

1. GEOGRAPHIC AREAS COVERED IN THE ACS

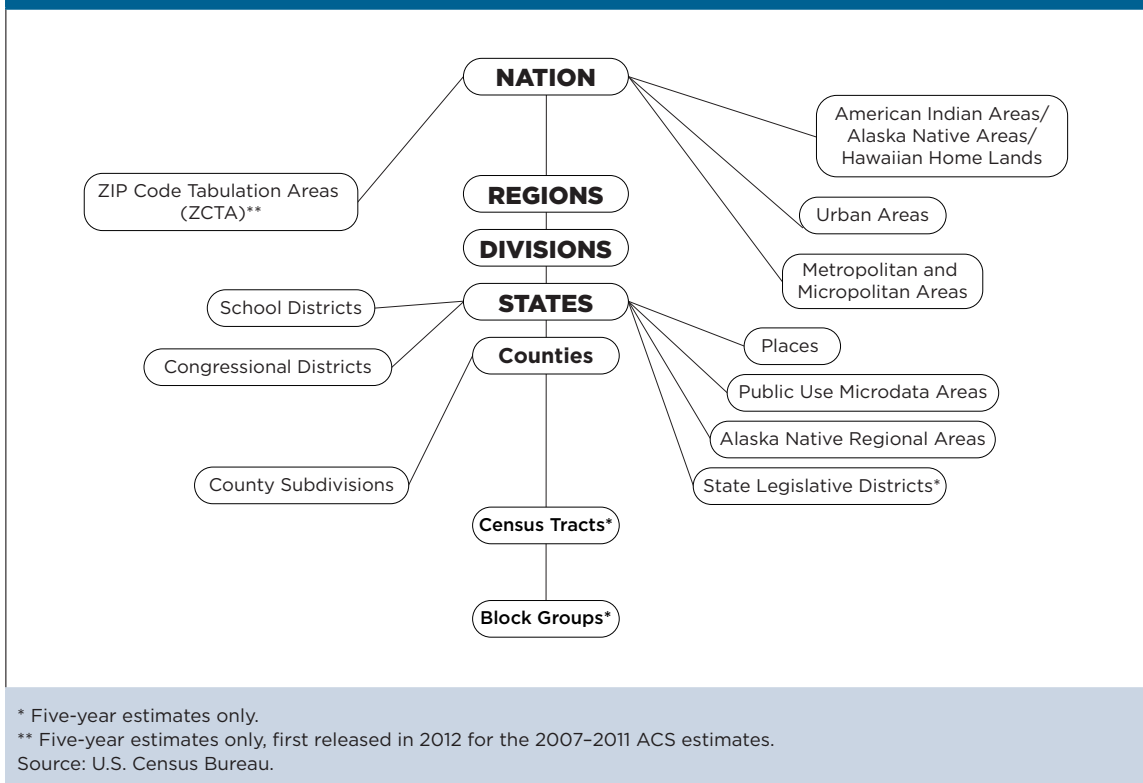
For reporting purposes, the U.S. Census Bureau divides the nation into two main types of geographic areas, legal and statistical. Legal areas are defined specifically by law, and include state, local, and tribal government units, and some specially defined administrative areas like congressional districts. Many, but not all of these areas, are represented by elected officials. An example of a legal area is New York State.

Statistical areas are defined directly by the Census Bureau and state, regional, or local authorities for the purpose of presenting data. Examples of statistical areas include census designated places, census tracts, urban areas, and metropolitan statistical areas (such as the Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Area).

Geographic areas are organized in a hierarchy (see Figure 1.1). Larger units, such as states, include smaller units such as counties and census tracts. This structure is derived from the legal, administrative, or areal relationships of the entities. In the American Community Survey (ACS), block groups are the lowest (smallest) level of geography published. Block group data are only available in the ACS 5-year data products. The ACS does not produce data at the block level.

In Figure 1.1, the geographic types connected by lines are nested within each other. For example, a line extends from counties to census tracts because a county is completely comprised of census tracts, and a single census tract cannot cross a county boundary.

