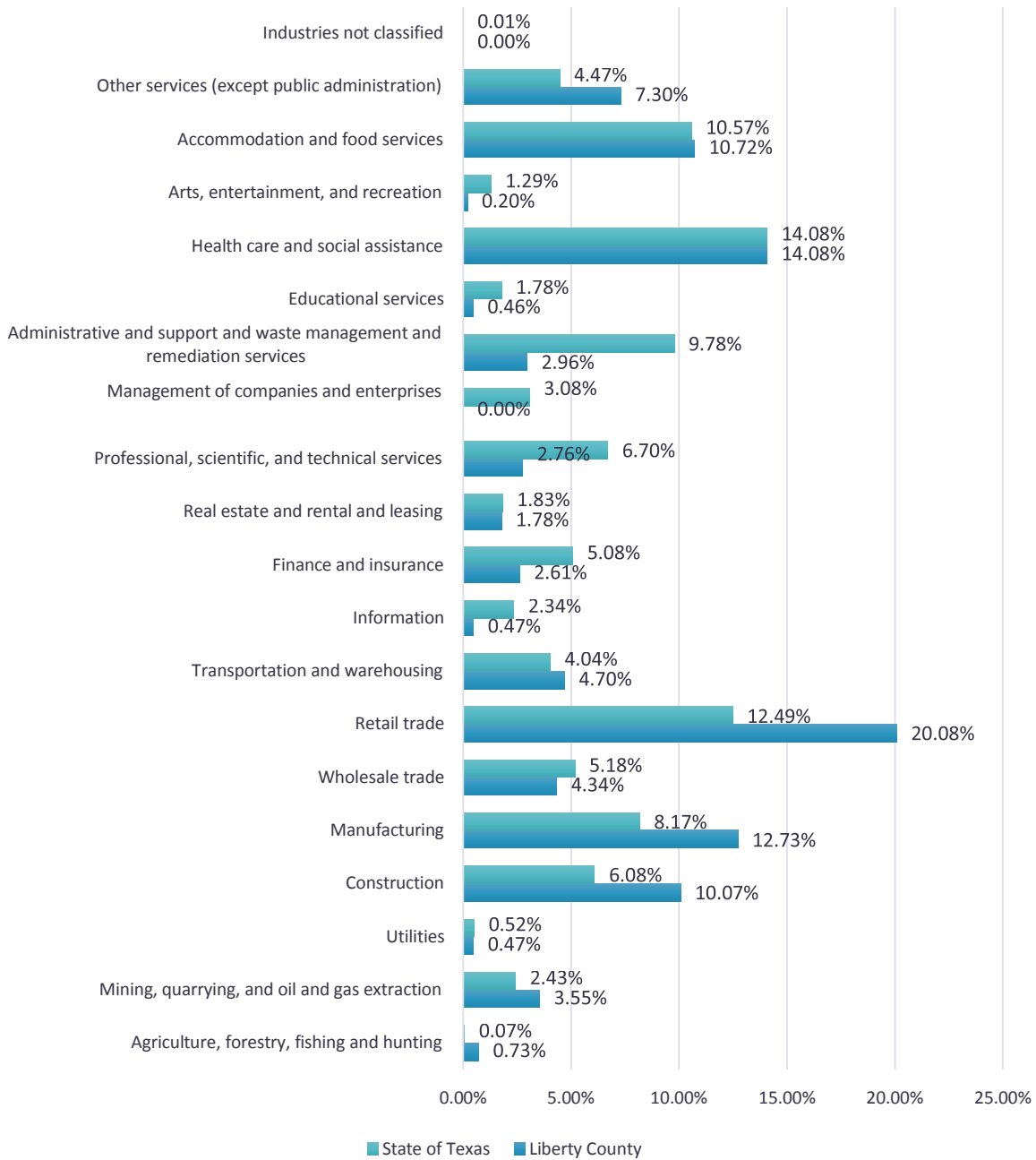
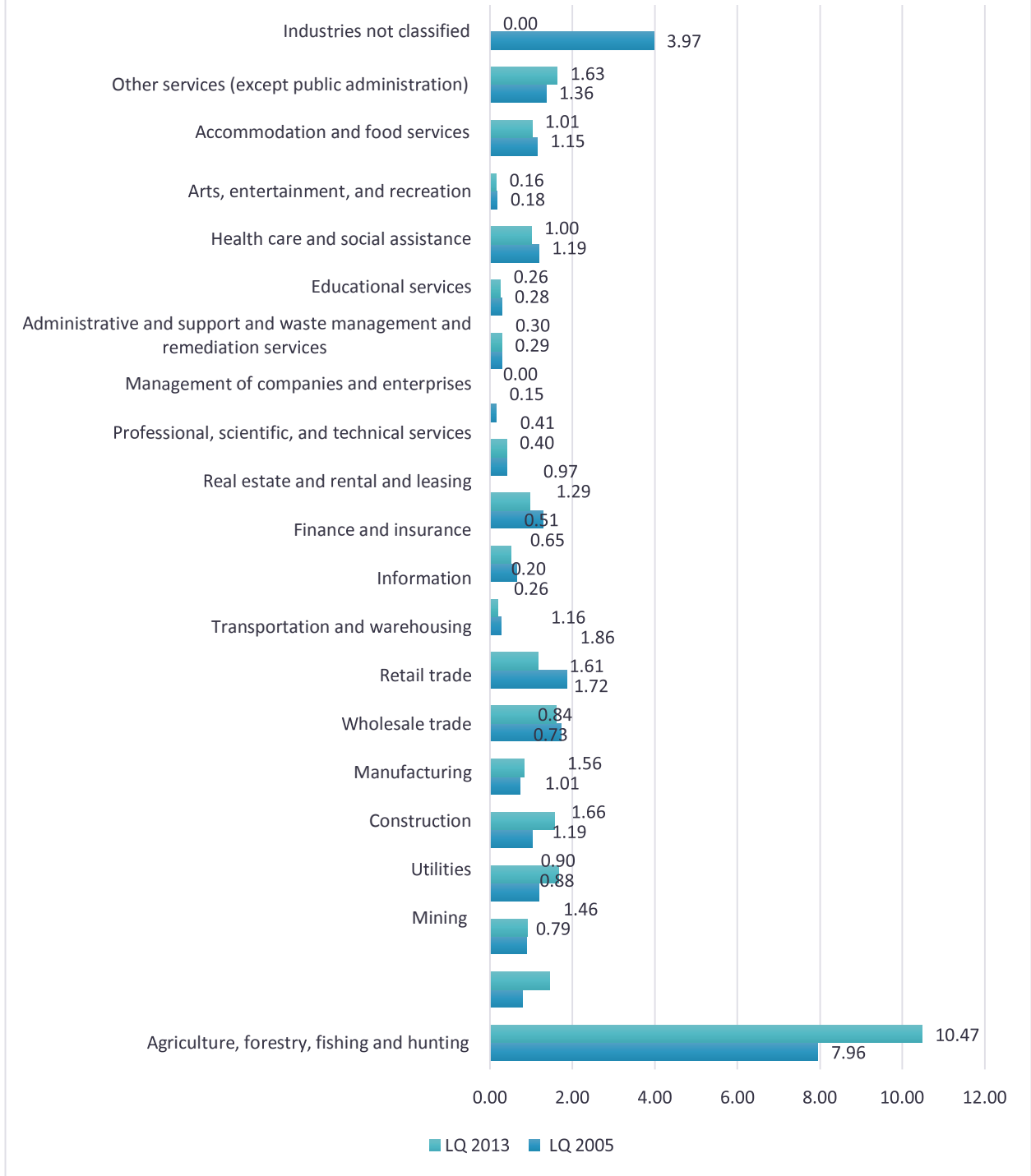


Figure 4.1.2 shows the distribution of the workforce of Liberty County compared to the State of Texas in 2013. In 2013, the top 3 shares of employment belonged to Retail Trade, Health care and social assistance, Accommodation and food services while the top 3 of Texas is the same but in different ranking and shares. The share of Retail Trade (top 1 of Liberty County) is more than one fifth while the top 1 industry of Texas, Health care and social assistance, accounts for 13.21%, close to the share of the second industry 13.02%. The employment distribution of Liberty County is too concentration.

