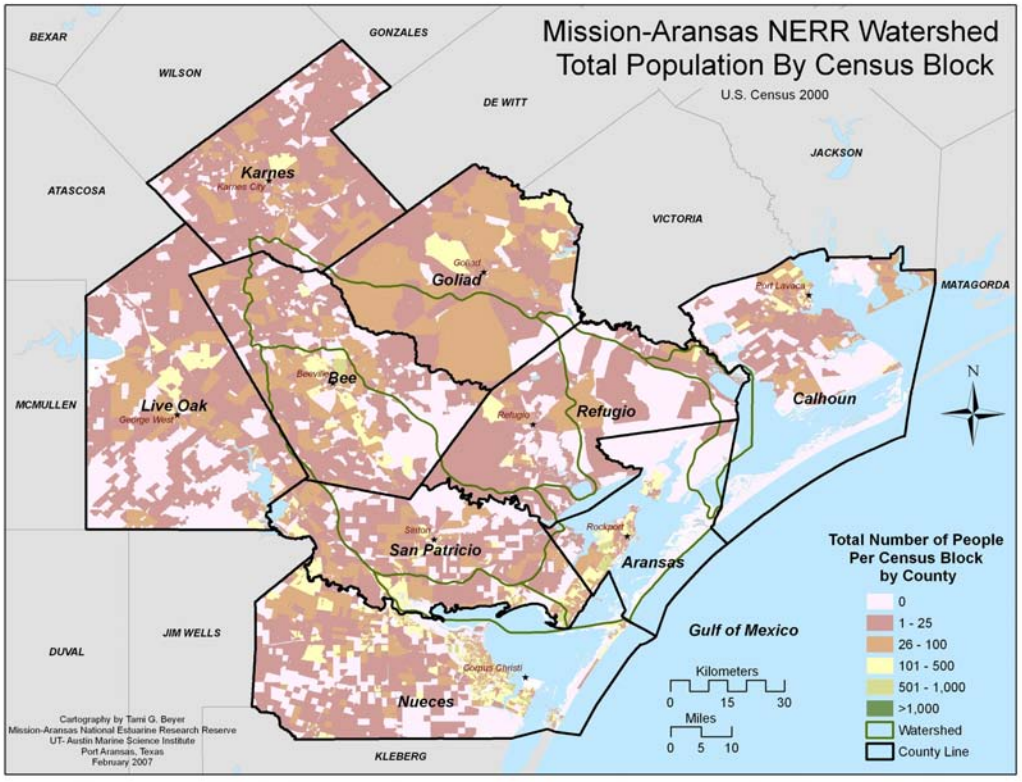
Community Characterization of the Mission-Aransas National Estuarine Research Reserve and Surrounding Areas



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1.0 INTRODUCTION

The human dimensions of our environment greatly influence the effectiveness of coastal management. The human dimension is characterized by the social, cultural, economic, and political aspects of our surrounding environment. Changes to these aspects influence human perception and behaviors, which affect resource management decisions. An examination of the human dimension can provide a better understanding of not only resource flow, but also how human perception and behaviors are linked to resource flow. This knowledge can be used to develop decision support tools that will increase state and local managers' capacity to address the human dimensions of coastal management.

The Mission-Aransas National Estuarine Research Reserve's (NERR) geographic, biophysical and political configurations are complex; therefore, a broad-scale assessment of the human dimension is necessary to provide a comprehensive snapshot of human behavior and trends. Characterization of the human dimension for the Mission-Aransas estuary and the surrounding watershed will document the current state of knowledge and provide a baseline assessment to identify changes in future characteristics of the human dimension. This characterization will support the Mission-Aransas NERR site profile development and management planning efforts. Characterization of the human dimension will also support development of a regional action strategy for applying social science to support ecosystem-based management and watershed planning in the Mission-Aransas NERR and the South Texas coast.

Characterizations of the human dimension and development of a regional action strategy will benefit coastal resource management professionals within the Mission-Aransas NERR, the State of Texas, and the NERR System. The intent of this document is to create an approach that can be applied at other NERR sites to identify human dimension data gaps and applied social science approaches necessary to support NERR site profile development and long-term management and planning efforts. This information will be used to enhance the capacity for resource managers to make better coastal management decisions.

2.0 SITE DESCRIPTION

2.1 Geography of the Mission-Aransas NERR

The Mission-Aransas National Estuarine Research Reserve (NERR) (185,708 acres/ 290 sq. mi. / 751.5 sq. km.) consists of a combination of approximately 115,138 acres of state-owned coastal habitat, including estuarine intertidal marsh, shallow open-water bottoms, and approximately 66,216 acres of estuarine marsh and non-tidal coastal plain habitat that is part of the Aransas National Wildlife Refuge (Figure 1). The Mission-Aransas NERR also encompasses the Buccaneer Cove Preserve (728 acres), Fennessey Ranch (3,324 acres), and Goose Island State Park (271 acres). The Mission-Aransas NERR includes a diverse suite of estuarine and non-estuarine habitats (many of high quality) that form major representative parts of a coastal watershed. Significant components include a number of archaeological sites (i.e., native Indian middens) and a substantial diverse flora and fauna. The Mission-Aransas NERR is relatively rural with limited industrial and urban impacts. Portions of the estuary include the Gulf Intracoastal Waterway right-of way and cabins leased by the Texas General Land Office (GLO), but these sites are not included in the Reserve boundary.

The lands within the Reserve are owned by a combination of state, federal and private entities. The Texas General Land Office (TGLO) owns the majority of submerged lands (bays and open water) within the Reserve. The U.S. Fish and Wildlife Service (USFWS) manage the Aransas National Wildlife Refuge, which includes Matagorda Island. The Texas Parks and Wildlife Department (TPWD) manages the Goose Island State Park, which is leased from TGLO. Private landholders include the Coastal Bend Land Trust, Nature Conservancy, and Fennessey Ranch. The Mission-Aransas NERR is managed by the University of Texas at Austin Marine Science Institute.

The Mission-Aransas Estuary is a typical, but complex Western Gulf of Mexico estuary (Diener 1975). The estuarine system is composed of tertiary, secondary, and primary bays. Mission Bay is the only tertiary bay, and Copano, Port and St. Charles Bay are secondary bays. Mesquite, Aransas and Redfish Bay are primary bays because they are adjacent to oceanic outlets. Copano Bay is a coastal plain estuary, composed of two drowned river mouths of the Mission and Aransas Rivers. Aransas, Redfish and Mesquite Bays are bar-built estuaries, in which an offshore sand bar partially enclosed a body of water. Aransas Bay is the largest bay, followed by Copano Bay and Mesquite Bay. The bay systems are shallow and the mean low water varies from 0.6 m in Mission Bay to 3 m in Aransas Bay (Chandler et al. 1981).

2.2 Information on Reserve Partners

The Mission-Aransas NERR has several partners including federal, state and private land owners. Fennessey Ranch is partner to the Mission-Aransas NERR and is privately owned and designed to be environmentally sound as well as an economically viable business. The Mission-Aransas NERR recently purchased a conservation easement on Fennessey Ranch. The current economic base incorporates hunting, wildlife tours, photography, and cattle enterprises (Crofutt and Smith 1997). It is composed of native tree/brush, prairie, freshwater wetlands, and Mission River riparian corridor. Wetlands at the Fennessey ranch cover about 500 acres, of which are temporarily, seasonally and semi-permanently flooded (White et al. 1998).

Buccaneer Cove Preserve is located at the mouth of the Aransas River and contains 856 acres of wetlands such as estuarine tidal flats and brackish marshes. This area is owned and managed by the Coastal Bend Land Trust whose primary goals are preserving and enhancing native wildlife habitat in the Coastal Bend. Johnson Ranch is located on Lamar Peninsula adjacent to St. Charles Bay and was purchase d by

The Nature Conservancy, who recently transferred ownership to the Aransas National Wildlife Refuge. The Johnson Ranch contains 245 acres of marshland, coastal prairie and oak motte habitat. These are valuable habitats for the whooping cranes, sandhill cranes, reddish egrets and other waterfowl. The state parcel of land in Mission Bay is also comprised of valuable wetland habitat. The Mission Bay state parcel, Buccaneer Cove Preserve, and Johnson ranch add 1159 acres of habitat that is essential to the ecological functioning of the system.

Goose Island State Park is 321.4 acres and located between Aransas and St. Charles Bay. The state park contains several habitats including live-oak thickets, tidal salt marshes, and mud flats, which support migrant birds including rails, loons, grebes, common goldeneyes, red-breasted mergansers, and redheads. The park also is home to the "Big Tree" Live Oak, which is estimated to be around 2000 years old. The park was acquired in 1931-1935 by deeds from private owners and Legislative Act setting aside the state-owned Goose Island as a state park. The earliest park facilities were constructed by the Civilian Conservation Corps (CCC) in the early 1930s. The park includes a coastal lease of submerged land adjacent to the park that includes seagrass beds and oyster reefs.

The Aransas National Wildlife Refuge (ANWR) is comprised of land on Blackjack Peninsula (Aransas proper), Tatton Unit (NW of St. Charles Bay) and Matagorda Island. The refuge was established in 1937 to protect the endangered whooping crane and was created through an executive order signed by Franklin D. Roosevelt. Matagorda Island Wildlife Management Area and State Park, became part of the ANWR in 1982 and is managed through a memorandum of agreement by Texas Parks and Wildlife Department (TPWD) and U.S. Fish and Wildlife Service (USFWS). The ANWR has a large portion of tidal and deltaic marshes. Upland vegetation is predominately coastal plain grasses interspersed with oak mottes, swales and ponds (Stevenson and Griffith 1946, Allen 1952, Labuda and Butts 1979). Vegetation and wetlands at the refuge support wildlife such as the brown pelican, peregrine falcon, white-tailed deer, javelina, coyote, wild pig, Rio Grande turkey, raccoon, armadillo, and the threatened American alligator (Chaney et al. 1996). The last sighting of an Attwater's Prairie chicken at the ANWR was in 1992.

2.3 Geography of the Surrounding Area

The Mission-Aransas NERR is the 3rd largest in the Reserve System and has land and water within five coastal counties (Aransas, Refugio, Calhoun, Nueces, San Patricio). The land adjacent to the Mission-Aransas NERR is largely rural (Table 1), and the majority of the land surrounding the Reserve is used for agriculture and rangeland for cattle.

Table 1. Estimated population density in counties surrounding the Mission-Aransas Estuary. Data generated from the U.S. Census Bureau, www.census.gov. Area and persons per square mile are calculated based on census data from the year 2000.

County	2003 Population Estimate	Area, Square Miles	Persons per Square Mile
Aransas	23,574	252	89.3
Calhoun	20,454	512	40.3
Refugio	7,625	770	10.2
San Patricio	68,050	692	98.1
Nueces	315,206	836	375.3
State of Texas	22,118,509	261,797	79.6

San Patricio County encompasses a very small portion of the Mission-Aransas NERR including Buccaneer Cove Preserve and the southern tip of Port Bay. The Aransas River watershed includes Chiltipin Creek and other unnamed tributaries which drain approximately two-thirds of San Patricio county including the cities of Sinton, Odem, and Taft. This drainage includes more than 250,000 acres of intensely managed cotton, grain, and sorghum row crop farms. Much of the Aransas River watershed lies within the land holdings of the Welder Wildlife Foundation (7,800 acres), whose primary purpose is wildlife management and conservation. In contrast, Aransas County has the highest percentage of both bare and developed lands. Most bare lands in this area are delineated as bay shoreline beaches, creating a significant tourism focus in the county and extensive urban development. Refugio has the most rural land use of the three counties, with the majority of the land identified as agriculture or ranching: limited urban development is centered in and around the towns of Refugio, Woodsboro, Bayside, Tivoli, and Austwell. Like San Patricio County, Nueces County encompasses a very small portion of the Mission-Aransas NERR, including the University of Texas Marine Science Institute property located in the city of Port Aransas. The city of Corpus Christi, also located in Nueces County, with a population of over 250,000 is the largest city in the area and as a result, the Nueces Estuary generally has more anthropogenic activities than the Mission-Aransas or Baffin Bay-Laguna Madre Estuary (Montagna et al. 1998). The Port of Corpus Christi is the sixth largest port in the United States, making marine transportation a dominant industry in the area. The Port of Corpus Christi houses several facilities including: liquid bulk docks, cargo terminals, Rincon Industrial Park, Ortiz Center, and a cold storage terminal. All ship traffic enters through Aransas Pass, which lies just south of the Mission-Aransas NERR.

The primary existing uses within the Mission-Aransas NERR include oil and gas activities, recreational and commercial fishing, ground and surface water withdrawal, tourism, and shipping (Table 2). Estuaries along the Gulf of Mexico, including Texas, are rich in oil and gas deposits. Every estuary in the Western Gulf of Mexico Biogeographic Sub-region has oil and gas wells and pipelines. Much of the past production in the Mission-Aransas Estuary has been depleted. However, recent testing indicates that there is interest in deeper exploration and drilling in the area. As drilling technology continues to improves, deeper depths become prospective. Currently, the Mission-Aransas Estuary has a low number of current leases and little production in comparison to all other estuaries along the Texas coast. The Mission-Aransas Estuary has the second lowest number of leases, and Aransas County has the second lowest production rates in comparison to all Texas coastal counties.

The Mission-Aransas NERR has a large tourism economy due to accessible beaches, abundant recreational fishing opportunities, and a high diversity of bird species. In addition, recreational and commercial landings of finfish, shrimp, and shellfish appear to be on an upward trend in the Mission-Aransas Estuary. Abundance of finfish, shrimp, and blue crab harvests were nearly equal to each other from 1972 - 1976. After 1976, the percentage of finfish harvests began to decrease in relation to shrimp and blue crab harvests. After 1981 until the present time, shrimp harvests increased in relation to finfish and blue crab harvests, and are now the major fishery for the Mission-Aransas Estuary (Robinson et al. 1994).

Table 2. Annual economic estimates for the state of Texas of the primary uses within the Mission-Aransas NERR .

Industry	Amount	Estimated Value	Year and Source
Commercial Finfish	6,317,800 lbs.	$8,023,500	1997, TPWD
Commercial Shellfish	71,811,800 lbs.	$181,142,300	1997, TPWD
GIWW shipping	63,390,000 short tons	$25,000,000,000	2002, TxDOT
Oil Production	390624005 bbl	$496,111,400 in tax	2004, RRC and Texas Comptroller
Gas Production	5952623117 mcf	$1,392,436,142 in tax	2004, RRC and Texas Comptroller

2.4 Watershed of the Mission-Aransas NERR

This document characterizes the human dimension of the counties within the watershed that drains into the Mission-Aransas NERR. Social patterns and uses within these counties will greatly affect the water quality and health of the Mission-Aransas Estuary. The current population dynamic is small, rural, urban communities transitioning into densely populated urban areas along the coast. The counties that lie within the watershed of the Reserve are Aransas, Refugio, Calhoun, Nueces, San Patricio, Karnes, Goliad, Bee, and Live Oak. The five counties of Aransas, Refugio, Calhoun, Nueces, San Patricio contain land and water within the Mission-Aransas NERR boundary.

There are five small sub-basins that drain into the Reserve and are here after referred to as the Mission-Aransas NERR watershed (Figure 2). The Mission and Aransas Rivers, within the watershed, are small and primarily coastal compared to other rivers in Texas. About 40% of all the water used in Texas is supplied by surface water structures. The cities and towns in the region of the Mission-Aransas Estuary are largely served by the City of Corpus Christi and groundwater (well-water) systems. The City of Corpus Christi operates two dams on the Nueces River, and is the major water wholesaler to municipal and county water resellers. Neither the Mission River nor the Aransas River has dams, or are used as water supplies for cities in the region. Groundwater supplies 60% of the water used in Texas, but 81% of that use is for irrigation. The watershed lies above the vast Gulf Coast Aquifer, which stretches the length of the entire coastal plain of Texas. The Gulf Coast Aquifer represents 15% of the groundwater in Texas and is the second largest aquifer after the Ogallala.

Groundwater conservation districts are in the early phases of operation in this region. The Mission-Aransas Estuary is one of the few estuaries on the Texas coast that still receives sufficient inflows of surface fresh water to maintain a healthy ecosystem. The National Wildlife Federation recently published a report that described the health of Texas estuaries based on full use of existing freshwater permits (Johns 2004). Out of the seven bay systems studied, the Mission-Aransas Estuary was one of the two bay systems that received a good ranking. Existing water use permits for the Mission and Aransas Rivers authorize 1,900 acre-feet of surface water diversions. At the current time, surface waters in the Mission River and the Aransas River are not currently at risk. However, future growth of south Texas cities will require additional water resources. This is one reason why characterization of the community will be invaluable for the resource managers.

The largest sub-basins in the area drain the Mission River and the Aransas River. The Mission River sub-basin is Hydrologic Unit Codes (HUC) 12100406 and the Aransas River sub-basin is HUC 12100408. The Mission and Aransas Rivers are small and primarily coastal compared to other rivers in

Texas. Texas law (first passed in 1957) ensures that sufficient flows are maintained for "receiving bay and estuary system that is necessary for the maintenance of productivity of economically important and ecologically characteristic sport or commercial fish and shellfish species and estuarine life upon which such fish and shellfish are dependent" (Texas Water Code, § 11.147).