Figure 1.1. **Hierarchy of Select Geographic Entities in the ACS**



If there is no line joining two geographic types, then an absolute and predictable relationship does not exist between them. For example, although many places (cities and towns) are confined to one county, some places, such as New York City, extend over more than one county (see Figure 1.2). Therefore, an absolute hierarchical relationship does not exist between counties and places.

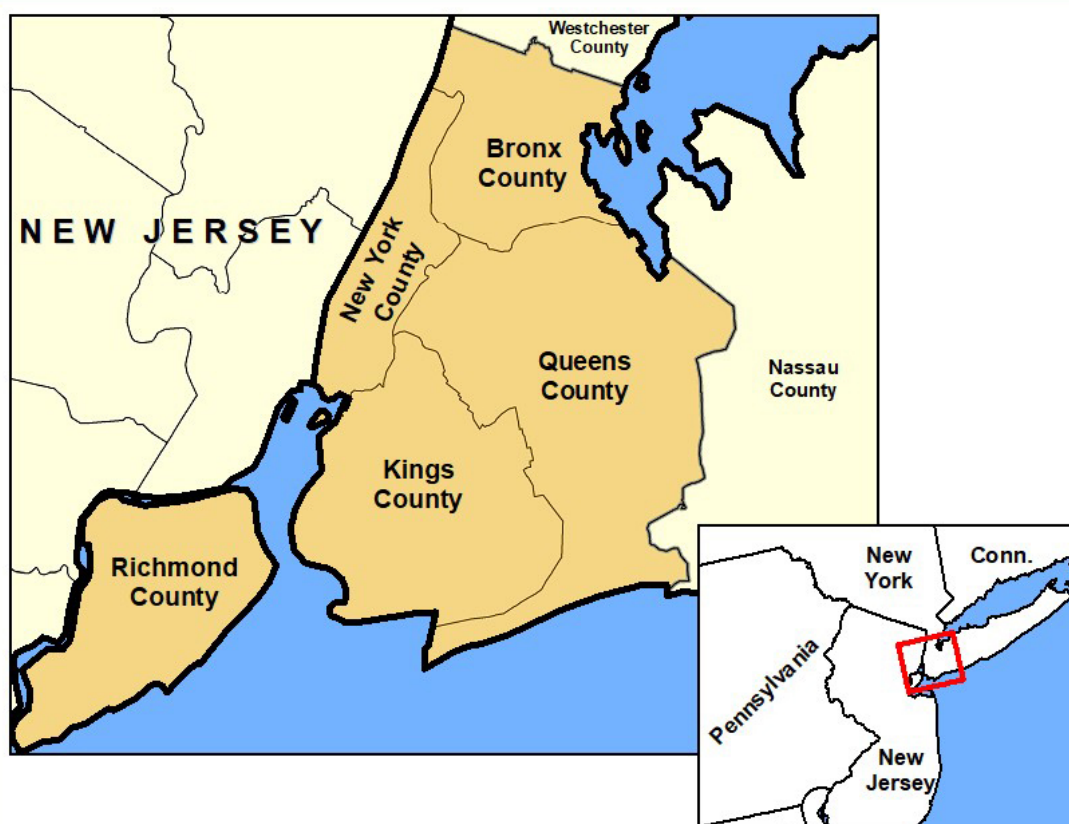
Geographic Summary Levels and Codes

There are two main types of identifiers that the Census Bureau uses for geographic areas: summary levels and geographic identifiers (GEOIDs).

Summary levels represent a geographic type, while GEOIDs are used to identify individual geographic areas. For example, State-County (summary level 050), represents the concept of a county within a state, while the GEOID for Madison County, Texas, is 48313 (state code '48' combined with county code '313'). These codes can be used to identify geographic areas in the ACS and many other public data sources.