4.2 ECONOMIC BASE ANALYSIS

Based on figure 4.2.1, compared the LQs of 2005 and 2013, Liberty County Gain advantage in agriculture, forestry, fishing and retail trade, mining, construction, manufacturing and other service but lost its advantage in transportation and warehousing and real estate and rental and leasing. Concentration on Agriculture, Forestry, Fishing and Hunting is still an economical threat of Liberty County.

Figure 4.2.1: Location Quotients of Liberty County for 2005 and 2013



Based on the map of employment densities for Liberty County in 2005 in figure 4.2.2, the employment within Liberty County concentrates on the three major cities – Liberty City, Cleveland City, and Dayton city,

similar to population distribution. The projected employment density for Liberty County shows the similar distribution. Figure 4.2.3 shows the employment distribution of H-GAC council area shows that the amount of employment in City of Houston far exceeds the around counties.

Figure 4.2.2: Job distribution in Houston and Galveston Council area

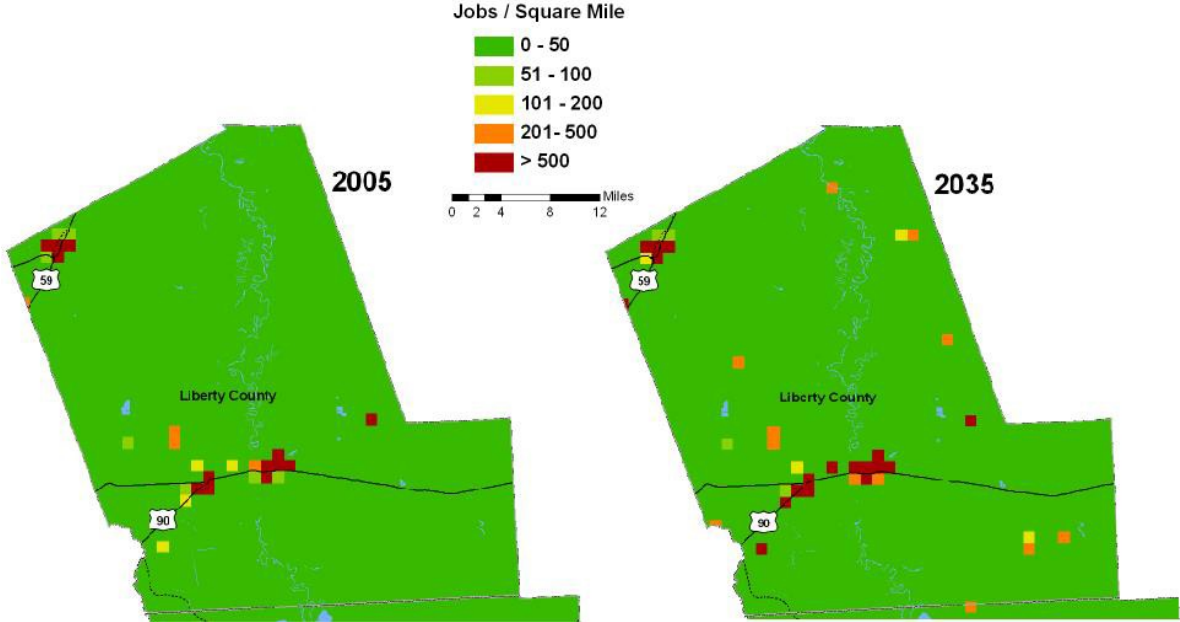
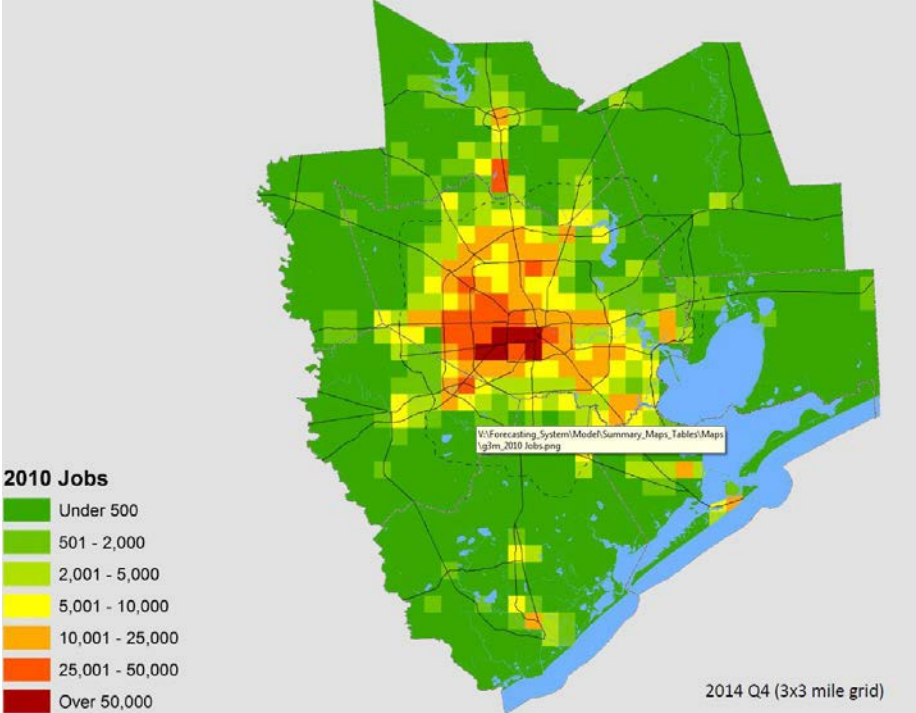
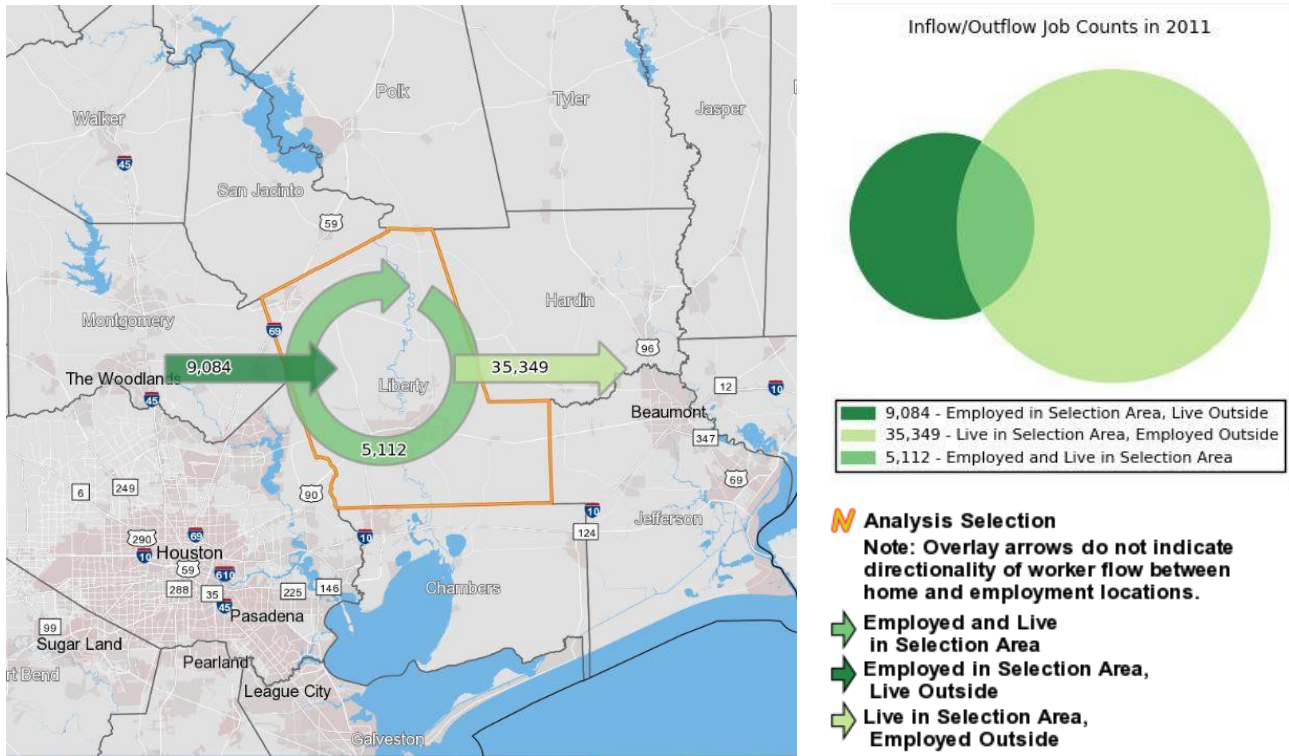


