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16. Abstract: As Texas population continues to grow and as the complexities of that growth change the fundamental demographic structure of the state, transportation planners will need a better understanding of demographic data. This report provides an overview of demographic data available for transportation planning, as well as a summary of current uses of demographic data within TxDOT and related transportation agencies in Texas. Findings from the report will help guide the development of a one-stop demographic data tool.

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Demographic Data Use and Demographic Data Needs at the Texas Department of Transportation and Related Agencies

by

Michael Cline, Steve Murdock, John McCray, Jolanda Prozzi, and Robert Harrison

Research Report 0-5392-1

IMPACTS OF FUTURE DEMOGRAPHIC TRENDS ON
TRANSPORTATION PLANNING IN TEXAS

Conducted for the Texas Department of Transportation

In cooperation with the
U.S. Department of Transportation
Federal Highway Administration

By the

INSTITUTE FOR DEMOGRAPHIC AND SOCIOECONOMIC RESEARCH
THE UNIVERSITY OF TEXAS AT SAN ANTONIO
AND
THE CENTER FOR TRANSPORTATION RESEARCH
THE UNIVERSITY OF TEXAS AT AUSTIN

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Chapter 1 : Introduction and Study Purpose

The Texas Department of Transportation (TxDOT) utilizes population data extensively, primarily in referencing data on population size, employment, and income in various analyses; however, data on population characteristics could be usefully expanded to more effectively guide district and state-level policy development. This project is intended to improve TxDOT planning by examining the broad impacts of demographics on Texas' transportation system, reviewing the development of demographic data sources for transportation analysis, developing county and TxDOT district-level demographic data sets in easy to use forms, examining future demographic data and data analysis needs, and assessing the broad implications of changing demographics for the policy context likely to impact TxDOT in the coming years.

This report provides a summary of the findings from the first two of six research tasks for this research project: the identification of existing demographic databases for Texas and the current uses of such data in transportation planning in Texas. These findings are a result of a review of demographic data sources useful for transportation planning; interviews with a cross section of TxDOT and Metropolitan Planning Organization (MPO) staff; and a survey of appropriate district, divisional, and state-level TxDOT and related transportation agency staff.

In order to complete these research tasks, the research team identified demographic data resources used in transportation planning. These resources were examined and cataloged with information showing the demographic database's reference date, frequency of production, level of geographical detail, the form of media (e.g., CD, DVD, cartridge) in which the data are available, and how it is used for transportation planning (see the appendix). The research team then interviewed a small sample of TxDOT district, divisional, and state-level staff, as well as staff from selected MPOs, to ascertain if each database is used, in which processes it is used, and what the limitations are in its use. Staff within the Dallas, Houston, Austin, San Antonio, El Paso, Lubbock, Pharr, and Tyler TxDOT districts were selected so that a cross section of transportation personnel from all areas of the state were represented. At these sites, professionals were asked to provide candid assessments of how data are accessed and how such data could be made more useful for them. In addition to the general information uncovered by these interviews, the discussions informed the development of a statewide survey of district personnel.

The research team then surveyed all appropriate district, division, state-level, and MPO personnel who were identified as demographic data users. A survey questionnaire was designed and pre-tested with a small group of personnel at each level, revised, and sent to all appropriate personnel. The questionnaire asked the respondents to identify the demographic databases that they use and the specific forms of their use. They were asked to identify the specific planning or other function in which they use the data. They were then requested to describe the limitations they perceive in the data relative to their uses of the data, the scope and form of data they would like to receive, and their priority for the development of new databases. The questionnaire also included a small number of items about the respondent to assist in the evaluation of their response. This included such information as the function in which the respondent has used such data, how long they have used such data, their training in the use of demographic data, and other relevant information. The outcomes of the analysis of the survey results are being used to design the preliminary data product to be developed for district and other uses.

1.1 What Is Demographic Data?

When talking about the development of and needs for transportation infrastructure, total population and total population change (often growth) are typically emphasized. However, in order to fully prepare for the future transportation needs of Texans, it is important to understand how the population is changing, where it will be distributed geographically, and how changes in the population's composition will influence those needs. Thus, in this research, demographic data are any data that provide an understanding of population size, distribution, and composition (Murdock and Ellis 1991). In this research those data sources and demographic data variables that have specific application to transportation (such as vehicles per household and commuting patterns) or those that are typically used for understanding relationships between demographic trends and transportation (such as total population, race/ethnicity, and median household income) are highlighted.

1.2 Why Is Demography Important to TxDOT?

Texas' population is growing and changing rapidly and such changes will have substantial impacts on the Texas Department of Transportation (TxDOT). Texas' rate of population growth has exceeded that for the nation in every decade since Texas became a state and its recent population increases have been particularly large. In the 1990s, Texas was the second fastest growing state in numerical terms (behind California) and the eighth fastest growing in percentage terms (U.S. Census 1990 and 2000). In the post-2000 period from April 1, 2000, (the 2000 Census date) to July 1, 2005, it was again the second fastest growing state in numerical terms and was the seventh fastest growing in percentage terms. The size of Texas' population has more than doubled in the past 25 years,

increasing from roughly 11.2 million in 1970 to nearly 22.9 million in 2005. In the 1990s its percentage increase of 22.8 resulted in a population increase of nearly 3.9 million people. This 3.9 million increase was roughly equivalent to having added the number of people who in 1990 lived in the cities of Houston, Dallas, San Antonio, and Corpus Christi combined. This 3.9 million was greater than the total population of 24 of the 50 states and meant that for every nine persons added to the population of the United States in the 1990s more than one was added in Texas. In the post-2000 period population growth has continued with an increase in Texas' population of more than 2.0 million from April 1, 2000, to July 1, 2005 (U.S. Census 2006). This level of growth, if continued, will mean that Texas' population increase from 2000 to 2010 will likely be between 3.6 and 4.0 million people.

However, neither the amount nor the rate of population change has been uniform across Texas. Some counties have grown significantly while others have lost population. Growth was particularly pronounced along the Texas-Mexico border and in the urban complexes of Houston, Dallas-Fort Worth, and the San Antonio to Austin Corridor. In the Dallas-Fort Worth area the population increased by nearly 1.2 million in the 1990s (greater population growth than occurred in 45 of the 50 states). At the same time, population growth was roughly 957,000 in the Houston-Galveston area (greater than 40 of the 50 states) while the population in the Austin-San Antonio corridor grew by an additional 748,000 people (31 percent). Also in the 1990s, 68 of Texas' 254 counties, all of which were non-metropolitan (i.e., rural), lost population. In the post-2000 period from 2000 to 2004 growth has been even more concentrated in the state's large suburban and central city complexes with the number of counties losing population increasing to 92, nearly all of these being non-metropolitan counties (Texas State Data Center 2005).

These patterns of population change are also seen in population changes at the TxDOT District level. Six districts, located in the aforementioned areas, grew at faster rates than the state as a whole (22.8%) during the 1990s. The TxDOT District with the largest growth in percentage terms during the 1990s was the Austin District (46.7%), followed by the Pharr District (at 38.5%). Other TxDOT Districts that had rates of growth larger than the State of Texas, included Dallas (31.7%), Laredo (30.6%), Fort Worth (25.0%), and Houston (25.0%). These same districts continue to show rapid growth in the post-2000 period, while others have shown limited growth or actual loss (Table 1-1).

Table 1-1: 2004 Population Estimates by TxDOT District

TxDOT District	2000 Census Count	July 1, 2004 Pop. Est.	Numerical Change	Percent Change
Abilene	252,753	252,505	-248	-0.10
Amarillo	350,605	358,999	8,394	2.39
Atlanta	303,557	310,036	6,479	2.13
Austin	1,349,581	1,516,544	166,963	12.37
Beaumont	552,822	562,829	10,007	1.81
Brownwood	126,210	129,088	2,878	2.28
Bryan	370,948	388,149	17,201	4.64
Childress	42,625	41,265	-1,360	-3.19
Corpus Christi	549,025	557,167	8,142	1.48
Dallas	3,414,427	3,767,815	353,388	10.35
El Paso	704,318	740,795	36,477	5.18
Ft. Worth	1,827,017	2,013,285	186,268	10.20
Houston	4,573,386	5,016,243	442,857	9.68
Laredo	329,483	363,787	34,304	10.41
Lubbock	429,458	432,202	2,744	0.64
Lufkin	284,315	294,866	10,551	3.71
Odessa	311,458	315,523	4,065	1.31
Paris	337,130	353,855	16,725	4.96
Pharr	1,004,222	1,138,079	133,857	13.33
San Angelo	154,379	153,249	-1,130	-0.73
San Antonio	1,798,385	1,940,075	141,690	7.88
Tyler	593,394	621,840	28,446	4.79
Waco	624,850	647,278	22,428	3.59
Wichita Falls	245,566	244,468	-1,098	-0.45
Yoakum	321,906	330,080	8,174	2.54
State of Texas	***20,851,820***	***22,490,022***	***1,638,202***	***7.90***

Source: Estimates of the Total Populations of Counties and Places in Texas for July 1, 2004, and January 1, 2005, Texas State Data Center, Oct. 2005.

The characteristics of Texas' population are also changing rapidly, particularly those related to its racial/ethnic and age composition. Although Texas' population in 1980 was roughly two-thirds Anglo, by 2000 it was 53 percent Anglo and the Census Bureau's estimates program indicated that by 2004 Texas was a state with no majority racial/ethnic group. Texas' population is now approximately 49 percent Anglo, 11 percent African American, 34 percent Hispanic, and 6 percent are members of other racial/ethnic groups (primarily Asian). Similarly, although a relatively young state overall (with the third youngest median age at 32.3), Texas, like the rest of the nation, has more than 25 percent of its population in the "baby-boom" ages (i.e., 41-59 years of age in 2005) and, as a result, will show increasing numbers of elderly persons in the coming decades. In fact, these two characteristics are interrelated: non-Anglo status and youth status and Anglo and older age status. Thus, as of 2000, 57 percent of the population under 18 years of age was non-Anglo while 57 percent of the population 18

years of age or older was Anglo.