Summary levels range from very large reporting units, such as "State," to much smaller reporting units such as "Census Tract." Each summary level has an assigned three-digit, summary-level code to help programmers link each summary level to its appropriate use in a

Figure 1.2. **Counties in New York City**



Source: U.S. Census Bureau, County Cartographic Boundary Shapefiles, <www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html>.

table, map, or other data summarization format. Here are some common summary levels used to identify types of geographic areas:

- 010 Nation
- 020 Region
- 030 Division²
- 040 State
- 050 State-County
- 140 State-County-Census Tract
- 155 State-Place-County
- 160 State-Place
- 250 American Indian Area/Alaska Native Area/Hawaiian Home Land
- 310 Metropolitan Statistical Area/Micropolitan Statistical Area
- 500 State-Congressional District

Summary levels may cross between two or more geographic hierarchies to produce units that are only portions of geographic areas. For example, summary level “State-Place-County” crosses the “State-Place” hierarchy with the “State-County” hierarchy and may create units that cover only a portion of one county.

A list of Cartographic Boundary File Summary Level Codes is available on the Census Bureau’s Web site.³

Geographic Codes

The Census Bureau and other state and federal agencies are responsible for assigning codes, or GEOIDs, to geographic areas. GEOIDs are numeric codes that uniquely identify each legal or statistical geographic area for which the Census Bureau tabulates data.

GEOIDS are useful for sorting names of geographic areas for presentation purposes or analysis, merging ACS data with data from other sources, identifying areas as legally or statistically defined entities, and describing the classification category of the area.

The Census Bureau uses several different code sets to identify geographic areas depending on area type and purpose. The most frequently used code systems are Federal Information Processing Series and American National Standards Institute codes.⁴

To identify a geographic area that is nested within a larger area, such as a state or the nation, one or more higher-level codes may be required. Census tract codes are unique within counties, and county codes are unique within states. Therefore, a complete set of state, county, and tract codes is needed to uniquely identify a particular census tract.

For example:

- The unique GEOID for census tract 201 in Autauga County, Alabama, is 01001020100.
- The unique GEOID for census tract 201 in La Paz County, Arizona, is 04012020100.

As shown in Table 1.1, a tract’s unique GEOID is created by combining its state, county, and census tract codes.

Some GEOIDs display additional information. For example, if you use the data.census.gov Web site to download ACS estimates for census tract 201 in Autauga County, Alabama, the GEOID is displayed as 1400000US01001020100, where “140” represents the summary level of the data, “0000” represents the two-digit geographic variant and the two-digit geographic component, “US” represents the United States, “01” represents the state of Alabama, “001” represents Autauga County, and “020100” represents the census tract.

For more information, visit the Census Bureau’s Web page on “Understanding Geographic Identifiers.”⁵

Table 1.1. GEOID Structure			
Name of census tract	State code	County code	Tract code
Census Tract 201, Autauga County, Alabama	01	001	020100
Census Tract 201, La Paz County, Arizona	04	012	020100
Source: U.S. Census Bureau.			

² Divisions represent regional subdivisions such as “Middle Atlantic Division.”

³ U.S. Census Bureau, Geography Program, Cartographic Boundary File Summary Level Codes, <www.census.gov/programs-surveys/geography/technical-documentation/naming-convention/cartographic-boundary-file/carto-boundary-summary-level.html>.

⁴ U.S. Census Bureau, Census Bureau Code Lists, American National Standards Institute (ANSI), <www.census.gov/library/reference/code-lists/ansi.html>.

⁵ U.S. Census Bureau, Geography Program, *Understanding Geographic Identifiers (GEOIDs)*, <www.census.gov/programs-surveys/geography/guidance/geo-identifiers.html>.

Population Thresholds for Geographic Areas

Each year, the Census Bureau publishes ACS 1-year estimates for geographic areas with populations of 65,000 or more. The 65,000-population threshold ensures that 1-year data are available for all regions, divisions, states, the District of Columbia, Puerto Rico, congressional districts, Public Use Microdata Areas (PUMAs), many large counties and county equivalents, metropolitan and micropolitan statistical areas, cities, school districts, and American Indian areas.⁶ The 1-year Supplemental Estimates—simplified versions of popular ACS tables—are also available for geographic areas with at least 20,000 people. These annual data provide policymakers, planners, business leaders, and others with a critical source of up-to-date information to plan for services such as transportation, medical care, housing, and schools.