Figure 4.2.3: Employment Densities in Liberty County for 2005 and 2035 (Projected)



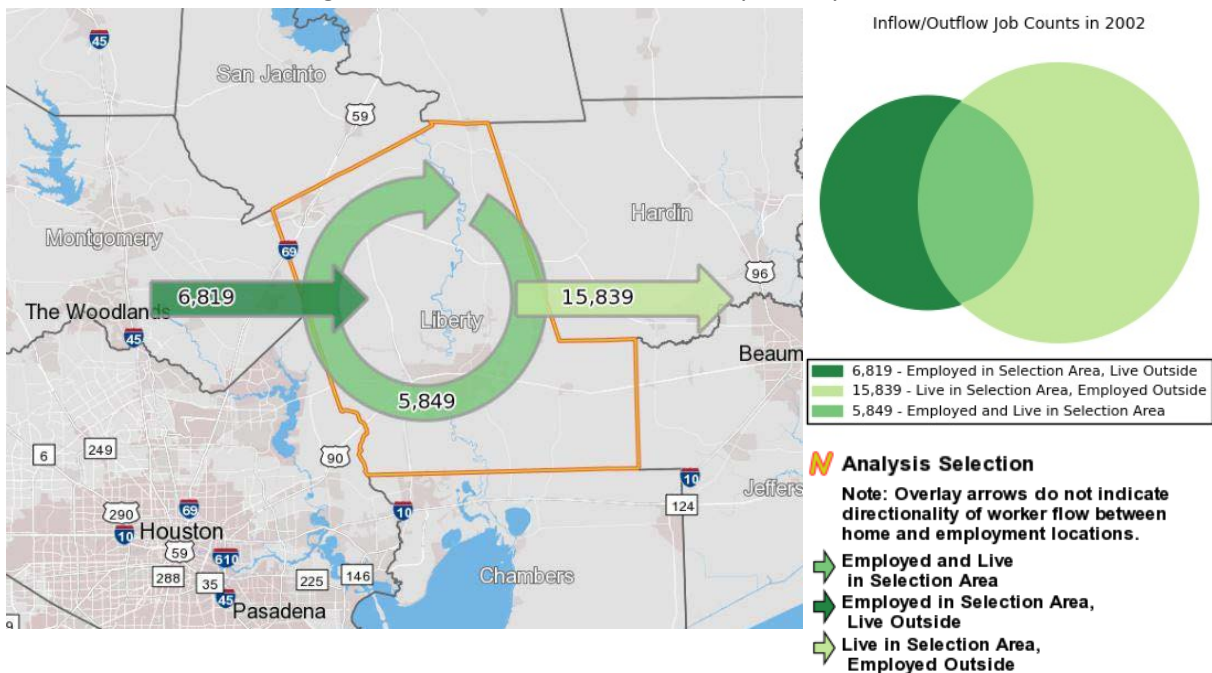
Retrieving data by On-the-Map, we have observed that the amount of people both living and working in Liberty County, as well as the amount of people traveling into or out of Liberty County for work for the year 2002 and 2011.

Figure 4.2.4: Inflow/Outflow of Liberty County for 2011



Based on the analysis for 2002 presented on Figure 4.2.5, Liberty County’s employment for primary jobs accounts for 12668. Out of the 12,668 jobs, 5,849 (46.17%) have lived in Liberty County while the rest lived outside. 15,839 have lived in the Liberty County, but been employed outside.

Figure 4.2.5 Inflow/Outflow of Liberty County for 2002



According to figure 4.2.4, the inflow/outflow analysis in 2011 presents that the amount of people both live and work in Liberty County goes down slightly. At the same time, the group who have been employment outside the Liberty County but lived inside has extended sharply (from 15,839 to 35,349), as well as the group, living outside but commuting to Liberty County (from 6,819 to 9,084). This is probably because Bastrop County is a suburb of the City of Houston, and a majority of people commute to the more urban city to work. Figure 4.2.6 and 4.2.7 explain the commute distance raises and employment locations moves towards Southwest where is the location of Houston City.

Figure 4.2.6: Commuting distance of Liberty County in 2011

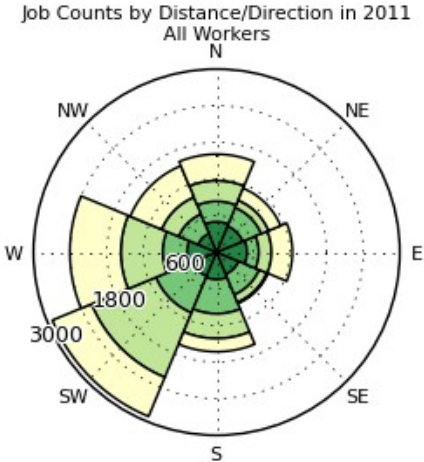
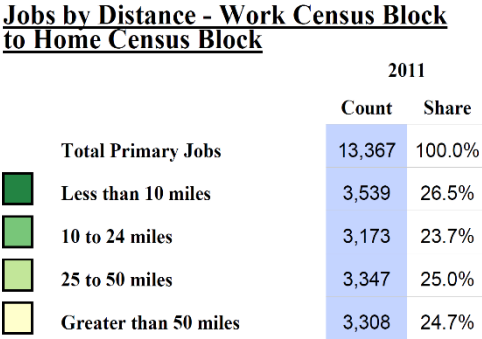
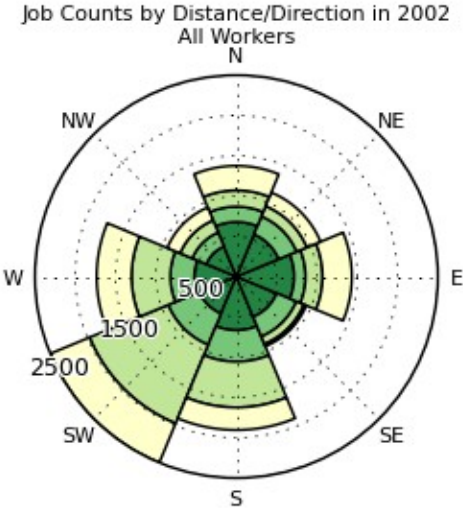
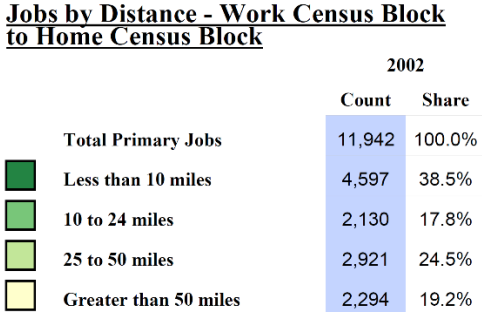