2.5 Community Involvement

The area around the Mission-Aransas NERR is a very complex system with several communities that have diverse demographics. In addition, there are many resource agencies that work independently to manage the natural resources. Further understanding of the regional organizational structure is required to effectively use the information presented in this document to actively change human behavior and apply this knowledge to resource management decisions.

An organizational network analysis will help define user groups of this information and identify strategies for social science applications. There are potentially many natural resource agencies that have programs with community involvement. Some of these agencies include: Texas Commission on Environmental Quality (TCEQ) and its Total Maximum Daily Load Program (TMDL), Texas Parks and Wildlife Department and it seagrass conservation plan, and groundwater districts. In addition, local county and city governments can use this information to make better decisions about population growth and land use.

Local counties and city governments would benefit from utilizing community characterization in land use planning. Such governments include the City of Rockport and the Town of Fulton, which lie at the center of the Mission-Aransas NERR (Figure 1). The City of Rockport is the largest city adjacent to the Reserve with a population of 9,041 and the Town of Fulton has a population of 1,663 (www.aransascounty.org). Rockport/Fulton is primarily a retirement community and its citizens evince a high degree of civic engagement. An active and motivated citizen's group has coalesced around the Aransas County Sea Grant Cooperative Extension program. This group includes a committed group of volunteers associated with both the Master Gardener and Master Naturalist programs. In 2004, a Texas Community Futures Forum (TCFF) was hosted by the Texas Cooperative Extension / Texas Sea Grant program to solicit and prioritize citizen's opinions about the most important needs and concerns in Aransas County. This forum helped citizens express and identify their top concerns including:

1. A need for a diversified economy
2. Loss of water quality and habitat
3. Population growth and loss of local "charm"
4. Need for a community college

To that effect, several groups and committees have formed with different missions to tackle some of these concerns. Aransas First and Stewardship Aransas were both recently formed to focus on natural area preservation and sustainable growth issues. Preserve Aransas County Environment (PACE) is a stakeholder committee that was formed to help guide the development of an educational program designed to inform local citizens about the impact of different population growth alternatives.

PACE suggested that a widely administered survey would be a powerful and important tool to help guide policy makers if, in fact, growth was found to be a widespread concern among county residents. PACE developed the survey instrument titled the Aransas County Quality of Life Survey. The purpose of the survey was to elicit input from county residents on what they perceived to be the most important issues affecting Aransas County. The survey was administered in September 2006 to Rotary Club members, a group of Master Gardeners, and to the Chamber of Commerce Board in October. In addition, over 400 surveys were collected at the Sea Fair festival in early October 2006 in Rockport. Analysis of the survey

was completed in October 2006 by the Texas Coastal Watershed Program (http://www.urban-nature.org). Three broad trends emerged from this survey:

1. Aransas county residents in general are very positive about growth. They feel growth has had a positive impact on the community and most believe the county needs more growth in order to prosper. But at the same time they appear to be concerned about future growth, which may be unprecedented in terms of its rate in the next few decades, and they very much want both local officials and citizens to take part in guiding the new growth.
2. A significant fraction of Aransas county residents want neighborhoods to be walkable, and want Rockport and Fulton to keep their coastal "charm".
3. A large majority of Aransas county residents want to preserve additional tracts of significant natural areas, and more importantly, appear to be willing to pay for that through some form of taxation.

The challenge now is to develop extension educational programs designed to help the residents of Aransas County in their quest for a vibrant and sustainable community and environment.

Local focus groups such as those stated above could also utilize this community characterization to address individual concerns.

3.0 COMMUNITY CHARACTERIZATION

3.1 Introduction

This document characterizes, at a broad scale, the socioeconomic conditions of communities within the Mission-Aransas NERR watershed. Information for this summary was derived from publicly available data from the Texas General Land Office and the 2000 U.S. Census. The data was compiled at the county or census block level depending on availability and adjusted to the watershed scale by taking into account the proximity of municipalities and wetland acreage. The data has been displayed on a series of maps located in section 6.0.

The maps present data on a subset of variables that were adapted from the Human Ecosystem Framework (Machlis et al. 1997). The Human Ecosystem Framework is a tool used by social ecologists to examine and measure the interactions between human communities and biophysical systems. For each variable, indicators are selected, and for each indicator, measures are chosen. These measures can be monitored over time to help detect trends in the system of interest. This study was modeled after the community characterizations completed for several NERRs by Shawn Dalton (Dalton 2005).

3.2 Biophysical Resources

3.2.1 Energy

Energy is the ability to do work or create heat and is one of our most critical natural resources. Critical natural resources are innately tied to our social system because they can limit the extent of human exploitation of the natural environment. The amount of energy consumed by humans can directly affect the natural resources in the surrounding ecosystem. Consequently, the availability and quality of these resources can influence the economics of the very energy sources required for human quality of life. Travel time within a community is used as an alternative measure of energy consumption to help understand the resource availability. Commuting time can provide a sense of relative energy consumption patterns within a community and help explain air quality patterns, public transportation needs, and the area's reliance on fossil fuels.

Among the 128.3 million workers in the United States in 2000, 76% drove alone to work, while 12% carpooled, 4.7% used public transportation, 3.3% worked at home, 2.9% walked to work, and 1.2 % used other means (including motorcycle or bicycle; Reschovsky 2004). From 1990 to 2000, the percent of people driving alone rose by 2.5 points and the percent of people carpooling to work decreased by 1.2 points. The average commuting time for those people traveling to work was about 26 minutes in 2000. This is an increase from 21.7 minutes in 1980 and 22.4 minutes in 1990. The increase in commute time may be related to an increase in distance workers are traveling or increased traffic congestion if the roadway infastructure did not keep up with increasing demands of commuters.

In Texas, the eastern half of the state generally drove 21-30 minutes to work, while the western half took only 16-20 minutes (Figure 3). In counties of the Mission-Aransas NERR watershed, commuting times were usually lower than the national average of 26 minutes (Figure 4). The counties of Calhoun, Refugio, San Patricio, and Nueces were all lower than the national average, while Aransas and Bee counties had an average commute time of 26 minutes or less. Goliad, Karnes and Live Oak counties had higher commute time averages.

3.2.2 Land Use

Patterns of land use dictate the spatial extent of human alteration and can be a valuable tool in determining how the natural resources in the area are utilized by humans. In particular, land use can help explain non-point source pollution, patterns of natural habitat, water quality, aesthetic characteristics of developed lands, and identify areas for conservation.

The state of Texas is primarily comprised of rangeland in the west, forested land in the east and central, with agricultural land in the panhandle and the west (Figure 5). The northern coast of Texas is mostly agricultural while, the southern coast is primarily rangeland. However, the watersheds of the Mission-Aransas NERR are primarily comprised of forested land and rangeland. At a closer look, San Patricio and Bee County have high percentages of agricultural land in the sub-basin (HUC 1200407) that drains the Aransas River into Copano Bay (Figure 6). Bee, Goliad, and Refugio County primarily have forested and rangeland within the sub-basin (HUC 1200406) that drains the Mission River into Copano Bay. The urban areas are primarily confined to cities such as Corpus Christi, Rockport/Fulton, and Sinton.

3.3 Socioeconomic Resources

3.3.1 Population

Population includes both the number of individuals and the number of social groups within a social system. This variable determines the consumption impacts of people as well as their creative actions. Population development is an important factor in determining anthropogenic impacts on the natural resources of the Mission-Aransas NERR and its surrounding area. Rapid population growth is a large concern among coastal communities because impacts associated with population growth (e.g., reduced flood control, increased pollution, subsidence, habitat loss) have tremendous impacts on the relatively sensitive estuarine systems adjacent to them. Although the watershed of the Mission-Aransas NERR have relatively low populations, it is predicted that population change will increase because the South Texas coast is one of the few coastal areas in the United States that remains relatively undeveloped. In this study, several indicators of population were measured and mapped for this characterization including: total population, population density, and the population change between 1990 and 2000.

3.3.1.1 Total Population

In 2000, 281.4 million people were counted in the United States and of those, 20.85 million resided in Texas making it the second most populated state behind California. The majority of the population in Texas is centered around metropolitan areas and there is a greater number of people along the coast and in the northeast (Figure 7). Parts of the southern coast, including the Mission-Aransas NERR, have some of the lower estimates of population. In particular, the northern counties of the watershed that drain into the Mission-Aransas NERR are some of the least populated in the state with on <25,000 people (Figure 8). Bee and San Patricio county make up the majority of the sub-basin that drain the Aransas River and these counties have higher population totals (25,001 - 75,000). On a smaller scale, it can be determined that people are centered near cities and towns with large rural tracts in between (Figure 9). It is interesting to note that there are low numbers of people around the lower portions of the Mission and Aransas Rivers. The census blocks in the city of Rockport and the Live Oak Peninsula show high numbers of people, which is likely not reflected at the county level because of the low numbers associated with the unpopulated areas of the Aransas National Wildlife Refuge and San Jose Island.

3.3.1.2 Population Density

Population density can indicate the severity of the anthropogenic impact humans have on the natural environment. In Texas, the densest populated areas are around metropolitan areas (Figure 10). In particular, the cities of Houston, Dallas, and San Antonio have high densities of people. There is also a corridor of high population densities extending from San Antonio to Dallas and surrounding Houston. The population densities at the watershed level show that Nueces, Aransas and San Patricio County have the highest numbers of people per square mile (Figure 11). The high population densities of Aransas and San Patricio County have a greater influence on the Aransas River sub-basin and the Mission-Aransas Estuary. High densities in Nueces County could also affect the Mission-Aransas Estuary because of its close proximity.

3.3.1.3 Population Change

In 2000, 281.4 million people were counted in the United States, which was a 13.2 % increase from the 1990 Census population of 248.7 million (Perry and Mackun 2001). The 1990 to 2000 population increase was the largest in American history. Texas experienced a large proportion of the US population growth with a 22.8% increase from 1990 to 2000. The metropolitan areas of Dallas, Houston, Austin, McAllen, and San Antonio metropolitan accounted for the majority of the population growth increase, while most of the non-metropolitan counties in the state recorded either slow growth or population decline. In comparison to other metropolitan areas in the US, Austin and McAllen are among the top ten fastest growing (Perry and Mackun 2001). The Mission-Aransas Estuary and its watershed are situated between these two metropolitan areas. The rapid growth has already started to have implications on available water supply for those rapidly growing municipalities.

Texas has seen a greater change in population in the eastern portion of the state (Figure 12). At the watershed level, all of the counties, except for Refugio, had a population increase above the U.S. average of 5.3% (Figure 13). The counties of Aransas, Bee and Live Oak have seen the greatest change (+25-50%) in population from 1990 - 2000. Historical trends also reflect a population increase in the local municipalities adjacent to the Mission-Aransas NERR (Table 3).

It is estimated by the Census Bureau that the US will increase to 293.4 million in 2005. This represents a 5.3% increase from 2000. Texas is estimated to increase to 22.9 million in 2005, which is a 9.6% increase from 2000.

Table 3. Decadal census counts for local municipalities. Numbers from 2005 are estimates.

Census	Corpus Christi	Aransas Pass	Port Aransas	Rockport	Fulton	Bayside	Refugio
1960	167690	935	824	2989	na	na	4944
1970	204525	726	1218	3879	na	na	4340
1980	231875	860	1968	3686	725	381	3898
1990	257453	7180	2233	4753	763	400	3158
2000	277454	8138	3370	7385	1553	360	2941
2005	283474	8877	3667	9041	1663	356	2797

3.3.2 Labor

Labor is an indicator of what type of anthropogenic impact occurs to the natural resources. In this study, industry was used as an indicator of labor because it describes the products created by labor that impact natural resources. In addition, spatial patterns of industry will help resource managers identify areas to target for outreach. Spatial patterns of industry also indicate the level of local expertise, which can help resource managers in developing content for outreach materials.

Education was the dominant industry of all counties in the Mission-Aransas NERR watershed (Figure 14). The top three dominant industries in each county were, in order, the following:

Refugio County: education, agriculture, and manufacturing
Calhoun County: manufacturing, education, and construction
Aransas County: education, arts, and construction
San Patricio County: education, retail and construction
Nueces County: education, retail, and arts
Bee County: education, public administration, and retail
Live Oak: education, agriculture, and public administration
Goliad County: education, agriculture, and construction

Of these dominant industries, agriculture is likely to have the greatest direct effect on our natural resources. Refugio, Live Oak and Goliad counties have the greatest dominance of agriculture for industries in the watershed (Figure 15).

3.3.3 Capital

Capital is defined as financial resources, resource values, and the human ability to manipulate these resources. The availability of capital can alter consumption levels of our natural resources. In the human ecosystem framework, capital is defined as the economic instrument of production that can affect and manipulate financial resources and resource values. In this study, median household income was used to measure capital. Those that are affluent or have a high household income have the ability to use more of their financial resources to use more natural resources. However, those that are affluent, also have the ability to pay more for products and materials that ensure sustainability, such as solar panels or high efficiency appliances.

In 1999, the economic census determined that the US median household income average was $41,994. Most of the state of Texas is lower than the national average, with more affluent areas around metropolitan areas of Houston, San Antonio, Austin, Midland, and Amarillo (Figure 16). In comparison to the rest of the state, the median household income of people within the Mission-Aransas watershed is low (Figure 17). Karnes, Bee and Refugio Counties had the lowest household income means, while Nueces, San Patricio, Goliad, and Calhoun had higher means.

3.4 Social Cycles and Norms

Social cycles are organized patterns that influence the distribution of critical resources. These cycles occur over times and can explain the ebb and flow of human action. Examples of social cycles include festivals, seasonal harvests, fishing/hunting seasons, business days and so forth. Informal norms are unwritten and sometimes unspoken rules that influence and govern human behaviors.

3.4.1 Institutional Cycles

Institutional cycles provide guidance and predictability to the flow of human actions. Age distribution was used as an indicator of institutional cycles because the proportion of children to elderly will influence the need for, flow and use of different resources. Seasonal residence was also used as an indicator of institutional cycles because it seasonal residence will influence the flow of resources during tourist seasons.

3.4.1.1 Age Distribution

Age distribution is an institutional cycle that can indicate what types of resources are currently being used. Changes to age distribution can further indicate future resources needs of our area. In this study, we determine the age distribution as the portion of children under the age of 18 to those over the retirement age of 65. In general, communities have a greater number of children, so that the proportion of children to retired is always above one. Therefore, the lower the value, the greater the proportion retired people and vice versa. Information in age distributions can help identify number of school systems, requirements of medical resources, availability of volunteers, and recreation patterns.

In Texas, there are is a greater proportion of those over the age of 65 in the "hill country" (west of San Antonio and Austin) and in northwest Texas (Figure 18). There are a greater proportion of children around the metropolitan areas of Dallas, Austin, Laredo and Houston. In the watershed of the Mission-Aransas NERR, there is a greater proportion of children in San Patricio and Nueces counties, and a greater proportion of people over the age of 65 in Aransas, Goliad and Live Oak County (Figure 19).

3.4.1.2 Seasonal Residential Cycle

Seasonal cycles of residence can indicate yearly flow of natural resources. Seasonality of residence can also help explain behavior patterns. High seasonal fluxes of residence may also lead to apathy about the natural resources in the area.

Aransas and Nueces County has the largest numbers of seasonal, recreational and occasional use residents (Figure 20). Bee and Refugio County has the least number of seasonal homes. The coastal communities of Port Aransas, North Padre Island, and Rockport/Fulton are encompassed in Nueces and Aransas County. These communities rely heavily on tourism and the natural resources of our local estuaries and beaches are the primary draw for tourism.

Tourism for the coastal communities of Port Aransas, North Padre Island, and Rockport/Fulton is largest during the summer months. The majority of Port Aransas tourism is based on fishing and the city of Port Aransas typically hosts 21 fishing tournaments from the months of April to September (Port Aransas Chamber of Commerce Flier, 2007). Although tourism is the greatest in the summer months, both Port Aransas and the Rockport/Fulton area have a peak tourism period from December to February from "winter Texans." The Aransas National Wildlife Refuge also experiences an overlap with the winter Texans and has visitation peaks from October through April during whooping crane season.

3.4.2 Informal Norms

In this study, we measured an informal norm by determining the number of single parent households. Most single parent households are single mother households (Dalton 2005). Information on the spatial

patterns will help explain behavior patterns and resources flow.

In Texas, the highest percentages of single parent households occur in the south (Figure 21). The lowest percentages occur in the central and northern part of the state. These low percentages correlate somewhat with the age distribution and the higher portion of those over the age of 65 occurring in the central part of Texas ("hill country"). At the watershed level, Nueces and Bee county have the highest percentage of single parent households, while Goliad and Live Oak County have the lowest percentage (Figure 22).

3.5 Social Order (Identity)

The social order of a population describes the identity that a person affiliates with himself. Identity can have a large effect on the behavior patterns and resource utilization.