For geographic areas with smaller populations, the ACS samples too few housing units to provide reliable single-year estimates. For these areas, several years of data are pooled together to create more precise multiyear estimates. Since 2010, the ACS has published 5-year data (beginning with 2005–2009 estimates) for geographic areas down to the census tract and block group levels.⁷

⁶ PUMAs are collections of counties—or census tracts within counties—with approximately 100,000 people each. PUMAs do not cross state lines. PUMAs were initially adopted by the ACS because they were the only wall-to-wall geographic entities below the state level that met the minimum population threshold of 65,000 required to disseminate ACS 1-year estimates.

⁷ For several years, the Census Bureau produced both ACS 3-year estimates (for areas with populations of 20,000 or more) and ACS 5-year estimates (for all geographic areas). Starting with the 2014 data release, the 3-year products were discontinued, but 5-year estimates are still published each year.

Table 1.2 shows the type and number of geographic areas included in the ACS 1-year and 5-year products for 2017. For example, in 2017, ACS 1-year data were available for 837 counties (26 percent of all counties), while the remaining 2,383 counties (74 percent of all counties) received 5-year estimates.

Data users interested in ACS estimates for areas with populations of 65,000 or more have a choice between the 1-year and 5-year data series. Which data should be used and why? The 1-year estimates for an area reflect the most current data but have larger margins of error (MOEs)—indicating less reliability or precision—than the 5-year estimates because they are based on a smaller sample. The 5-year estimates for an area have a larger sample and smaller MOEs than the 1-year estimates. However, they are less current because the larger samples include data that were collected in earlier years. The main advantage of using multiyear estimates is the increased statistical reliability for smaller geographic areas and small population groups.

In the end, what makes the most sense is a matter of judgment regarding the balance between the period covered by an estimate and its level of reliability or precision. The key is to strive to use only reliable estimates, where the period covered best suits the question at hand. For more information about ACS 1-year and 5-year estimates, see the section on “Understanding and Using ACS Single-Year and Multiyear Estimates” in the Census Bureau’s handbook on *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.⁸

⁸ U.S. Census Bureau, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*, <www.census.gov/programs-surveys/acs/guidance/handbooks/general.html>.

Table 1.2. Selected Geographic Areas Published in the 2017 American Community Survey (ACS) 1-Year and 5-Year Estimates

Geographic areas	Total number of areas	Areas receiving 1-year and 5-year estimates		Areas receiving only 5-year estimates ¹	
		Number	Percent	Number	Percent
United States	1	1	100.0	0	0.0
Region	4	4	100.0	0	0.0
Division	9	9	100.0	0	0.0
States, the District of Columbia, and Puerto Rico	52	52	100.0	0	0.0
County or equivalent ²	3,220	837	26.0	2,383	74.0
County subdivision ³	36,631	224	0.6	36,407	99.4
Subminor civil division (Puerto Rico only)	145	N	N	145	100.0
Census tract	74,001	N	N	74,001	100.0
Block group	220,333	N	N	220,333	100.0
Place (incorporated places and census designated places)	29,576	614	2.1	28,962	97.9
Consolidated city	8	N	N	8	100.0
Alaska Native Regional Corporation	12	3	25.0	9	75.0
American Indian Area/Alaska Native Area/Hawaiian Home Land	695	13	1.9	682	98.1
Specified American Indian area—tribal census tract	483	N	N	483	100.0
Specified American Indian area-tribal census tract-tribal block group	917	N	N	917	100.0
Metropolitan/micropolitan statistical area	945	518	54.8	427	45.2
Principal city of metropolitan or micropolitan statistical areas	1,265	399	31.5	866	68.5
Metropolitan division	31	31	100.0	0	0.0
Combined statistical area	174	171	98.3	3	1.7
Combined New England city and town area	7	7	100.0	0	0.0
New England city and town area	39	25	64.1	14	35.9
Principal cities of New England city and town areas	59	19	32.2	40	67.8
New England city and town area division	10	10	100.0	0	0.0
Urban area	3,592	435	12.1	3,157	87.9
Congressional districts, 114th Congress	435	435	100.0	0	0.0
Delegate district, 114th Congress (at large, District of Columbia)	1	1	100.0	0	0.0
Resident commissioner district, 114th Congress (at large, Puerto Rico)	1	1	100.0	0	0.0
State legislative district, upper chamber ⁴	1,954	N	N	1,954	100.0
State legislative district, lower chamber ⁴	4,825	N	N	4,825	100.0
Public Use Microdata Area	2,378	2,378	100.0	0	0.0
5-Digit ZIP Code Tabulation Area	33,120	N	N	33,120	100.0
Elementary school district	1,995	80	4.0	1,915	96.0
Secondary school district	509	90	17.7	419	82.3
Unified school district	10,902	872	8.0	10,030	92.0
TOTAL	428,517	7,159	1.7	421,358	98.3