Figure 4.2.7: Commuting distance of Liberty County in 2002



5 TRANSPORTATION

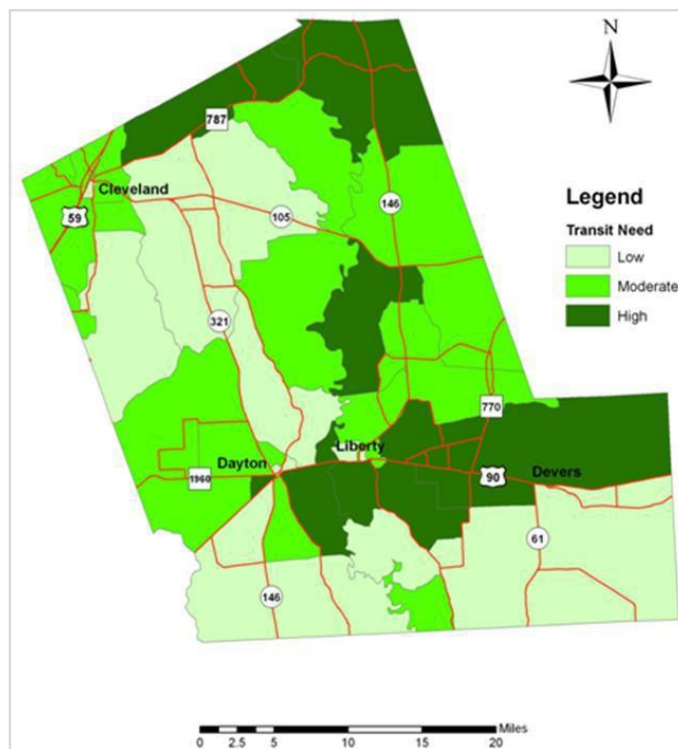
Liberty County is located to the northeast of Houston proper and has two major roadways that serve the Houston metropolitan area. US Highway 90 serves as a major route eastern from downtown Houston towards Beaumont and Louisiana. Interstate Highway 69 radiates northeast from downtown Houston and continues north as US Highway 59 through many east Texas communities, before crossing state boundaries near Texarkana.

5.1 LIBERTY COUNTY TRANSIT PLAN

The County has developed a transit plan, which identifies short-, mid-, and long-term goals. The plan was approved by both the Liberty County Commissioners and Houston-Galveston Area Council in June 2009. The plan identifies two key recommendations for the County: a countywide demand response service and a park-and-ride facility from Dayton to the Houston central business district. The plan also identified areas most in need of public transit, as can be seen below in Figure 5.1.1. This was done by calculating a Transit Need Index based upon demographic characteristics and then showing the data spatially.

The County plan also includes an overview of current transit availability. Currently there is no countywide public transit, but the cities of Cleveland, Dayton, and Liberty all have fixed route public transportation systems. All three routes are operated by Brazos Transit District, under a contract with the Texas Department of Transportation (TxDOT) which provides rural transit (TxDOT program 5311).

Figure 5.1.1, Transit Needs within Liberty County, Texas (H-GAC).



Another major trend outlined in the plan is the daily commute of residents out of the County to work in other places. The development of a park-and-ride facility in Dayton, along US Highway 90, would allow for residents with automobiles or the ability to drive access outside of the County for work, school, and medical visits.

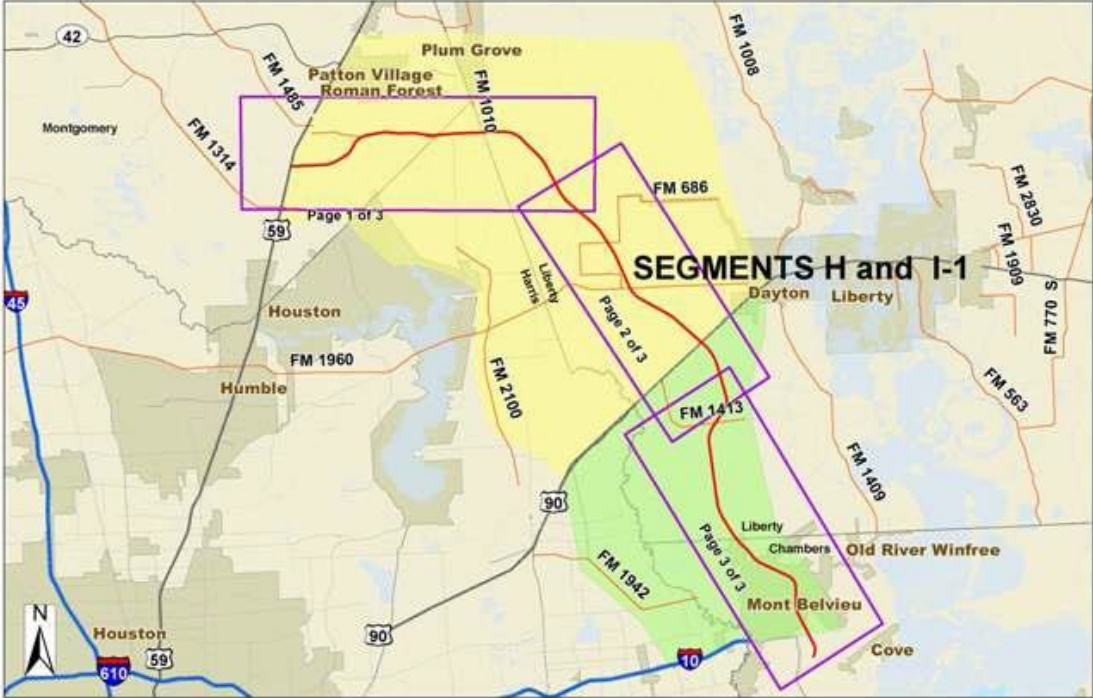
5.2 TEXAS DEPARTMENT OF TRANSPORTATION

Liberty County is part of the Beaumont TxDOT district. There are currently 13 funded and active projects with the County, most being roadway maintenance and updates. There is one major project active along US Highway 90, where the roadway is being widened in a five mile stretch from SH 61 east towards Beaumont. The project is expected to cost about 21 million dollars and is presently approximately 30% complete. Other projects include road resurfacing and repairs, a bridge replacement, and safety treating of fixed objects.

5.3 GRAND PARKWAY

The construction of Grand Parkway as the third loop around the Houston metropolitan area serves as a great economic opportunity for Liberty County. Segments H and I-1 are 37 miles long and expected to be constructed partially within the County, as can be seen in Figure 5.3.1. This would increase mobility and growth within the County and encourage economic development. Construction of the segments is expected to begin in 2016.

Figure 5.3.1, Location of Segments H and I-1 (The Grand Parkway Association).

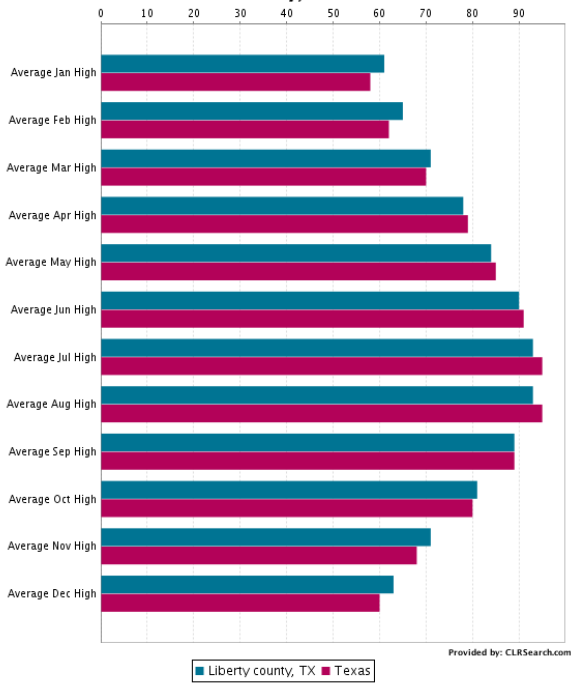


6 ENVIRONMENT

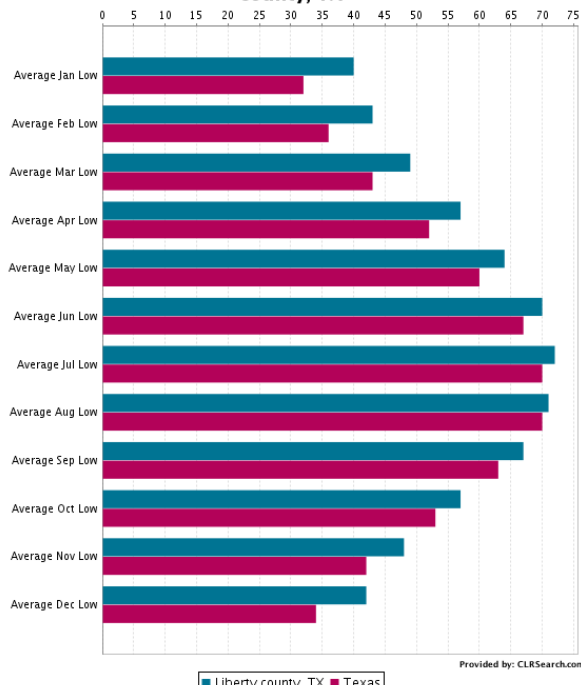
6.1 CLIMATE

According to Texas State Historical Association, Liberty County, TX, is divided by the north-south moving Trinity River and is on US Highway 90 half way between Beaumont TX, and Houston, TX. Liberty County is considered as Coastal Prairie located near to the coastal belt and is approximately 1,158.42 square miles of size. According to the Liberty community report, the climate of the Liberty County, TX, is subtropical and humid climate. During January, the minimum temperature is 40°F and 94°F is the maximum during July. However, temperature below the freezing point is marked that County has experienced such temperature nearly 22 days in a year. It has also observed that the normal annual temperature for this County is 69°F. Moreover, its average rainfall is ranges from 51.15 inches in the southeast to 48 inches in the northwest. In order to understand the climatic scenario of this community, month by month basis climatic data for 2012 has shown below (Fig 6.1).