3.5.1 Median Age

Age is an important variable of identity because most of human activity is age dependent. Age can help explain patterns of occupation, recreation, health care, and political activity. In Texas, the southern and western regions are generally younger, while the northern and eastern regions are older (Figure 23). Metropolitan areas have a lower median age. In the counties of the Mission-Aransas NERR watershed, Aransas County has a higher median age (Figure 24). The city of Rockport and the town of Fulton have high numbers of retirees, which is likely the cause for the higher median ages shown.

3.5.2 Class

The term class implies individuals sharing a common situation within a social structure (Dalton 2005). In this study, educational achievement was used to indicate classes. Educational achievement spatial patterns can help resource managers determine the level of content for outreach materials.

In Texas, central and northern regions tend to have higher education achievement of both high school level and bachelor degree (Figure 25). Classes with high percentages of bachelor degrees are concentrated around the metropolitan areas of Austin and Dallas. Classes with low percentages of bachelor degrees are concentrated along the southern border with Mexico. In the counties within watershed of the Mission-Aransas NERR, Karnes County has the lowest percentage of high school graduates, while Aransas and Nueces have the highest (Figure 26). A similar pattern is described by those achieving a bachelor degree. However, all counties within the watershed are below the national average for bachelor degree achievement (24.4%).

3.5.3 Ethnic Origin

Ethnic origin is also an important variable of identity. Ethnic origin spatial distributions can help explain language patterns, which has is an important factor in outreach materials that often is overlooked by resource managers. Texas has a large percentage of the population that identifies themselves as Hispanic (Figure 27). Percentages follow a latitudinal gradient from south to northeast. With the exception of Aransas County, the majority of counties in the Mission-Aransas NERR watershed claim Hispanic origin from 25.1-75%.

The Hispanic population distribution is displayed separately from ethnic distribution because the federal government considers race and Hispanic origin to be two separate and distinct concepts (Grieco and

Cassidy 2001). The Census questionnaire does not distinguish or define Hispanic populations as ethnicity or race. Therefore, for example an individual can identify themselves as Hispanic and white.

The largest ethnic identity of counties within the Mission-Aransas NERR watershed is white followed by an unknown "other" (Figure 28). Aransas County has the highest percentage of the white majority, and Bee County has the greatest percentages of minorities.

3.6 Hierarchy

3.6.1 Wealth

Wealth is an indicator of hierarchy because it defines access to material resources. Wealth distributions can explain social inequality and opportunity (Dalton 2005). In this study, the inverse of wealth is defined as the rate of poverty.

In 2000, the Census defined the poverty threshold for those under 65 years of age at $8,959 and for those 65 years and older at $8,259. In the Mission-Aransas NERR watershed, Nueces County had the greatest number of people living in poverty (Figure 29). Live Oak, Goliad and Refugio County had the fewest number of people living in poverty.

3.6.2 Power (Social)

Social power is the ability to alter other's behavior (Dalton 2005). It usually consists of the elites with political or economic power who have considerably better access to resources than the average person. Power is measured in terms of the number of households with income greater than $100,000.

In the Mission-Aransas NERR watershed, Bee County had the lowest percentage of households with income greater than $100,000 (Figure 30). Nueces and Aransas County have the greatest percentage of households with income greater than $100,000. Although, these statistics indicate that Nueces and Aransas County have the most individuals with power, both counties are below the national percentage of 12.3%.

4.0 SUMMARY OF FINDINGS

4.1 Counties within the Mission-Aransas NERR

Although five counties are included in the Mission-Aransas NERR (Table 1), three counties comprise nearly 97% of the area. The majority of the Mission-Aransas NERR (75%) lies in Aransas County. Other major counties in the Reserve include Calhoun (12%), Refugio (10%) and Nueces (3%). Only 0.1% of San Patricio County lies in the Reserve. The most populous counties on both a regional and state level are Nueces and San Patricio, and both lie predominantly outside the Reserve. Consequently, the Mission-Aransas NERR is likely one of the lowest density sites in the NERR System.

The low population of counties the Reserve distributed in respective densities of less than 25 people/square mile in Calhoun and Refugio County compared to a modest 89 people/square mile in Aransas County. Similarities among all three counties include a predominantly white population with a low poverty level, a relatively low proportion of children to retired (ratio 1.2-2.5), and a majority of the population with at least a high school degree. Urban development throughout the area is very low (<5%).

Of the three counties however, it is clear that Refugio has lowest proportion of individuals that earn in excess of $100,000/year. The low financial and social power of this county is also reflected in the lowest medium income, very few seasonal homes, and a higher proportion of employment in agriculture. Among all these indicators, the most profound is the lack of population change for Refugio County, compared to significant increases for all other neighboring counties in the region. The lack of a population increase (or perhaps a slight decrease) is in stark contrast to most Texas counties which showed some growth, and to the southern half of the state as a whole. The causes for the slowdown in growth for Refugio County are not apparent, but may be related to immense amount of area committed to rangeland and the lack of job opportunities for young people.

It is clear from this analysis that Aransas County is characterized by the greatest amount of wealth in the region. This is likely related to the abundance of desirable waterfront property as reflected in higher incomes, second homes, and a greater median age (and fewer adults under 18) than the adjacent counties. Consequently, it is likely that adults have greater free time in which to dedicate toward community service projects and are more likely to be more active stakeholders in the management of their region.

4.2 Counties within the Mission-Aransas NERR Watershed

The four remaining counties that are in the Reserve watershed are Bee, Goliad, Karnes and Live Oak County. These counties are almost exclusively rural and characterized by lands that are either forested, used for agriculture, or pastures for free ranging cattle. Consequently, population densities are very low (<25 people/square mile). In other respects, the human characteristics among the four counties are diverse, with Bee county displaying high educational achievement (>72% completing high school) compared to Karnes (<60%). Bee County is also unique in a relatively higher number of single-parent households (11-12%), lowest median age, and a higher ratio of children under 18 relative to adults over 65 compared to the other three counties. All four counties exhibited high population growth (range 10 to 50%) and generally very low poverty (Bee County was average). The low population density of these counties, combined with very low urban land use, is favorable to the continued health of the Mission-Aransas watershed, although population increases are an important consideration for future planning.

5.0 RECOMMENDATIONS

The Mission-Aransas NERR is composed of a relatively homogenous human population that is largely dependent, with the exception of the residents of Aransas County, on an economy based on land use for agricultural and grazing purposes. Clear opportunities exist to empower the residents of Aransas County to engage in activities related to the management of a rapidly growing county. Many citizens in Aransas County appear to have a higher proportion of disposable free time than most citizens of the area. This is important, since a proactive involvement by local people will be important in managing an extensive shoreline that is sensitive to rapid urban development. The rapid increase in population growth of counties of the Mission-Aransas watershed is also an important challenge for effective management of the Reserve. Based on the results of this analysis, the managers are in a unique position to educate local residents of areas adjacent to the Reserve to facilitate sustainable management of this unique ecosystem for years to come.

6.0 FIGURES

Figure 1. Habitats of the Mission-Aransas NERR.

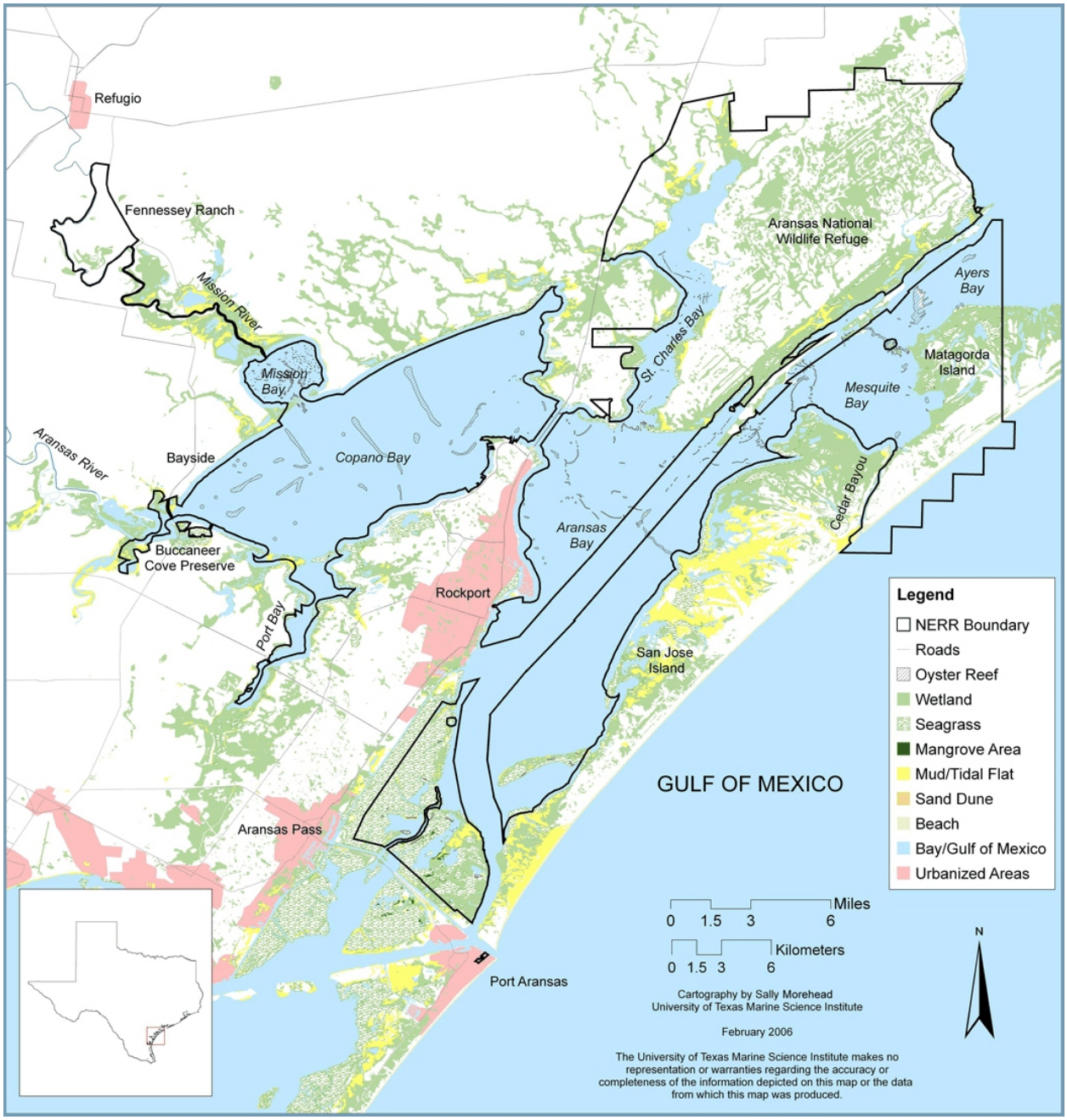


Figure 2. Watershed sub-basins that drain into the Mission-Aransas NERR.

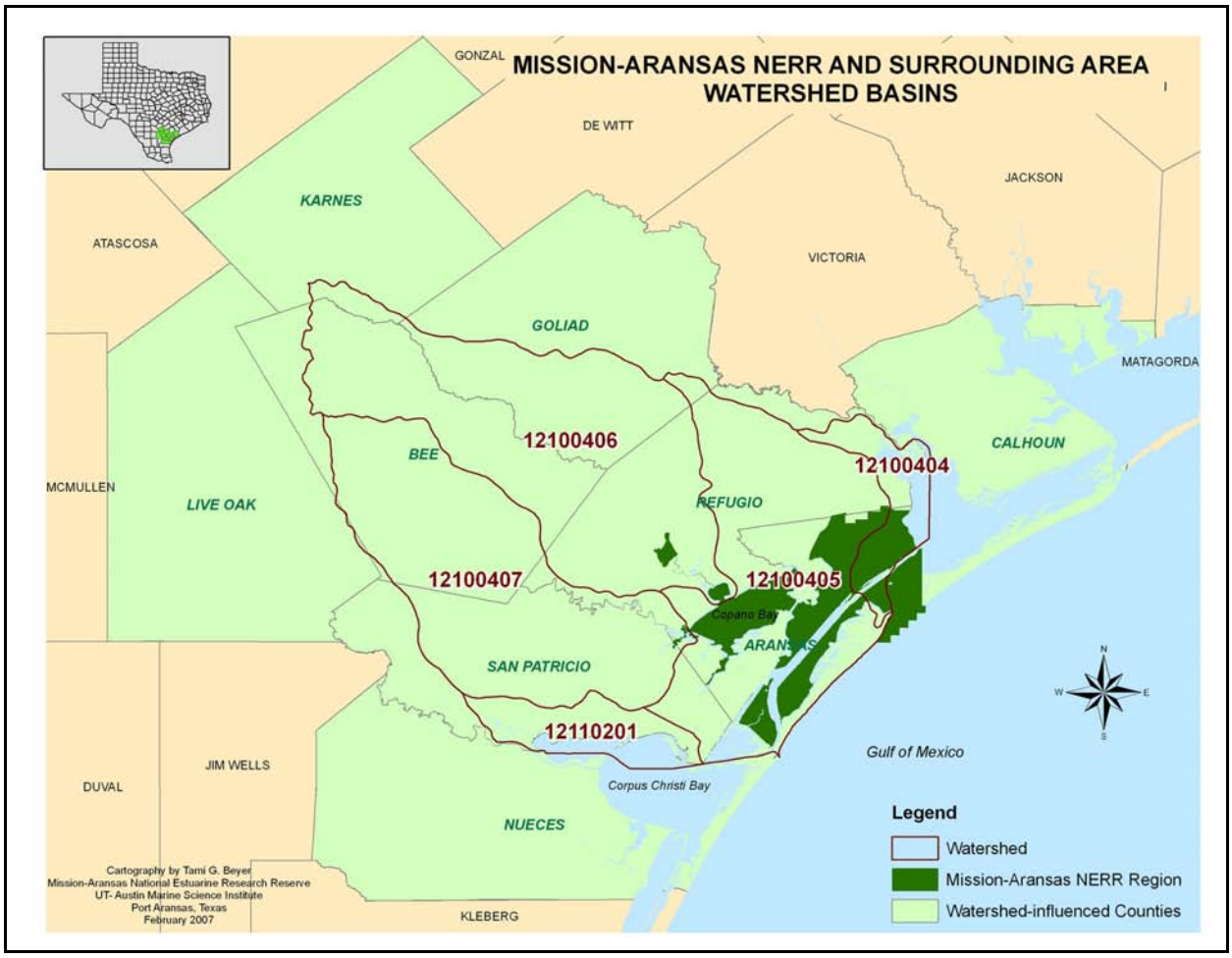


Figure 3. Average travel time required in minutes by county for workers in Texas.

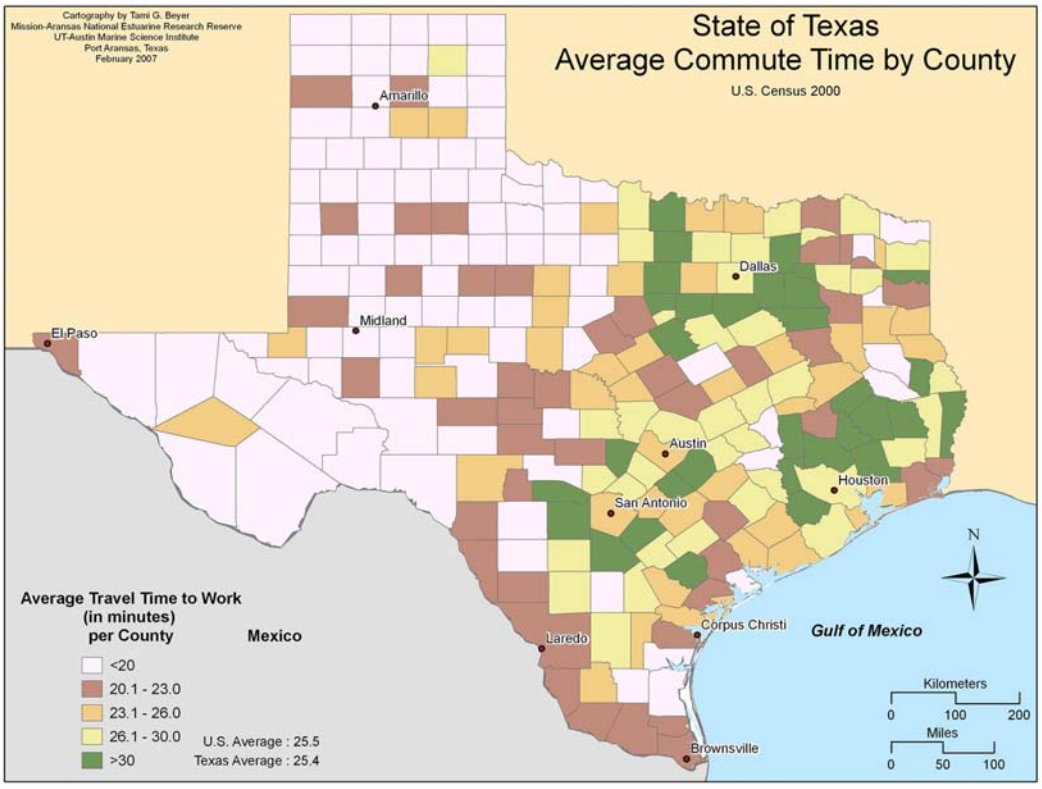


Figure 4. Average travel time required in minutes by county for workers in counties within the Mission-Aransas NERR watershed.

