Technical Memorandum

Demographic and Commuting Trends in Florida

– Methodologies and Procedures

Prepared for
Florida Department of Transportation

Forecasting and Trends Office

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INTRODUCTION

PURPOSE

Each year the Florida Department of Transportation (FDOT) Forecasting and Trends Office (FTO) analyzes and reports demographic and commuting trends in Florida based on the latest data available. The following analyses were conducted:

- Population estimates for FDOT Districts, counties, cities, urban/non-urban areas, and Metropolitan Planning Organizations (MPO),
- Employment estimates for FDOT Districts, counties, cities, urban/non-urban areas, Census tracts, and MPOs,
- Population density analysis for FDOT Districts, counties, Urbanized Areas (UAs) and metropolitan or micropolitan statistical areas (MSA), and
- Commute travel patterns at state, county and MSA level.

GEOGRAPHIC AREAS

Analyses results were reported for a variety of geographic areas. Definitions of these geographic areas are summarized below.

FDOT Districts

FDOT is decentralized in accordance with legislative mandates and consists of eight (8) districts: District 1, District 2, District 3, District 4, District 5, District 6, District 7, and Turnpike Enterprise. Each district is managed by a District secretary[1].

MPOs

There are 27 Metropolitan Planning Organizations (MPOs) in Florida, some of which are also called Transportation Planning Organizations (TPO), Transportation Planning Agencies (TPA) or Metropolitan Transportation Planning Organizations (MTPO). MPOs are "entities comprised of representatives from local governments and transportation authorities that are responsible for regional transportation planning in urbanized areas with populations of over 50,000[2]. For a detailed map of MPOs, please visit the Florida MPO Advisory Council's website[3].

Counties

Florida consists of 67 territorially defined political subdivisions called counties.

Cities (Incorporated Places)

In the Bureau of Economic and Business Research (BEBR) estimates and this memorandum, the term "city" refers to a Census incorporated place. The Census Bureau defines a place as a concentration of population that is named, locally recognized, and not a part of any other place.

[1] https://www.fdot.gov/publications/distmap/index.shtm
[2] https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/policy/briefing-sheets/briefing_sheet_mpo_102720.pdf?sfvrsn=b17ab46b_2
[3] https://www.mpoac.org/mpos/

Incorporated places are legally incorporated under the law of respective states, such as cities, boroughs, towns, and villages. Incorporated places can cross county boundaries.

MSA

An MSA is a metropolitan or micropolitan statistical area delineated by the United States Office of Management and Budget. An MSA is "a core area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core." This analysis uses current MSA delineations, which were based on the application of 2010 MSA delineation standards and became effective in March 2020. Each MSA must have at least one urbanized area of 10,000 or more population. If the urbanized area's population is less than 50,000, the MSA is a micropolitan statistical area. Otherwise, it is a metropolitan statistical area.[4]

Urban/Rural Areas

The Census Bureau's urban-rural classification is a delineation of geographic areas. Urban areas are updated after each decennial census by applying specified criteria to decennial census and other data. For the 2010 Census, an urban area comprises a densely settled core area that meets minimum population requirements, along with adjacent territory that contains nonresidential urban land uses or links outlying densely settled territory with the core area. Urban areas must encompass at least 2,500 people, 1,500 of which must reside outside institutional group quarters. Based on population, the Census Bureau identifies two types of urban areas: Urbanized Areas (UAs) (50,000 or more people) and Urban Clusters (UCs) (at least 2,500 and less than 50,000 people). All population, housing, and territory that the Census Bureau does not classify as urban are classified as rural. In this technical memorandum, UA and UC exclusively refer to urbanized areas and urban clusters designated by the Census Bureau.

[4] https://www.census.gov/programs-surveys/metro-micro/about.html

DATA SOURCES

Population Data

The primary data source for population estimates is Florida Estimates of Population 2021 by the Bureau of Economic and Business Research (BEBR) at the University of Florida[5]. The BEBR Population Program produces Florida's official city, county, and state population estimates each year. The BEBR's Florida Estimates of Population 2021 also includes population from the 2000, 2010, and 2020 Census years, for calculating population changes. 2010 Census population, 2020 Census population, and 2021 Census population estimates were collected for out-of-state counties that are located in an MSA or MPO in Florida.

Employment Data

The January 2020 Dun & Bradstreet employment dataset was used for developing employment data in Florida for different geographic areas. The source of Dun & Bradstreet employment dataset is the Local Area Unemployment Statistics (LAUS). The LAUS pertains to employed people by their place of residence, including people "who did any work at all for pay or profit during the survey reference week, including work in their own unincorporated business or on a farm[6]."