2012 Average Monthly High Temperatures for Liberty county, TX

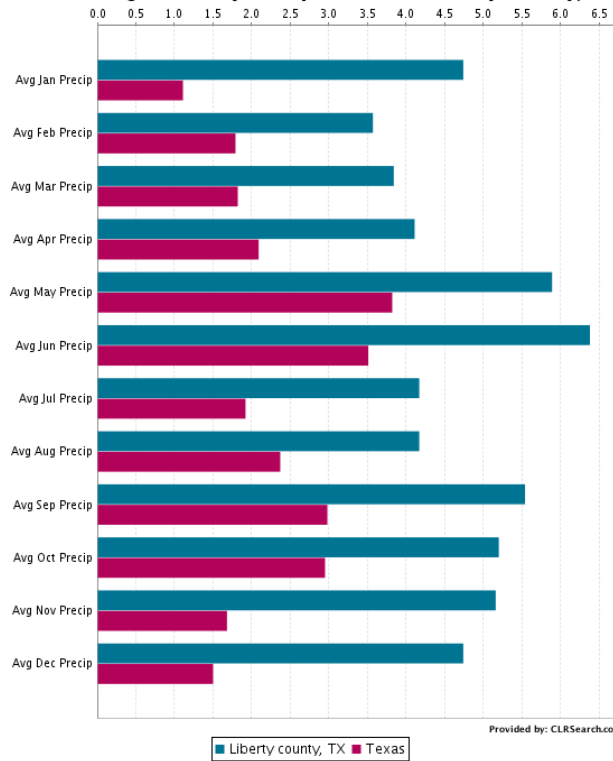


2012 Average Monthly Low Temperatures for Liberty county, TX



a

2012 Average Monthly Precipitation for Liberty county, TX



b

c

Figure 6.1: Average monthly a) high temperature, b) low temperature, and c) precipitation for Liberty County, TX.

Hazard Vulnerability

Before going to develop any area, it is almost obvious to know the most common hazards (both natural and man-made) and their relevant threats to the area. There have been 111 presidential or Small Business Administration (SBA) declared disasters in the Liberty County as well as Houston-Galveston region since 1980. Over those time period hurricanes, floods, severe storms, wildfires, and freezing have identified the major disturbances for this County (Table 6.1). They have caused the most damages for the County. To analyze the hazard vulnerability part of this report all of the facts has been taken from Houston-Galveston area council Hazard Mitigation Plan (H-GAC HMP) 2011 update, September 4, 2012 and Liberty County Hurricane Ike impact report.

Table 6.1: Major disasters in Liberty County (H-GAC, HMP 2011 update, September 4, 2012)

| County | Year | Disaster Number | DEM Incident Type | Presidential Declaration | SBA Declaration |
|---------|------|-----------------|--|--------------------------|-----------------|
| Liberty | 2008 | 1791 DR | Hurricane | Yes | Yes |
| Liberty | 2007 | 1709 DR | Severe Storms, Tornadoes, and Flooding | Yes | Yes |
| Liberty | 2006 | 1624 DR | Extreme Wildfire Threat | Yes | No |
| Liberty | 2005 | 1606 DR | Hurricane | Yes | Yes |
| Liberty | 2002 | 1439 DR | Severe Storms, Tornadoes | Yes | Yes |
| Liberty | 2001 | 1379 DR | Tropical Storm | Yes | Yes |
| Liberty | 2000 | 3259 | Flood | No | Yes |
| Liberty | 1998 | 1257 DR | Flood | Yes | Yes |
| Liberty | 1994 | 1041 DR | Flood | Yes | Yes |
| Liberty | 1992 | 937 DR | Flood | Yes | Yes |
| Liberty | 1991 | 930 DR | Flood | Yes | Yes |
| Liberty | 1990 | 863 DR | Flood | Yes | Yes |
| Liberty | 1989 | 828 DR | Flood | Yes | Yes |
| Liberty | 1989 | 836 DR | Hurricane | Yes | Yes |
| Liberty | 1983 | 2091 | Flood | No | Yes |
| Liberty | 1983 | 2115 | Freeze | No | Yes |
| Liberty | 1983 | 689 DR | Hurricane | Yes | Yes |

Floods

Liberty County has experienced two types of floods such as riverine and coastal flood due to its geographic settings. Riverine flooding poses a serious threat to Liberty County and heavy rainfall events has caused flash flooding. Any future development should consider the flood zone map of this County (Fig 6.2). Based on the potential annualized losses of the Houston-Galveston area council Counties, Liberty County has the highest annualized loss ratio (2.04%) among all the Counties (Table 6.2).

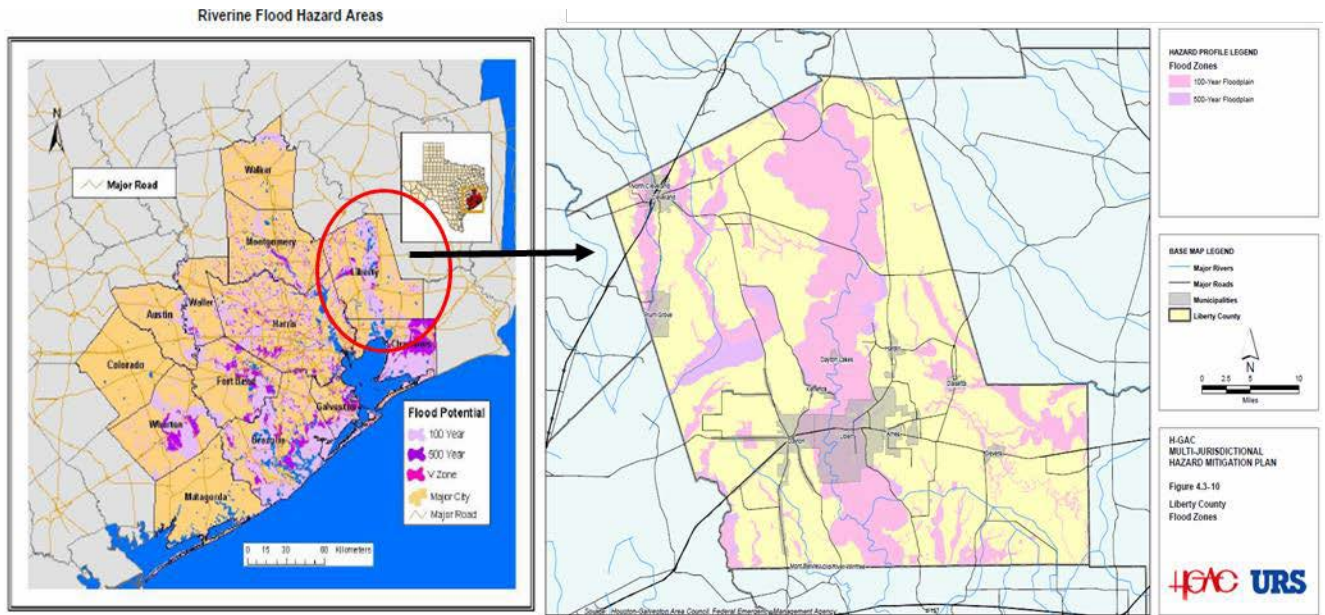


Figure 6.2: Riverine flood hazard zone map for Liberty County (H-GAC, HMP 2011 update, September 4, 2012)