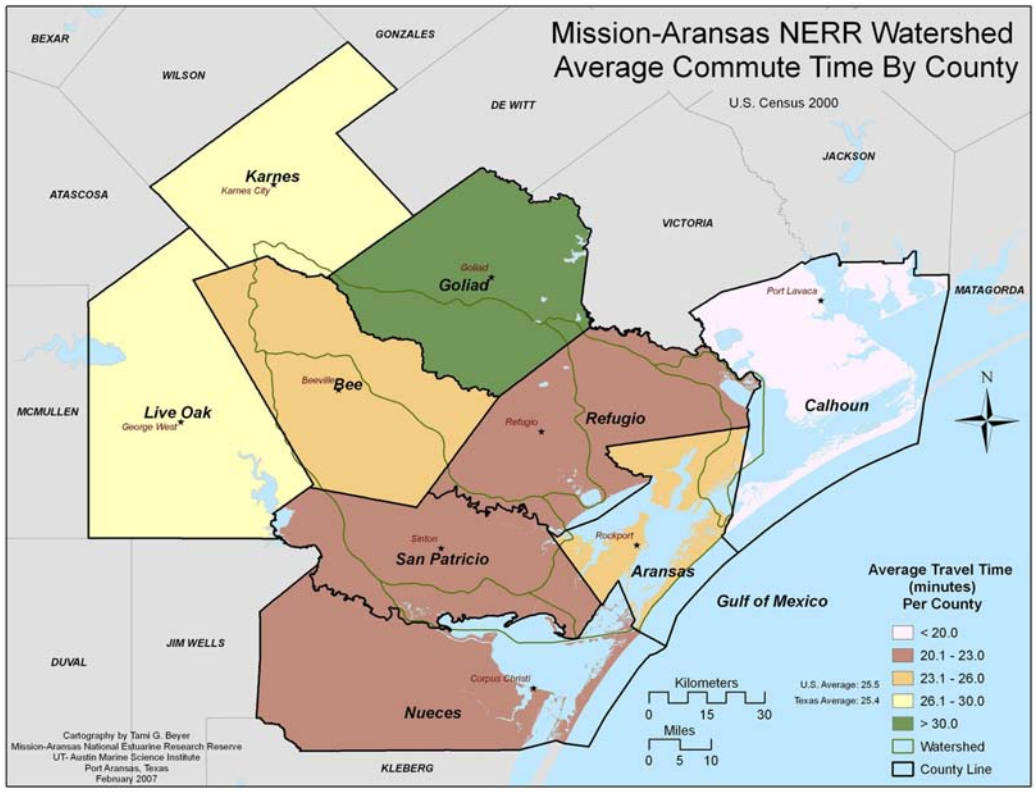


Figure 5. Land use and land cover information for Texas.

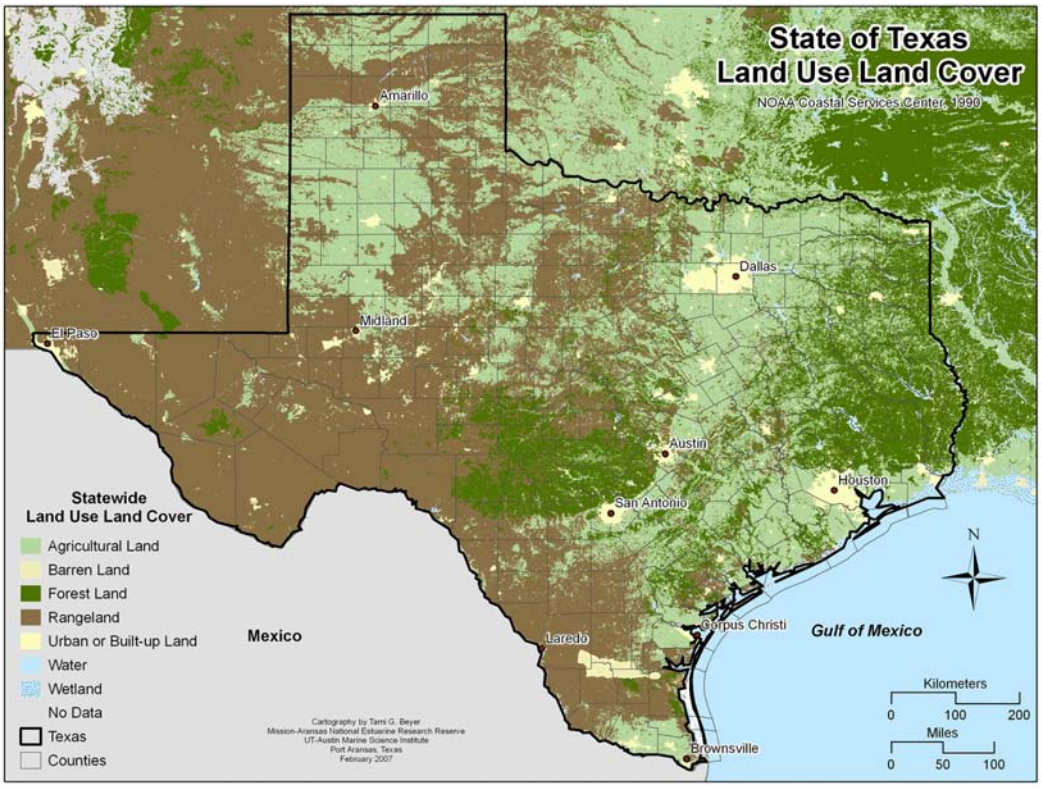


Figure 6. Land use and land cover information for the Mission-Aransas NERR watershed.

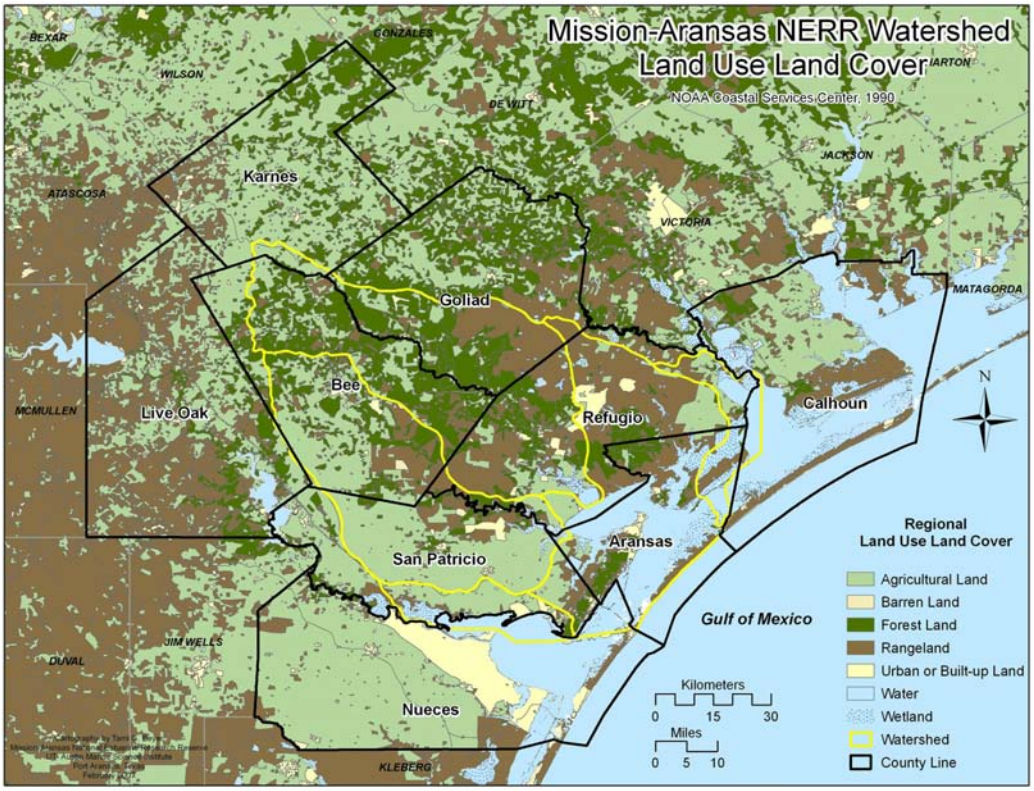


Figure 7. Total population values for Texas by county.

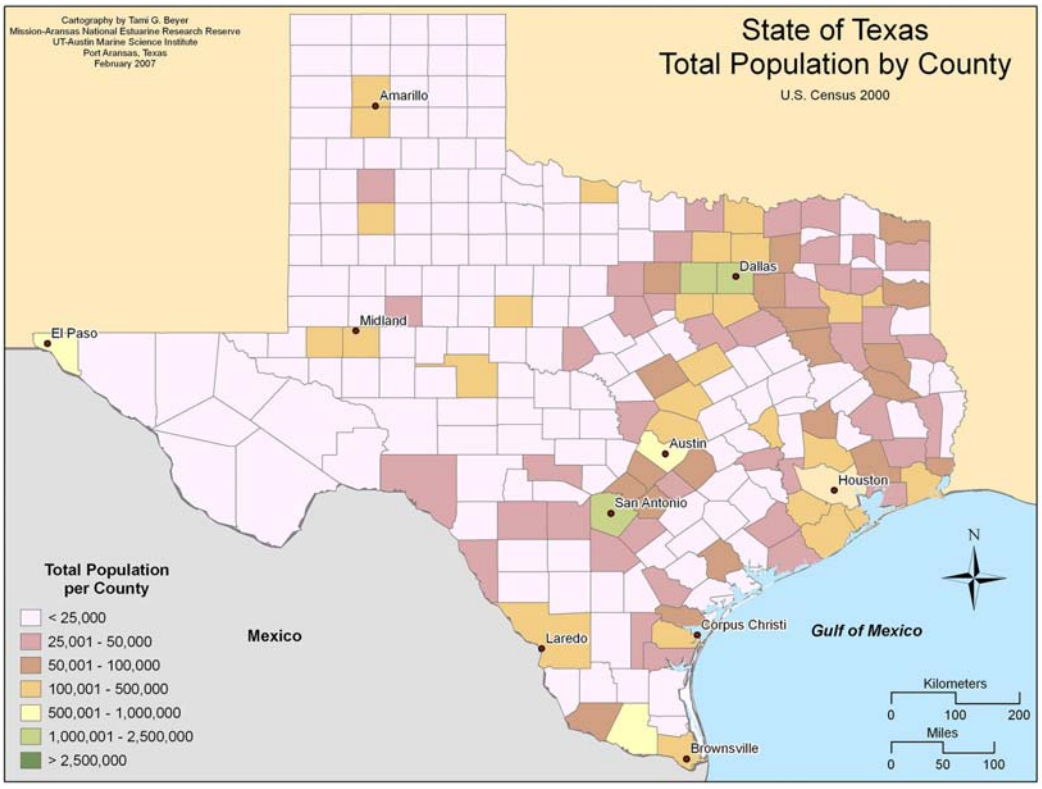


Figure 8. Total population values for Mission-Aransas NERR watershed by county.

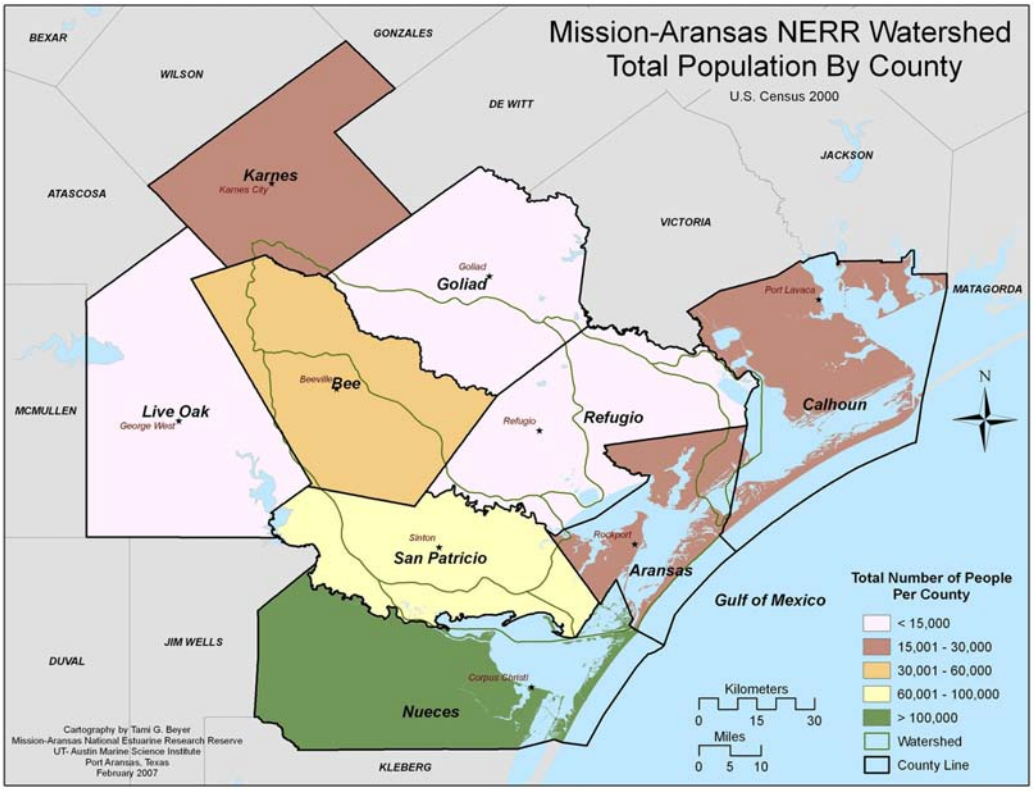


Figure 9. Total population values for the Mission-Aransas NERR watershed by census block.

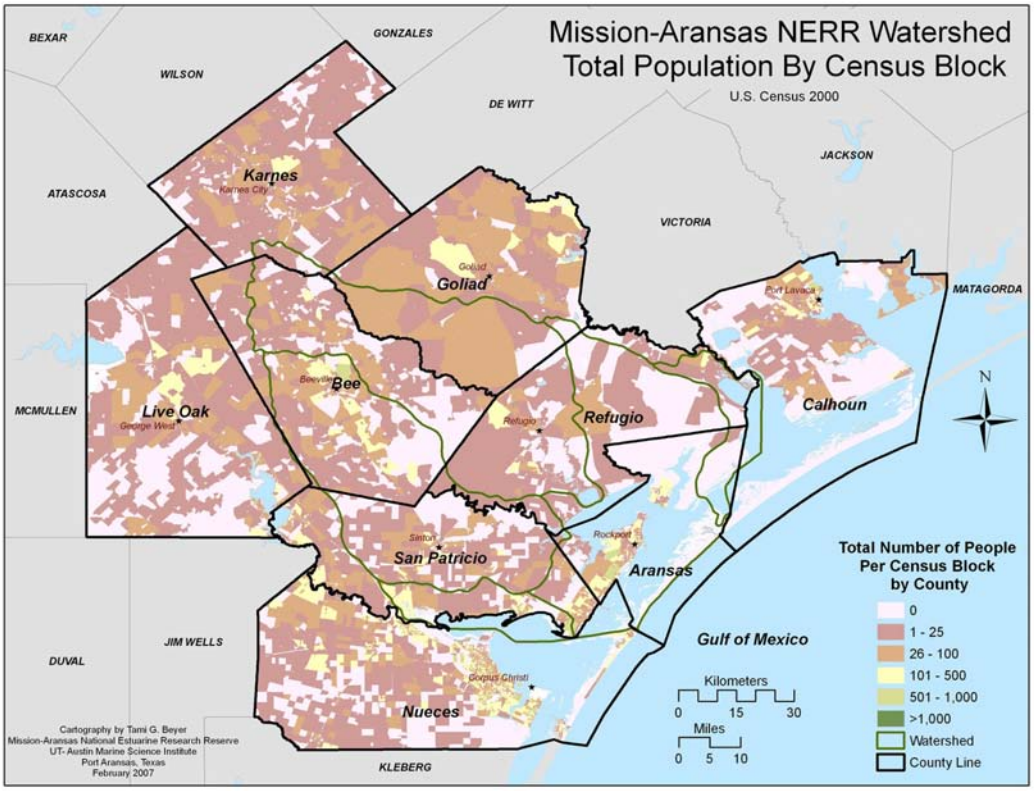


Figure 10. Number of people per square mile for Texas.

