



Mid-Ohio Regional
Planning Commission

2018 POPULATION ESTIMATE METHODOLOGY

■ SEPTEMBER 29, 2017

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BACKGROUND

This year, MORPC completed a comprehensive review of our process for estimating populations at the sub-county, jurisdictional level in the Central Ohio region. These estimates are completed annually for the purposes of calculating membership dues, determining member representation, as well as other analyses conducted by MORPC throughout the year. From this review, there was a concern that, even with previous years' efforts to 'close the gap' between MORPC population estimates and Census population estimates, the disparity between the two numbers persisted for some counties.

The gap for the entire 15-county MORPC region was closed to a difference of about 2,000 people in the 2017 estimates. However, in a county-by-county comparison, there were instances where MORPC estimates were greater than Census estimates by as many as 4,400 people, and where MORPC estimates were less than Census estimates by as many as 11,000 people¹. After a thorough review of both the data inputs and the methodology used for population estimates, two key improvement areas were identified: (1) Improve upon the building permit data collection process; and (2) Implement a methodology that better controls for uncertainties and known limitations when conducting sub-county population estimates.

PREVIOUS METHODOLOGY

The MORPC methodology for estimating population for years before 2017 added population to each jurisdiction by multiplying the number of new housing units built each year by the 2010 average household size. The population living in group quarters (e.g. dormitories, correctional facilities, nursing homes) was assumed to stay constant from the 2010 Census counts.

For the 2017 estimates (released this time last year), an assumption was added to the methodology in an effort to close the widening gap between MORPC population estimates and Census population estimates. The assumption was that the housing unit method was not sufficiently accounting for international migration—a significant source of growth in Central Ohio. The method for applying 'international migration' was to use the total population growth from international migration in each county, and distribute that growth to sub-county jurisdictions based on the relative size of the foreign-born population in each place².

- ¹ *Licking County was overestimated by 4,404 people and Franklin County was underestimated by 10,996 people when comparing July 1, 2016 Census population estimates to January 1, 2017 MORPC population estimates.*
- ² *The 2016 Census Population Estimate Program Components of Change table (PEPCCOMP) was used to determine total International migration. The Census American Community Survey (5-year 2010-2014 estimates) was used to determine the distribution of the foreign-born population for each county.*

2018 REVISED METHODOLOGY

The revised 2018 population estimate methodology makes the most of what we know about the population with the highest degree of certainty (see *Figure 1, page 4*). First, we can make a reasonable estimate of county total populations by starting with the 2010 Census population, then adding or subtracting population by using total births and deaths, and total net migration (both domestic and international) up to the estimate year³. Second, we can reasonably estimate how the population in each county is *distributed* by estimating the population for each sub-county jurisdiction. This is done by multiplying new housing units by average household size and occupancy rate⁴. Finally, these estimates of the share of the household population living within each sub-county jurisdiction are multiplied by the total household population in each county—resulting in sub-county population estimates that are based on more-certain data about births, deaths and migration.

Furthermore, MORPC conducted an in-depth review of its building permit collection process and data this year. Through this review—which involved consultation with building and planning staff in many of our member jurisdictions—MORPC was able to collect and verify more complete and accurate data inputs for the 2018 population estimates.

LIMITATIONS OF THE HOUSING UNIT METHOD FOR ESTIMATING POPULATION

Estimating population becomes increasingly difficult when evaluating places with smaller population sizes. Even when the input data is believed to be complete and accurate, using the housing unit method of population estimation has limitations. The two main limitations are related to occupancy rates and average household size: (1) these rates can change over time, and (2) these rates for an entire area (city, village, or township) are applied homogenously across the jurisdiction, even though actual rates are always likely to vary from place to place within the jurisdiction.

Since it is not feasible to know these exact rates at a high-level of detail for the population estimate year, there is a degree of error expected when using the housing unit method of population estimation alone. However, knowing where new housing units have been built, and estimating how many people live in those new housing units provides data about how the population is distributed in an area with a better-known population total—in this case, counties.

3 County-level births and deaths from 2010 through 2017 were obtained from the Ohio Department of Public Health. Net Migration from 2010 through July 1, 2016 was obtained from the 2016 Census Population Estimates Program Components of Change (PEPCCOMP). A trend analysis was used to estimate net migration for each county through January 1, 2018.

4 In order to estimate population based on new housing units, housing units are multiplied by occupancy rates (to account for the housing units that have no people living in them) and then by average household size (to estimate about how many people live in those new dwellings). In MORPC's analysis, single family and multi-family housing units were considered separately, using owner-occupied and renter-occupied rates, respectively.

GROUP QUARTERS POPULATION

Group quarters populations consist of persons not living in traditional households, such as incarcerated persons, students in dorms, and people in senior living facilities, etc. They are calculated separately from household population because residential building permit data used to track population growth does not adequately account for these groups.

In the 2018 methodology, after calculating the household population for each community, the population living in group quarters was added to complete the total population estimate. In addition to the 2010 Census group quarters population, MORPC accounted for any known new facilities, or any known increases in existing facilities (e.g. OSU students living in student housing). New facilities were identified, and corresponding population was added, using building permit data, meetings with local planning staff, and a spatial analysis, which compared 2010 group quarters population with the group quarters population, as reported in the most recent 5-year estimates of the American Community Survey⁴. MORPC uses the Census definition of group quarters populations in its estimates.

BENCHMARKING OUR ESTIMATES

The Ohio Development Services Agency (ODSA) publishes annual sub-county population estimates for the entire state of Ohio. These estimates are not used for MORPC's purposes, because they are published on a time-delay that does not align with MORPC's need for current-year estimates. Regardless, the ODSA sub-county estimates serve as an important benchmark as MORPC completes its annual population estimates.