Table 6.2: Potential annualized loss ratio for Liberty County (H-GAC, HMP 2011 update, September 4, 2012)
Potential Annualized Losses by County (Riverine Flood)*

| Jurisdiction | Total Exposure to Flood | Single Family Residential Buildings at Risk | Multi-Family Residential Buildings at Risk | Commercial Buildings at Risk | Critical Facilities at Risk | Total Potential Annualized Losses | Total Annualized % Loss Ratio |
|--------------|-------------------------|---|--|------------------------------|-----------------------------|-----------------------------------|-------------------------------|
| Austin | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Brazoria | \$57,343 | \$1,062 | \$15 | \$0 | \$0 | \$1,077 | 1.88% |
| Chambers | \$305,041 | \$5,314 | \$60 | \$175 | \$0 | \$5,549 | 1.82% |
| Colorado | \$46,319,699 | \$190,306 | \$8,330 | \$9,000 | N/A | \$207,636 | 0.45% |
| Fort Bend | \$1,642,461,050 | \$13,639,027 | \$1,245,988 | \$13,418,449 | \$579,416 | \$28,882,879 | 1.76% |
| Galveston | \$1,295,876,443 | \$11,859,566 | \$3,533,836 | \$6,954,726 | \$232,870 | \$22,580,998 | 1.74% |
| Harris | \$72,872,983,574 | \$282,741,211 | \$77,109,006 | \$99,280,000 | N/A | \$459,130,217 | 0.63% |
| Liberty | \$830,257,935 | \$7,796,253 | \$835,951 | \$2,921,926 | \$1,496,763 | \$12,850,893 | 2.04% |
| Matagorda | \$191,704,634 | \$846,518 | \$99,951 | \$101,000 | N/A | \$1,047,469 | 0.55% |
| Montgomery | \$2,941,381,783 | \$25,756,783 | \$4,630,512 | \$20,820,374 | \$1,562,798 | \$52,772,467 | 1.79% |
| Walker | \$203,857,121 | \$2,185,928 | \$614,917 | \$841,024 | \$91,862 | \$3,733,731 | 1.83% |
| Waller | \$145,743,710 | \$1,630,830 | \$311,220 | \$415,562 | \$63,155 | \$2,420,767 | 1.66% |
| Wharton | \$950,965,233 | \$8,227,745 | \$2,906,049 | \$6,045,762 | \$1,775 | \$17,181,351 | 1.81% |
| TOTAL | \$80,921,913,556 | \$354,882,543 | \$91,095,835 | \$150,808,017 | \$4,028,639 | \$596,786,395 | 0.74% |

Note: * Results are from the 2006 Regional Hazard Mitigation Plan

It is evident from the analysis that single family residential buildings are the highest risk compare to commercial and multi-family buildings (Fig 6.3). As a whole, over period of time flood has a great impact on Liberty County, and it is identified as second highest flood damages among the Texas coastal Counties (Fig 6.4).



Figure 6.3: Coastal flood hazard map during a category 5 storm event for Liberty County (H-GAC, HMP 2011 update, September 4, 2012)

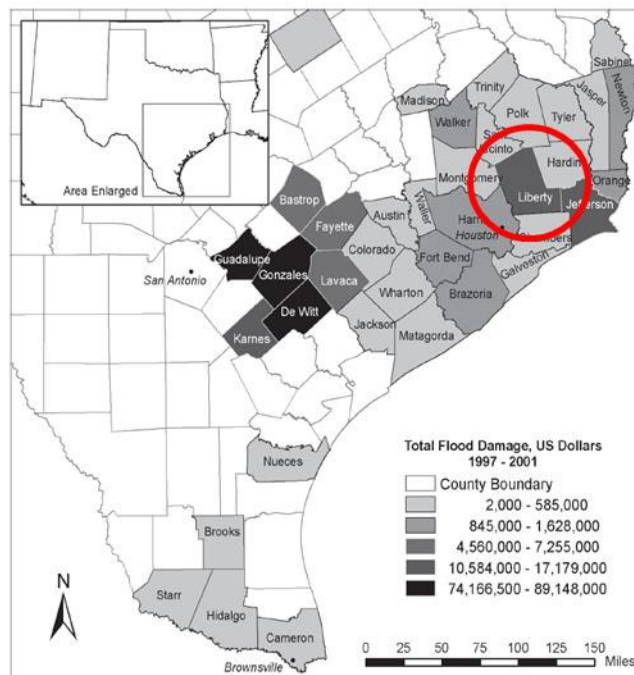


Figure 6.4: Cumulative flood damages from 1997 to 2001 (Environmental Planning and Sustainability Research Unit Texas A&M University)

Hurricanes and Tropical Storms

Liberty County is vulnerable to damage from hurricane winds and the inland impacts associated with coastal storms due to its geographic location. From 1983 to 2008 this area has attacked by four major hurricane hits and experienced a lot of damages. However, local and city authority of this County should consider and analyze the previous hurricane events before taking any future development decision. Figure 6.5 shows the potential hurricane winds that could affect the study area assuming 100- and 500-year wind events.

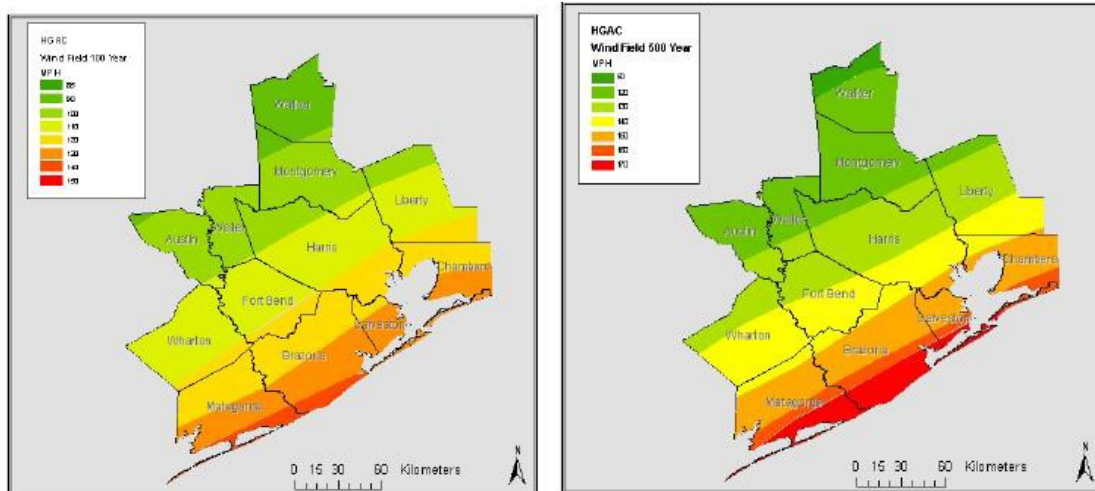


Figure 6.5: Potential hurricane wind speed for 100 and 500 year events (H-GAC, HMP 2011 update, September 4, 2012).

Hurricane Ike impacts

On September 13, 2008, Hurricane Ike hit north-northeast up Liberty County’s western border. The storm moved through the western part of the county with sustained winds of 110 miles-per-hour. It destroyed houses, diminished the beautiful forests, and collapsed the County’s power lines.

According to the Disaster Impact Model, developed by Texas A&M AgriLife, the manufacturing sector still suffered \$227 million in losses. The main cause of such damage to Liberty County is strong southern winds from Ike. According to the Hurricane Ike impact report, Hurricane Ike damaged almost 234,000 acres of timberlands, and nearly 30% were located in this County. The recovery process was hampered due to debris problem, and the cost of debris removal also add \$26 million to the total cost (Fig 5).

However, after Hurricane Ike, the County itself experienced on average a 6% per quarter gain in gross sales during the four quarters following the storm. As a total, Liberty County gained an estimated \$147.8 million (Fig 6.6).

