Using the ACS: Issues with studying small areas and change over time

Presented to
Washington Metropolitan Area Council of Governments
Cooperative Forecasting and Data Subcommittee

USCENSUSBUREAU

Plan for today

- **Overview**
  - **ACS data products and data quality (Trent Alexander)**
- Issues with multi-year data and making comparisons
  - Comparing ACS over time and with decennial data (Nicole Scanniello)
- Issues with studying small areas
  - Weights, sub-county controls, impact of 2010 census, sample reallocation (Michael Beaghen and Daniel Sommers)

Overview of the ACS

- Samples approximately 2.9 million addresses per year

- 21 questions about housing unit
  48 questions about each person

ACS data products

- Similar to decennial “long form” data
- About 1,000 tables for each geographic area
  - approx 700,000 areas in 5-year data products
- Annual PUMS samples for ~1% of population

2009 ACS data releases

Product	Availability
1-Year estimates	September
1-Year PUMS	October
5-Year estimates	December
3-Year estimates	January
3-Year and 5-Year PUMS	February, 2011

Population thresholds for ACS estimates

	1-year estimates	3-year estimates	5-year estimates
65,000 + people	X	X	X
20,000+ people		X	X
Less than 20,000 people			X

Areas that get published estimates

	Percentage with Published ACS Estimates		
	1-Year	3-Year	5-Year
United States	**100**	**100**	**100**
State, DC, Puerto Rico	**100**	**100**	**100**
County or equivalent	**25**	**59**	**100**
Place (incorporated places and census designated places)	**2**	**8**	**100**
Unified School District	**7**	**26**	**100**
Census Tract	**0**	**0**	**100**

PUMS data files

Public Use – anonymized, downloadable

Microdata – individual-level, all variables

Sample – only some of the records we have

Microdata versus Published Data

Microdata

- "Raw" data containing each person's responses
- Flexibility: make custom tables, create new variables, etc.
- Limitations: geography, top-coding

Published Data

- Premade or published tables
- Easy access, data on very small areas
- Limitations: limited content

Product availability in local jurisdictions

	5-year	3-year	1-year	PUMS
Frederick co.	x	x	x	1
Montgomery co.	x	x	x	7
Prince George co.	x	x	x	7
Loudoun co.	x	x	x	
Fairfax co.	x	x	x	5*
Arlington co.	x	x	x	1
Prince William co.	x	x	x	2*
Alexandria city	x	x	x	1
Falls Church city	x			
Manassas city	x	x		
Manassas Park city	x			

Where to get the data

- First Stop: American FactFinder
  - http://factfinder.census.gov
- Second Stop: ACS 5-Year Data Page
  - Some tables are available only on the FTP site

Quality of ACS estimates

- Sampling Error: Uncertainty because the data are gathered from a **sample** of the population
- Nonsampling Error: Error from respondents not answering questions, giving incorrect answers, etc.
- ACS has higher sampling error but lower nonsampling error than Census 2000 long-form

Margins of Error and Data Filtering

- For the 5-year data, all estimates are published, regardless of margin of error
- You should check margin of error before using the estimate
- You can improve reliability by aggregating geographies or subpopulations

Example of Aggregating Estimates

http://www.census.gov/acs/www/data_documentation/documentation_main/
http://www.census.gov/acs/www/guidance_for_data_users/handbooks/

Geography	Estimate	Margin of Error
Tract 8601.01	803	129
Tract 8601.02	912	151
Tract 8602	1647	205

Apply the formula: $MOE_{agg} = \pm\sqrt{\sum_{c} MOE_{c}^{2}}$

New Estimate = 3,362 (Equal to the sum of estimates)
New Margin of Error = 285 (Less than the sum of MoE's)

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Overview

- Constructing multiyear estimates
- When to use multiyear estimates
- How to use multiyear estimates to make comparisons
- Comparing ACS to the Decennial Census Long-Form Sample

Constructing Multiyear Estimates

Period Estimates

- All ACS estimates are period estimates, including 1-year estimates
- Describe the average characteristics over a specific period of time
- Period estimates do not represent a single point in time