Changes in the characteristics of the state's population alter social and cultural patterns but may have particularly pronounced effects on all services and planning processes including transportation and transportation planning because of differentials in economic resources. Owing to a variety of historical, discriminatory, and other factors, African-American and Hispanic populations in Texas had median household income levels in 1999 that were less than two-thirds of those for Anglos, whereas poverty levels for African-Americans and Hispanics were nearly three times as high as those for Anglos. Educational gaps also remain substantial with the percent of adults (25 years of age or older) with a college degree in 2000 being roughly 30 percent for Anglos, 15 percent for African-Americans, and 8.9 percent for Hispanics. Similarly, income levels vary with age such that median household income levels tend to be higher for middle-aged than for younger or older households.

Projections by the Texas State Data Center (2004) and Murdock et al. (2003) suggest that Texas' population will (a) continue to grow rapidly with continued concentration in urban areas, (b) will become increasingly diverse and older, and (c) that such changes could have dramatic impacts on the state's socioeconomic resources. According to the Texas State Data Center's two projection scenarios that most closely reflect recent patterns of population change (those assuming the 2000-2002 and 1990-2000 rates of net migration, respectively), Texas' population would be between 45 and 52 million people in 2040 (40- year growth rates of 118 to 148 percent) and would be between 24 and 26 percent Anglo, about 8 percent African-American, between 58 and 59 percent Hispanic, and between 8 and 9 percent other racial/ethnic groups, primarily Asian. Texas' non-metropolitan population would decrease to roughly 9 percent of the total population (compared to 15 percent in 2000), while the Dallas-Fort Worth region could exceed 17 million and the Houston-Galveston region could exceed 13 million. Texas' elderly population would grow from 9.9 percent of the population in 2000 to between 16 and 20 percent by 2030 – a change that could require a greater emphasis on public transportation within the Texas transportation system. Even more startling, Murdock et al. (2003) suggest that in the absence of change in the socioeconomic differentials among racial/ethnic and age groups, these population changes could also substantially alter the socioeconomic characteristics of Texas' population such that the work force could be less well educated in 2040 than in 2000, its median household income could be $6,500 poorer in 2000 constant dollars than in 2000, and the percentage of family households in poverty could increase by roughly four percent compared to that in 2000.

Clearly, such changes portend substantial impacts on TxDOT. The rapid growth in the state has strained the existing transportation network and resulted in the need for extensive expansions to

the system in virtually every major city in Texas. In slower growing rural areas the need for roadway maintenance is high at a time when the sources of revenue related to population are either declining or relatively stagnant. Funding for either expansion or maintenance projects has often been insufficient and a variety of new forms of funding (e.g., toll roads) are being planned but seldom has the long-term funding required for such projects been evaluated relative to the future socioeconomic characteristics of the population. Similarly, system preferences have often not been sufficiently evaluated relative to key population segments (e.g., by race/ethnicity, age, economic status) so that it is not clear whether what is preferred and supported now will be in the future. It is apparent that an expansion in the use of demographic data will be beneficial and essential to TxDOT planning in the coming years.

In the next chapter, a brief review of similar research undertaken for other state transportation agencies is provided. Then in the following chapter, the findings from the initial interviews are outlined, followed by a summary of the results of the survey of demographic data users at TxDOT and related agencies. In the appendix, a listing of selected demographic data resources used within transportation planning is provided.

Chapter 2 : Review of Similar Transportation Agency Projects

The following pages provide six examples of how other state departments of transportation evaluated the impacts of demographic trends on statewide transportation demand or developed tools and resources to assist local and regional transportation planners and project engineers with demographic analyses. The first three listings are examples of overall analyses of demographic trends and impacts on transportation; the latter three listings are of projects developed primarily as data analysis tools to be used by state, regional, and local planners. The California and Florida examples include data analysis tools in addition to the overall assessment of demographic trends.

2.1 California Department of Transportation

California Travel Trends and Demographics Study

http://www.uctc.net/trends/
http://www.uctc.net/trends/papers/final/uctcdemorev501.pdf
http://www.dot.ca.gov/hq/tpp/TDS_final_report_121902.pdf

This website provides a link to special reports on demographic trends, as well as a link to a series of maps of demographic variables at the tract level for 1990 and 2000 for regions in California and for the entire state. In addition, there are links to environmental documentation guidebooks. A screenshot of one of the maps produced by this project can be seen in Figure 2-1.

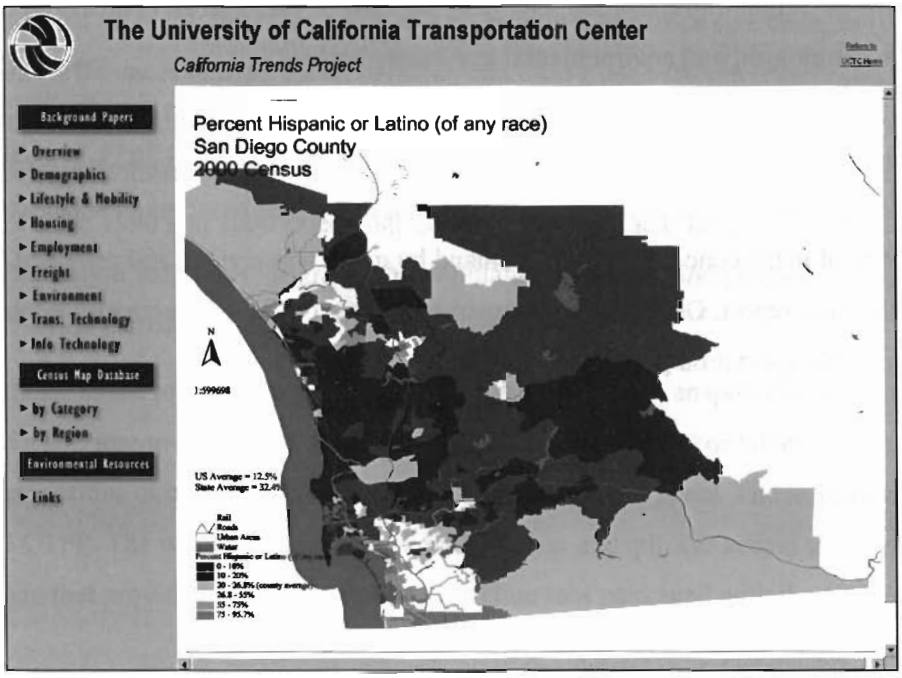

Figure 2-1: Screenshot of California Demographic Map

This project was created to analyze the impacts of demographic trends to 2025 on transportation in California as part of the development of a long-term, multi-modal transportation plan for the California Department of Transportation (Caltrans). The study was developed by the University of California Transportation Center at UC Berkeley, the Institute of Transportation Studies at the School of Public Policy and Social Research at the University of California, Los Angeles (UCLA), and Solimar Research Group. The project was developed in three phases by the two institutes and the private firm. In the first phase, a series of working papers were written to review broad demographic, logistical, and technological trends and their possible impacts on transportation demand in California. In the second phase, demographic projections were developed for geographies down to the census tract level. In the final phase, the projections in phase two were used to estimate the impacts of socioeconomic changes on travel demand in future years. In addition to their statewide study, the researchers at UCLA created an analysis tool that could be used by transportation planners within the state to create their own scenarios and impact assessments for specific projects.

UC Berkeley provided an analysis of general demographic, environmental, and technological trends that might impact transportation in the state. These are presented in a series of working papers and as a series of static maps on the UC Transportation Center website. The authors reviewed trends in regards to total population growth; components of population change; changes in the population composition; changes in employment patterns; shifts in housing location, type, and affordability; changing patterns of freight transportation; changing patterns of personal and household travel; the impact of new technologies; and environmental and equity issues.

UCLA and Solimar Research Group projected population by census tract for 2015 to 2025. From those projections, UCLA developed travel demand trends to 2015 and 2025. They then provided an overall analysis of transportation demand trends by area based upon socioeconomic variables. A series of maps concerning travel demand by mode was created and provided in the appendices of the final report. Geographic Information System (GIS) files were also given to the Caltrans for use in transportation planning.

2.2 Florida Department of Transportation

Shaping Florida's Future: Trends and Conditions
http://www.dot.state.fl.us/planning/policy/trends
Journey-to-Work: Florida Edition
http://www.j2w.usf.edu/default.asp

The Office of Policy Planning of the Florida Department of Transportation (FDOT), the Center for Urban Transportation Research at the University of South Florida and the Bureau of Economic and Business Research at the University of Florida have developed a series of reports outlining demographic trends impacting travel behavior and transportation as they relate to the Florida 2020 Transportation Plan. FDOT houses these reports or links to these reports from their website (*http://www.dot.state.fl.us/planning/policy/trends*). These reports include, among others, "Population Growth and Characteristics," "Travel Demand and Travel Behavior Trend," and "Policy Considerations." "Population Growth and Characteristics" provides an overview of state-wide and county level changes including: total population growth, components of growth (natural increase, domestic and international migration), growth rates, population densities, distribution of population by age and race, labor force change, education, income, and housing tenure. This report provides a general overview of demographic changes with limited discussion about how those changes might impact transportation uses and demand. Transportation demand was specifically mentioned in reference to race and ethnicity (mobility and transit demand); labor force size changes (work-related travel); housing (differences in trips, travel demand, and transit use between renters and home owners); income (higher demand among higher income households); and housing unit type (travel demand according to housing densities). Data sources include the Census Transportation Planning Package (CTPP), the 1990 and 2000 Decennial Census, 2001 National Household Travel Survey, U.S. Census Population Estimates Program, and population estimates and projections from the University of Florida Bureau of Economic and Business Research.

