

Tennessee State Data Center

Your Local Population and Census
Partner



BOYD CENTER FOR BUSINESS &
ECONOMIC RESEARCH



Tennessee State Data Center

Tim Kuhn, Director

Agenda

- Intro the **TNSDC**
- 2020 Census Results and Trends
- Population Projections
- 2020 SDC Products
- 2020 Census Products
- PUMA Geography Update
- Q & A

To know us is to love us...

INTRO TO THE STATE DATA CENTER

TNSDC Mission

- “Make Tennessee Data Users Stronger”

We are experts in accessing, understanding and disseminating data about Tennessee. We make it understandable and useful to citizens, businesses and agencies across the state. We work continuously to find innovative ways to add value to Tennessee’s state and local government agencies.

TNSDC Partnership

- **State of Tennessee**
 - Funding
 - Key customer/client
- **University of Tenn. – Boyd Center, Haslam Business College**
 - Brand/platform
 - Center of expertise
 - Overhead and services
- **Census Bureau**
 - Training and resources
 - Access to the national SDC network
- **Data Center Affiliates**

Four primary relationships

PERENNIAL STATE-CENSUS RELATIONSHIPS

1. State Data Center

- Origins and evolving roll
- Active in 50 states and 6 territories
- Mission
 - Efficient access to Census Bureau data and data products
 - Training and technical assistance
 - Feedback on usability, data needs and operational issues
- Other work as assigned...

2. FSCPE/FSCPP

- Active in 50 states and Puerto Rico
- Typical designation
 - State demographer
 - Universities

2. FSCPE/FSCPP Roles

- **Pop estimates support**
 - Vital stats
 - [Group quarters](#)
 - **Housing unit review**
 - Estimate review
- **2020 Census Roles**
 - Define College off-campus areas (E-NRFU)
 - Census Master Address File Review (Count Review Operation)
- **Support other state-census relationships**


3. Governor's liaison

- Active during decennial census
- Currently vacant

4. Geography Update Partnerships

- Redistricting liaison
 - Comptroller, Office of Local Government
- Boundary Annexation Survey (BAS)
 - Unofficial state partnership
- School District Boundaries
- Participant Statistical Area Program (PSAP)
- Local Update of Census Address (LUCA)

Engaging with TNSDC

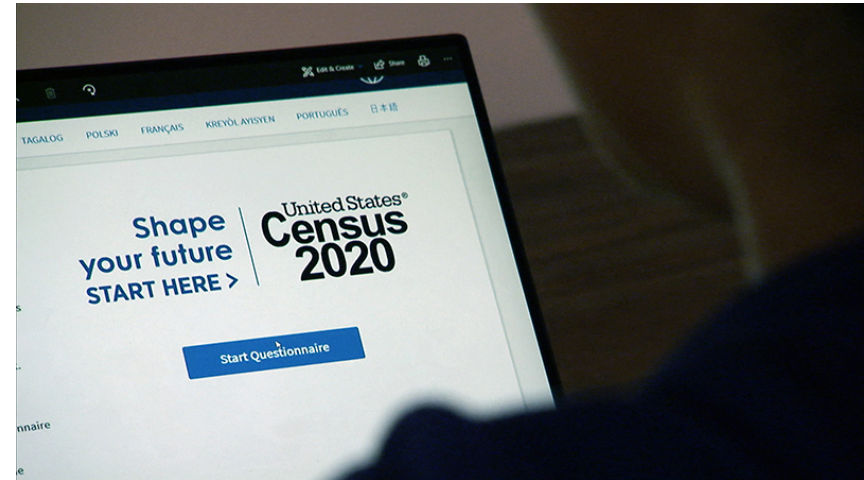
- Subscribe
 -  @TNSDC
 - Bimonthly newsletter
- Webinar Series
- Questions: Call or email

What's been released and what we have learned about Tennessee.

RECAPPING THE 2020 DECENNIAL CENSUS DATA RELEASE

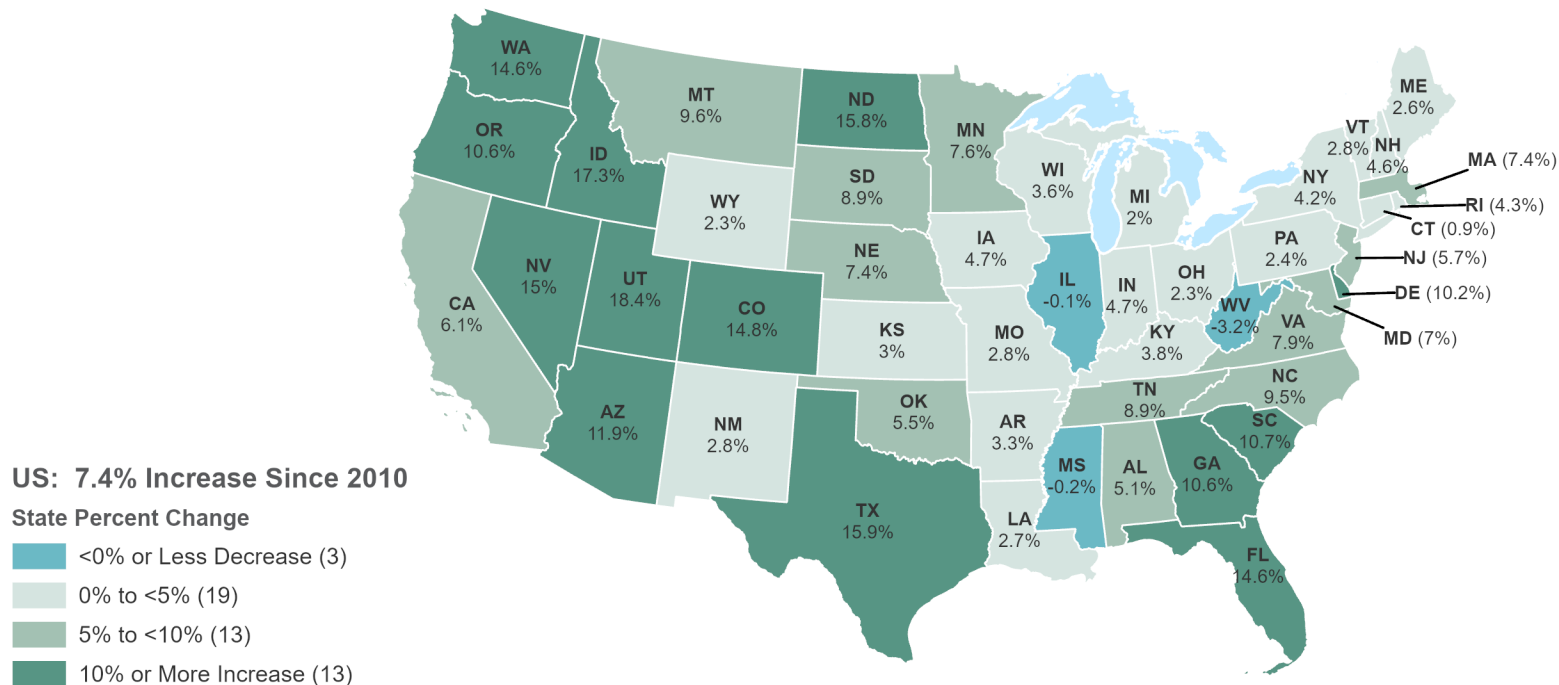
Who is counted and what is collected?