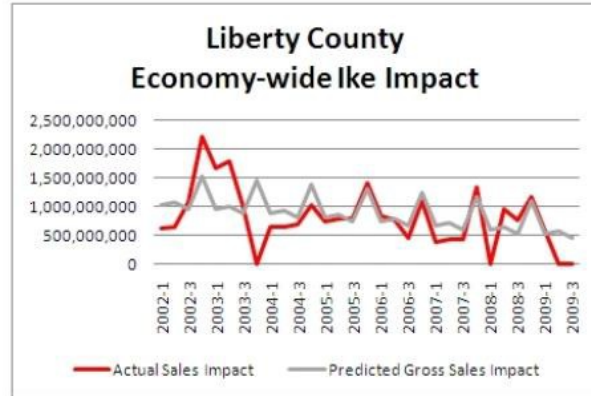


Figure 6.6: Liberty County Hurricane Ike impact (Hurricane Ike Impact Report, TEEX).

Wildfire Risk (Areas of Concern)

Wildfire is another hazard risk for the Liberty County. In this area of study, wildfires occurred predominantly in forested and woody wetland areas, and damaged many natural resources. The Texas Forest Service has conducted wildfire risk assessment for the seven Counties including Liberty County (Fig 6.7). It identified 'Areas of Concern' based on the Wildfire Susceptibility Index (WFSI) (Fig 6.8). The analysis came up with maps showing the locations where fire planning is needed and where communities at high risk. This result will help city authorities for their future decision making process.

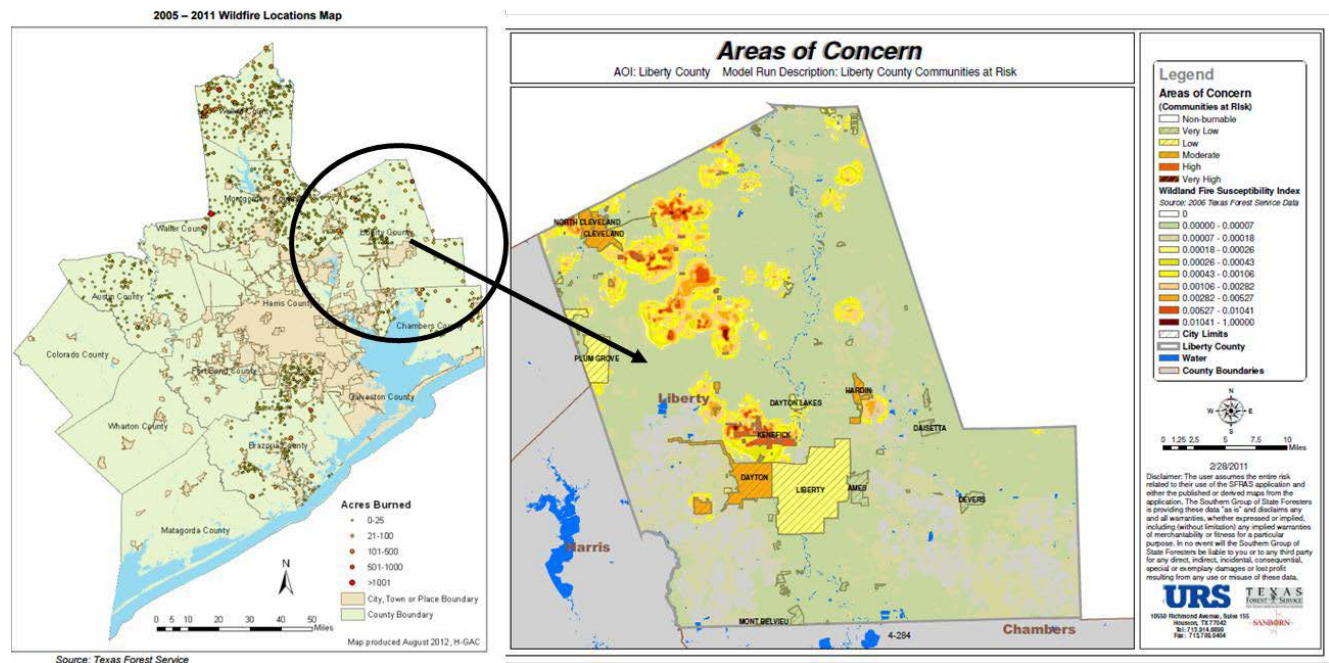


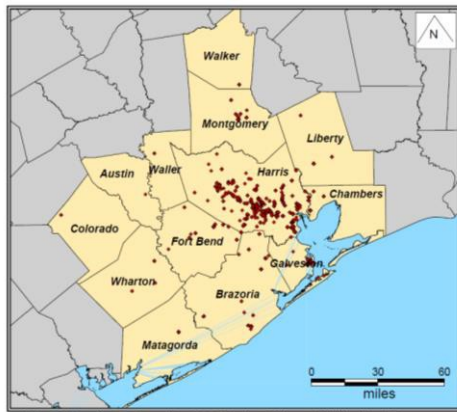
Figure 6.7: Wildlife risk Assessment, Liberty County (H-GAC, HMP 2011 update, September 4, 2012)

| Jurisdiction | Areas of Concern (Community Risk) |
|-------------------------|-----------------------------------|
| City of Ames | Very Low |
| City of Cleveland | Moderate |
| City of Daisetta | Very Low |
| City of Dayton | Moderate |
| City of Dayton Lakes | Low |
| City of Devers | Very Low |
| City of Hardin | Moderate |
| City of Kenefick | High |
| City of Liberty | Low |
| City of North Cleveland | Moderate |
| City of Plum Grove | Low |

Figure 6.8: Area of Concern for different cities, Liberty County (H-GAC, HMP 2011 update, September 4, 2012)

Toxic Release or Hazardous Material

Toxic releases location or hazardous material sites is an important consideration for sustainable and resilient development. It has a great impact on health and safety of the public. It can cause several deaths, and damages to nearby properties. Based on the Toxics Release Inventory (TRI) database, Liberty County has very few toxic sites compare to Harris County (fig6.9).



Note: * Results are from the 2006 Regional Hazard Mitigation Plan

Estimated Exposure of People and Buildings by County (Toxic Release)*

| Jurisdiction | Potential Residential Buildings at Risk | | Potential Commercial Buildings at Risk | | Potential People at Risk |
|--------------|---|-------------------------|--|------------------------|--------------------------|
| | Number | Value | Number | Value | |
| Austin | - | - | - | - | - |
| Brazoria | 3,401 | \$881,041,913 | 29 | \$115,035,652 | 8,729 |
| Chambers | 47 | \$12,079,283 | 1 | \$954,730 | 70 |
| Colorado | 6 | \$1,342,129 | 1 | \$172,552 | 16 |
| Fort Bend | 3,693 | \$1,088,831,209 | 56 | \$194,828,733 | 5,219 |
| Galveston | 3,128 | \$904,398,055 | 23 | \$110,521,958 | 7,674 |
| Harris | 35,309 | \$10,400,342,848 | 344 | \$1,449,013,889 | 98,548 |
| Liberty | 531 | \$95,428,208 | 3 | \$13,388,658 | 1,215 |
| Matagorda | 11 | \$2,251,921 | 0 | \$0 | 24 |
| Montgomery | 1,111 | \$273,306,285 | 21 | \$80,821,515 | 3,571 |
| Walker | 1 | \$30,893 | 1 | \$41,795 | 1 |
| Waller | 18 | \$2,845,829 | 1 | \$1,867,447 | 66 |
| Wharton | 15 | \$3,250,110 | 1 | \$157,421 | 40 |
| TOTAL | 47,265 | \$13,643,848,460 | 478 | \$1,966,202,329 | 123,17113,652 |

Note: * Results are from the 2006 Regional Hazard Mitigation Plan

Figure 6.9: Location of Toxic sites, and estimated exposure of people and buildings by Toxic releases, Liberty County (H-GAC, HMP 2011 update, September 4, 2012)

Summary of hazard Exposure and Potential Impact of Hazards in Liberty County

It is evident from the findings of this Risk Assessment by Houston-Galveston area council Hazard Mitigation Plan 2011 that the hazards posing the greatest threat to the Liberty County are Floods, hurricanes and tropical storms, tornadoes, and excessive heat and freezing. Other hazards are considered to be low risk (Table 6.3). According to the risk assessment, potential impact has been classified in the following categories:

- Catastrophic: High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of facilities for 30 days or more.
- Critical: Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than one week.
- Limited: Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than one day.
- Minor: Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.