N Not available.

¹ Geographic areas with populations of 20,000 or more also receive 1-year Supplemental Estimates, which are simplified versions of popular ACS tables. About three-fifths of counties receive 1-year Supplemental Estimates.

² County equivalents include Alaska boroughs, municipalities, city and boroughs, and census areas; Louisiana parishes; Puerto Rico municipios; and independent cities in Maryland, Missouri, Nevada, and Virginia.

³ For 1-year estimates, qualifying minor civil divisions in 20 states only. For 5-year estimates, all county subdivisions.

⁴ Legislative session year 2016.

Note: Figures based on geographic area boundaries as of January 1, 2016, new and dissolved incorporations as of January 1, 2017, and population estimates from the July 1, 2017, Census Bureau Population Estimates. The Census Bureau does not publish ACS data for individual blocks.

Key Geographic Areas in the ACS

Figures 1.3 through 1.7 show data users some of the key geographic areas available through the ACS: congressional districts, counties, PUMAs, and census tracts.

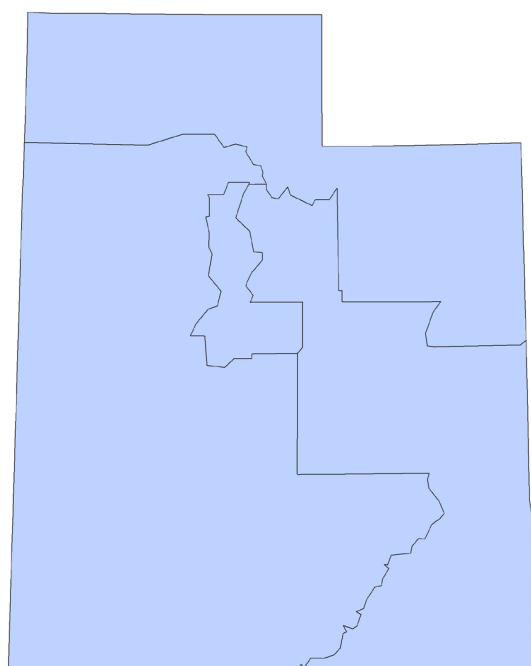
Congressional districts are redrawn after each census for the purpose of electing the members of the U.S. House of Representatives.⁹ Each of Utah's four

⁹ Boundaries for congressional districts may change in between decennial censuses if a state initiative or court-ordered redistricting requires a change.

congressional districts (shown in Figure 1.3) includes approximately 750,000 people. ACS data on congressional districts can be used to compare the characteristics of the home districts of the 435 House members and how they have changed over time.

Counties are also important because they are the primary legal subdivision within each state. ACS 1-year estimates are currently available for 10 of Iowa's 99 counties—those with populations of 65,000 or more in 2017 (see Figure 1.4). Iowa has 33 counties with populations of at least 20,000 people that receive 1-year

Figure 1.3. **Congressional Districts in Utah**



Source: U.S. Census Bureau, Congressional District Cartographic Boundary Shapefiles, <www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html>.