Constructing Multiyear Estimates

- The estimates are NOT an average of 1-year estimates
- Data are pooled across 36 or 60 months
- Data are weighted to produce estimates
- Estimates are controlled for age, sex, race, and Hispanic origin
- Estimates are based on geographic boundaries as of January 1 of the last year in the multiyear period
- Dollar-value estimates are inflation adjusted to the most recent year for the period

When to Use Multiyear Estimates

Use Multiyear Estimates When …

- No 1-year estimate is available
- Comparing various geographies when one or more of them do not receive 1-year estimates
- Margins of error for 1-year estimates are larger than required
- Analyzing data for small population groups

Currency vs. Reliability

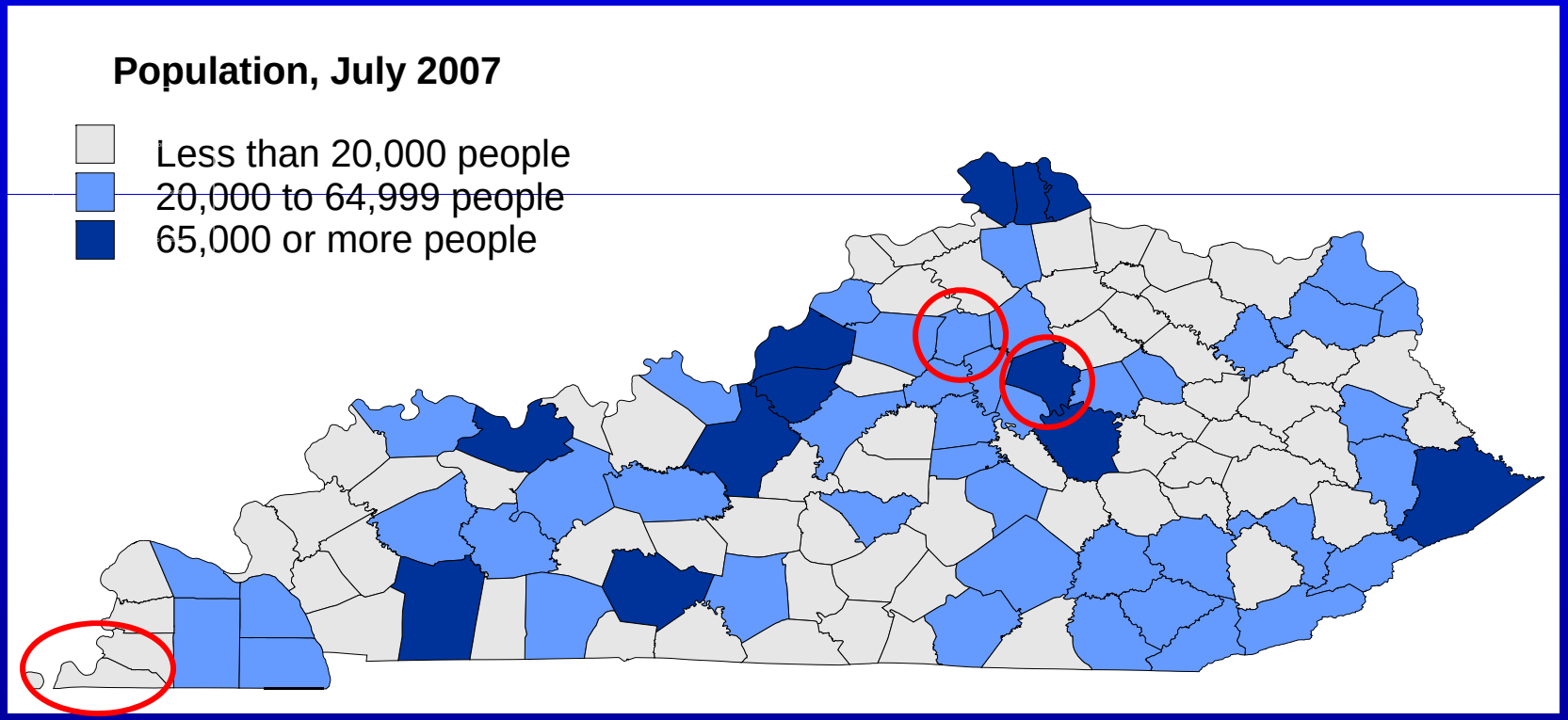
	Currency	Reliability
1-year estimates	Most current	Less reliable due to smaller sample size
3-year and 5-year estimates	Less current – include data from previous years	More reliable due to larger sample size