- Every person living in U.S and military/federal employees living overseas
- Place of residence of April 1, 2020
- Data collected
 - Age
 - Sex
 - Race/Hispanic ethnicity
 - Relationships
 - Occupied and vacant housing units
 - Population in group quarters



2020 Census

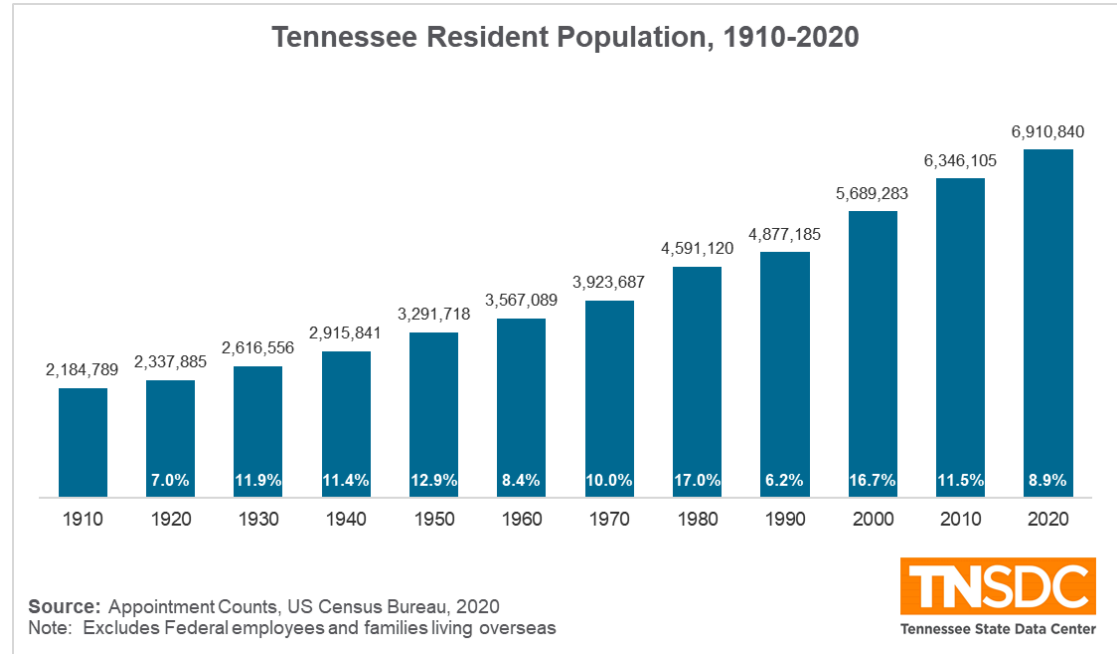
Percent Change in Resident Population (2010-2020)



Map: Tennessee State Data Center, University of Tennessee, Knoxville • **Source:** Resident Population of the 50 States (Table 2), US Census Bureau, 2010 and 2020 • **Note:** Resident population excludes counts of overseas U.S. military and federal civilian employees (and their dependents living with them).

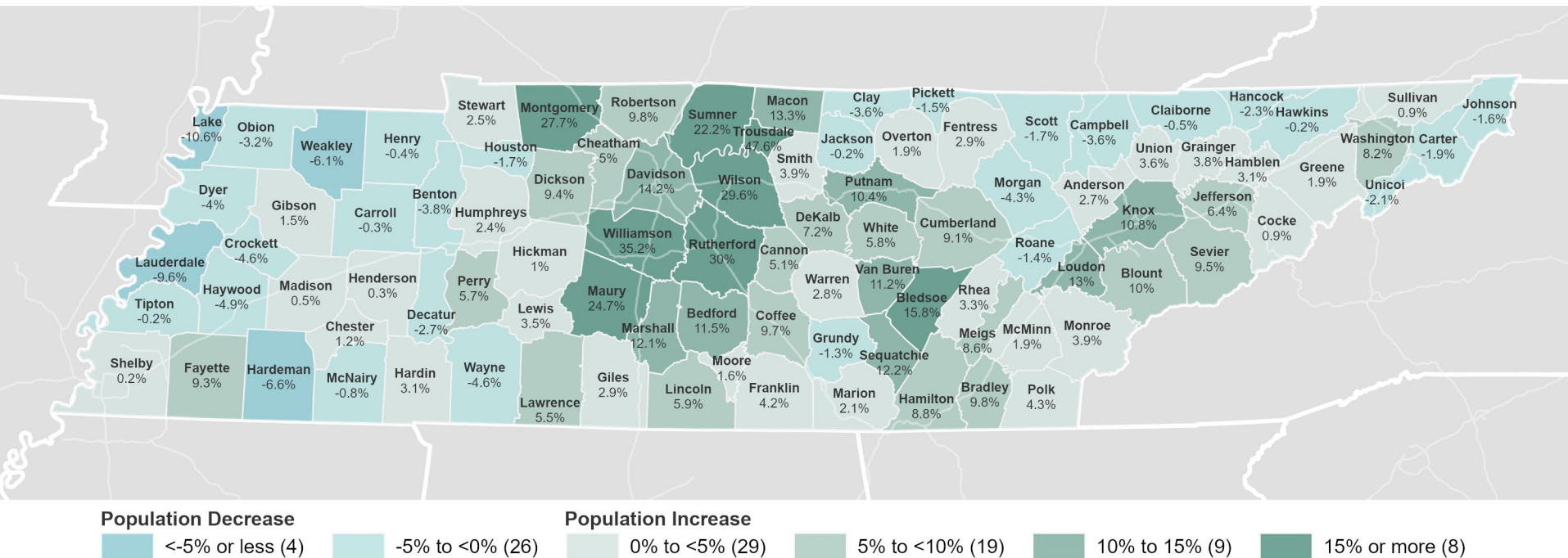
Tennessee's growth was slower last decade but outpaced the US