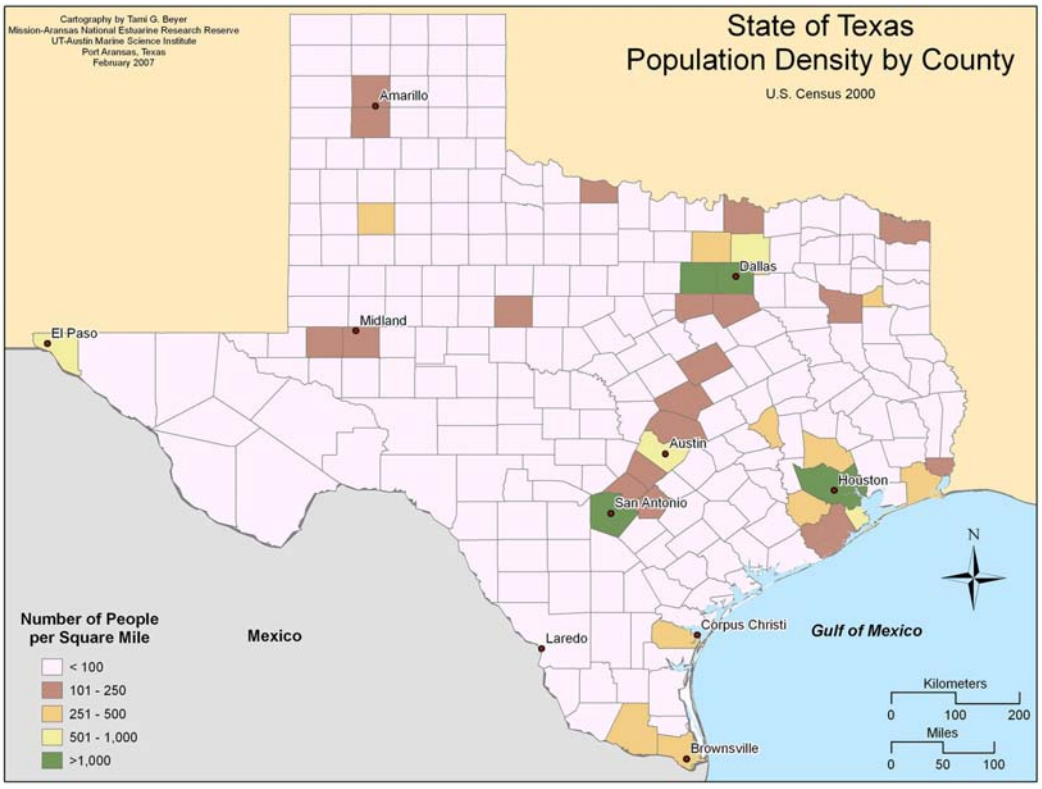


Figure 11. Number of people per square mile for the Mission-Aransas NERR watershed.

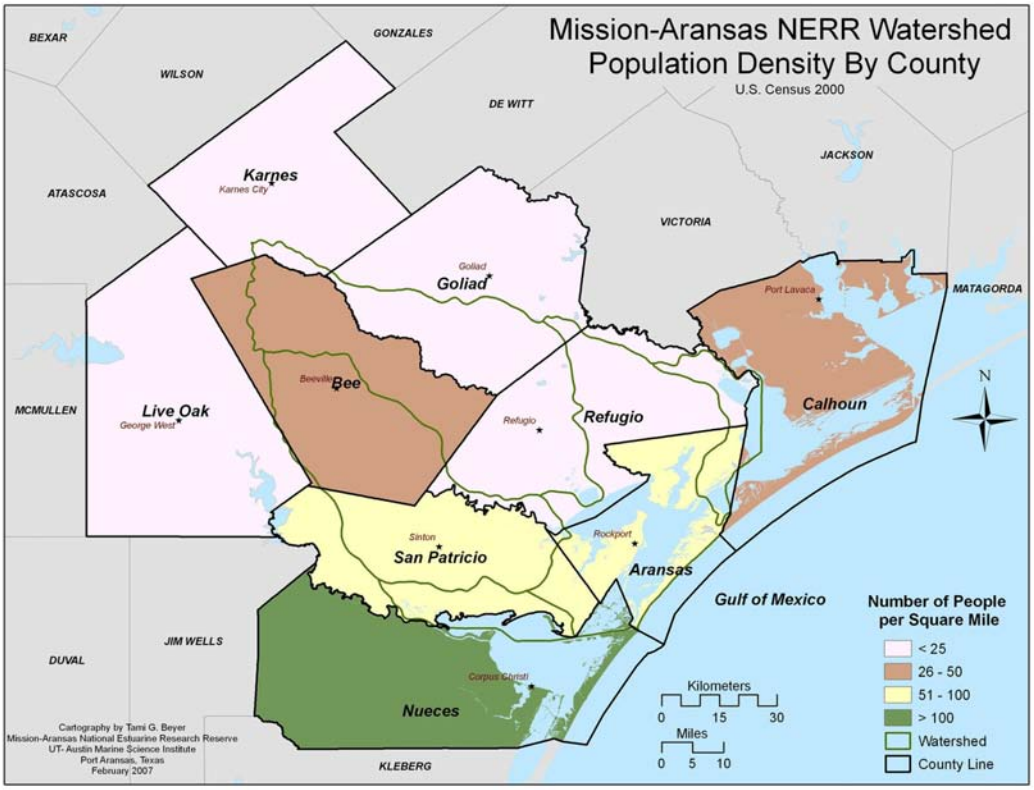


Figure 12. Total population change from 1990 to 2000 for Texas.

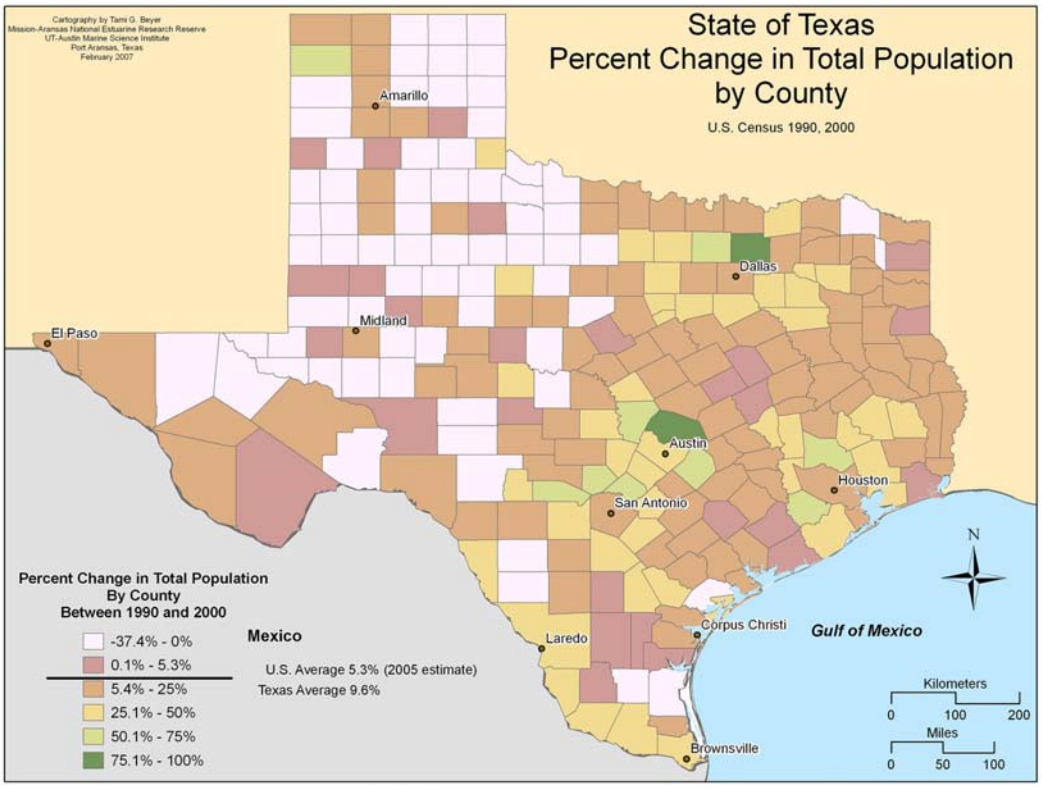


Figure 13. Total population change from 1990 to 2000 for the Mission-Aransas NERR watershed.

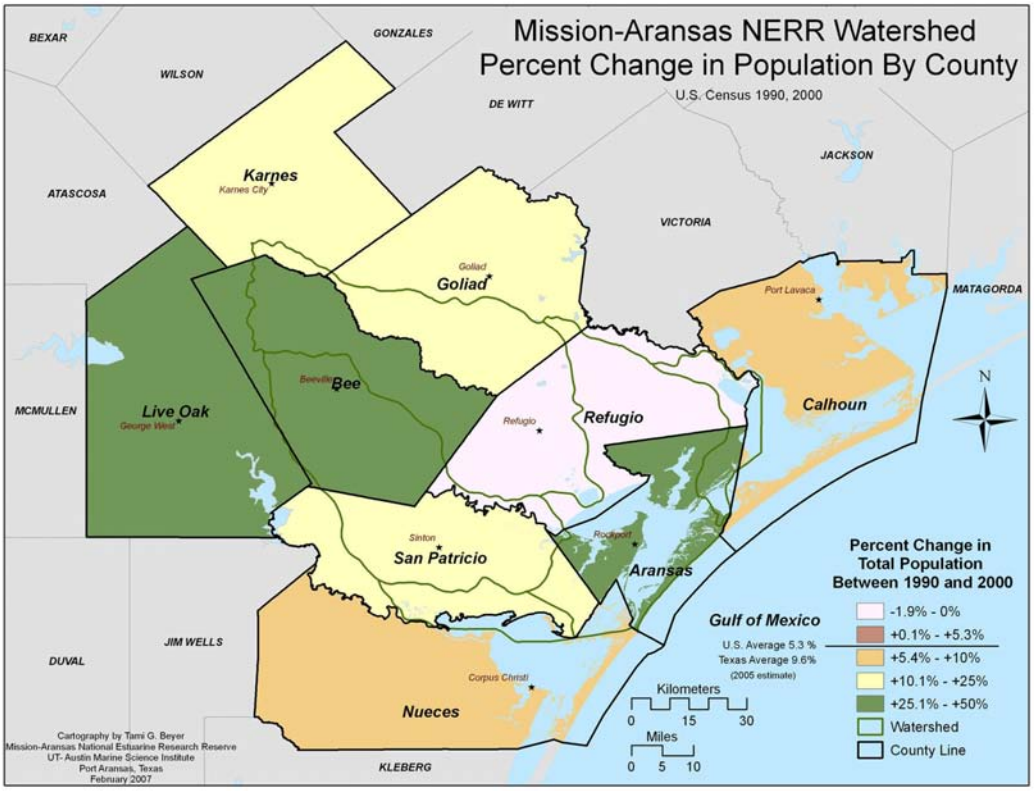


Figure 14. Percentage of employment by industry for counties within the Mission-Aransas NERR watershed.

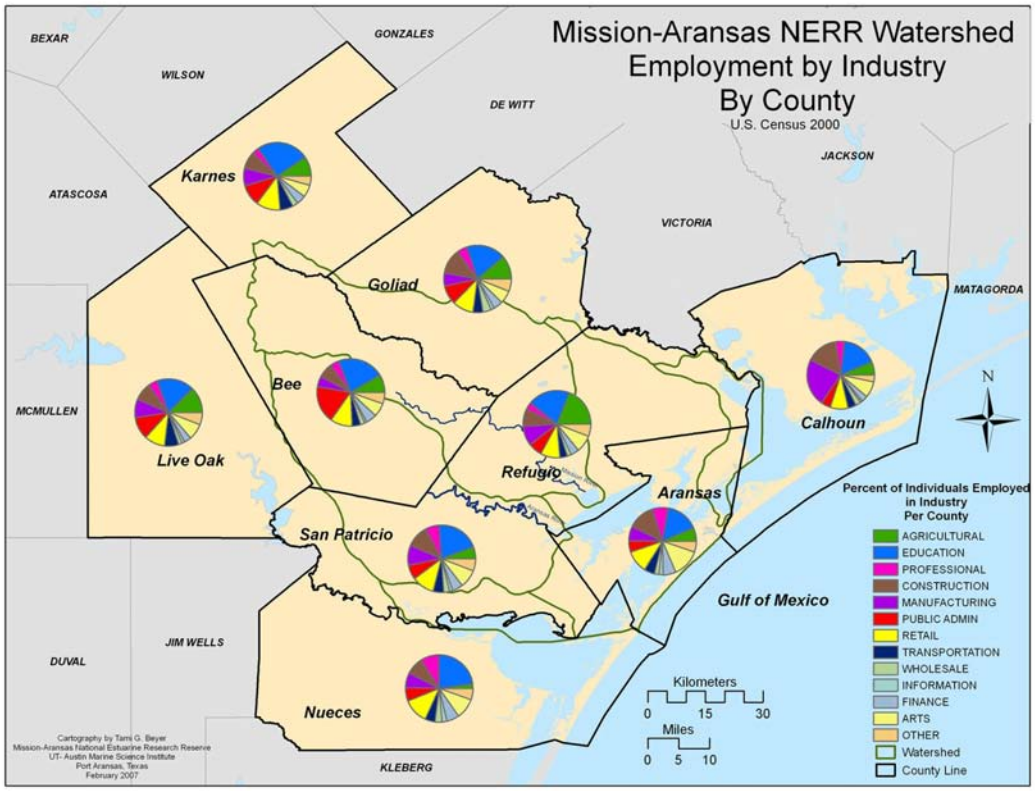


Figure 15. Percent of employment of the agricultural industry for counties within the Mission-Aransas NERR watershed.

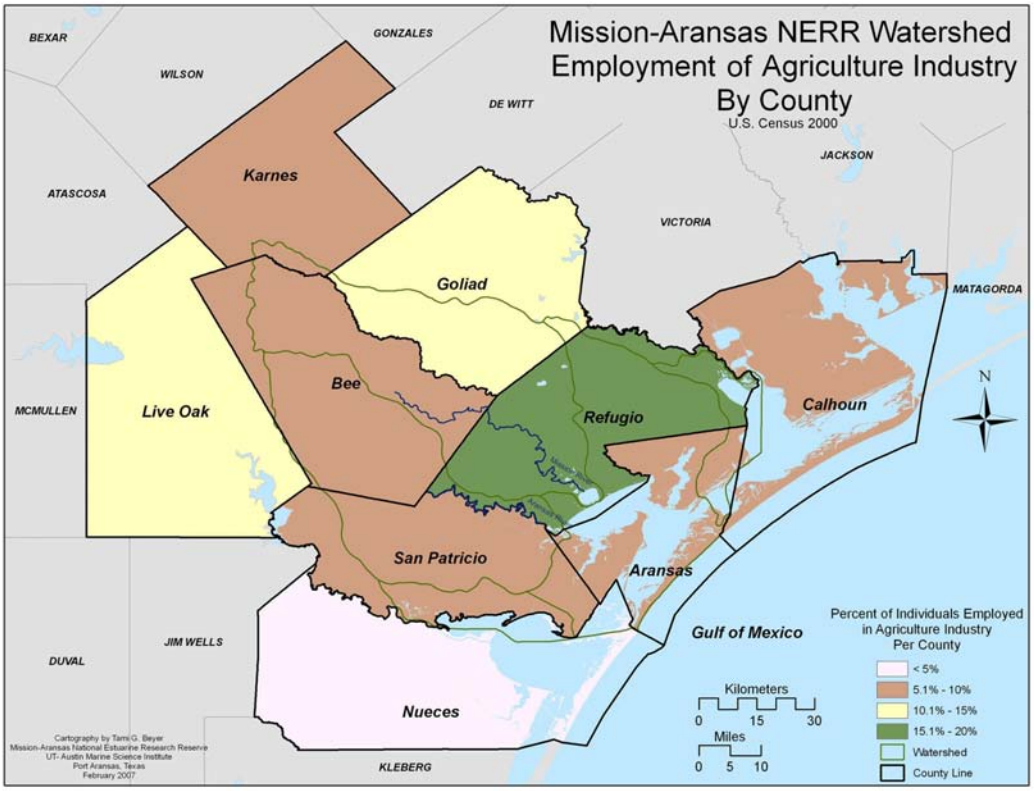


Figure 16. Median household income by county for Texas.

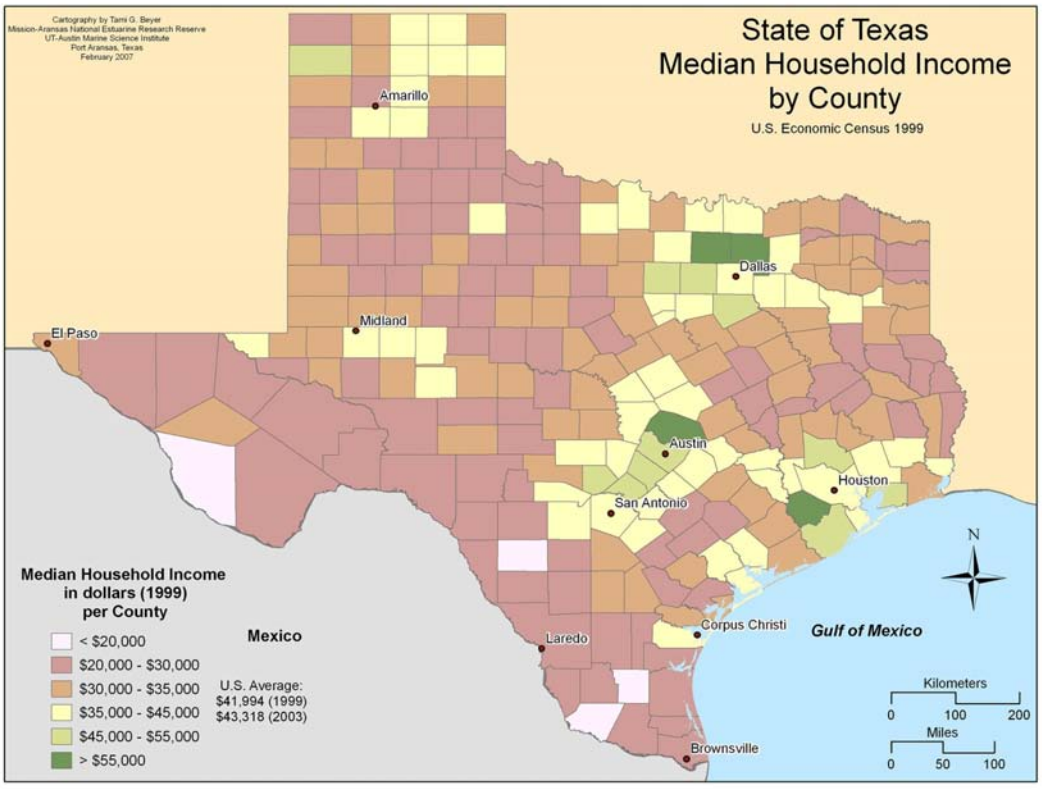


Figure 17. Median household income for counties within the Mission-Aransas NERR watershed.