How to Use Multiyear Estimates to Make Comparisons

Using ACS Data for Comparisons

- Compare across geographies
- Compare across subpopulations
- Compare across time periods
- Only compare estimates from the same time period

Example of Comparing Across Geographies: Counties in Kentucky



Comparing Data in 2010

	2009	2007-2009	2005-2009
Fayette County	X	X	X
Franklin County		X	X
Fulton County			X

Comparing Across Geographies

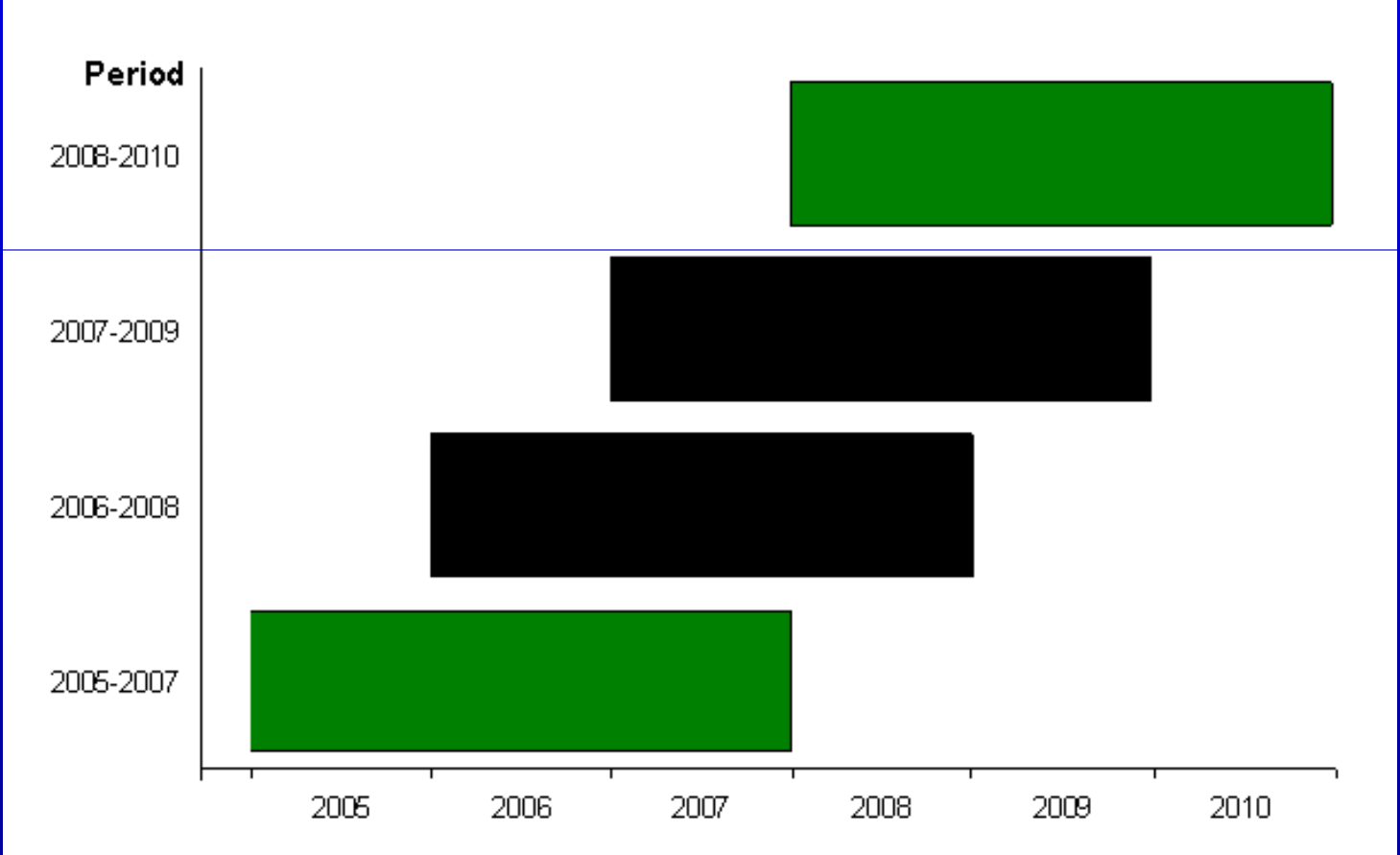
- The 5-year ACS release includes two products to help users make comparisons across geographies
  - Geographic Comparison Tables (GCTs)
  - Thematic Maps
- 72 different characteristics
- Can compare across