In addition to the reports cited above, the Center for Urban Transportation Research and FDOT created a Journey-to-Work web application that provides a series of tables, charts, and maps of origins and destinations of commuters within Florida by county and place. The information is derived from the 2000 CTPP. The web-based product provides easier and quicker access to journey-to-work information than that provided by the CD-based extraction tool packaged with the CTPP data (see Figure 2-2).

Figure 2-2: Screenshot of Journey-to-Work: Florida Edition

2.3 Virginia Department of Transportation

Expected Changes in Virginia Transportation Demand by 2025

http://www.virginiadot.org/projects/resources/VTransTrendsMarch31F.pdf

This document was developed by the Virginia Transportation Research Center as part of the Virginia Department of Transportation's long-range multi-modal transportation plan. The report analyzed historical and projected changes of socioeconomic indicators; trends in travel behavior, automobile ownership, and mode choices; public policy and technological impacts to transportation; and projections of freight demand. The researchers used various data sources, including the Census Bureau, the Bureau of Transportation Research, and the Virginia Employment Commission, among many others to develop a picture of how trends will impact transportation in the future.

2.4 Missouri Department of Transportation

Socio-Economic Indicator Resource (SEIR)

http://oseda.missouri.edu/modot/

The Missouri Department of Transportation (MoDOT) worked with the University of Missouri Extension Office of Social and Economic Data Analysis (OSEDA) to develop a web tool to aid transportation planners and project administrators. The web tool provides ready access to data, maps, tables, charts, and graphics to help assess the potential impacts to environmental justice (EJ) communities.

The web tool provides data for geographies down to the block group level. Maps, graphs and tables can be created from a data query tool. The data on the Socio-Economic Indicator Resource (SEIR) site comes from Census Summary Files 1 and 3 for 1990 and 2000 and the 2000 Census Transportation Planning Package (CTPP).

A SAS database houses the social and economic indicator data and is enabled through a Geographic Information System (GIS). Pre-generated reports for MPOs, Planning Districts, Selected Corridors, and Regional Planning Commissions are available online. In addition, query driven reports can be created for user-specified geographies.

The project was awarded the American Association of State Highway and Transportation Officials (ASHTO) Trailblazer Award in 2003. OSEDA developed another application for the state education office based on lessons learned with the SEIR project. Figure 2-3 shows a screen shot of the home page of SEIR. Reports can be generated by MoDOT Planning District, MPO, Regional Planning Commission, county, or place. In addition, data from the CTPP are made available via this website.

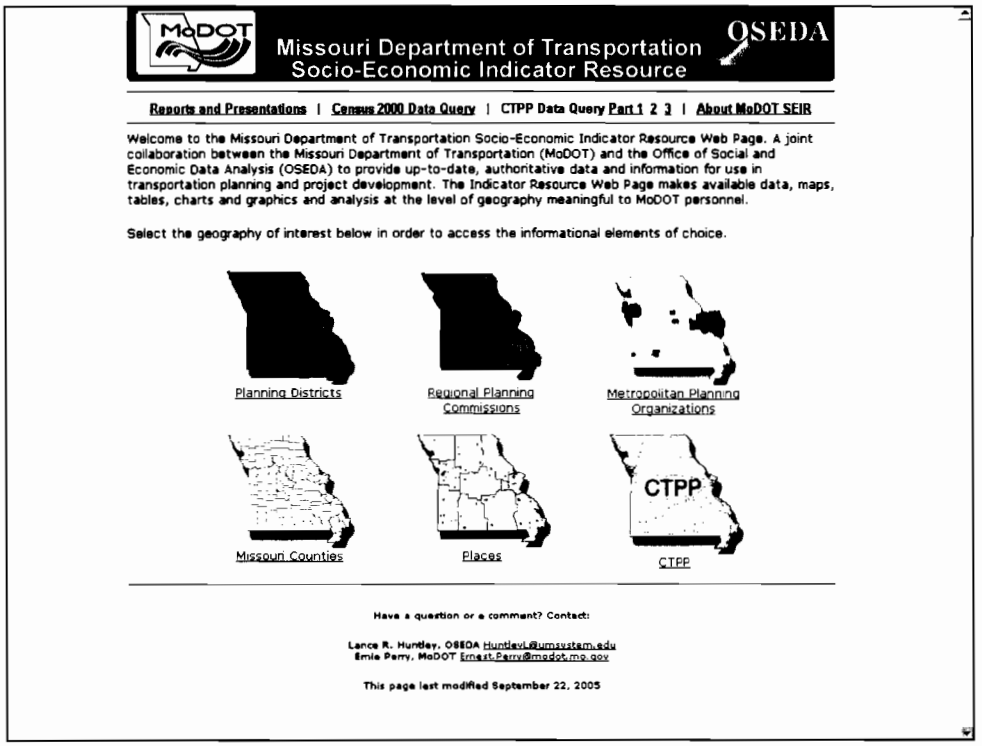

Figure 2-3: Screenshot of Missouri SEIR

2.5 Colorado Department of Transportation

Statistics and Data

http://www.dot.state.co.us/App_DTD_DataAccess/index.cfm

Although not as dynamic of an application as those of California, Florida, or Missouri, this website is an access point to statistics, maps, and GIS data files frequently used by transportation planners in Colorado. The link includes access to a series of demographic statistical tables by county. These files are provided in HTML and MS Excel formats. Data are derived from 1990 and 2000 U.S. Census, IRS Migration Data files, and the Colorado Department of Local Affairs. Example tables by county include: household totals, household size, housing unit totals, housing unit occupancy, vehicles per household, group quarters population, population by age group, median age, disability status, employment status, employment by occupation, family income, median household income, per capita income, journey to work files, migration, poverty, race and ethnicity, and total population. A limited number of these files are also provided for municipalities.

2.6 Washington Department of Transportation

Environmental Justice Analysis Tools

http://www.wsdot.wa.gov/environment/envJustice/Analysis.htm

This website is primarily a "one-stop" website developed for transportation planners and project engineers who are working on environmental impact and environmental justice issues. The website provides links to sites that provide information and data related to EJ analysis. These include links to an environmental procedures manual; data extraction tools; links to the Census and American FactFinder; links to poverty threshold guidelines; language resources; and links to state economic statistics. In addition, there are links to Federal Highway Administration (FHWA) and Transportation Research Board (TRB) developed guidebooks on public involvement; American with Disabilities Act (ADA) related resources; tribal impact resources; and links to information on cultural impacts. The data extraction tools linked from this website includes a GIS Workbench and Census Data Engine to extract and map census and environmental data for EJ analysis.

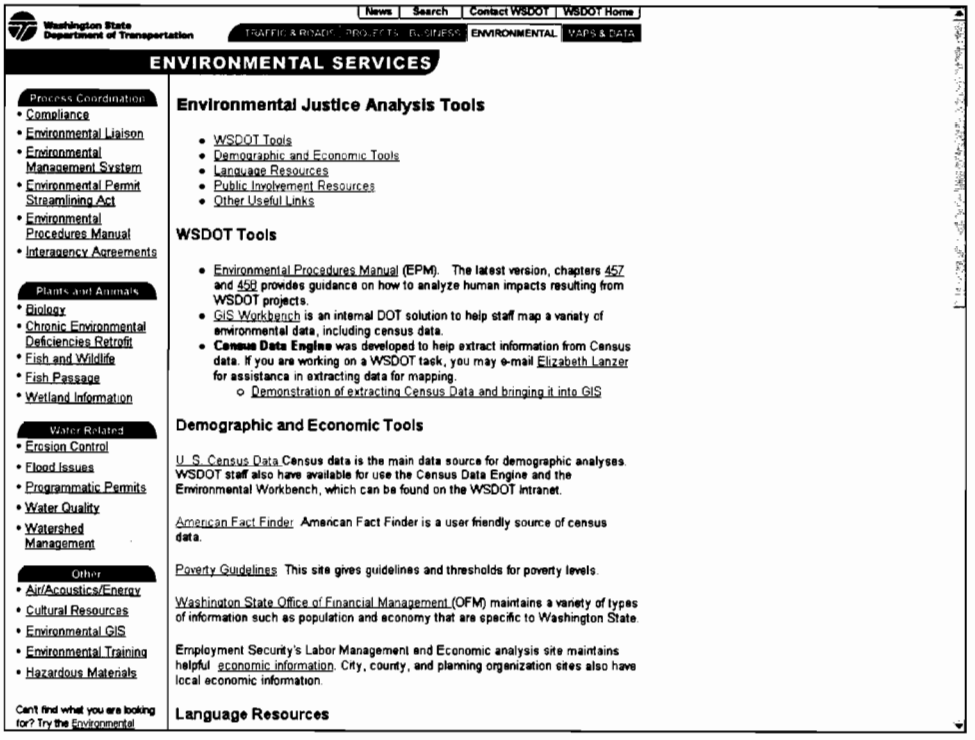

Figure 2-4: Screenshot of Washington EJ Analysis Tools

Chapter 3 : Summary of Interviews of Select Transportation Personnel

In order to understand how demographic information is utilized within the Texas Department of Transportation (TxDOT), the research team interviewed a cross section of transportation planners. With the assistance of the Project Director, the research team selected and interviewed individuals from a range of rural oriented to large urban oriented TxDOT Districts and a cross section of users within the headquarters divisions. Personnel in the following divisions were interviewed: Environmental, Transportation Planning and Programming (TP&P), Texas Turnpike Authority, and Government and Business Enterprise. In addition, personnel from the following districts were interviewed: El Paso, Pharr, Lubbock, Tyler, Dallas, Austin, Houston, and San Antonio. Since TxDOT personnel work closely with Metropolitan Planning Organizations (MPOs), MPO personnel in Dallas, Lubbock, and San Antonio were also interviewed. In one case, a current TxDOT planner provided his insight as a former planner for the El Paso MPO.

The research team asked these individuals how their offices used demographic information. They were asked to review demographic variables needed for their specific uses and to provide an overview of the sources utilized to obtain those data. In addition, the selected personnel were asked for their opinions about any limitations or problems with the availability of demographic information or the data sources used within TxDOT.