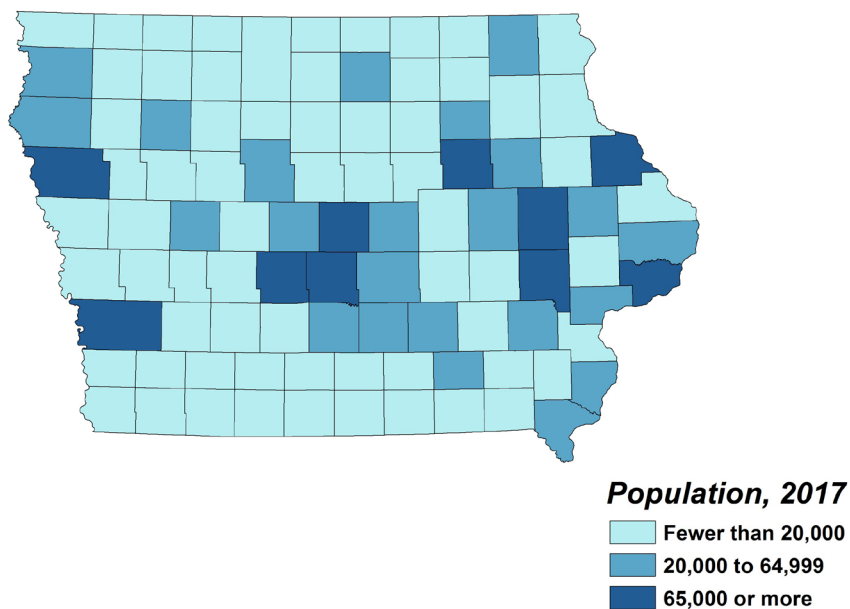
Supplemental Estimates.¹⁰ The 66 counties in Iowa with fewer than 20,000 people only receive 5-year estimates.

The Census Bureau also divides each state into a series of PUMAs, each of which has a minimum population of 100,000. PUMAs are constructed based on county and census tract boundaries and do not cross state lines. PUMAs provide nationwide coverage for 1-year and 5-year data and can be aggregated to create custom geographic areas. PUMAs are updated after each decennial census.

¹⁰ Geographic areas with 65,000 or more people receive both 1-year estimates and 1-year Supplemental Estimates.

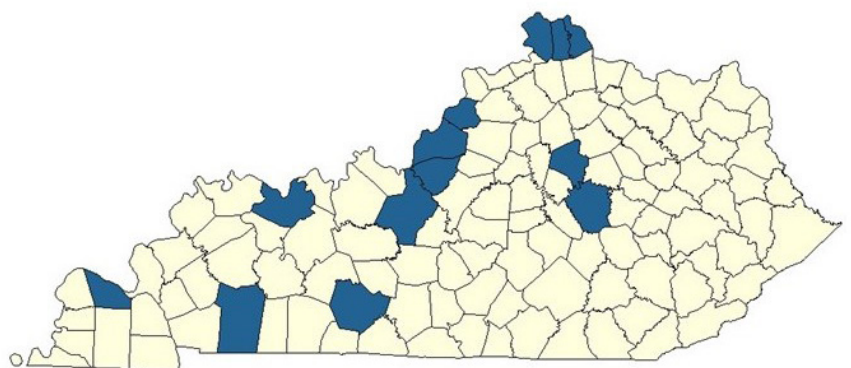
Typically, counties with large populations are subdivided into multiple PUMAs, while PUMAs in more rural areas are made up of groups of adjacent counties. PUMAs are especially useful for rural areas because, unlike counties, they meet the 65,000-population threshold required to provide ACS 1-year estimates. The value of using PUMA geography becomes apparent when looking at a state such as Kentucky (see Figures 1.5 and 1.6). The 2017 ACS 1-year estimates include data for only 13 of Kentucky's 120 counties, but they also include data for all 34 Kentucky PUMAs covering the entire state.

Figure 1.4. **Counties in Iowa by Population Size: 2017**



Source: U.S. Census Bureau, Congressional District Cartographic Boundary Shapefiles, <www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html>.