- 6.91 million residents in 2020
- 564,735 increase (8.9%)
- Slowest percentage gain since 1980 to 1990



Tennessee 2020 Census

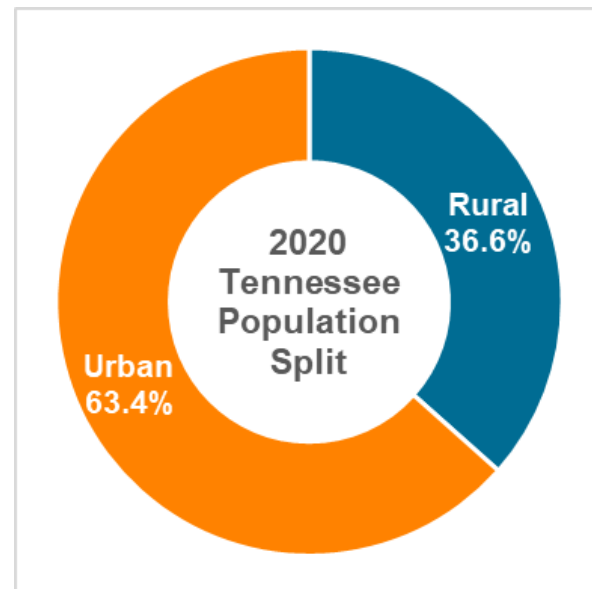
Percent Change in County Population (2010-2020)



Map: Tennessee State Data Center, University of Tennessee, Knoxville • **Source:** 2020 Census P.L. 94-171 Redistricting Data Summary File, 2010 Census Summary File 1 by U.S. Census Bureau

Rural population losses are accelerating

- 65 of 95 counties grew last decade
- Rural counties with population loss
 - 8 counties 2010
 - 29 counties in 2020
- 2 point decrease in share of population living in rural counties since 2000



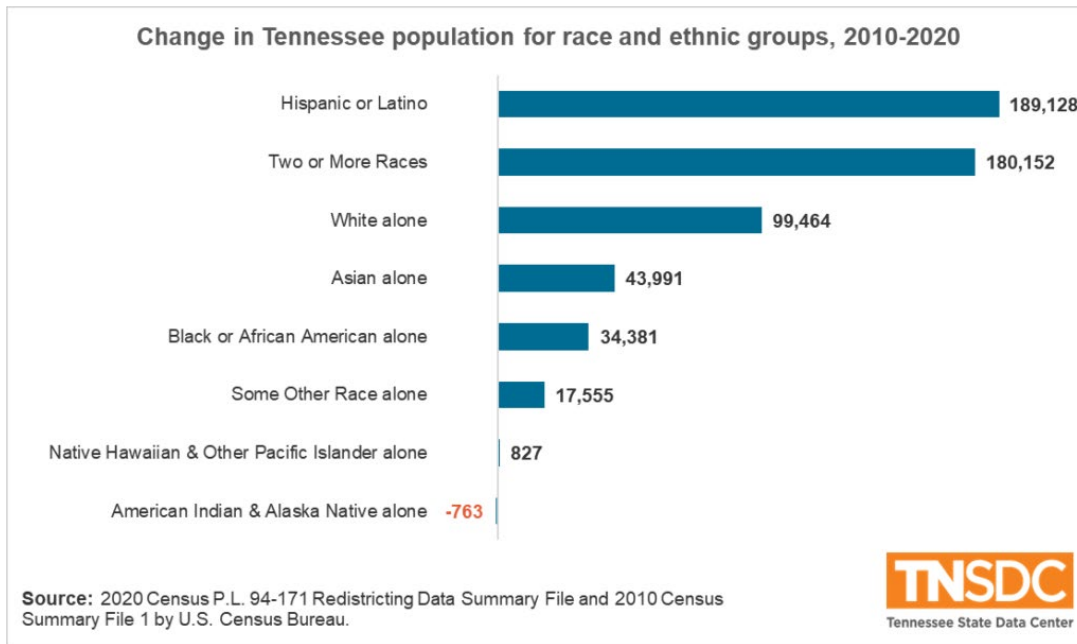
- 65 of 95 counties have fewer children than 10 years ago
- Adult population declined in only 18 counties



Growing Racial and Ethnic Diversity

- Most groups race and ethnic groups grew
- 82% of population increases since 2010 were not “white” alone