  States, Counties, Places, Metropolitan and Micropolitan Statistical Areas, Combined Statistical Areas, Congressional Districts, Urban/Rural Areas, Urbanized Areas, PUMAs, School Districts, and American Indian Areas/Alaska Native Areas/Hawaiian Homelands/Alaska Native Regional Corporations

Comparing Across Time Periods

- Be aware of changes in geography
- Compare estimates from the same time period (e.g., 1-year vs. 1-year)
- Be aware of question changes
- Compare non-overlapping time periods

Overlapping Periods



Comparing ACS to the Decennial Census Long-Form Sample

American Community Survey
Similarities with Census 2000 Long-Form Sample

- Both produce estimates on characteristics from a sample of the population
- Same questions and many of the same basic statistics
- 5-year ACS estimates were produced for same broad set of geographic areas including census tracts and block groups

American Community Survey
Key Differences from Census 2000 Long-Form Sample

- Census 2000 long-form estimates described the population and housing as of April 1, 2000. ACS estimates describe a period of time.
- Different Data Collection Methods
- Different Residence Rules
- Different sample sizes

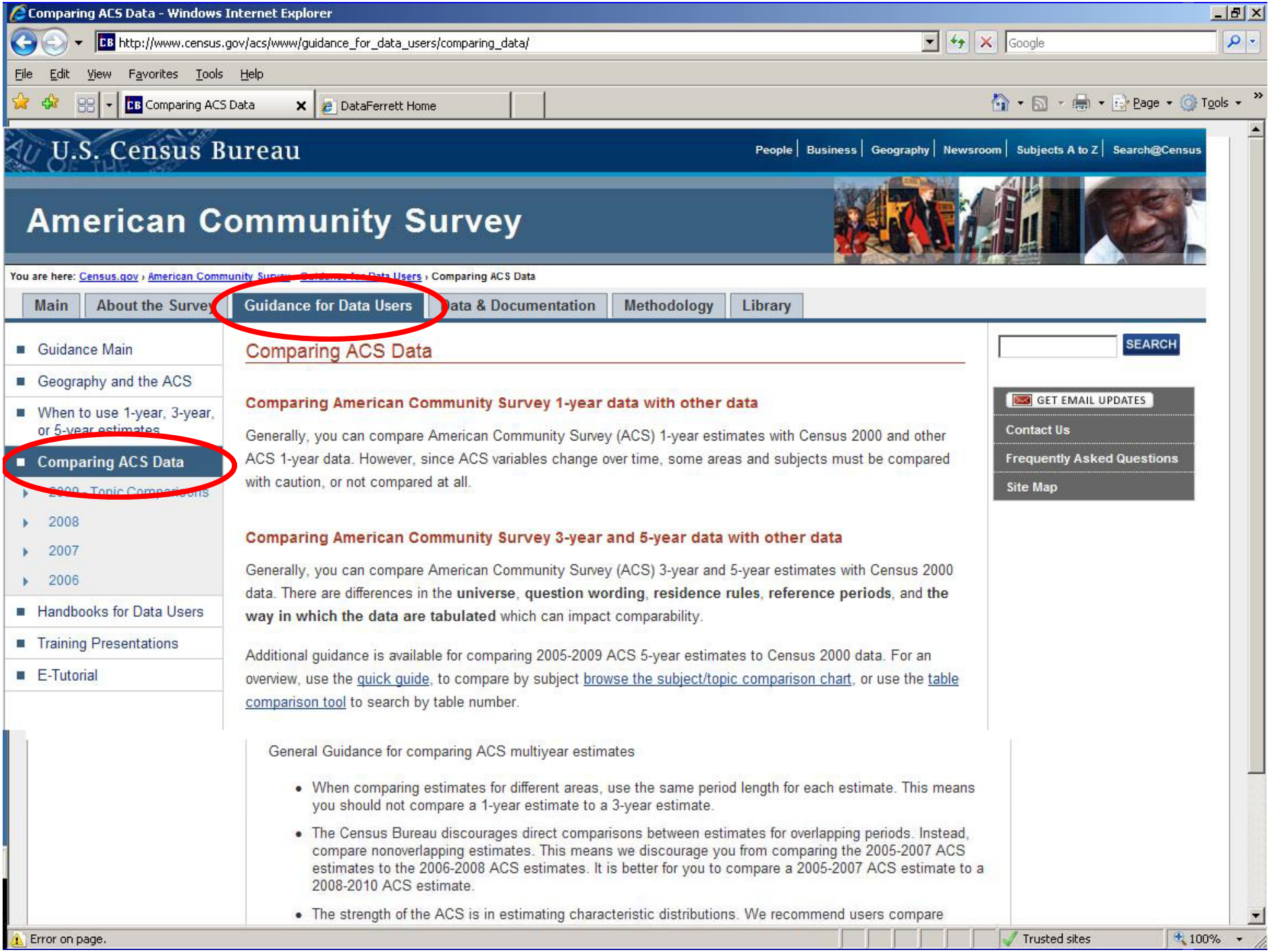
American Community Survey
Key Differences from the 2010 Census