Commuting Data

Commuting data used in this analysis was collected from the 2021 American Community Survey (ACS) 1-year estimates. The ACS is a demographics survey program conducted by the U.S. Census Bureau and can be accessed from https://data.census.gov/.

Geographic Boundaries

All legal boundaries and names were obtained from the US Census Bureau's TIGER/Line Files (2021)[7]. Urbanized Areas (UAs), Urban Clusters (UCs) and Rural/Non-Urban areas were defined by the US Census Bureau based on 2010 US Census. The MSA delineations used in this analysis were updated in March 2020, based on official standards published in the Federal Register on June 28, 2010 (OMB 17-01). Boundaries of MPOs and FDOT Districts were obtained from FDOT.

[5] https://www.bebr.ufl.edu/population_page_repo/florida-estimates-of-population-2021/
[6] Cambridge Systematics. (2021). *Memorandum for the 2020 Dun & Bradstreet Employment Data*
[7] https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.2021.html#list-tab-UF4E6JR9HV90QE1VYV

POPULATION ESTIMATES

This section describes the data sources and methods used for producing 2021 estimates of population and population density. By default, all estimates refer to FDOT estimates produced, unless otherwise specified (e.g., BEBR population estimates). An ArcGIS toolbox was developed to automate the computing process, which will significantly reduce the time needed for future population estimates. The scripts were developed using Python, an open-source programming language.

Step 1. Develop Population Estimates for FDOT Districts

For each FDOT District, the sum of all BEBR county population estimates were calculated, and then rounded to the nearest hundred.

Step 2. Develop Population Estimates for Counties

First, initial county population estimates were produced by rounding BEBR county population estimates to the nearest hundred. After rounding, the sum of county estimates in a district may not match that district's rounded population estimates (produced in **Step 1**). If a mismatch was identified, an adjustment process was performed to resolve the issue: If the sum of initial county estimates exceeds the district's population estimate by N * 100, identify N counties whose BEBR estimates' last two digits are greater than but closest to 50, and reduce their initial FDOT estimates by 100. If the district's population estimate exceeds the sum of initial county estimates by N * 100, identify N counties whose BEBR estimates' last two digits are smaller than but closest to 50, and increase their initial FDOT estimates by 100.

Step 3. Develop Population Estimates for Cities

Initial population estimates for cities were produced by rounding BEBR city population estimates to the nearest hundred. Then, the same adjustment process described in **Step 2** was applied, so that the sum of city population estimates in each county match the county population estimate produced in **Step 2**.

Population estimates for unincorporated areas in each county were calculated by subtracting population estimates in all cities in the county from the county's population. Note that the City of Weeki Wachee was disincorporated on June 9, 2020. Therefore, the population of Weeki Wachee was added to the unincorporated area in Hernando County.

Step 4. Develop Population Estimates for Urban/Rural Areas

First, the percentages of county population that live in each urban area (UA or UC) was calculated based on the 2010 Census Urban Area-County Relationship Table. For each urban area-county pair, the 2010 Census Relationship Table summarizes the total county population and the number of residents that live both in this county and the urban area, among other data fields for year 2010. Then, assuming these percentages remain the same and apply them to corresponding 2020 Census population and 2021 population estimates (**Step 2**) in every county. This yielded the number of residents that live in each urban area by county. The Century, FL-AL Urban Cluster and the Pensacola, FL-AL Urbanized Area each includes a county from Alabama. The 2021 population estimates for these two counties (Baldwin County, AL and Escambia

County, AL) came from the 2021 Census population estimates. Finally, the total population living in each urban area was summarized for year 2020 and 2021.

To estimate rural areas' population, the total number of residents living in any urban area was summarized for each county. The rural area population of a county was calculated by subtracting the total number of residents living in urban areas from the county population.

All population estimates for year 2021 were rounded to the nearest hundred.

Step 5. Produce Population Estimates for MPOs

For each MPO, the total population residing in all counties that an MPO is located in was calculated using county population data from Census 2010, Census 2020, and **Step 2**. The Florida-Alabama TPO includes two out-of-state counties: Baldwin County, AL and Escambia County, AL. These two counties are not included in BEBR estimates, so their 2021 Census population estimates were used in the analysis. For easier reference, these calculated populations are referred to as MPO-related county population in the remainder of this section.

Then, the percentage of MPO-related county population living in each MPO was calculated using 2010 MPO population estimates and 2010 Census population. The 2010 MPO population estimates were the most recent MPO population estimates based on Census data at the time of analysis, and thus were deemed the most reliable reference.