*Race question and coding changes partially responsible



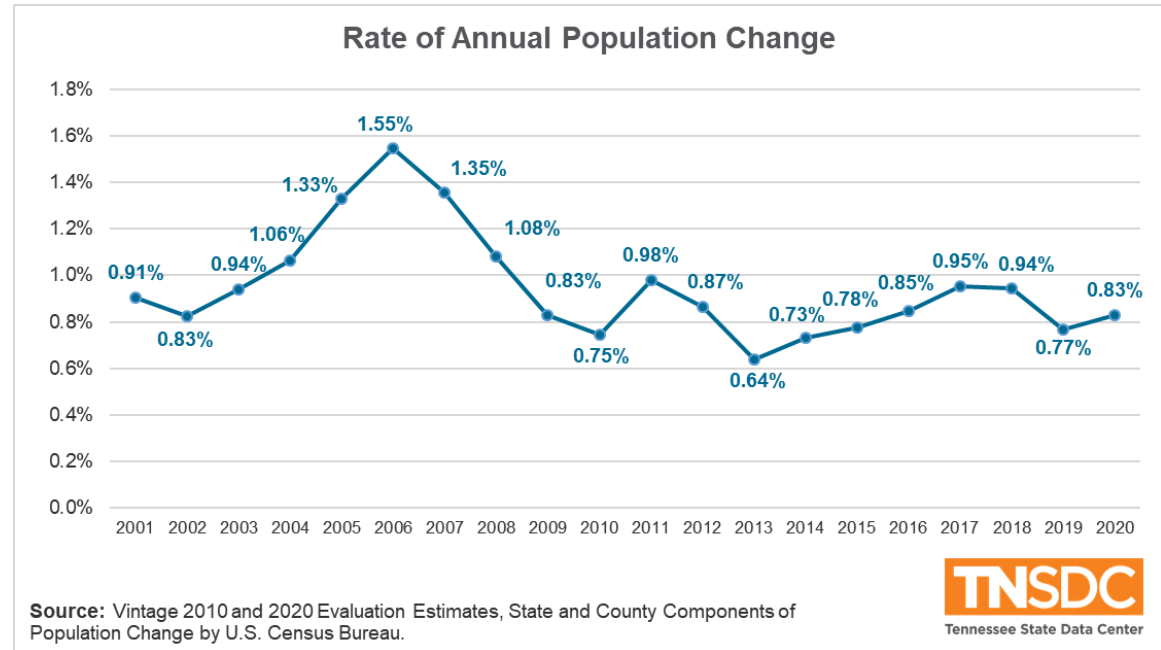
Population increases in 2000's were more concentrated in the middle-part of the decade

Annual Growth Rate

- 2000 - 2010: 1.06%
- 2011 - 2020: 0.93%

Through the 2000's annual growth rates regularly exceed 1% in non-recessionary years.

From 2011 to 2020 annual increases were generally lower and more consistent.



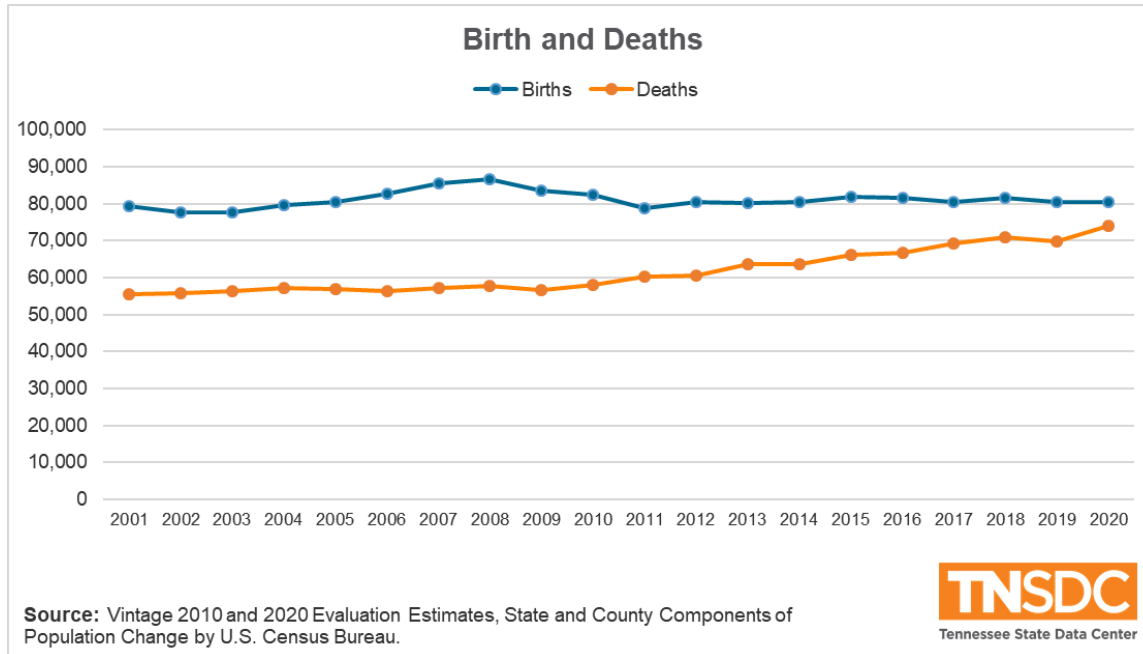
An aging population pushed deaths higher while births have remained nearly flat

Population gains from natural change (births – deaths) are steadily withering.