The following discussion provides an overview of the findings from these interviews. The responses have been categorized based upon the major areas discussed.

3.1 Demographic Data Uses at TxDOT

The interviewees were first asked how they and their departments utilize demographic information. Personnel indicated that the greatest use of demographic information occurs within the planning and project development areas of TxDOT districts. Project development utilizes demographic information for environmental related analyses and documentation. Demographic information may also be utilized in evaluating alternative roadway alignments. Planning, along with local MPOs, uses demographic information to develop long-range plans and travel demand models. At TxDOT Headquarters, the Environmental and TP&P Divisions are the most frequent users of demographic data for the same reasons as those highlighted for district users.

Finally, demographic information is often a part of feasibility studies or other projects where consultants develop the analyses. Interviewees indicated that, unfortunately, the source of and assumptions underlying the consultant-provided demographic information is not always clear.

The interviewees mentioned that they use demographic data within the context of the following general categories:

NEPA processes and documents such as:

- Categorical Exclusions
- Environmental Assessments
- Environmental Impact Statements
- Environmental Justice (Title VI)
- Supplemental Evaluations

Route studies:

- Alignment Issues
- Alternative Route Comparisons

Funding:

- Benefit Cost Analysis
- Funding Categories
- Grant Funding
- Unified Work Program
- Special Funding for Border Areas
- Economically Disadvantaged Counties Program
- Rural Transportation Improvement Program
- Public Transportation Grant Allocations
- Category 5 Funding (Congestion Mitigation and Air Quality Improvement)

Toll Roads:

- Toll Feasibility Analysis
- Toll Modeling
- Toll Planning and Corridor Planning (Trans Texas Corridor)
- Tolling and Bonding Issues (Consultants)

Planning:

- Corridor Analysis
- Feasibility Studies
- Long Range Planning
- Metropolitan Mobility Planning
- Metropolitan Transportation Plan
- Route Planning (Transit)
- Strategic Plan for the State
- Statewide Transportation Plan

Models:

- Air Quality Modeling
- Congestion Index Model
- Travel Demand Models

Other:

- Design Plans (Consultants)
- Policy Analysis
- Presentations
- Roadway Districts
- Traffic Impact Analysis (Consultants)
- Safe Routes to School
- RideShare
- Congestion Management System

3.2 Data Sources

The most frequently cited sources of information were the Census, the Census Transportation Planning Package (CTPP), Texas State Data Center Population Projections for Counties, Council of Governments (COG)–developed population projections, and employer data from the Texas Workforce Commission. The data sources mentioned in the interviews include the following (in alphabetical order):

- American FactFinder (Census)
- Appraisal Districts
- Bureau of Economic Analysis
- Census
- Census Transportation Planning Package (CTPP)
- COG or MPO developed population projections
- Comptroller's Office
- Consultants
- Demographic Books (in-house)
- MPO Travel Demand Model
- Modern Language Association Map of Languages Spoken at Home (Census derived)
- Public Use Microdata Sample (PUMS)
- Texas State Data Center at UTSA Population Projections for Counties
- Texas State Data Center at UTSA Population Estimates for Counties
- Texas Water Development Board Population Projections
- Locally Developed Estimates and Projections (COG/MPO/University)
- TxDOT SAM Model (Various Sources)
- TxDOT Travel Survey
- Texas Workforce Commission

3.3 Demographic Variables Used

The demographic data variables mentioned during the interviews include these (in alphabetical order):

- Age
- Auto ownership
- Commuting
- Economic data
- Educational attainment
- Employer data (from TWC)
- Employment
- Family income
- Gender
- Gross state product
- Households
- Households or employers
- Household income
- Household size
- Income
- Income brackets
- Language spoken at home
- Median income
- Mode split at the county level
- Number of children
- Number of disabled
- Number of elders
- Personal income
- Personal transportation costs
- Population
- Population density
- Property values
- Race/ethnicity
- Registered vehicles
- Vehicles per household

- Special population groups such as Indian tribes
- Time to work
- County level population and socioeconomic data
- Households below national income level
- Population in economically disadvantaged counties
- Unemployment

3.4 Models that Require Demographic Data

The models used by local planners for transportation modeling that require demographic data include the following, according to our interviews:

- Economic Impact (employment)
- Metropolis
- QUANTM
- SAM
- TBEST
- REMI (for economic modeling of corridor studies)
- TLOG
- DRAM/EMPAL
- TransCAD
- UrbanSim

3.5 Typical Users

The interviewees were asked to identify other individuals or job functions that might use demographic data. The job titles and functions mentioned include the following:

- Advanced Project Managers
- Environmental Coordinators
- Environmental Specialists
- Environmental Planners
- Environmental Staff
- Engineers
- Financial Program Managers
- Grant Managers
- District Engineers (for inclusion in presentations)
- Public Information Staff (in each district)
- MPO Staff
- Public Transportation
- Statewide Planners
- Traffic Forecasters
- Transportation Modelers
- Transportation Planners
- Urban Modelers

3.6 Typical Departments

In addition, the interviewees were asked what departments within TxDOT they felt would have a need for demographic information. The departments and divisions mentioned include the following:

- Aviation (for NEPA)
- Environmental Affairs
- Government Business Enterprise
- MPOs
- Planning (District)
- Project Development (District)
- Public Transportation
- Transportation Programming and Planning
- Texas Turnpike Authority
- Travel
- Vehicle Title and Registration

3.7 Strengths and Weaknesses of Current Demographic Information

The interviewees were asked to describe any strengths or weaknesses in the demographic information made available to them. A summary of comments obtained during the course of the interviews follows:

- Access to demographic information is good. The biggest issue is adjusting for geographic boundary mismatch between data sets.
- COG data are not detailed enough for EJ analysis, so we go to the census data at the tract level (rather than the TAZ).
- Data are not always in the right format. We are concerned about using the American Community Survey because of questions about its continued funding.
- Data are too general and not forecasted for particular groups (e.g., age, sex, race/ethnicity).
- There are data sharing issues between agencies (for travel demand modeling and population projection development). Data can be hard to get. Also, the COG or MPO cleans the data and tries to give it back to the original data source but the data are not accepted.
- We need to know where to find the data. The CTPP is not very easy to use. There are lots of data available on CTPP but we need to know how to use it.
- We don't always know where to get the information we need.
- We just need to know where to find the information.
- At MPO level, there is considerable turnover and not much in the way of training on methods for collecting data and developing and evaluating estimates and projections.
- Data collection costs.
- TWC data are not accurate and must be checked because data for a location may include corporate employment and not site-specific numbers.
- TxDOT can only use certified data. Unfortunately, in many cases certified data are old or outdated. We would like to have access to more recent or frequently updated information.
- In an effort to compile the data into a format that is understandable to most people, we would like to have access to a graphical presentation of demographic data that can be copied into reports and presentations.

- Demographic information is only required in formulas for the allocation of one or two of the twelve funding categories. Most of the data needed are highway and vehicular data.
- Planners are interested in seeing how age structure and gender patterns might impact travel demand. Also, how racial/ethnic changes impact transportation variables on demand. For instance, persons per household impact the travel demand models. Trends have been flattening out and future demand will increase due to changes in persons per household.
- The U.S. Census information is not disaggregated enough for project level analysis. It is also not updated frequently enough.
- The U.S. Census data are not easy to work with. I need something that is easier to work with and an easier way to compile maps.

3.8 Data Tool

Data Access Preference

Those interviewed indicated an overwhelming preference for online access. In some cases, demographic data are used infrequently, so the online access was preferred so that users could go to one place and not have to remember where to go to get the information. A CD or DVD was mentioned as the second choice but there was some concern that not all work stations would have a DVD drive available and that the data would only be useful for a short time, whereas a website could be updated regularly. Some felt that although enough demographic information was available for their purposes, having a "one-stop-shop" would be nice. Others also expressed a need for training on where to go to find information, how to access that information and how to interpret and use that information.

There are a variety of demographic data users throughout TxDOT and the MPOs, with needs ranging from specific socioeconomic variables at the census tract or traffic analysis zone (TAZ) level[1], to more general population numbers at the county and district levels. The smaller scale needs may require specialized data from local sources that vary from MPO to MPO, making it difficult to create a "one-stop-shop" for data at those detailed geographic levels.

[1] Sometimes referred to as the traffic serial zone. A traffic analysis zone, or TAZ, is a special statistical geographic unit delineated by local MPOs in order to tabulate special traffic related census data, particularly items related to commuting. TAZs consist of one or more census block groups or census tracts. Data for TAZs are included in the Census Transportation Planning Package, a special Census tabulation prepared in conjunction with the Federal Highway Administration (U.S. Census 2000b).