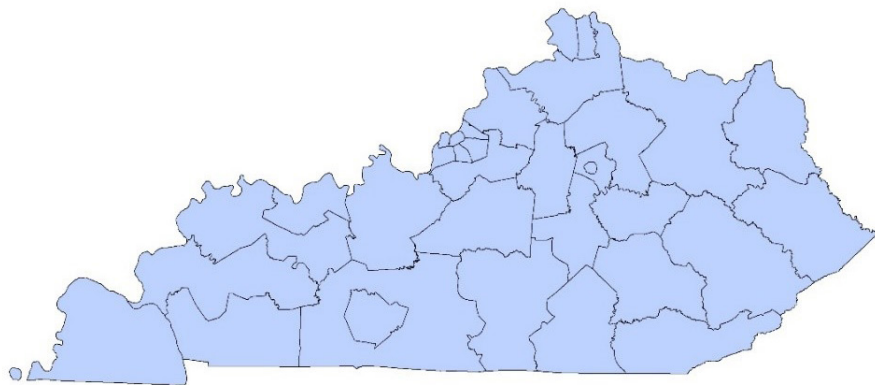
Figure 1.5. **Availability of ACS 1-Year Estimates for Kentucky: 2017**



Counties for which 2017
ACS 1-year data are available

Source: U.S. Census Bureau, 2017 American Community Survey, 1 Year Estimates, Population Reference Bureau analysis of data.

Figure 1.6. **Public Use Microdata Areas in Kentucky**



Source: U.S. Census Bureau, Congressional District Cartographic Boundary Shapefiles, <www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html>.

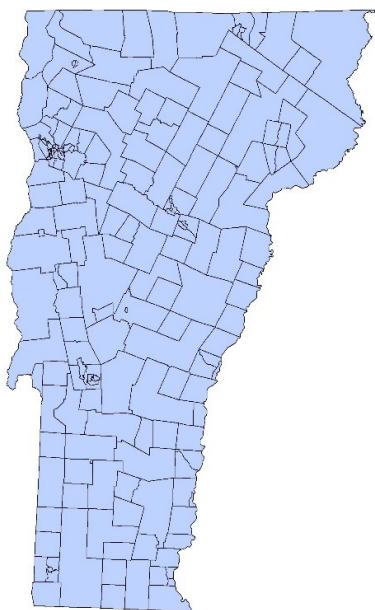
PUMAs are also useful for examining densely populated areas in depth. Data users who want to investigate single-year estimates for subregions within large urban areas can do so by using PUMA-level data to obtain detailed descriptions of the areas. For example, the ACS releases estimates for the city of Chicago (in Cook County, Illinois), but Chicago is also subdivided into 19 PUMAs, each with its own ACS 1-year estimates.

Census tracts—small subdivisions of counties that typically have between 1,200 and 8,000 residents—are commonly used to present information for small

towns, rural areas, and neighborhoods. For example, in Vermont, there are currently 184 census tracts with data available through the ACS 5-year data products (see Figure 1.7).

There are also more than 300 ACS data tables available for block groups—subdivisions of census tracts—that include between 600 and 3,000 people each. In the ACS, block groups are the lowest (smallest) level of geography published. Block group data are only available in the ACS 5-year data products.

Figure 1.7. **Census Tracts in Vermont**



Source: U.S. Census Bureau, Census Tract Cartographic Boundary Shapefiles, <www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html>.

User-Defined Areas

Beyond the standard legal and statistical geographic entities created by the Census Bureau, there are instances where analysts might want to show data for a custom, user-defined geographic area. For example, many states have regional planning commissions designed to foster cooperation among contiguous counties with similar needs. Figure 1.8 illustrates the boundaries of the Eastern Upper Peninsula Regional Planning & Development Commission, one of 14 regional agencies in Michigan that serves the needs of the three easternmost counties of the state's Upper Peninsula (Luce, Chippewa, and Mackinac counties).