- The 2010 Census counts the population to support apportionment and redistricting.

- The ACS supplements this information with annually updated data on the nation's population and housing characteristics.

Guidance on Comparing ACS Data

- Quick Guide – Simple topic by topic recommendations for making comparisons
- Comparison Guidance – More detailed explanation of how differences in the two surveys impact comparability
- Table Comparison Tool – Helps you locate comparable ACS and Census 2000 Detailed Tables


Comparing ACS Data - Windows Internet Explorer
http://www.census.gov/acs/www/guidance_for_data_users/comparing_data/
File Edit View Favorites Tools Help
Comparing ACS Data
DataFerrett Home
U.S. Census Bureau
People Business Geography Newsroom Subjects A to Z Search@Census
American Community Survey
You are here: Census.gov › American Community Survey › Guidance for Data Users › Comparing ACS Data
Main About the Survey Guidance for Data Users Data & Documentation Methodology Library
Guidance Main
Geography and the ACS
When to use 1-year, 3-year, or 5-year estimates
Comparing ACS Data
2008
2007
2006
Handbooks for Data Users
Training Presentations
E-Tutorial
Comparing ACS Data
Comparing American Community Survey 1-year data with other data
Generally, you can compare American Community Survey (ACS) 1-year estimates with Census 2000 and other ACS 1-year data. However, since ACS variables change over time, some areas and subjects must be compared with caution, or not compared at all.
Comparing American Community Survey 3-year and 5-year data with other data
Generally, you can compare American Community Survey (ACS) 3-year and 5-year estimates with Census 2000 data. There are differences in the universe, question wording, residence rules, reference periods, and the way in which the data are tabulated which can impact comparability.
Additional guidance is available for comparing 2005-2009 ACS 5-year estimates to Census 2000 data. For an overview, use the quick guide, to compare by subject browse the subject/topic comparison chart, or use the table comparison tool to search by table number.
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General Guidance for comparing ACS multiyear estimates
When comparing estimates for different areas, use the same period length for each estimate. This means you should not compare a 1-year estimate to a 3-year estimate.
The Census Bureau discourages direct comparisons between estimates for overlapping periods. Instead, compare nonoverlapping estimates. This means we discourage you from comparing the 2005-2007 ACS estimates to the 2006-2008 ACS estimates. It is better for you to compare a 2005-2007 ACS estimate to a 2008-2010 ACS estimate.
The strength of the ACS is in estimating characteristic distributions. We recommend users compare
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For more information