Examples of websites

Some of the respondents provided examples of websites that they felt were good examples of websites providing data. These sites include, in alphabetical order:

- Alamo Community Information System - *http://www.aacis.info/*
- American FactFinder - *http://factfinder.census.gov*
- Bureau of Business Research - *http://www.mccombs.utexas.edu/research/bbr/*
- Bureau of Economic Analysis – *http://www.bea.gov*
- Bureau of Labor Statistics – *http://www.bls.gov*
- Bureau of Transportation Statistics – *http://www.bts.gov*
- Claritas – *http://www.claritas.com*
- EPA EnviroMapper - *http://www.epa.gov/enviro/html/em/index.html*
- Federal Highway Center - *http://www.tfhrc.gov/*
- Glenmary Research Center – *http://www.glenmary.org*
- Kidsdata.org – *http://www.kidsdata.org*
- Perryman Group - *http://www.perrymangroup.com/*
- Texas Health Department - *http://www.dshs.state.tx.us/*
- Texas State Data Center – *http://txsdc.utsa.edu*
- Texas Workforce Commission - *http://www.twc.state.tx.us/*
- Transportation Research Board – *http://www.trb.org*
- U.S. Census – *http://www.census.gov*
- Volpe Research Center - *http://www.volpe.dot.gov/.*

Chapter 4 : Survey Results

Following the interviews with selected personnel within TxDOT and selected MPOs, a comprehensive web-based survey of demographic data users was administered in April and May of 2006. The purpose of this survey was to further understand (a) how demographic data are used at TxDOT and related agencies, (b) the extent and use of selected data resources, and (c) the needs and uses of district and region-wide demographic data. Survey participants included individuals from TxDOT, MPOs, Regional Mobility Authorities (RMAs), and Toll Authorities, all of whom were identified by name by the interviewees or identified according to their job title. Questionnaires focused on how demographic data are used, sources of data, and possible limitations or gaps in accessing demographic information. In addition, respondents were asked about their needs regarding access to demographic data and how they might like to access that information. The survey results will be used to (a) report on demographic data uses within TxDOT; (b) guide the development of a demographic data analysis tool for use by transportation professionals in Texas; and (c) understand what demographic data users within these agencies see as the most important demographic trends impacting transportation in Texas. Some of the salient findings of the survey follow:

- Demographic data are important to a majority of the respondents within the context of their jobs.
- Demographic data users in non-TxDOT agencies are less sure of TxDOT's consideration of demographic factors in planning transportation infrastructure than TxDOT demographic data users.
- Most respondents see total population growth as the most significant trend impacting transportation in Texas. Other demographic trends recognized as significant or very significant included suburban population growth, dispersion of employment locations within metropolitan areas, and increases in vehicles per household.
- Additional demographic data are needed at smaller geographies, including information about specific populations at the TAZ or block group level.
- Almost 30% of respondents see an urgent need for better tools to access demographic information and wish to access it via the Internet.

The following sections report on the responses to this survey. First an overview of the survey methods is provided, as well as selected demographic backgrounds of the respondents,

including information about their training and educational background relating to demographic data analyses techniques. Then an analysis of respondents' use of and needs for selected demographic data is provided, followed by an overview of desired items to be included in a demographic data tool. Finally, summaries of respondents' perceptions about TxDOT's use of demographic data and demographic trends impacting transportation in Texas are provided.

4.1 Demographics of Survey Respondents

The original sampling frame consisting of 286 individuals with e-mail addresses was developed from the following sources: (a) interviews of selected TxDOT personnel (task 1); (b) staff listings of specific titles for the TxDOT offices; (c) staff listings at all MPOs, RMAs, and Toll Authorities; and (d) selected individuals in divisional offices. After removing those who indicated that they were not users of demographic data and after removing non-deliverable addresses, a total of 165 remained. An e-mail letter of introduction with a link to the survey on the Institute for Demographic and Socioeconomic Research (IDSER) website was sent to the original list. Respondents were requested to complete the survey online. Two additional e-mail mailings and one phone call were used to follow up with those not responding. Responses were received from a variety of transportation-related agencies and from throughout Texas. Responses were received from communities within all but two TxDOT Districts (Lufkin and Bryan). Table 4-1 shows the responses by transportation organization.

Table 4-1: Survey Responses by Organization

Organization	Total Contacted	Total Returned	% of Total Returned	Participation Rate
TxDOT District	30	21	23	70
TxDOT Division	19	9	10	47
MPO/COG	108	57	62	53
RMA	6	4	4	67
Toll Authority	2	1	1	50
Total	165	92	100	56

The survey included demographic data users from TxDOT and other transportation organizations, including Metropolitan Planning Organizations (MPOs), Toll Authorities, Councils of Governments (COGs) and Regional Mobility Authorities (RMAs). Thirty-three percent of the respondents work for TxDOT, both at the district and division level. Of the 62 respondents who worked for a MPO or COG, 29 worked at a large MPO or COG (those serving a population of 500,000 or more), 10 worked at a medium MPO or COG (those serving a population of 200,000

to 499,999), 10 worked at a small MPO or COG (those serving 50,000 to 199,999), and an additional 8 worked at a COG exclusively.

Of those responding to the survey, the overwhelming majority (67%) works in transportation planning. The next most frequently cited job types include those involved in environmental analyses (10%). Three District Engineers also responded to the survey.

On average, respondents have worked in their respective agencies for 8.2 years. Respondents working for TxDOT have worked, on average, 16.1 years, compared to all other respondents, who worked in their positions, on average, 4.5 years. Most of the respondents have at least a Bachelor's Degree, with 52% indicating that they have a graduate or professional degree.

Table 4-2: Respondents' Post-Secondary Education

Post-Sec. Degree	Count	Percent
None	2	2.2
Assoc. Degree	5	5.4
Bachelor's	37	40.2
Master's or Prof.	40	43.5
Ph.D.	8	8.7

Respondents have most experience and training in interpreting and analyzing demographic data and in using travel demand models and least experience in calibrating travel demand models and developing population estimates and projections. This is not surprising given that the latter require special training and may not be required for the respondents' job position (see Tables 4-3 and 4-4).

Table 4-3: Respondents' Years of Experience for Selected Demographic Analysis Techniques

Technique	None		LT 1 Year		1-4 Years		5-9 Years		10-14 Years		15+ Years	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Developing Population Estimates	42	45.7	14	15.2	16	17.4	8	8.7	4	4.3	8	8.7
Developing Population Projections	44	47.8	10	10.9	18	19.6	8	8.7	4	4.3	8	8.7
Calibrating Travel Demand Models	50	54.3	9	9.8	20	21.7	7	7.6	5	5.4	1	1.1
Using Travel Demand Models	29	31.5	14	15.2	26	28.3	12	13.0	7	7.6	4	4.3
Analyzing Demographic Data	19	20.7	10	10.9	33	35.9	11	12.0	7	7.6	12	13.0
Interpreting Demographic Data	13	14.1	11	12.0	36	39.1	13	14.1	7	7.6	12	13.0
Average	33	35.7	11	12.3	25	27.0	10	10.7	6	6.2	8	8.2

Table 4-4: Respondents' Education and Training for Selected Demographic Analysis Techniques

Technique	None		1 College Course		2+ College Course		1 Work Related Course		2+ Work Related Courses		Combo College & Work	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Developing Population Estimates	59	64.1	7	7.6	6	6.5	2	2.2	2	2.2	16	17.4
Developing Population Projections	58	63.0	7	7.6	6	6.5	3	3.3	2	2.2	16	17.4
Calibrating Travel Demand Models	51	55.4	7	7.6	6	6.5	3	3.3	9	9.8	16	17.4
Using Travel Demand Models	44	47.8	10	10.9	7	7.6	4	4.3	10	10.9	17	18.5
Analyzing Demographic Data	38	41.3	12	13.0	9	9.8	5	5.4	5	5.4	23	25.0
Interpreting Demographic Data	37	40.2	14	15.2	8	8.7	6	6.5	4	4.3	23	25.0
Average	48	52.0	10	10.3	7	7.6	4	4.2	5	5.8	19	20.1

4.2 Demographic Data Use and Needs

Demographic data are used in a variety of applications within transportation, including travel demand modeling, long-range planning, and environmental documentation, among other things. Specific activities that respondents are involved in are listed in Table 4-5. From the interviews, transportation planning, travel demand modeling, and environmental analyses appeared to be the areas where demographic data are most important. This was also confirmed in the responses to the statewide survey. Of those responding, 22 percent estimate or calibrate travel demand models or prepare environmental-related assessments.

Table 4-5: Respondents' Use of Demographic Data

Activity	No.	%
Estimate or Calibrate Travel Demand Models	20	21.7
Prepare Environmental-Related Assessments	20	21.7
Develop Corridor Type Studies	16	17.4
Develop Long-Range Plans	16	17.4
Toll Route Planning	11	12.0
Transport or Capital Improvement Plans	9	9.8
Air Quality Analyses	6	6.5
Right-of-Way Analyses	4	4.3

Multiple responses possible. Percent of all respondents who indicate that they use demographic data for any of these purposes.

Respondents were asked to comment on any limitations that might be present in the data available for preparing any of the analyses listed in Table 4-5. The most frequently mentioned item concerned the level of geographic detail available for specific demographic variables, followed by projections of specific populations (i.e., racial, ethnic, or low income populations). U.S. Census data are subject to disclosure limitations and for many variables, census block groups are the smallest geography available. In addition, projections of specific populations are problematic at smaller geographies (such as projections of households by income level). Though no question was asked about the respondents' knowledge of these limitations, it may be important to provide such explanations in the demographic data tool being developed for this research project.

All respondents were asked to indicate what demographic data were needed for their jobs. Table 4-6 provides the results to questions concerning selected needs of demographic data users ranked according to the combined responses of "needed, but not urgent" and "urgent need." The

most urgent need is better tools to access demographic data (29% "urgent need" responses). All of the data need responses received 10 percent or less of "not needed" responses.

Table 4-6: Data Needs

Item	Not Needed		Non Urgent Need		Urgent Need		*Total, Need*	
	No.	%	No.	%	No.	%	*No.*	*%*
Additional Demographic Data	3	3.4	65	73.0	21	23.6	*86*	*96.6*
Key Demographic Data Tables	8	9.0	61	67.8	21	23.3	*82*	*91.1*
Better Data Access Tools	9	10.1	55	61.1	26	28.9	*81*	*90.0*

4.3 Training Needs Related to Demographic Data Use

During the preliminary interviews, some of the staff mentioned that in smaller MPOs, the turnover is typically greater than in TxDOT. Because of continued changes in the local areas and greater regulatory demands placed upon these MPOs, interviewees felt that there is a need for training on how to interpret the demographic data that is available. Survey respondents were asked to rank their need of training on various demographic data sources and techniques. Table 4-7 shows the results of these questions. Although 50 percent of the respondents indicated a need for training on all items, the responses that received the most "non-urgent" and "urgent need" responses were training on demographic techniques (such as population estimates and projections) and training on the Census Transportation Planning Package (CTPP).