Fertility rates are at historic lows and continue to fall

Increasing deaths from an aging population will continue to climb

Eight US states saw a natural decrease in 2020



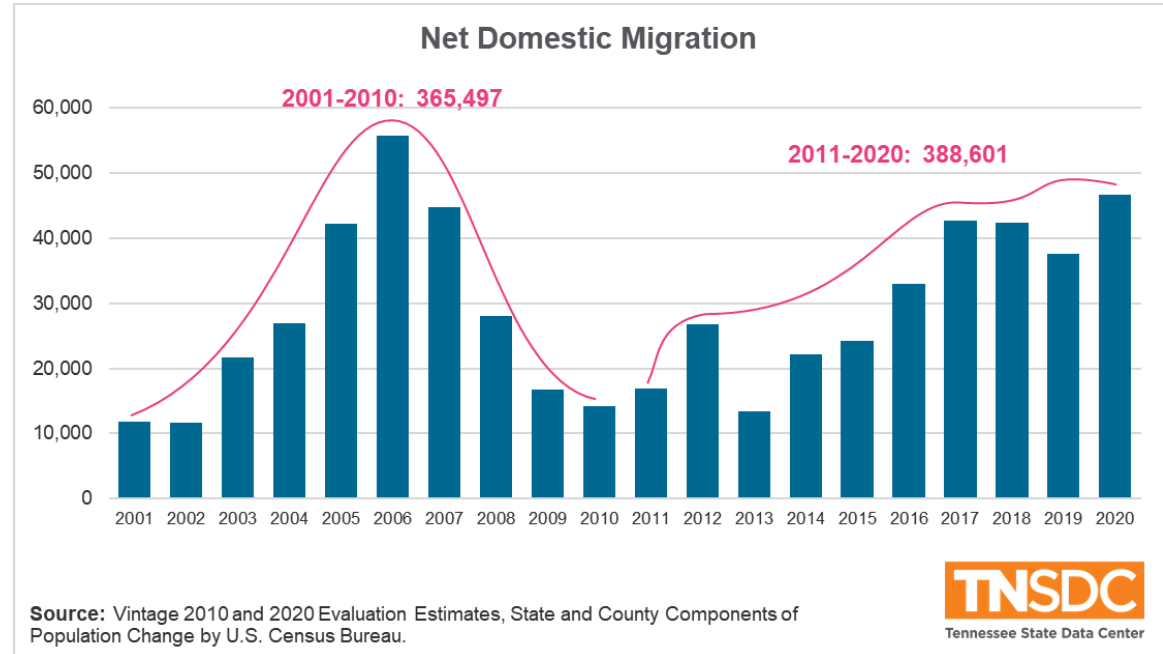
Economic cycles have influenced migration patterns in the last two decades

Domestic net migration totals in the 2000's and 2010's are comparable

Recessionary periods in the 2000's bookended the highest increases in 2006

2011 to 2020 saw steadily increasing migration

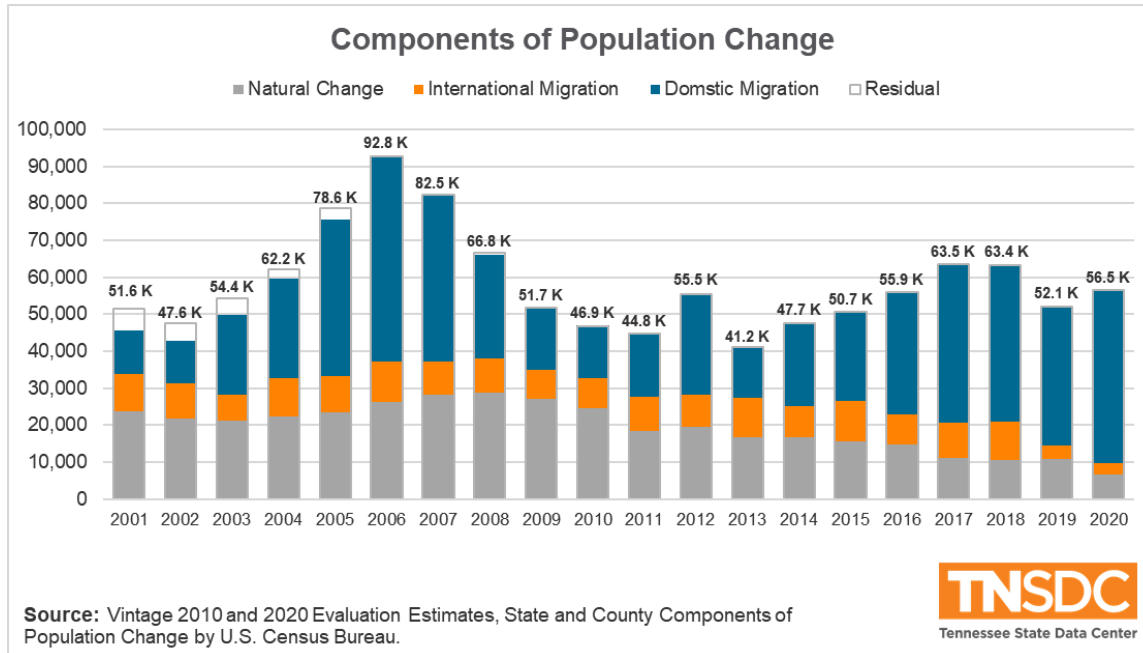
Migration trends during the pandemic are unclear but dramatic departures from recent trends are not yet evident



Current trends suggest domestic net migration will drive further state population increases

Domestic migration accounted for 51.8% of population increases in 2000's, but grew to 63.4% in the 2010's

Change Component	2001-2010	2011-2020
Natural Change	35.2%	23.1%
International Migration	13.0%	13.5%
Domestic Migration	51.8%	63.4%