TIP: When aggregating ACS estimates across different geographic areas or population subgroups, data users should avoid combining ACS 1-year estimates with ACS 5-year estimates. That is, 1-year estimates should only be combined with other 1-year estimates, and 5-year estimates should only be combined with other 5-year estimates. When such derived estimates are generated, the user must also calculate the associated MOE.

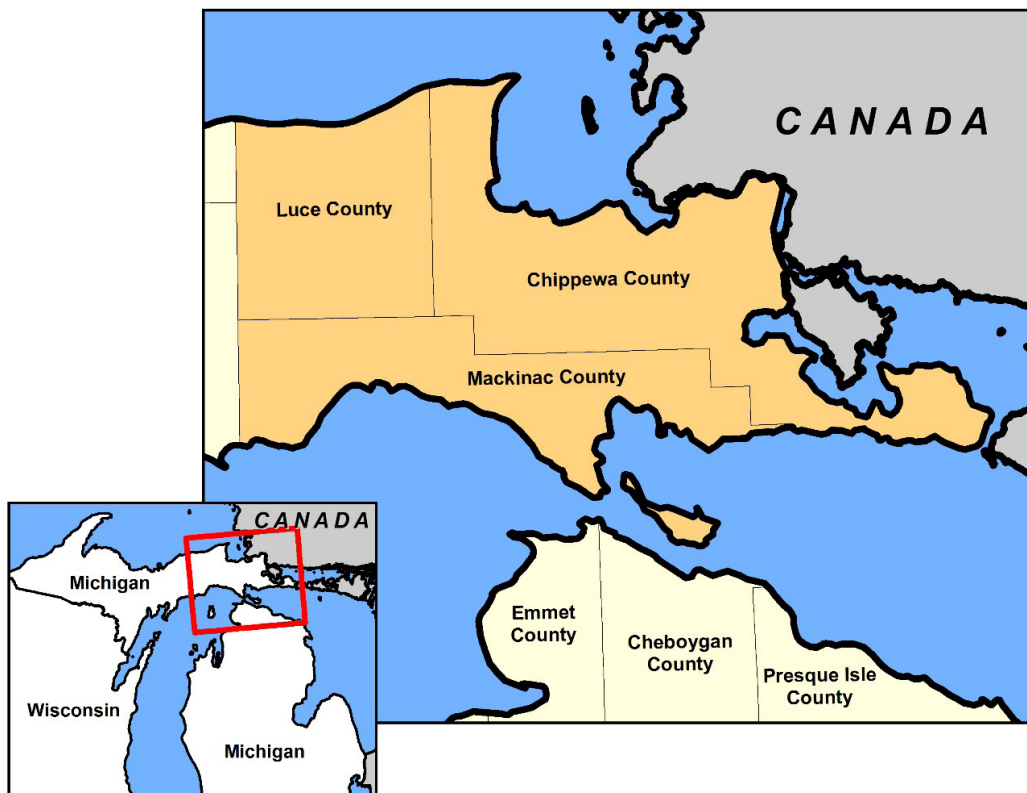
For more information about creating ACS estimates for custom geographic areas, see the section on “Calculating Measures of Error for Derived Estimates” in the Census Bureau’s handbook on Understanding and Using American Community Survey Data: What All Data Users Need to Know.¹¹

Advanced users who are aggregating ACS estimates can use the Census Bureau’s Variance Replicate Tables to produce MOEs for selected ACS 5-year Detailed Tables.¹² Users can calculate MOEs for aggregated data by using the variance replicates. Unlike available approximation formulas, this method exactly matches MOEs published on data.census.gov by including a covariance term.

¹¹ U.S. Census Bureau, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*, <www.census.gov/programs-surveys/acs/guidance/handbooks/general.html>.

¹² U.S. Census Bureau, American Community Survey (ACS), Variance Replicate Tables, <www.census.gov/programs-surveys/acs/data/variance-tables.html>.

Figure 1.8. Eastern Upper Peninsula Regional Planning and Development Commission: Michigan



Source: Eastern Upper Peninsula Regional Planning & Development Commission.