Table 4-7: Training Needs

Item	Not Needed		Non-Urgent Need		Urgent Need		*Total, Need*	
	No.	%	No.	%	No.	%	*No.*	*%*
General Demographic Tech.*	15	16.9	57	63.3	18	20.0	*75*	*83.3*
CTPP+	15	16.9	54	60.0	21	23.3	*75*	*83.3*
Accessing Data	16	18.0	54	60.0	20	22.2	*74*	*82.2*
Estimates & Projections	17	19.1	51	56.7	22	24.4	*73*	*81.1*
American Community Survey	21	23.6	52	57.8	17	18.9	69	76.7
American FactFinder	33	37.1	48	53.3	9	10.0	*57*	*63.3*

**Includes population estimates and projections techniques.*
+Census Transportation Planning Package.

4.4 Demographic Variables Accessed

Table 4-8 provides the responses to questions about the demographic variables used for various analyses and the frequency of that use. Fifty percent of respondents indicated that they use total population at least once a month, followed by population density (33.7%), household income (33.7%), and transportation modes (31.5%).

Table 4-8: Demographic Data Variables Used

Item	A Few Times A Year		A Few Times A Month		Several Times A Month		At Least Monthly	
	No.	%	No.	%	No.	%	No.	%
Total Population	29	31.5	27	29.3	19	20.7	46	50.0
Population Density	32	34.8	19	20.7	12	13.0	31	33.7
Household Income	23	25.0	21	22.8	10	10.9	31	33.7
Modes of Transportation	25	27.2	16	17.4	13	14.1	29	31.5
Total Households	26	28.3	16	17.4	12	13.0	28	30.4
Travel Time to Work	24	26.1	15	16.3	13	14.1	28	30.4
Vehicles per Household	27	29.3	14	15.2	10	10.9	24	26.1
Race/Ethnicity	24	26.1	16	17.4	7	7.6	23	25.0
Household Size	27	29.3	13	14.1	8	8.7	21	22.8
Poverty	16	17.4	16	17.4	5	5.4	21	22.8
Vehicle Occupancy	24	26.1	12	13.0	8	8.7	20	21.7
Employment Density	21	22.8	10	10.9	9	9.8	19	20.7
Age	20	21.7	13	14.1	4	4.3	17	18.5
Industry of Worker	12	13.0	9	9.8	6	6.5	15	16.3
Housing Type	15	16.3	11	12.0	3	3.3	14	15.2
Employment Status	15	16.3	10	10.9	4	4.3	14	15.2
Per Capita Income	19	20.7	10	10.9	3	3.3	13	14.1
Personal Travel Costs	18	19.6	7	7.6	6	6.5	13	14.1
Sex	15	16.3	8	8.7	2	2.2	10	10.9
Time Leaving from Work	17	18.5	3	3.3	6	6.5	9	9.8
Disability Status	22	23.9	4	4.3	2	2.2	6	6.5
Housing Tenure	12	13.0	4	4.3	2	2.2	6	6.5
Occupation of Worker	11	12.0	3	3.3	3	3.3	6	6.5
Household Composition	12	13.0	3	3.3	0	0.0	3	3.3

Response categories were combined. These categories include the responses of 6-10 times, 11-20 times, and more than 20 times a month (Several Times a Month); 1-5 times a month (A Few Times a Month); and less than 1 time a month (A Few Times a Year). In this table, " Several Times a Month" and " A Few Times a Month" combined for "At Least Monthly."

As would be expected for individuals involved in transportation planning and analyses, the level of geography used for most applications and most variables is the traffic analysis zone (27%) as shown in Table 4-9. MPOs use TAZ geography for planning and travel demand modeling, so it is not surprising that this is the level of geography used for most variables listed. When limiting the responses to TxDOT only, the geographic level of most uses is at higher levels of geography: mainly the TxDOT District, county, and Metropolitan Statistical Area (MSA) levels[2].

Table 4-9: Geographic Level of Most Uses (Combined Responses)

Geographic Level	% of All Responses*	% of All TxDOT Responses+
TAZ	26.8	9.1
Block Group	18.2	6.4
MSA	15.0	18.3
Tract	13.4	14.6
County	13.1	18.3
TxDOT District	7.0	25.6
Place	6.6	2.7

**Includes responses by all respondents for all variables listed.*
+Includes responses by TxDOT respondents for all variables listed.

4.5 Demographic Data Sources Accessed

Demographic data users were asked from what sources they obtained demographic data and at what frequency. Those sources used at least monthly by 50 percent or more of the respondents include: COG or MPO developed population estimates and projections (71%), U.S. Census Summary Files (63%), Texas State Data Center Population Projections (56%), Texas State Data Center Population Estimates for Counties (54.9%), city developed population estimates and projections (54.4%), and Texas State Data Center Population Estimates for Places (53.3%), as shown in Table 4-10.

[2] Both TxDOT Districts and MSAs are configurations of several counties combined. A MSA is a statistical area designated by the US Office of Management and Budget. Metropolitan areas include an urbanized central county and any surrounding counties with dense populations and/or commuting patterns into the central county. The definition of MSAs change over time, so caution must be taken when comparing data over time.

Table 4-10: Frequency of Use for Demographic Data Sources

Item	A Few Times A Year		A Few Times A Month		Several Times A Month		At Least Monthly	
	No.	%	No.	%	No.	%	No.	%
COG or MPO Dev. Est. & Projections	13	14.4	27	30.0	37	41.1	64	71.1
U.S. Census Summary Files	23	25.6	32	35.6	25	27.8	57	63.3
SDC Population Projections	18	19.8	32	35.2	19	20.9	51	56.0
SDC Population Estimates for Counties	18	19.8	31	34.1	19	20.9	50	54.9
City Dev. Est. & Projections	19	21.1	27	30.0	22	24.4	49	54.4
SDC Estimates for Places	16	17.8	33	36.7	15	16.7	48	53.3
Census Transportation Planning Package	27	29.7	19	20.9	15	16.5	34	37.4
Journey to Work	33	36.3	21	23.1	10	11.0	31	34.1
Census PUMS	26	28.6	27	29.7	3	3.3	30	33.0
TxDOT SAM	19	20.9	18	19.8	11	12.1	29	31.9
TWC Quarterly Emp. Data	18	19.8	18	19.8	7	7.7	25	27.5
County-to-County Workflow Data	30	33.0	15	16.5	9	9.9	24	26.4
BEA Regional Economic Info. System (REIS)	21	23.1	18	19.8	6	6.6	24	26.4
American Community Survey	23	25.6	18	20.0	5	5.6	23	25.6
PL 94-171	24	26.4	11	12.1	2	2.2	13	14.3

Besides these demographic data sources, respondents also use university developed data (3 responses), school district or TEA data (2 responses), Texas Water Development Board population projections (1 response), Mexican Government related data (1 response) and other non-specified data (2 responses). Listed sources that received the largest number of "do not use" responses include: PL 94-171 (46%), Texas Workforce Commission Quarterly Employment Data (37%), Bureau of Economic Analysis REIS data (37%), American Community Survey (36%), and the TxDOT SAM model (32%). Most of these data sources are specialized sources of information and the number of "do not use" responses is not surprising. One item that does stand out is the number of "do not use" responses for the American Community Survey (ACS). The intention of the U.S. Census Bureau is to replace the long-form data for the Decennial Census with the ACS. Thus transportation planners will be dependent upon the ACS in the future for such things as information on income levels, poverty, and language spoken at home, among other items. Additional awareness about this change in data availability and its limitations will be critical for demographic data users at TxDOT and other transportation related agencies in the future.

4.6 Demographic Data Tool Preferences

In addition to the questions about data sources and variables used and needed, the demographic data users were asked about their preferences for accessing demographic data via a demographic analysis tool as outlined in the original project proposal. First, users were asked to indicate their preference for accessing demographic data. Overwhelmingly the respondents expressed a desire to access demographic data through the Internet (86%) (shown in Table 4-11).

Table 4-11: Preferred Method of Access

Media Method	No.	%
Internet	77	85.6
CD	11	12.2
DVD	1	1.1
Other	1	1.1
Total	90	

Respondents were also asked to rank the importance of specific features that might be included within a demographic data tool (Table 4-13). Forty-nine percent of respondents felt that an ability to create user-specific queries was very important, followed by the ability to export the data to an Excel format for reporting (46%).

Understanding how the demographic data may be utilized within other software and databases will help refine the features of the demographic data tool. Only 34% of respondents indicated that mapping features were very important for the design of a demographic data access tool. This may be a reflection of the data users' access to other mapping packages where demographic data may be imported and analyzed. Most users (96%) have access to an ESRI-based Geographic Information System (GIS)(shown in Table 4-12).

Table 4-12: Geographic Information System Software Used

GIS	No.	%
ArcView/ArcGIS	68	95.8
TransCAD	35	38.0
GeoMedia	3	3.3
Maptitude	8	8.7
MapInfo	4	4.4
Other GIS	2	2.2

Table 4-13: Importance of Selected Features

	Unimportant		Of Little Importance		Moderately Important		Important		Very Important	
Item	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Data Query Tool	0	0.0	0	0.0	10	11.1	36	40.0	44	48.9
Excel Imports	0	0.0	1	1.1	17	18.9	31	34.4	41	45.6
Maps	1	1.1	2	2.2	21	23.3	35	38.9	31	34.4
Charts & Graphs	0	0.0	5	5.6	26	28.9	33	36.7	26	28.9
Tables of Key Variables	1	1.1	2	2.2	21	23.3	40	44.4	26	28.9
.DBF Export	2	2.2	7	7.8	25	27.8	35	38.9	21	23.3
.CSV Export	7	7.9	14	15.7	34	38.2	20	22.5	14	15.7

4.7 Perceived Demographic Trends Impacting Transportation in Texas

Demographic data users within TxDOT and other transportation related agencies find that the most significant trend impacting transportation in Texas is total population growth within the state. Ninety-three percent of respondents indicated that this trend is a significant or very significant trend impacting Texas transportation. Five trends involving different aspects of total population growth (state population growth, growth in the Texas triangle, suburban population growth, exurban population growth, and Hispanic population growth) received 50 percent or more responses of significant or very significant. Table 4-14 provides the number and percentage of respondents for each demographic trend, ranked by combined responses of significant or very significant. Figure 4-1 shows the items with 50 percent or more of responses listed as significant or very significant.