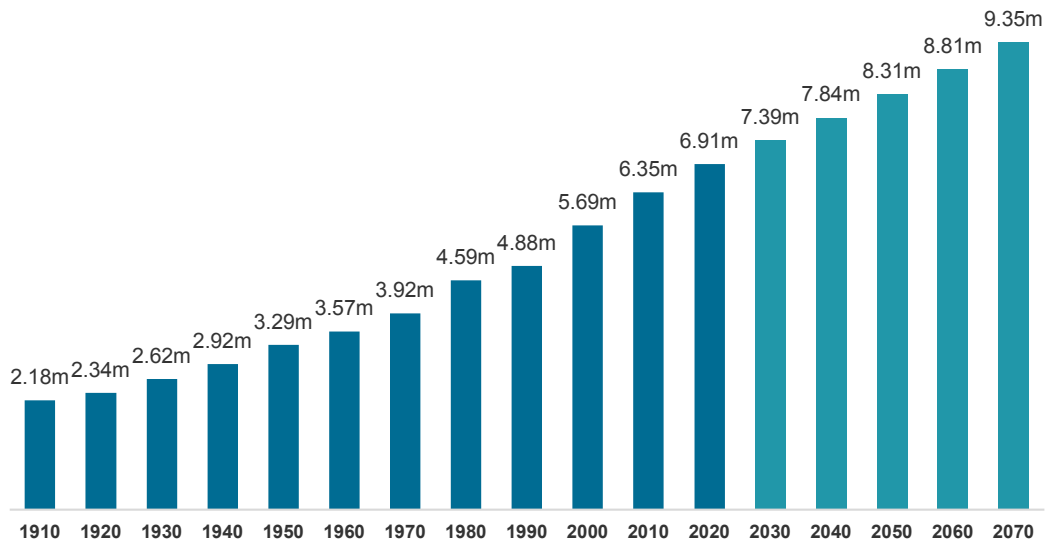
Where is population headed

BOYD CENTER POPULATION PROJECTIONS

Boyd Center Projection Overview

- Updated Biennially
- County-level
- Sub-county methodology

Tennessee Census and Projected Population



Source: Appointment Counts, US Census Bureau, Boyd Center Population Projections

Cohort Component Projection Methodology

Inputs

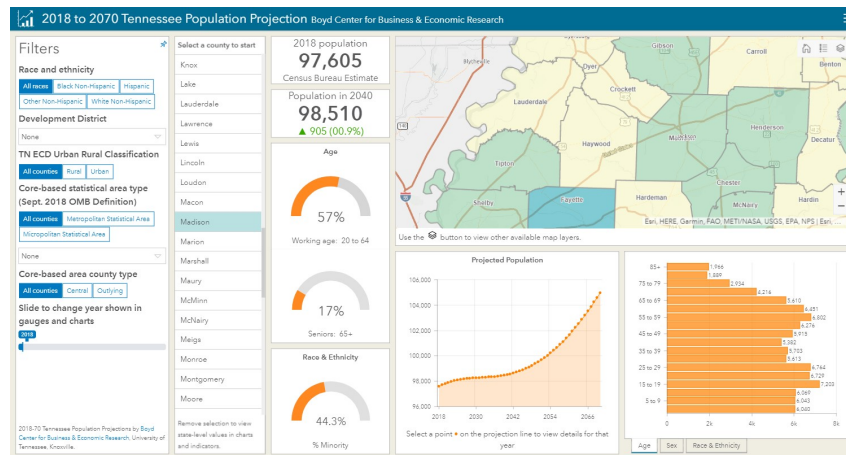
- Decennial census & population estimates
- Vital statistics
- Life tables
- Birth rates

Projected variables

- 95 counties
- Race, age and sex
- 5-year age bands

Accessing the Projections

- Excel Workbook
 - Raw data
 - Summary-levels
- GIS formats
- Interactive dashboard



<https://tnsdc.utk.edu/estimates-and-projections/boyd-center-population-projections/>

Projection Updates

- Current (October, 2019)
 - 2000 Base Year, 2018 Estimates
 - 2019 Launch Year
- Update (Expected Q1 2022)
 - 2000 Base Year, 2020 Eval. Estimates
 - 2020 Census incorporated
 - 2021 Launch Year
- Webinar early next year

Too soon to tell...

- 2021 Projection Trends
 - COVID-19 impacts
 - +12,000 Deaths (Natural decrease)
 - Accelerating migration patterns?
 - Further fertility-rate declines
- Employment Forecast?

Ready-to-use GIS for Tennessee

2020 CENSUS DATA PRODUCTS

2020 Census Data Releases

- **Apportionment Counts** (April 26, 2021)
 - Nation and states
 - Population
- **P.L. 94-171 Redistricting Data** (August 12, 2021)
 - All census geographies
 - Housing, population and characteristics
- **Upcoming Releases**
 - Demographic Profiles (Age, sex, household relationship) (TBD)
 - Demographic and Housing Characteristics (formerly SF1) (TBD)
 - Urban Areas (Final criteria, geography) (Early 2022)

Retrieving 2020 Census Data

- **New Census Data Users**
 - Review [Census Academy](#) videos
- **Experienced Users**
 - Tabular data from data.census.gov
 - GIS DIY - Assemble “Legacy” Format Data
 - [TIGER/Line 2020 Shapefiles](#)
 - [Redistricting Data Summary Files](#) (Text)
 - [Microsoft Access Table Shells](#)
 - Download from Tennessee data from **TNSDC**
 - [NHGIS](#) (National coverage)

TNSDC “QuickStats” 2020 Census Data

- 33 most requested fields from Redistricting release
- Available Formats
 - Tables: CSV, Excel
 - GIS: Shapefile, File Geodatabase, ArcGIS Online Hosted Feature Layers

Decennial Census Content on TNSDC Site

- “QuickStat” data downloads
- Ready-to-use maps (PDF, PNG)
- Data for 2000 and 2010



The screenshot shows the Tennessee State Data Center website. The header includes the University of Tennessee Knoxville logo and the center's name. A left sidebar contains a search bar and a list of navigation links: Home, About, Conferences and Training, Data and Tools, Tennessee Leading Economic Indicators, 2020 Census Data Products (highlighted), Estimates and Projections, Special Census, News, and Give to UT. The main content area features sections for '2020 Census Data Products', 'Download 2020 Census Data Files', '2020 QuickStats Tables and GIS Data', and '2000 and 2010 Census Data'. A button labeled 'View and Download Quickstat Data' is visible under the 2020 QuickStats section. The bottom section for 2000 and 2010 data includes a map of Tennessee and descriptive text about the compiled data.