Visit the ACS/PRCS website:
http://www.census.gov/acs/www

Contact by email:
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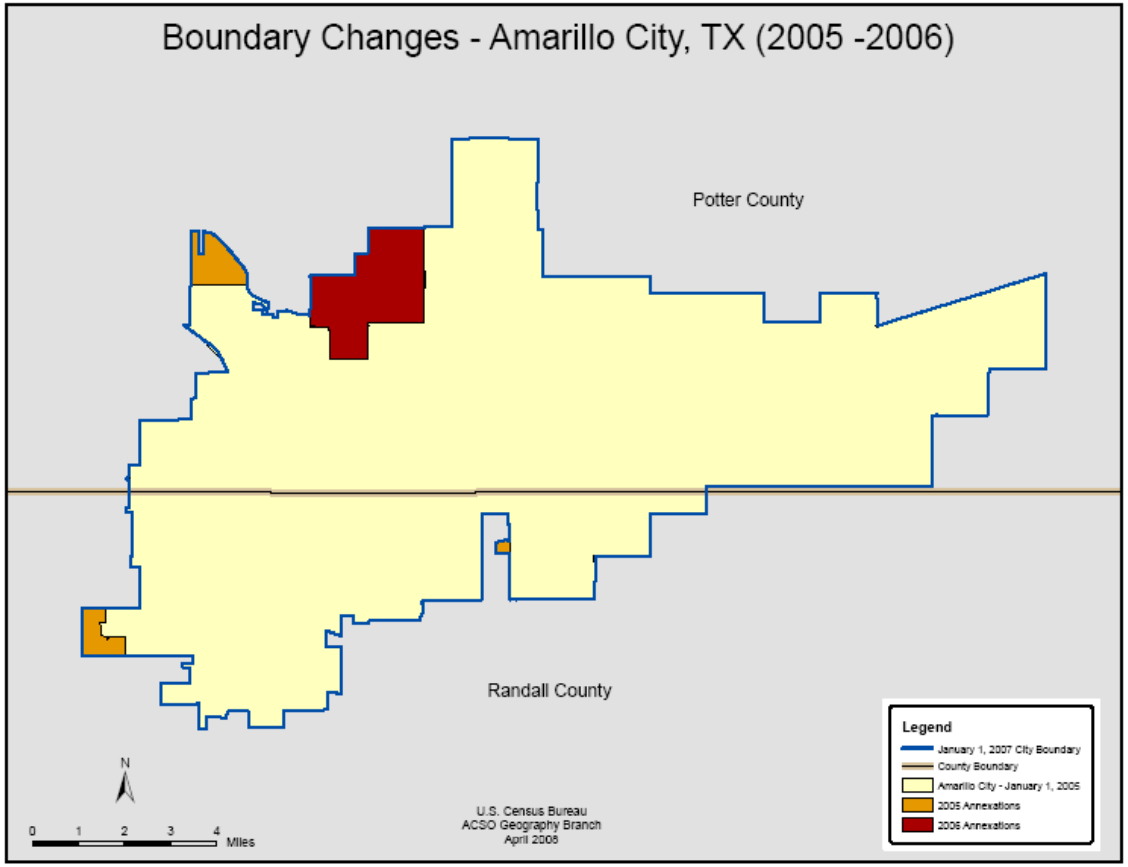
Geographic Boundaries

- Multiyear estimates are based on geographic boundaries as of January 1 of the last year in the multiyear period
- Boundary Annexation Survey collects boundary changes
- Boundaries of other statistical areas will be updated every decade in conjunction with the decennial census

Geographic Boundaries
Amarillo city, Texas



Future ACS 5-Year Releases

2006-2010 ACS

New Data Access System

New Population Controls

- Based on 2010 Census

Updated Geographies

Beyond

Benefits of 2008 Improvements

- New and modified content

Benefits of 2011 Expansion

- If funded, would have more cases and accuracy

Recent/upcoming census releases

2010 Census

- Dec.: apportionment counts
- Feb./March: state and local data

2010 Demographic Analysis

- Dec.: National estimates

American Community Survey

- Sept.: 2009 1-Year estimates and PUMS
- Dec.: 2005-2009 5-Year estimates
- Jan.: 2007-2009 3-Year estimates
- Feb.: 2005-2009 5-Year PUMS files

Using ACS Multiyear Estimates and Comparing ACS Data

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Cooperative Forecasting and Data Subcommittee
Washington, DC
January 11, 2011