Assuming the ratio of MPO-related county population living in each MPO stays the same, 2020 MPO population estimates were updated using 2020 Census population, and 2021 MPO population estimates were produced using BEBR 2021 population estimates. All estimates were rounded to the nearest hundred.

Step 6. Calculate Population Change

Based on results from **Step 1-5**, both the absolute population changes and the percentage population changes have been calculated by FDOT District, county, city, urban/rural areas, and MPOs.

Step 7. Calculate Population Density

Population densities (persons per square mile) were calculated using land area ("ALAND") reported in 2010 Census, and population estimates developed in previous steps. Population densities were reported by FDOT Districts, counties, UAs, and MSAs. The density estimates of UAS and MSAs adopt the same approaches as **Step 4**.

EMPLOYMENT ESTIMATES

Step 1. Verify Location Information

The Dun & Bradstreet employment dataset includes 1,501,412 records. Each employment record has multiple data fields that contains location information, such as street address, census tract, county, and latitude/longitude coordinates. Consistency between these data fields were reviewed. Data review identified 15,791 (1.05%) records with inconsistent county and street address data, and 18,806 (1.25%) records with inconsistent latitude/longitude and census tract information.

The street addresses of these records with inconsistent location data were verified using the Census Geocoder[8], and their location information were updated based on geocoding results. If the Census Geocoder returned no result or multiple results that partially matched the original address, this record's street address was deemed invalid, and all location data fields were updated based on latitude/longitude coordinates.

Step 2. Summarize Employment Data

Using verified or updated location information from **Step 1**, employment records were mapped in ArcGIS, and summarized by different geographic areas, including FDOT Districts, counties, cities, urban/non-urban areas, and MPOs. The 2020 Dun & Bradstreet employment data was summarized by 2-digit NAICS code[9]. NAICS stands for "North American Industry Classification System", which is a standard used by Federal statistical agencies in statistical analysis related to U.S. business economy. Two-digit NAICS code represent industry sectors. Three sectors (Manufacturing, Retail Trade, and Transportation and Warehousing) are represented by a range of 2-digit codes. **Table 1** summarizes the total employment by industry.

[8] https://geocoding.geo.census.gov/geocoder/
[9] https://www.census.gov/naics/

Table 1. Total Employment by Sector

NAICS Code	Sector	Employment
62	Health Care and Social Assistance	1,307,351
44-45	Retail Trade	1,199,881
72	Accommodation and Food Services	959,691
56	Administrative and Support and Waste Management and Remediation Services	874,764
54	Professional, Scientific, and Technical Services	835,093
61	Educational Services	765,907
92	Public Administration	650,284
23	Construction	639,238
81	Other Services (except Public Administration)	617,634
31-33	Manufacturing	567,813
42	Wholesale Trade	454,657
52	Finance and Insurance	400,271
48-49	Transportation and Warehousing	363,650
53	Real Estate and Rental and Leasing	354,151
71	Arts, Entertainment, and Recreation	237,636
51	Information	206,176
11	Agriculture, Forestry, Fishing and Hunting	72,523
22	Utilities	44,000
55	Management of Companies and Enterprises	29,999
21	Mining, Quarrying, and Oil and Gas Extraction	6,120

COMMUTING TRENDS SUMMARY

For easier comparison, the 2021 Commuting Trends in Florida Report used the same metrics as the 2019 report. Because the COVID-19 pandemic disrupted the ACS data collection effort in 2020, the 2020 ACS 1-year estimates did not meet Census Bureau's quality standards. Therefore, the ten-year trend analysis used ACS 1-year estimates for year 2011-2021 (excluding 2020). The summary compared commuting trends in Florida and nationwide, and reported a variety of commuting characteristics in Florida by MSA, state, and county.

ACS data was queried and downloaded from https://data.census.gov/, an official platform for accessing digital content from Census Bureau. The 2021 ACS Table List and Detailed Table Shells[10] were used to identify table IDs that can provide data required for this analysis.

For example, **Table B08301 – Means of Transportation to Work** provides means of transportation (MOT) information for commute trips. To search for MOT information for all counties in Florida and the state of Florida, the following filters were applied along with the table ID "B08301":

- Geography: Select *State* > *Florida*. Select *County* > *Florida* > *All Counties within Florida*
- Surveys: Select *American Community Survey* > *1-Year Estimates* > *Detailed Tables*
- Topics: Select *Employment* > *Commuting*
- Years: Select *2021*

If there were multiple 2021 ACS tables that contained information for the same topic, the table that provided information for more geographical areas would be chosen as the data source.

[10] https://www.census.gov/programs-surveys/acs/technical-documentation/table-shells.html