<https://tnsdc.utk.edu/data-and-tools/2020-census/>

How you think about decennial census data should change

2020 CENSUS DISCLOSURE AVOIDANCE: CONSIDERATIONS FOR DATA USERS

2020 Census Disclosure Avoidance Strategies

Differential Privacy (DP)

- Adds “noise” to published statistics

Publish fewer statistics

- Eliminate tables in upcoming 2020 data products
- Data at fewer geographic levels

2020 Census Data Product Planning

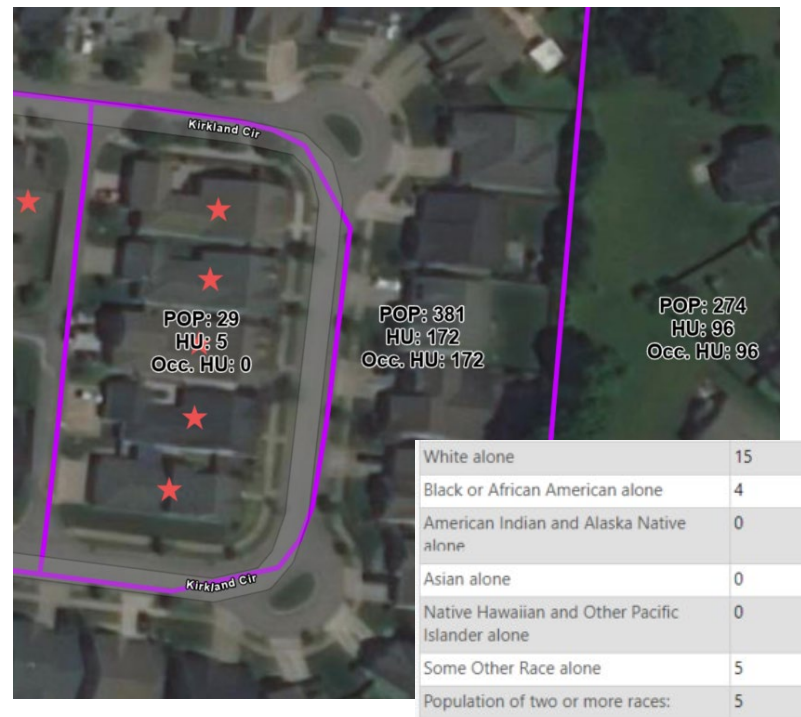
- Overview of 2020 Census Product changes
 - Demographic Profiles available at place-level or higher only (currently tract)
 - Reduces geographic levels of about 30 tables
 - Eliminates nearly 50 other tables
- Detailed in Crosswalk Spreadsheet
- Other proposals...

2020 Census Data Product Planning Crosswalk

Proposed 2020 Census Demographic Profile (DP) Crosswalk					
2020 DP Table Number	2010 DP Table Number	Title	Proposed 2020 Lowest Level of Geography	2010 Lowest Level of Geography	Proposed for Inclusion in 2020 DP
DP1	DP1	SEX AND AGE	Place/MCD	Tract	Yes
DP2	DP2	MEDIAN AGE BY SEX (1 expressed decimal)	Place/MCD	Tract	Yes
DP3	DP3	SEX FOR THE POPULATION 16 YEARS AND OVER	Place/MCD	Tract	Yes
DP4	DP4	SEX FOR THE POPULATION 18 YEARS AND OVER	Place/MCD	Tract	Yes
DP5	DP5	SEX FOR THE POPULATION 21 YEARS AND OVER	Place/MCD	Tract	Yes
DP6	DP6	SEX FOR THE POPULATION 62 YEARS AND OVER	Place/MCD	Tract	Yes
DP7	DP7	SEX FOR THE POPULATION 65 YEARS AND OVER	Place/MCD	Tract	Yes
DP8	DP8	RACE	Place/MCD	Tract	Yes
DP9	DP9	RACE (TOTAL RACES TALLIED)	Place/MCD	Tract	Yes
DP10	DP10	HISPANIC OR LATINO	Place/MCD	Tract	Yes
DP11	DP11	HISPANIC OR LATINO BY RACE	Place/MCD	Tract	Yes
DP12	DP12	RELATIONSHIP	Place/MCD	Tract	Yes
DP13	DP13	HOUSEHOLDS BY TYPE	Place/MCD	Tract	Yes
DP14	DP14	HOUSEHOLDS WITH INDIVIDUALS UNDER 18 YEARS	Place/MCD	Tract	Yes
DP15	DP15	HOUSEHOLDS WITH INDIVIDUALS 65 YEARS AND OVER	Place/MCD	Tract	Yes
DP16	DP18	HOUSING OCCUPANCY	Place/MCD	Tract	Yes
DP17	DP19	HOMEOWNER VACANCY RATE (1 expressed decimal)	Place/MCD	Tract	Yes
DP18	DP20	RENTAL VACANCY RATE (1 expressed decimal)	Place/MCD	Tract	Yes
DP19	DP21	HOUSING TENURE	Place/MCD	Tract	Yes
N/A	DP16	AVERAGE HOUSEHOLD SIZE (2 expressed decimals)	N/A	Tract	No, proposed for inclusion in 2020 Detailed DHC
N/A	DP17	AVERAGE FAMILY SIZE (2 expressed decimals)	N/A	Tract	No, proposed for inclusion in 2020 Detailed DHC
N/A	DP22	POPULATION IN OCCUPIED HOUSING UNITS BY TENURE	N/A	Tract	No, proposed for inclusion in 2020 Detailed DHC
N/A	DP23	AVERAGE HOUSEHOLD SIZE OF OCCUPIED HOUSING UNITS BY TENURE (2 expressed decimals)	N/A	Tract	No, proposed for inclusion in 2020 Detailed DHC

Impact of Differential Privacy

- **Invariant**
 - Population in each state
 - Number of housing units
 - Number and types of groups quarter facilities
- **Subject to Noise Infusion**
 - Occupied/vacant households
 - Population counts and all characteristic
- **Population decoupled from household and housing unit**



Implausible Block Scenario 1

- One occupied housing unit but dozens of people
- 1,433 blocks (0.8%)



Implausible Block Scenario 2

- Everyone in area under age 18
- 3,050 blocks (1.7%)



Implausible Block Scenario 3

- Zero occupied housing units but more than zero household population
- 9,869 blocks (5.5%)



Implausible Block Scenario 4

- More occupied housing units than people
- 1,409 blocks (0.8%)



Aggregate blocks

- Aggregate blocks to areas with >500 people
- Use block groups instead
- Census Bureau research