The ODSA estimates are calculated with a similar methodology to the one that MORPC has used for the 2018 estimates—estimating the population distribution using housing units, then applying that distribution to a county-level total, based on more certain, administrative records-based data sources (births, deaths, and migration)⁵. Because MORPC works with a smaller area than the State, we are able to collect and verify building permit data directly from many of our member communities. As a result, our building permit data inputs are sometimes different than the building permit reports collected by the State, which has an impact on the 'share' of the population assigned to each jurisdiction.

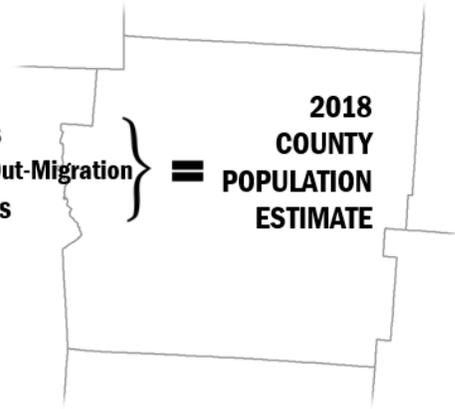
4 *ACS group quarter counts have high margins of error and were not used directly in our estimates. They do, however, point to any new group quarters facilities that have been identified by the U.S. Census Bureaus since 2010. MORPC used this as one of many tools to identify these facilities.*

5 *The most recent Ohio Development Services Agency sub-county population estimates, along with a description of their methodology can be found at <https://development.ohio.gov/files/research/P5027.pdf>.*

STEP 1

Calculate Total
County
Population

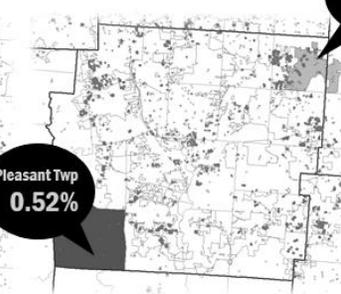
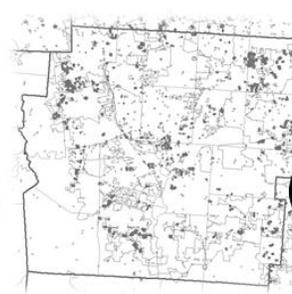
$$\begin{array}{l}
 \text{2010} \\
 \text{COUNTY} \\
 \text{CENSUS} \\
 \text{POPULATION}
 \end{array}
 + \left\{ \begin{array}{l} + \text{ Births} \\ + \text{ In-Migration} - \text{ Out-Migration} \\ - \text{ Deaths} \end{array} \right\} = \begin{array}{l} \text{2018} \\ \text{COUNTY} \\ \text{POPULATION} \\ \text{ESTIMATE} \end{array}$$



STEP 2

Calculate
Population
Distribution

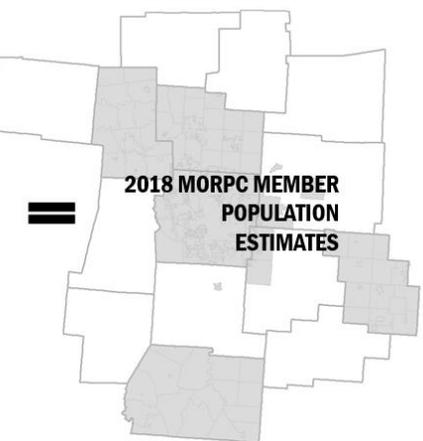
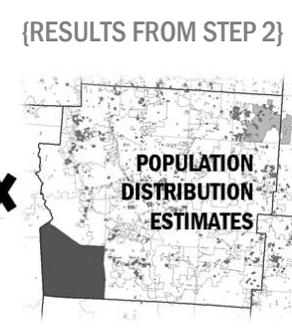
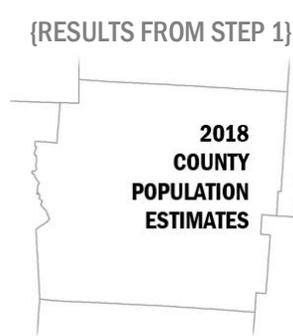
$$\begin{array}{l}
 \text{2010 CITY, VILLAGE \&} \\
 \text{TOWNSHIP CENSUS} \\
 \text{POPULATION}
 \end{array}
 + \left\{ \begin{array}{l} [\text{NEW HOUSING UNITS}] \\ \times [\text{PEOPLE PER HOUSE}] \\ \times [\text{OCCUPANCY RATE}] \end{array} \right\} = \begin{array}{l} \text{SUB-COUNTY} \\ \text{POPULATION} \\ \text{DISTRIBUTION} \end{array}$$



STEP 3

Calculate
Member
Estimates

$$\begin{array}{l}
 \{\text{RESULTS FROM STEP 1}\} \\
 \text{2018} \\
 \text{COUNTY} \\
 \text{POPULATION} \\
 \text{ESTIMATES}
 \end{array}
 \times \begin{array}{l}
 \{\text{RESULTS FROM STEP 2}\} \\
 \text{POPULATION} \\
 \text{DISTRIBUTION} \\
 \text{ESTIMATES}
 \end{array}
 = \begin{array}{l}
 \text{2018 MORPC MEMBER} \\
 \text{POPULATION} \\
 \text{ESTIMATES}
 \end{array}$$



2018 MEMBER POPULATION ESTIMATES METHODOLOGY

FIGURE
1



Mid-Ohio Regional
Planning Commission

111 Liberty Street, Suite 100
Columbus, Ohio 43215

T 614.228.2663
TTY 614.228.2663

www.morpc.org