Table 4-14: Perceptions of Demographic Trends Impacting Transportation

	Not Significant		Moderately Significant		Significant to Very Sign.	
Item	**No.**	**%**	**No.**	**%**	**No.**	**%**
State Population Growth	0	0.0	6	6.6	85	93.4
Suburban Population Growth	0	0.0	14	15.4	77	84.6
Dispersion of Employment Nodes*	1	1.1	18	19.8	72	79.1
Texas Triangle Growth	7	7.7	13	14.3	71	78.0
Increase in Autos per Household	7	7.7	13	14.3	71	78.0
Exurban Population Growth	0	0.0	26	28.6	65	71.4
Work Related Travel	5	5.5	25	27.5	61	67.0
Baby Boom Aging	11	12.2	23	25.6	56	62.2
Hispanic Population Growth	18	17.6	22	24.2	53	58.2
Decrease in Avg. Household Size	18	19.8	28	30.8	45	49.5
Foreign Immigration	23	25.3	27	29.7	41	45.1
Concentration of Poverty	14	15.4	38	41.8	39	42.9
Increase in Minority Auto Ownership	28	30.8	33	36.3	30	33.0

**Over the last fifty years or longer, population within cities in the United States has expanded beyond the central business district. In addition, employers seeking to be close to employees as well as seeking lower cost land have sought out locations in suburban and exurban areas, thus dispersing employment nodes beyond traditional central city locations.*

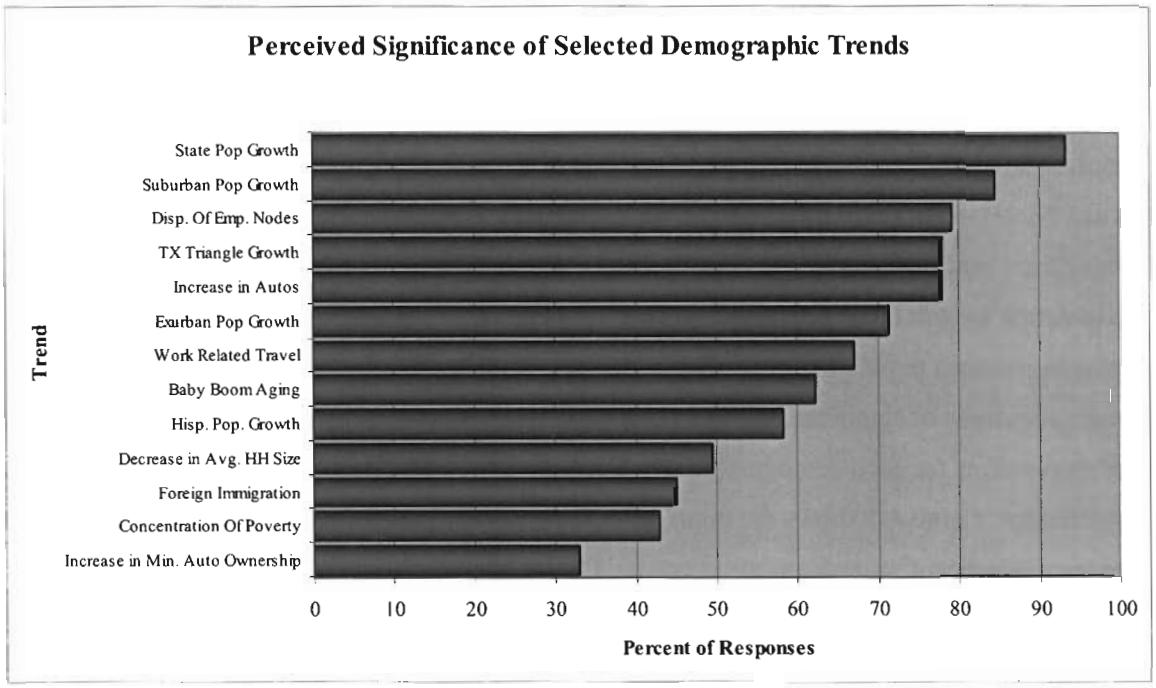

Figure 4-1: Significant or Very Significant Trends

Nine respondents indicated that other trends were having impacts on transportation. The item most cited (four responses) concerned rising fuel costs. One respondent indicated a concern for population age differentials between urban, older-suburban and newer-suburban neighborhoods. All other respondents did not specify the trend they perceived as impacting transportation in Texas.

Respondents were asked to indicate their level of agreement with this statement: "TxDOT adequately considers demographic factors when planning new transportation infrastructure." Though a majority of the respondents either agreed or strongly agreed with this statement, the percentages of the responses varied by organization type (whether the respondent was from TxDOT or another agency). Only 41 percent of non-TxDOT personnel agreed or strongly agreed with this statement, compared to 83 percent of TxDOT personnel. Table 4-15 and Figure 4-2 show the responses by respondent type and response.

Table 4-15: Response to Statement: "TxDOT Adequately Considers Demographic Factors..."

Respondent Type	Disagree* No.	%	Undecided No.	%	Agree* No.	%
TxDOT Personnel	1	3.3	4	13.3	25	83.3
Others	16	26.2	20	32.8	25	41.0
All	17	18.7	24	26.4	50	54.9

N = 91
$X^2 = 15.1$
Cramer's V = .41

**Responses of disagree (agree) and strongly disagree (agree) combined. Chi-Square significant at the .001 level.*

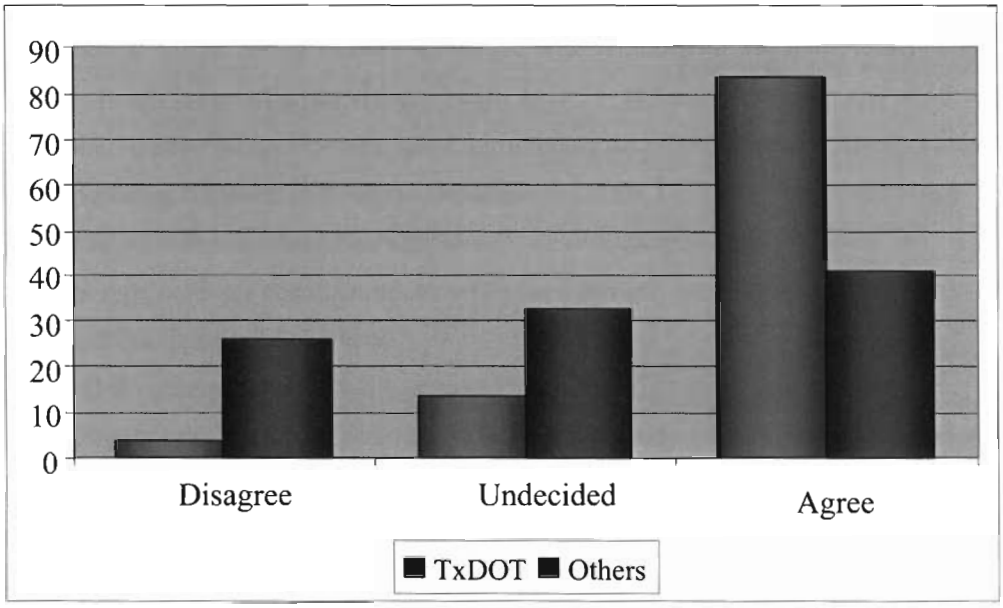

Figure 4-2: TxDOT's Consideration of Demographic Factors

Regardless of the respondents' opinions about TxDOT's use of demographic information for transportation planning, the majority of the respondents (53%) feel that demographic data are very important to their job. No one felt that demographic data are unimportant for their own job.

Table 4-16: Importance of Demographic Data for Respondents' Job

Level of Importance	No.	%
Very important	48	52.8
Important	28	30.8
Moderately important	13	14.3
Of little importance	2	2.2
Total Responses	91	

Chapter 5 : Conclusions

The results of the survey and the interviews show that demographic data are important to many at TxDOT and other transportation related agencies. However, there are gaps in availability and knowledge about sources of demographic data available for TxDOT planners. Demographic information is used at TxDOT, although the number of individuals using demographic data on a regular basis is in the 50-60 person range. Even when individuals were identified as potential users because of their title, replies to the survey were received that, in effect, stated that these individuals did not use demographic data very much. The survey showed that the geographic level of detail for most TxDOT personnel use was at the district or county levels, whereas MPO and other staff used data at smaller levels of geographic detail, mainly the TAZ, census tract, or census block group levels. Since TxDOT is charged with planning for transportation needs statewide, this is not necessarily surprising. Within TxDOT, demographic data users are found primarily in the Transportation Planning and Programming and Environmental Affairs Divisions and in Transportation Planning and Project Development at the District level. Both Project Development and Environmental Affairs personnel use demographic data primarily for environmental type analyses and documents, while the other two areas use demographic data for planning to address transportation needs.

One of the greatest uses of demographic data is related to environmental analyses, including environmental justice (EJ) studies. TxDOT has recently sponsored research that will develop a methodology for conducting EJ studies (Victoria et al. 2006). This should provide some consistency in what demographic data are utilized, at what geographic levels and for what purposes, as well as some understanding of why those methods and data were used instead of others.

For EJ and other transportation planning uses, a number of demographic data sources are available to demographic data users; however, users do not always know where to locate those sources or how to evaluate their usefulness. In addition, a data source may be used for a project in one month but it might not be needed again for several months. At that point, the user may have forgotten how to access that data from the data source. A one-stop source may be valuable for these users.

The information provided by this research will guide the development of a one-stop demographic data tool for TxDOT data users. The data tool will be designed so that it can be accessed through a CD ROM software database platform with the goal of migrating it to a web-

based application during an implementation phase. A users group made up of a small number of TxDOT and MPO transportation planners will provide feedback to the project team. In addition, a workshop made up of demographic data users will be held in San Antonio in the spring of 2007, so that data users can test a preliminary copy of the demographic data tool. Feedback from this workshop will be used to refine the product so a final version can be distributed to TxDOT demographic data users in late spring of 2007.