95% of block groups were within 5% of published statistics using 2010 PPMF and published SF1 data

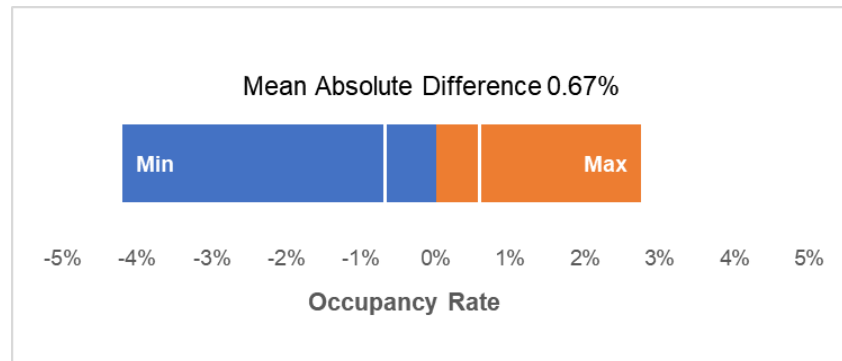
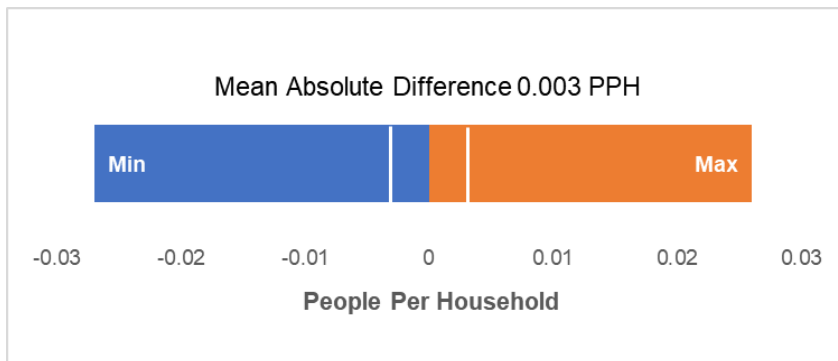
Avoid rate calculations at tract and smaller

Data should not be divided across tables in low population areas

2010 PPMF v 2010 SF1 for MCD's <5000 people

Persons Per Household

HU Occupancy Rates



Source: UMass Donahue Institute, Economic and Public Policy Research & Population Estimates Program

Disclosure Avoidance Resources

- Census Bureau Website
 - Email Newsletter
 - DA Handbook (released 11/3)
 - 2020 Decennial Census Product Crosswalk

The screenshot shows the top of the Census Bureau website with a dark blue header. The header includes the 'United States Census Bureau' logo, a search bar, and navigation links: 'BROWSE BY TOPIC', 'EXPLORE DATA', 'LIBRARY', 'SURVEYS/ PROGRAMS', 'INFORMATION FOR...', 'FIND A CODE', and 'ABOUT'. Below the header is a breadcrumb trail: 'Census.gov > 2020 Census Decade > 2020 Decennial Census Program Management > Process > Disclosure Avoidance Modernization'. The main heading is '2020 Census Data Products: Disclosure Avoidance Modernization'. The text explains that modern computers and today's data-rich world have rendered the Census Bureau's traditional confidentiality protection methods obsolete. It mentions a powerful new disclosure avoidance system (DAS) designed to withstand modern re-identification threats. Two video thumbnails are visible on the right side of the page, one titled 'Protecting Privacy in Census Bureau Statistics' and another 'Protecting Privacy with the 2020 Census DAS'.

<https://www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance.html>

PUMA – not just the world's third largest sportswear producer

PUBLIC USE MICRODATA AREA UPDATE

Public Use Microdata Areas

- PUMA's
 - State-based, non-overlapping, statistical areas
 - No fewer than 100,000 people each
 - Follow county and census tract boundaries
 - Used with Public Use Microdata Samples (PUMS) products from ACS.
- Redrawn after decennial census by SDC's

Census Microdata

- Anonymized single-person and single-household responses
 - Decennial Census
 - American Community Survey (ACS)
- Custom tabulations not available in pre-compiled tables
- Accessed with statistical packages or MDAT

2020 Tennessee PUMA Criteria

- **Required PUMA Criteria (U.S. Census Bureau)**
 - Must not cross state boundaries
 - Must exceed 100,000 people and maintain this population throughout the decade
 - Must be constructed of counties and/or census tracts
 - Portions of counties included in PUMA's which cross a county line must not exceed 10,000 people
- **Other Guidance (U.S. Census Bureau)**
 - Should not contain more than 200,000
 - Should be contiguous
 - Should be comprised of areas entirely within or outside of CBSA's
 - Should maintain relationships with geographies including places, 2010 urban/rural delineations
 - Recognize Place of Work and Migration UMAs
- **Tennessee Specified Criteria**
 - Support longitudinal PUMA analysis by preserving existing boundaries when feasible
 - Whole counties with population in excess of 100,000 people should be preserved as individual PUMAs
 - Where feasible, create PUMA's nesting within Workforce Development Areas\Development Districts boundaries
 - Consider the boundaries of Metropolitan Planning Organization Boundaries and Metropolitan Planning Areas in PUMA delineations

2020 PUMA Update Scenarios

- Alternative 0: No changes
- Alternative 1: Minimal revisions
- Alternative 2: Conformance with PUMA Criteria



2020 PUMA Update Timeline

- Final PUMA Criteria (September, 2021)
- PUMA Drafting/Input (November 2021 – January 31, 2022)
- Webinar (Mid-December, 2021)

American Community Survey

- One-Year (65,000+)
 - 2020 Cancelled
 - Experimental, state-level replacement
- Five-year
 - 2016-2020 delayed until March
 - Cancellation of release is a possibility



Tim Kuhn

(865) 947-6070

tkuhn@utk.edu



BOYD CENTER FOR BUSINESS &
ECONOMIC RESEARCH



Tennessee State Data Center