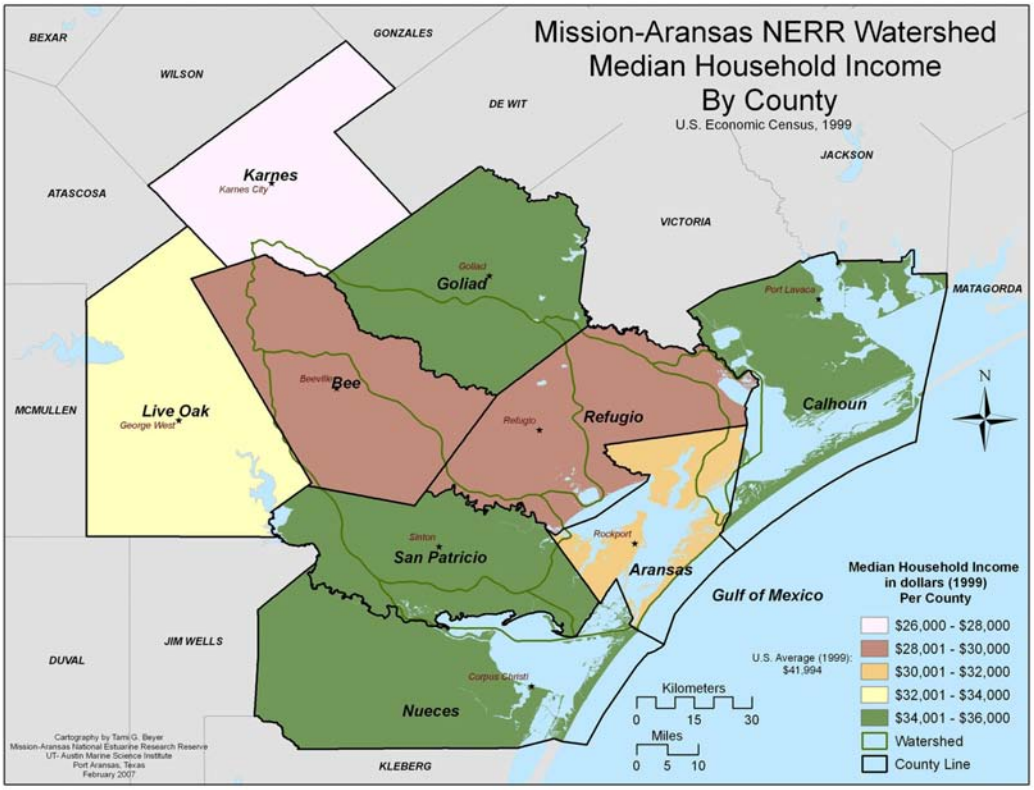


Figure 18. Age distribution of people in Texas distributed by county.

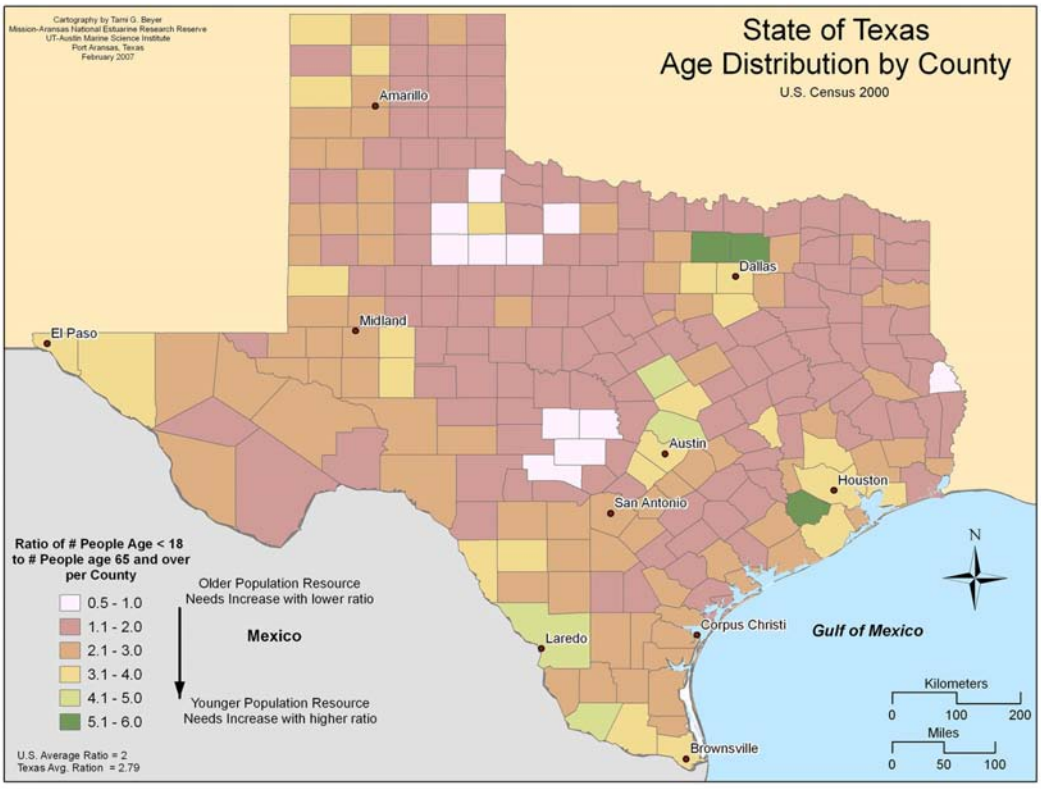


Figure 19. Age distribution for counties within the Mission-Aransas NERR watershed.

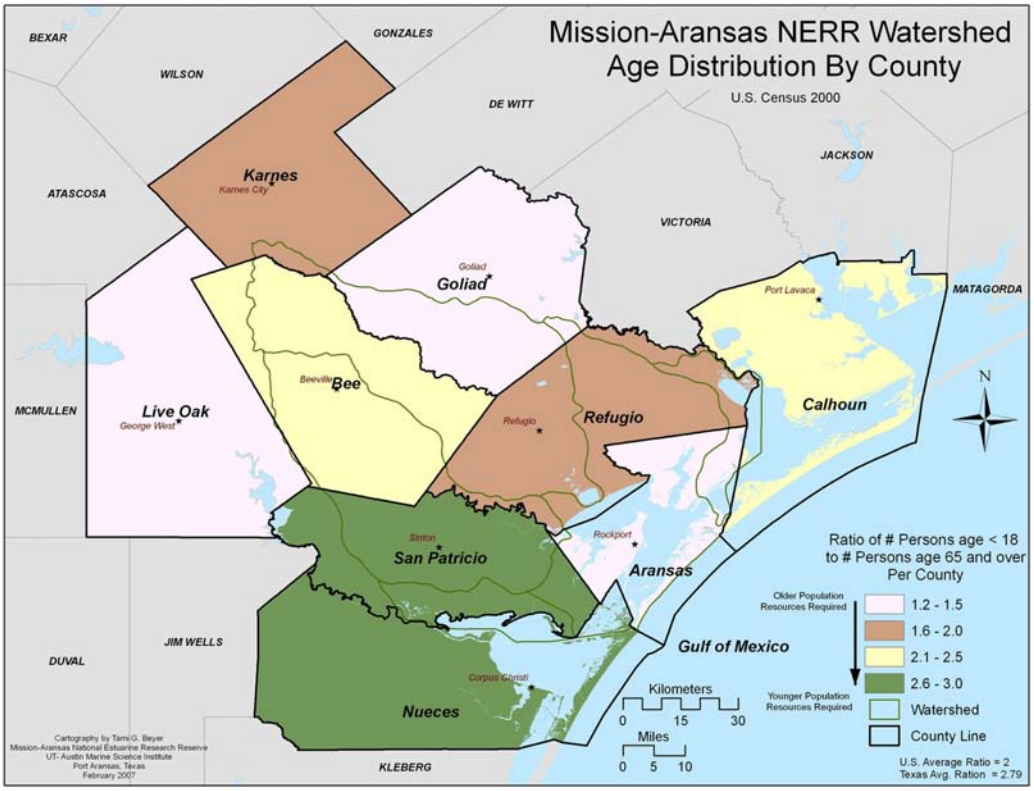


Figure 20. Number of housing units occupied on a seasonal basis for counties within the Mission-Aransas NERR watershed.

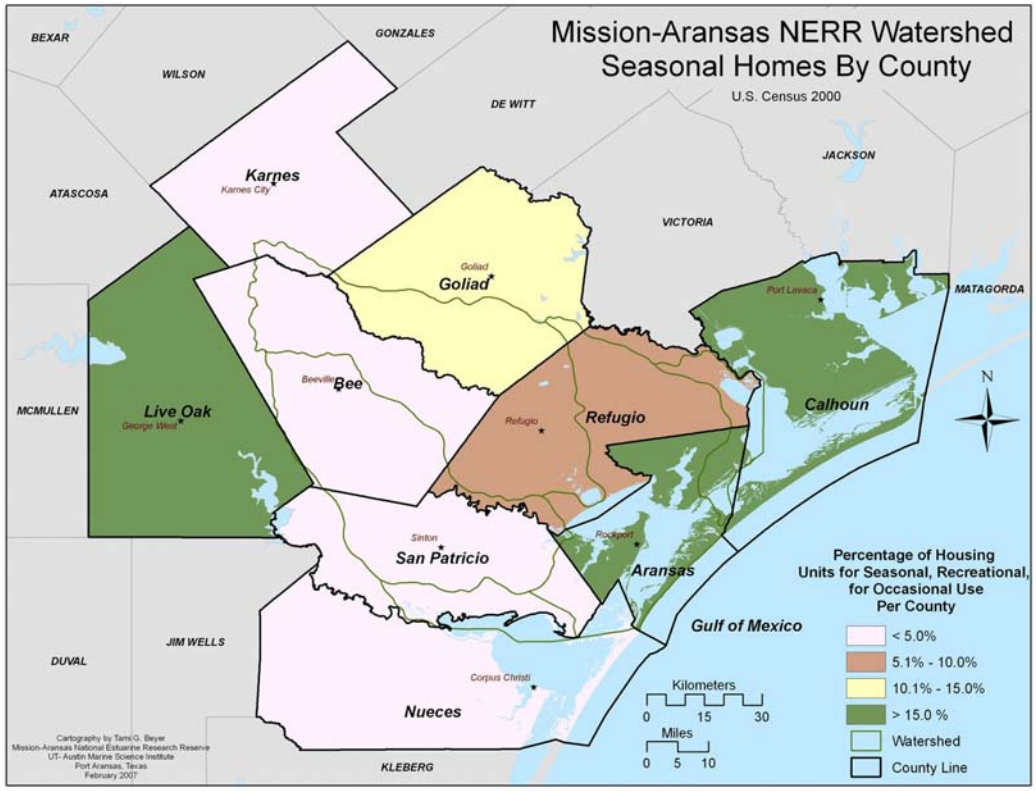


Figure 21. Number of single parent households in Texas.

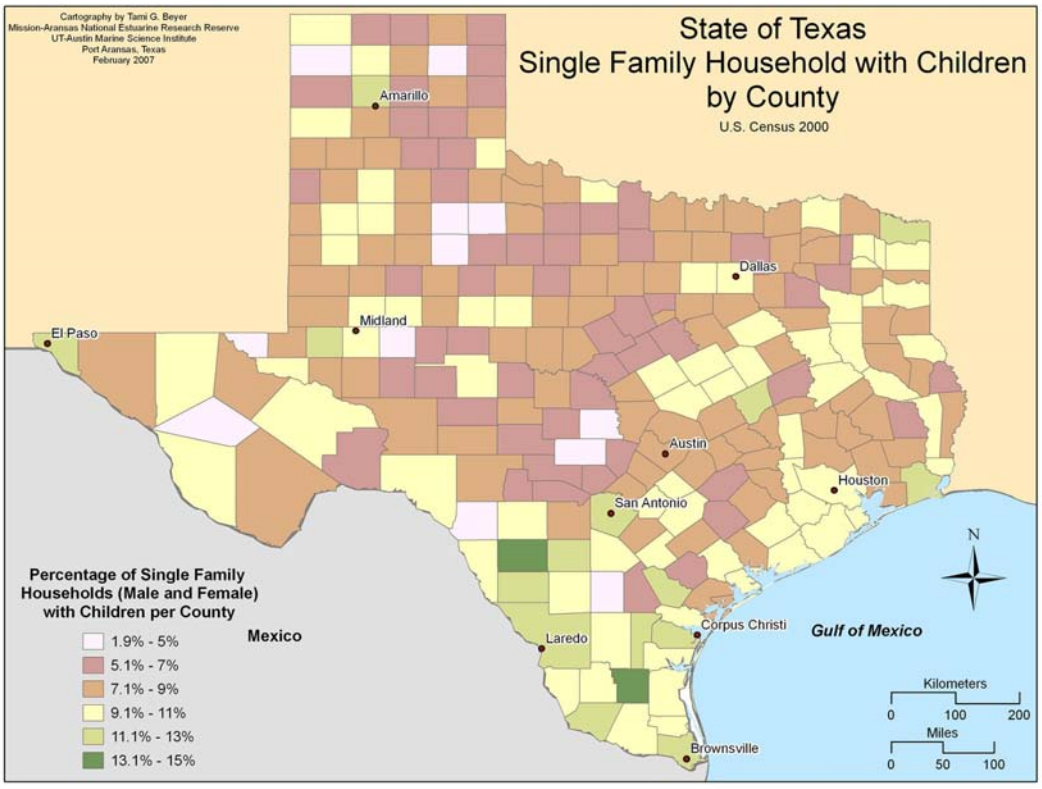


Figure 22. Number of single parent households for counties within the Mission-Aransas NERR watershed.

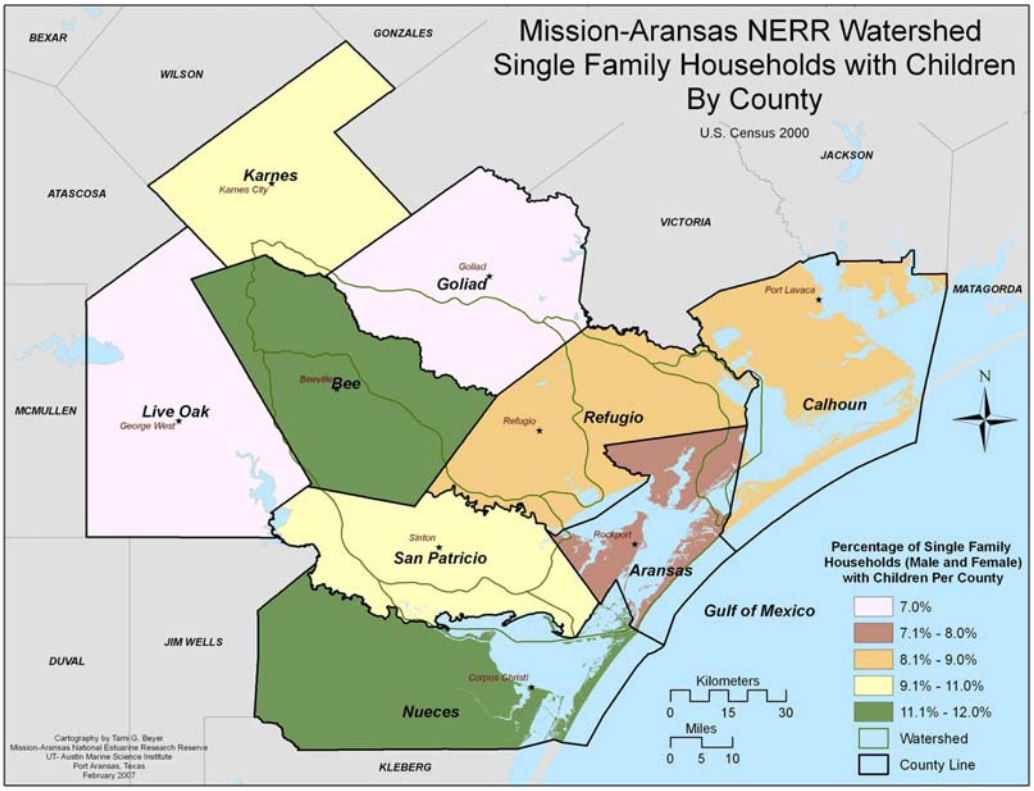


Figure 23. Median age of the population in Texas.