In addition to the development of a demographic data tool, the project team will embark on a review of the demographic trends that will have impacts on transportation in Texas. Some of these issues were briefly discussed in Chapter 1 of this document, including: population growth, changes in age composition and racial and ethnic diversity, and differentials in income disparity. First, a comprehensive review of the literature of demographic trends as they relate to transportation will be completed. In consultation with the research management committee, the research team will outline other areas of inquiry that appear critical to transportation in Texas. Several trends will be explored in depth during the second year and will conclude with a final document about demographic trends in Texas.

Appendix: Catalogue of Demographic Data Sources Used in Transportation Planning

The following list of databases was derived from initial research about uses of demographic information within transportation, as well as from our interviews of selected TxDOT personnel. Our goal was to uncover public sources of demographic data that are useful for TxDOT personnel. We believe we have uncovered the majority of sources most valuable to TxDOT personnel; however, some sources might have been omitted. Additional sources will be added as they are discovered throughout the course of this research project.

Database:	***American Community Survey***
Source:	U.S. Census Bureau
Reference Date of Latest Data:	2004 (limited by geography)
Frequency of Production:	Yearly, 6 to 8 months after year of data collection
TxDOT Uses:	Environmental justice analysis, transportation planning, travel demand calibration and modeling
Geographic Level(s):	Block group, tract, county, MSA, state (not available for all areas at this time)
Variables:	Multiple census variables (population, household, housing)
Media:	Online, ftp download
Additional Notes:	The American Community Survey is designed to replace the long form of the decennial census. Yearly data are available for the nation, states, and populous areas (governmental units with 65,000 or more in population). Data for other areas will be reported on a 3 to 5 year rolling average basis. Data are available for years 2000 to 2004. Some pre-2000 data are available for the test sites of Fort Bend, Harris, Starr, and Zapata counties in Texas. Since CTPP related questions are asked on the long form, this will be the main source of transportation related census data in the future.
Website:	*http://www.census.gov/acs/www*

Database:	***Census 2000, SF 1-4***
Source:	U.S. Census
Reference Date of Latest Data:	2000
Frequency of Production:	Every 10 years, generally 1 to 3 years after data collection
TxDOT Uses:	Environmental justice analysis
Geographic Level(s):	Block (SF-1, 2), block group, tract, city, ZCTA, county, MSA, state, nation
Variables:	Various (population, journey to work, income, vehicle ownership)
Media:	Online, CD or DVD, ftp download
Website:	*http://factfinder.census.gov*

Database:	***Census 2000, Public Use Microdata Samples (1% & 5%)***
Source:	U.S. Census
Reference Date of Latest Data:	2000
Frequency of Production:	Every 10 years, generally 1 to 3 years after data collection
TxDOT Uses:	Used to calibrate travel demand models
Geographic Level(s):	PUMAs
Variables:	Various (population, journey to work, income, vehicle ownership)
Media:	DVD, ftp download
Website:	*http://www.census.gov/main/www/pums.html*

Database:	***Census 2000, County to County Flow Data***
Source:	U.S. Census
Reference Date of Latest Data:	2000
Frequency of Production:	Every 10 years, 3 to 4 years after data collection
TxDOT Uses:	Transportation planning
Geographic Level(s):	Counties
Variables:	Total number of commuters by residence county and work county
Media:	Available to download (Excel and text formats)
Additional Notes:	These data were derived from the decennial census long-form. Because the American Community Survey is replacing the long form, there will be changes in this data set.
Website:	*http://www.census.gov/population/www/cen2000/commuting.html*

Database:	***Texas Statewide Analysis Model (SAM)***
Source:	TxDOT (data sources vary)
Reference Date of Latest Data:	1998
Frequency of Production:	First version created; planned update every 5 years
TxDOT Uses:	Grant planning; project analysis
Geographic Level(s):	Counties, TxDOT Districts, state, TAZ
Variables:	Total population, total households, employment, population projections
Media:	CD software
Website:	None

Database:	***Census Transportation Planning Package 2000***
Source:	U.S. Census Bureau and Federal Highway Administration
Reference Date of Latest Data:	2000
Frequency of Production:	Every 10 years
TxDOT Uses:	Used to calibrate transportation models; used in general transportation planning
Geographic Level(s):	Traffic Analysis Zone (TAZ) (for some areas) and block group or tract for all others; county; state
Variables:	Place of work and place of residence workforce data; modes of transportation; commute times; demographic characteristics from census data
Media:	CD Data Extraction Tool
Additional Notes:	The CTPP is created in partnership between FHWA and the Census Bureau. Both are working on ways to integrate transportation data within the American Community Survey.
Website:	*http://www.fhwa.dot.gov/ctpp/*

Database:	***Consumer Expenditure Survey***
Source:	U.S. Bureau of Labor Statistics
Reference Date of Latest Data:	2004
Frequency of Production:	Every year, 10 year after data collection
TxDOT Uses:	Used to estimate transportation costs for various demographic groups
Geographic Level(s):	National; regions (combination of states); selected MSAs (including Dallas-Ft. Worth and Houston)
Variables:	Consumer expenditures by consumer unit type and region; transportation costs and expenditures on travel among expenditures tabulated
Media:	Online, ftp, selected publications
Website:	*http://www.bls.gov/cex/home.htm*

Database:	***EnviroMapper*** ***(See Specifically Environmental Justice Assessment Tool)***
Source:	EPA (data sources vary)
Reference Date of Latest Data:	2000 (demographic data)
Frequency of Production:	Demographic data from U.S. Census. Additional data on monitored sites, environmental cleanup sites, transportation, and other items; updated with various frequencies.
TxDOT Uses:	Environmental Justice
Geographic Level(s):	Census block group
Variables:	Persons per square mile, per capita income, percent minority, percent persons below poverty, educational attainment (less than high school diploma, high school diploma, and bachelors or greater), percent persons below age 18 years, percent houses built prior to 1950, and percent of people who speak English less than very well)
Media:	Online
Website:	*http://www.epa.gov/enviro/html/em/index.html*

Database:	***Local Employment Dynamics***
Source:	U.S. Census/U.S. Bureau of Labor Statistics
Reference Date of Latest Data:	2003
Frequency of Production:	Yearly
TxDOT Uses:	New database in testing phase. Estimate and map out labor sheds by location (origins and destinations of workers).
Geographic Level(s):	Labor sheds; county; city; MSA
Variables:	Total Worker Population by Place of Residence and Place of Work (Labor Shed/Commute Shed); Industry Employment by Age and Sex; Earnings by Age and Sex; Turnover by Industry, Age, and Sex
Media:	Online
Additional Information:	Texas is one of several states currently partnered with the Census Bureau for this program.
Website:	*http://lehd.dsd.census.gov/led/index.html*

Database:	***Modern Language Association Language Map***
Source:	U.S. Census 2000
Reference Date of Latest Data:	2000
Frequency of Production:	Unknown
TxDOT Uses:	Used for environmental justice analysis and public hearing preparation (printing of flyers for dominate languages).
Geographic Level(s):	ZIP Code Tabulation Area; county
Variables:	Map of languages spoken at home derived from the 2000 Census
Media:	Online
Website:	*http://www.mla.org/census_map*

Database:	***National Household Travel Survey***
Source:	U.S. Bureau of Transportation Statistics and Federal Highway Administration
Reference Date of Latest Data:	2001
Frequency of Production:	Varies; scheduled for 2008
TxDOT Uses:	Used to calibrate travel demand models
Geographic Level(s):	National
Variables:	Combines data from former National Personal Travel Survey and American Travel Survey
Media:	Online, various publications
Website:	*http://www.bts.gov/programs/national_household_travel_survey/*

Database:	***Population Estimates by County and Place***
Source:	Texas State Data Center/Texas State Demographer
Reference Date of Latest Data:	July 1, 2004
Frequency of Production:	Yearly
TxDOT Uses:	Used to control local estimates and calibrate travel demand models. Used for funding allocations. Used in environmental related analyses.
Geographic Level(s):	Place; county; MSA; COG; state
Variables:	Total population by age, sex, race, and ethnicity (at county level)
Media:	Online (limited), CD, paper
Website:	*http://txsdc.utsa.edu*

Database:	***Population Projections by County***
Source:	Texas State Data Center/Texas State Demographer
Reference Date of Latest Data:	Projections for 2000 to 2040
Frequency of Production:	Every other year
TxDOT Uses:	Used to control local estimates and calibrate travel demand models; used in long-range planning
Geographic Level(s):	County; MSA; COG; state
Variables:	Total population by age, sex, race, and ethnicity; households, labor force, school enrollments (every 2-3 years)
Media:	Online (limited), CD, paper
Website:	*http://txsdc.utsa.edu*

Database:	***Population Projections by County***
Source:	Texas Water Development Board
Reference Date of Latest Data:	Population projected from 2000 to 2060
Frequency of Production:	Last revision, 2004
TxDOT Uses:	Used to control local estimates
Geographic Level(s):	County; water planning regions; state
Variables:	Total population
Media:	Online
Website:	*http://www.twdb.state.tx.us/data/popwaterdemand/main.asp*

Database:	***Regional Economic Information System (REIS)***
Source:	U.S. Bureau of Economic Analysis
Reference Date of Latest Data:	2004
Frequency of Production:	Every year
TxDOT Uses:	Income data used to calibrate travel demand models
Geographic Level(s):	County, MSA, BEA economic region, state, national
Variables:	Per capita income; earnings by NAICS; employment by NAICS by place of work; total population
Additional Information:	Data are available for 1969 through 2004, so historical data can be reviewed for economic trends. Population estimates from the U.S. Census Bureau are included in the data.
Media:	Online, CD
Website:	*http://www.bea.gov/bea/regional/data.htm*

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