Table 6.3: Summary of potential impact of hazards, Liberty County (H-GAC, HMP 2011 update, September 4, 2012)

| Jurisdiction | Flood | Hurricanes and Tropical Storms | Severe Thunderstorms | Tornadoes | Wildfires | Drought | Expansive Soils | Excessive Heat | Winter Storms | Hail | Coastal Erosion | Dam/Levee Failure | Toxic Release/HAZMAT | Energy Pipeline Failure |
|-------------------------|----------|--------------------------------|----------------------|-----------|-----------|---------|-----------------|----------------|---------------|-------|-----------------|-------------------|----------------------|-------------------------|
| Liberty County | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | Limited | Minor | Limited |
| City of Ames | Minor | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | NA | NA | Minor |
| City of Cleveland | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | NA | Minor | Minor |
| City of Daisetta | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | Minor | NA | Minor |
| City of Dayton | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | NA | Minor | Minor |
| Town of Dayton Lakes | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | NA | NA | Minor |
| City of Devers | Minor | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | Limited | NA | Minor |
| City of Hardin | Minor | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | NA | NA | Minor |
| City of Kenefick | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | Limited | NA | Minor |
| City of Liberty | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | Limited | Minor | Minor |
| City of North Cleveland | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | NA | NA | Minor |
| City of Plum Grove | Critical | Catastrophic | Minor | Critical | Minor | Minor | Minor | Critical | Critical | Minor | NA | NA | NA | Minor |

Local capability of Liberty County

A capability assessment has conducted by Houston-Galveston area council Hazard Mitigation Plan 2011. The findings of the capability assessment are described below for Liberty County (Table 6.4).

Some of the findings from this assessment are:

- None of the cities of this County except the City of Liberty have Disaster Recovery Plan
- Except the City of Dayton, none of them have Comprehensive Land Use Plan
- Few cities have Floodplain Management Plan
- None of the cities have Zoning Ordinance and Historic Preservation Plan
- Good point is that all of the cities Hazard Mitigation Plan and national flood Insurance Program

Table 6.4: Relevant plans and programs in Liberty County (H-GAC, HMP 2011 update, September 4, 2012)

| Table Key | | | | | | | | | | | | | | | | | | | |
|--|-----|-----|------|-----|-----|-----|------|-----|------|--|-----|--------|-----|----|----|------|------|-----|----|
| HMP: Hazard Mitigation Plan DRP: Disaster Recovery Plan CLUP: Comprehensive Land Use Plan FMP: Floodplain Management Plan SMP: Stormwater Management Plan EOP: Emergency Operations Plan COOP: Continuity of Operations Plan REP: Radiological Emergency Plan SARA: SARA Title III Emergency Response Plan TRANS: Transportation Plan | | | | | | | | | | CIP: Capital Improvements Plan (that regulates infrastructure in hazard areas) REG-PL: Regional Planning HPP: Historic Preservation Plan ZO: Zoning Ordinance SO: Subdivision Ordinance FDPO: Flood Damage Prevention Ordinance NFIP: National Flood Insurance Program CRS: Community Rating System BC: Building Codes | | | | | | | | | |
| Jurisdiction ¹ | HMP | DRP | CLUP | FMP | SMP | EOP | COOP | REP | SARA | TRANS | CIP | REG-PL | HPP | ZO | SO | FDPO | NFIP | CRS | BC |
| Liberty County | ✓ | | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | | |
| City of Ames | ✓ | | | | | ✓ | | | | | | ✓ | | | ✓ | | | | ✓ |
| City of Cleveland | ✓ | | | ✓ | | ✓ | ✓ | ✓ | | ✓ | | | | | ✓ | ✓ | ✓ | | ✓ |
| City of Daisetta | ✓ | | | ✓ | | ✓ | | | ✓ | | | ✓ | | | | | ✓ | | |
| City of Dayton | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | | ✓ |
| City of Dayton Lakes ² | ✓ | | | | | | | | | | | | | | | | ✓ | | |
| City of Devers | ✓ | | | | | | | | | | | | | | | | | | |
| City of Hardin | ✓ | | | | | | | | | | | | | | | | | ✓ | |
| City of Kenefick ² | ✓ | | | | | | | | | | | | | | | | | | |
| City of Liberty | ✓ | ✓ | | | | ✓ | | ✓ | ✓ | | | ✓ | | | ✓ | | ✓ | | ✓ |
| City of North Cleveland ² | ✓ | | | | | | | | | | | | | | | | | | |
| City of Plum Grove ² | ✓ | | | | | | | | | | | | | | | | ✓ | | |

7 STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS

This section gives an overview of the strengths, weaknesses, opportunities, and threats for the County. These were developed based upon statistics and data presented in this report and outline major trends, both positive and negative, that should be addresses when looking the Liberty County's future.

(S)trengths

- US Highway 90 is a major connection between Houston and Beaumont
- Trinity River
- Quality farmland
- Quality high school education
- Hazard mitigation upgrade program

(W)eaknesses

- Many people are employed outside of the County
- No comprehensive land use plan
- No disaster recovery plan
- No zoning ordinances
- No historic preservation plan

(O)ppurtunities

- Increase job opportunities within the county
- Lots of open space for development
- High growth rate
- Grand Parkway Segments
- Changing population dynamics

(T)hreats

- Economy is very limited to agriculture and oil/gas
- Increasing unemployment rate
- Changing population dynamics
- High risk of flooding and hurricane related hazards

8 RECOMMENDATIONS

Based upon the current state of the community and the strengths, weaknesses, opportunities, and threats identified in this report, a list of recommendations were developed in order to encourage resiliency for the County of Liberty. Our recommendations are as follows:

- Develop a countywide strategic plan to guide cohesive development
- Encourage municipalities within the County to adopt zoning ordinances and comprehensive plans
- Take precautions to prepare for hazards, both before and after the event
- Develop a countywide Disaster Recovery Plan
- Encourage diversity in economy
- Evaluate future housing needs to meet changing county demographics
- Establish environmental conservation program to protect the Trinity River and areas of wetlands and forestry

9 SOURCES

The Grand Parkway Association. (n.d.). *US 59 (N) to IH 10 (E) Segments H & I-1*. Retrieved May 4, 2015 from

<http://www.grandpky.com/segments/h/>

Houston-Galveston Area Council. (2009). *Liberty County Transit Plan*. Retrieved May 4, 2015 from

http://www.h-gac.com/taq/transit_planning/county_plans/docs/LCTP%20Final%20Doc-UAW%20oct%202009.pdf

Liberty County. (n.d.). *Liberty County Housing Authority*. Retrieved May 4, 2015, from

http://www.co.liberty.tx.us/default.aspx?Liberty_County/housing

Kleiner, D. J. (2010, August 7). *Handbook of Texas Online*. Retrieved May 4, 2015 from

<http://www.tshaonline.org/handbook/online/articles/hcl08>

Texas Department of Transportation. (n.d.). *Current TxDOT Projects: Liberty County*. Retrieved May 4, 2015 from

http://www.txdot.gov/apps-cq/project_tracker/projects.htm?view=cnty&dist=Beaumont&cnty=Liberty

U.S. Census Bureau. (2013). *Selected Housing Characteristics: Liberty County, Texas*. Retrieved May 4, 2015 from

<http://factfinder.census.gov/>

U.S. Department of Housing and Urban Development. (n.d.). *Affordable Housing*. Retrieved May 5, 2015, from

http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing/

Texas Department of State Health Services

<https://www.dshs.state.tx.us/chs/popdat/st2020.shtm>

Texas State Data Center. *Texas Population Projections Program*

<http://txsdc.utsa.edu/Data/TPEPP/Projections/Index.aspx>

Census Viewer

<http://censusviewer.com/state/TX>