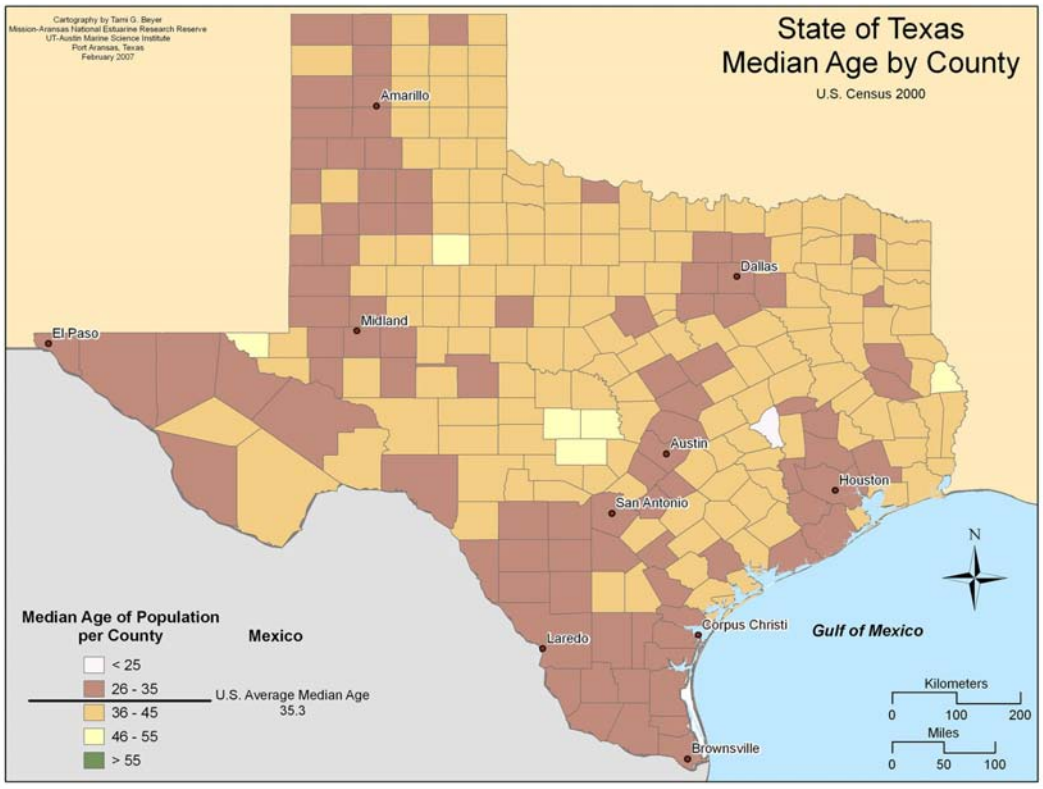


Figure 24. Median age of the population for counties within the Mission-Aransas NERR watershed.

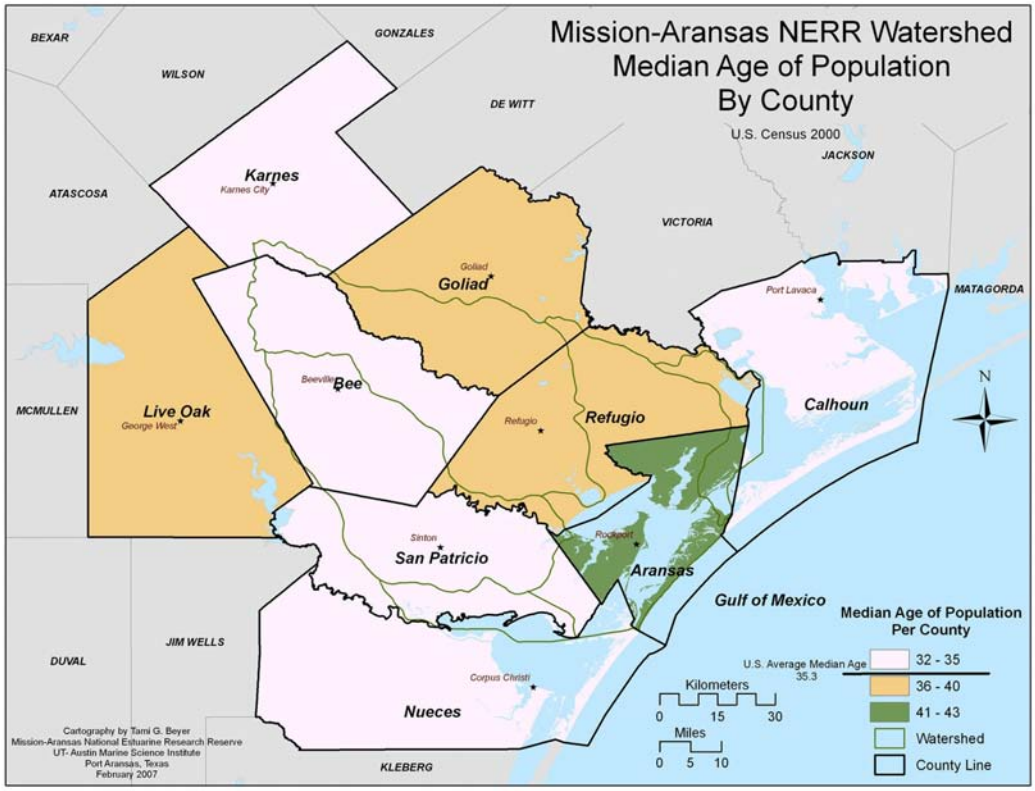


Figure 25. Educational achievement in Texas by highschool and bachelors degree.

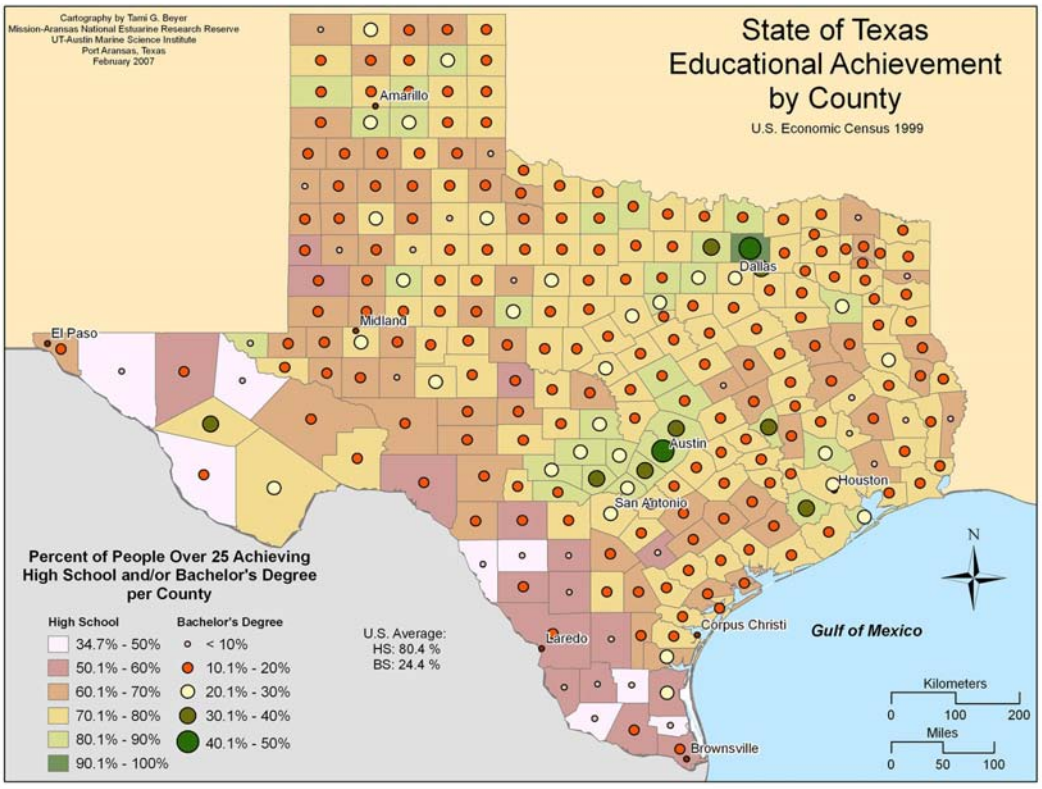


Figure 26. Educational achievement by high school and bachelors degree for counties within the Mission-Aransas NERR watershed.

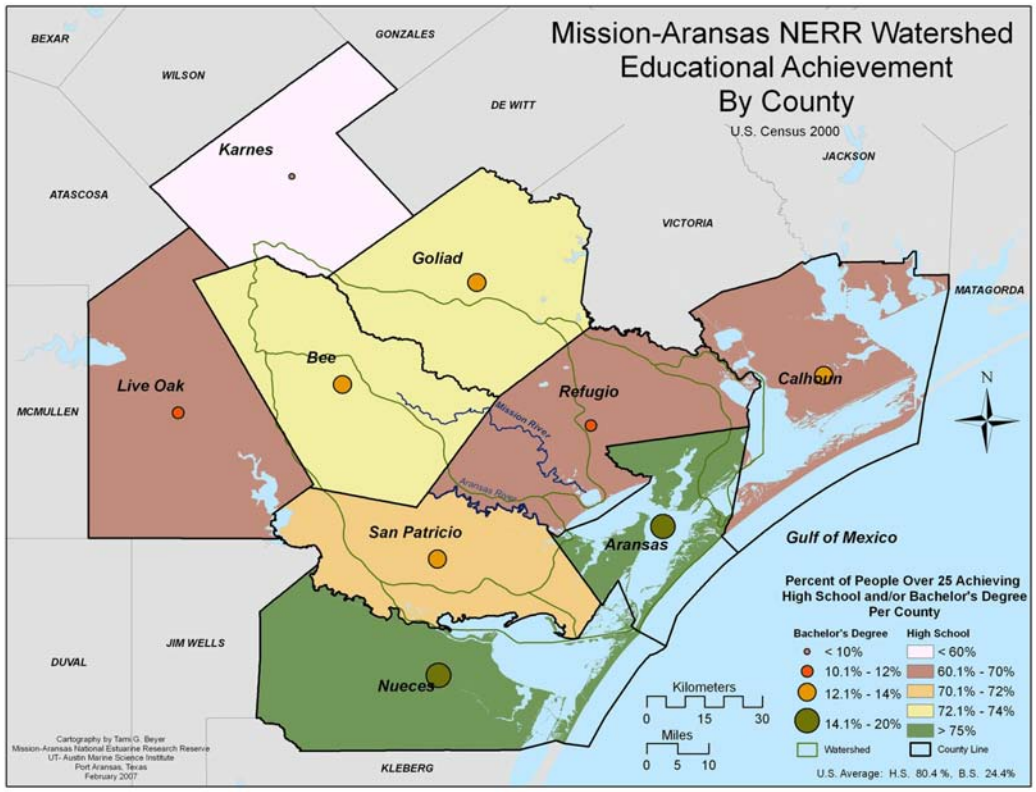


Figure 27. Hispanic distribution in Texas.

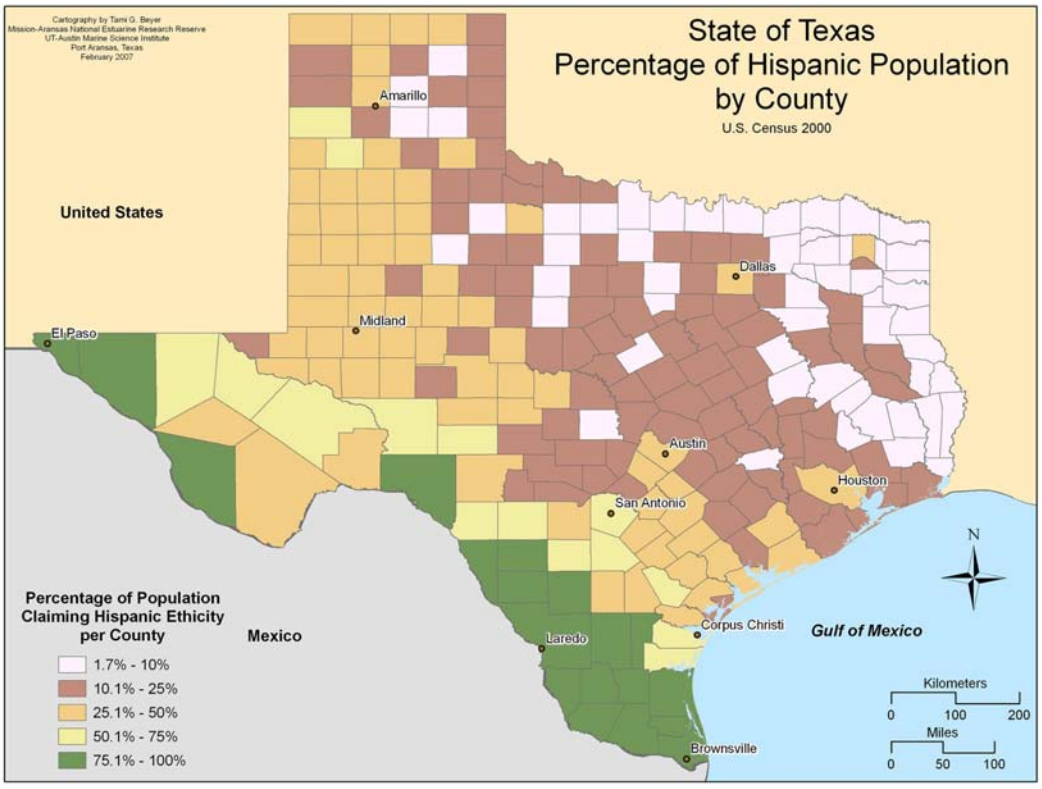
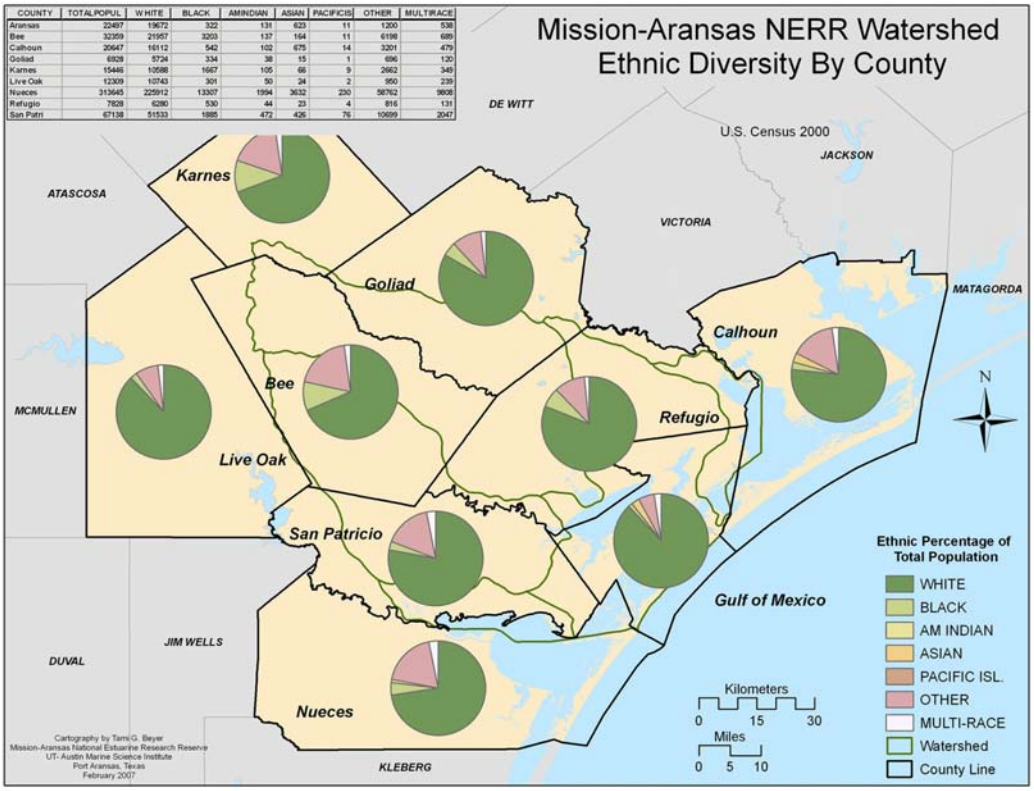


Figure 28. Ethnic distribution in counties within the Mission-Aransas NERR watershed.



COUNTY	TOTALPOPUL	WHITE	BLACK	AMINDIAN	ASIAN	PACIFICIS	OTHER	MULTIRACE
Aransas	22497	19672	322	131	623	11	1200	538
Bee	32359	21957	3203	137	164	11	6198	689
Calhoun	20647	16112	542	102	675	14	3201	479
Goliad	6928	5734	334	38	15	1	696	120
Karnes	15446	10586	1667	105	66	9	2662	349
Live Oak	12309	10743	301	50	24	2	950	239
Nueces	313645	225912	13307	1994	3632	230	58762	9808
Refugio	7828	6280	530	44	23	4	816	131
San Patri	67138	51533	1885	472	426	76	10699	2047

Figure 29. Number of individuals below the poverty level for counties within the Mission-Aransas NERR watershed.

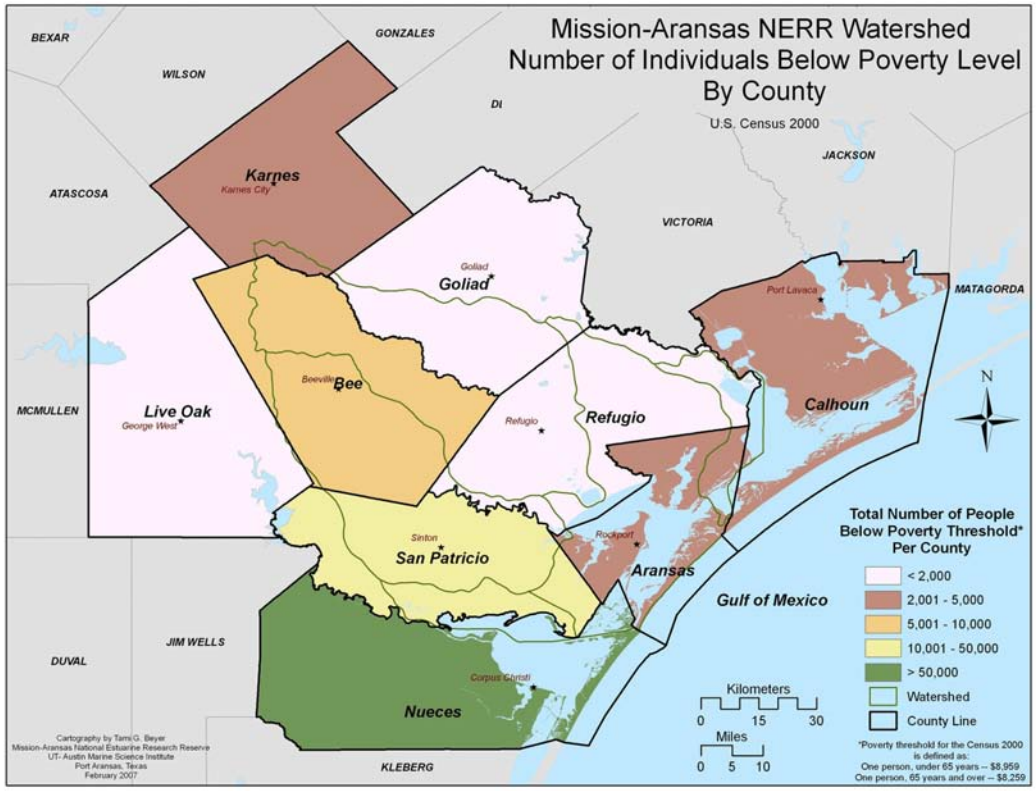
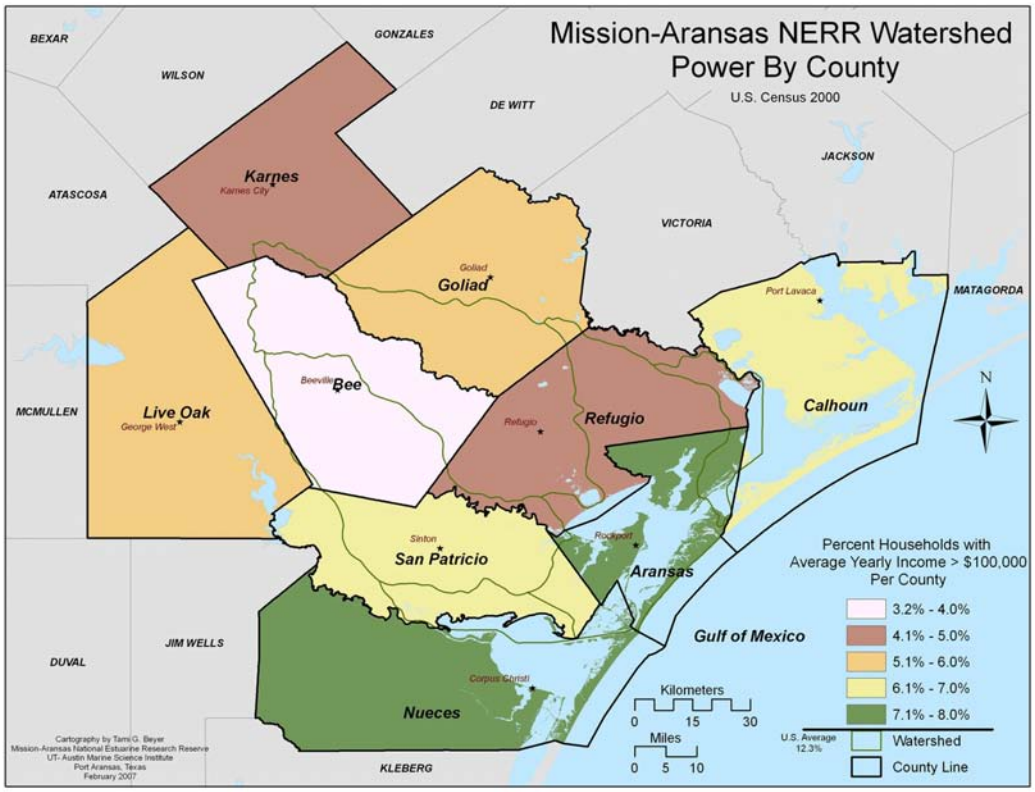


Figure 30. Power estimate (Average yearly income >$100,000) for counties within the Mission-Aransas NERR watershed.



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8.0 GIS DATA DICTIONARY

All layers utilized in the Human Dimension GIS dataset are compiled in a File Geodatabase that is compatible with ESRI's ArcINFO 9.2 software. The layer names used in Mission-Aransas NERR maps are descriptive terms used by the Mission-Aransas NERR Human Dimension Project only and may not reflect original file information. This Data Dictionary outlines each layer's original file format and descriptive information. All original files were converted to NAD 83 geographic coordinate system when applicable at the County, Census Tract, Census Block Group or Census Block geographic scales. Additionally, there is a definition section for the data terminology used for all demographic maps. At the end of this dictionary is a brief overview of the conversion process used to import and relate the relevant Human Dimension variables.

Several data sources were used to develop the maps presented in the Mission-Aransas NERR Community Characterization report. Publicly available datasets were reviewed, compiled, and processed to the display the characteristics relevant to the MANERR watershed and the surrounding areas. This data dictionary provides comprehensive information regarding the original sources, names, and file locations for all data layers found in the Human Dimension geodatabase.

8.1 Geodatabase Organization

The Human Dimension geodatabase is a file geodatabase that was created in ArcGIS 9.2 software. All files located within the database have been projected to the following Geographic Coordinate System for consistency:

GCS_North_American_1983
Angular Unit: Degree (0.0174532925199433299)
Prime Meridian: Greenwich (0.000000000000000000)
Datum: D_North_American_1983
  Spheroid: GRS_1980
   Semimajor Axis: 6378138.000000000000000000
   Semiminor Axis: 6356752.314140356100000000
   Inverse Flattening: 298.257222101000020000

For organizational purposes, many original datasets were re-named for convenience and quick retrieval of information within the geodatabase. A summary table of all data layers found within the geodatabase is displayed in Table 4.

Table 4. Data definition summary table.

Layer Name	GDB File Type	Data Type	Description/Value	Original File Name
County_Outline	Feature class	polygon	This file is a merged shapefile of the 9 county census block geography	
CensusBlock MANERR	Feature class	polygon	This a shapefile that displays Census Block boundaries for the 9 MANERR watershed counties	CENSUS BLOCK XXX.shp
CensusBG_MANERR	Feature class	polygon	This a shapefile that displays Census BlockGroup boundaries for the 9 MANERR watershed counties	censusbg00
CensusTracts MANERR	Feature class	polygon	This a shapefile that displays Census Tract boundaries for the 9 MANERR watershed counties	
Cities Strat	Feature class	Point	This is a shapefile that displays the major cities within the 9 MANERR watershed counties.	StratMapv2 city pnt.shp
Counties_allTX	Feature class	polygon	This is a shapefile that displays the counties within the State of Texas.	
hydroglop	Feature class	polygon	This is a shapefile that displays the shoreline of the Gulf of Mexico from LA to the Mexican border.	hydroglop
LULC gom clip	Feature class	polygon	This is a shapefile that is a clip of the LULC within the MANERR.	gom eda cda land use
LULC US	Feature class	polygon	This is a shapefile that is the LULC for the entire US. It is a merged file for both coastal cover and upland.	gom_eda_cda_land_use and gom fda fcda land use
MA_Streams	Feature class	line	This is a shapefile that is a clip of the streams within the MANERR watershed.	B18_19_20_Streams,shp
MANERR boundary	Feature class	polygon	This is a shapefile of the MANERR boundaries.	
NERR area	Feature class	polygon	This is a shapefile clip and calculation of the MANERR boundaries with county area included.	
NERR Cities	Feature class	Point	This is a shapefile clip of the cities within the MANERR watershed.	
NERR Counties	Feature class	polygon	This is a shapefile clip that displays the counties within the MANERR watershed.	
StreamsTxDOT	Feature class	line	This is a shapefile of all the streams within the State of Texas.	hydrotxdota
Sub-basins	Feature class	polygon	Represents HUCs of MANERR and surrounding area River Basins. Original creation by USGS.	
Texas	Feature class	polygon	This is a shapefile for the Texas boundary geography.	
TexasCities	Feature class	Point	This is a shapefile for key Texas cities.	cities.shp
TexasCounties	Feature class	polygon	This is a shapefile for the Texas county boundary geography.	counties.shp
TexasPlaces	Feature class	Point	This is a shapefile for Texas places - includes cities, towns, and villages.	places.shp
Transportation all	Feature class	line	Texas roads for Aransas, Goliad, and Refugio (in progress for all counties)	xXXX v2.dbf
TxDOTRd North	Feature class	line	Texas main roads for South-Central Texas	txdotrds2.shp
TxDOTRd_South	Feature class	line	Texas main roads for South Texas	txdotrds3.shp
tx_hucdd	Feature class		This is a shapefile of all the hydrologic basins within the State of Texas.	tx_hucdd
Txshoreline	Feature class	polygon	This is a shapefile of all the major water bodies, including the shoreline.	hydro2m
US MEX	Feature class	polygon	This is a shapefile of North America	Country Boundaries 2.shp
WatershedOutline	Feature class	polygon	Represents HUCs of Texas River Basins. Original creation by USGS.	
WesternGOM	Feature class	polygon		hydro2m
Censusbg00 TX	Feature dataset	polygon	This a shapefile that displays Census Block Group boundaries for the State of Texas.	Censusbg00
Census_blk	Table	dBASE	This file is a table with all variable information for the Human Dimension by Census Block for the 9 county region	tgr48000sf1blk.dbf
Census cty1	Table	dBASE	This file is a table with all variable information for the Human Dimension by Census Block for the all Texas counties.	tgr48000sf1cty.dbf
Census_cty2	Table	dBASE	This file is a table is similar to census_cty1, but it was retrieved directly from the US census with no header information to distinguis the datasets.	dc_dec_2000_sf1_u_data1.txt
CensusBlock SF1	Table	dBASE	This is a table that has Summary File 1 information from the U.S. Census for Census Blocks in the 9 MANERR watershed counties.	
County_Info	Table	dBASE	This file is a table with all original and calculated variable information for the Human Dimension by County for the 9 MANERR watershed counties.	
Data all	Table	dBASE	This file is a table with all variable information for the Human Dimension by County for the all Texas counties.	
USDAcensus	Table	dBASE	This file is a table of farm, livestock, and crop economics by the 9 MANERR counties.	
USDAcensus crop	Table	dBASE	This file is a table of USDA economics for all Texas counties.	

8.2 Data Acquisition

For purposes of this Characterization report, census data variables were collected through a series of queries from the U.S. Census Bureau Download Center at http://factfinder.census.gov/. Data collected from this site was retrieved in tabular format and later converted to a usable GIS format (comma-delimited text file). Detailed information regarding individual variables obtained from this website can be reviewed further in a series of Summary File documents briefly described here.

Summary File 1 SF1

Summary File 1 (SF 1) contains the 100-percent data, which is the information compiled from the questions asked of all people and about every housing unit. Population items include sex, age, race, Hispanic or Latino, household relationship, and group quarters. Housing items include occupancy status, vacancy status, and tenure (owner occupied or renter occupied). SF 1 for states also has inventory (complete) summaries for the following geographic areas:
Place
Census tract
Block group
Congressional district (106th Congress)
Consolidated city
Metropolitan area
ZIP Code® tabulation area (ZCTA™)

Summary File 2 (SF 2)

This file presents data similar to the information included in Summary File 1, but the tables in this file are iterated for a selected list of race and Hispanic or Latino categories and for American Indian and Alaska Native tribes. These data are shown down to the census tract level for up to 250 race and ethnic categories that meet a specified minimum population size threshold of 100 in a geographic area.

Summary File 3 (SF 3)

This file is the first release of the information collected on a sample basis. It includes data on income, educational attainment, poverty status, home value, and population totals for foreign born and ancestry groups. Data are provided down to the block group level for several tabulations but only down to the census tract for others. SF 3 also includes data by ZCTAs and Congressional Districts (106th Congress).

Once the raw Census data was displayed in a GIS table, additional field calculations were performed to acquire specific data for the maps. For example, Age Distribution is calculated as the ratio of the number of children (<18) to the number of people over 65. The Census data acquires these numbers, but does not perform the ratio equation. In addition to the 9 counties in the Mission-Aransas NERR watershed, all counties needed to be calculated. GIS provides a more efficient means to perform that task.

8.3 Definitions

Many maps created in this document require more clarification in terminology. Below is a brief compilation of terms used in the Census data and maps display.

Blocks - A block is the smallest geographic unit for which the Census Bureau tabulates data. Approximately 8.5 million blocks are identified in Census 2000.

Block groups (BGs) - Block groups are a collection of census blocks within a census tract, sharing the same first digit of their four-digit identifying numbers.

Census tracts - Small statistical subdivisions (averaging about 4,000 persons) of counties generally have stable boundaries and, when first established, were designed to have relatively homogeneous demographic characteristics.

Educational attainment - The highest diploma or degree, or level of work towards a diploma or degree, an individual has completed.

Goods-producing industries (Standard Industrial Classification) - Includes manufacturing, mining, and construction.

Goods-producing industries (North American Industry Classification System) - Includes manufacturing, construction, and natural resources and mining.

Hispanic or Latino ethnicity - Refers to persons who identified themselves in the enumeration process as being Spanish, Hispanic, or Latino. Persons of Hispanic or Latino ethnicity may be of any race.

Hydrologic basin (see also watershed) - A geographical area drained by a particular surface water and/or groundwater system. The basin boundaries are demarcated so that there is generally no flow from one basin into another.

Hydrologic Sub-basin - A discrete hydrologic sub-unit of a basin. Discharge can take place from one sub-basin to another within the same basin via a surface channel or a groundwater flow path.

Hydrologic Unit Code (HUC) - A discrete hydrologic sub-unit of a basin. Discharge can take place from one sub-basin to another within the same basin via a surface channel or a groundwater flow path.

Industry - A group of establishments that produce similar products or provide similar services. For example, all establishments that manufacture automobiles are in the same industry. A given industry, or even a particular establishment in that industry, might have employees in dozens of occupations. The North American Industry Classification System (NAICS) groups similar establishments into industries. NAICS is replacing the former Standard Industrial Classification (SIC) system.

MANERR - Mission-Aransas National Estuarine Research Reserve

Median income - Median income is the amount which divides the income distribution into two equal groups, half having incomes above the median, half having incomes below the median. The medians for households, families, and unrelated individuals are based on all households, families, and unrelated individuals, respectively. The medians for people are based on people 15 years old and over with income.

Poverty rate - The percentage of individuals who are below poverty level.

Poverty threshold - Dollar amounts the Census Bureau uses to determine a family's or person's poverty status.

Race (Current Population Survey) - The CPS provides data by race, with the race given by the household respondent. Since 2003, respondents are allowed to choose more than one race; previously, multiracial persons were required to select a single primary race. Persons who select more than one race are

classified separately in the category "two or more races." Persons who select one race only are classified in one of the following five categories: 1) white, 2) black or African American, 3) Asian, 4) Native Hawaiian and other Pacific Islander, and 5) American Indian or Alaska Native. Only data for whites, blacks, and Asians are currently published because the number of survey respondents for the other racial categories is not large enough to produce statistically reliable estimates.

TIGER/Line® files - These files contain geographic boundaries and codes, streets, address ranges, and coordinates for use with geographic information systems for mapping and other applications.

Watershed - A drainage basin or catchment; the region of land that drains into a particular body of water.