

History of the American Community Survey

American Community Survey

Issued January 2024



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Delivering What Users Want: The Evolution of U.S. Census Bureau Small Area Data—Introduction to the History of the American Community Survey

INTRODUCTION

“Tools are of no value unless they are used” (Vergil Reed, assistant director, Bureau of the Census, December 29, 1941).¹

The year 2010 marked a watershed in the history of the United States census. In that year, the U.S. Census Bureau released the first 5-year American Community Survey (ACS) estimates designed to provide data comparable to those produced by the decennial census long form used for the 2000 Census and previous censuses. The advent of the ACS signaled a change in the methodology and design underlying the collection of detailed information on population and housing characteristics for the nation’s communities—a responsibility that the Census Bureau had shouldered increasingly at the behest of data users since the 1890 Census. This change had potentially far-reaching consequences.

For decades, a growing number of people and institutions had sought more timely data for small areas than those provided by a once-a-decade decennial sample survey and had sought that data even down to the level of census tracts and block groups.² Before the advent of the ACS, such data users turned to their own surveys or to administrative records, which they frequently found lacking sufficient demographic details. At the same time, the costs of conducting the decennial survey had risen as the complexities associated with data collection for a diverse population had increased.

¹ The Census Bureau’s assistant director uttered these words when advocating that businessmen use the growing amount of census data available to them to tailor their operations more efficiently to markets where they sought to sell goods. Vergil Reed, assistant director, Bureau of the Census, “Business Uses of Data by Census Tracts and Blocks,” paper presented before the annual meeting of the American Statistical Association, New York City, December 29, 1941, p. 2.

² Small area data, as referenced throughout this paper, are defined as statistics for geographic areas below the level of counties or cities. This definition is taken from a paper by Marshall Turner and Frederick Bohme that examines the expansion of the number of geographic areas for which the Census Bureau published data. Nancy Krieger gives a great overview of changes in the use of census tract data for statistics of public health. The paper, “The National Census: The Parts Are Greater Than the Whole,” by Marshall L. Turner, Jr., and Frederick G. Bohme was prepared for presentation at the Social Science History Association annual meeting, November 5–8, 1992; along with Nancy Krieger’s paper, “A Century of Census Tracts: Health & the Body Politic (1906–2006),” *Journal of Urban Health*, Vol. 83, No. 3, May 2006, pp. 355–361.

The Census Bureau’s response to these challenges was to launch a new design for its long-form survey based on a continuous data collection process that was decoupled from the once-a-decade census enumeration. This design made it possible to produce more current information for small populations than had ever been possible on a nationwide basis. At the same time, this enabled the agency to focus fully on the critical enumeration of the nation’s population during the decennial census year. After more than 10 years of testing, the first ACS data products were released in 2006 and provided data for areas with populations of 65,000 or more.³ Five years later, the first data products comparable to those from the decennial census long form were released, and the public had its first access to ACS data for small areas with populations of fewer than 20,000. While reactions to these data varied, broadly speaking, the government agencies and private-sector organizations that had always thrived on long-form survey data of the past embraced the ACS data for small areas. In addition, with the release of the first ACS 5-year estimates, communities that had previously relied on outdated census data to make critical decisions for allocating resources, or that had paid for supplemental local surveys to update census information, could begin to take advantage of current data every year from the ACS conducted by the Census Bureau. As the following pages will show, the implementation of the ACS was part of a long line of responses by the agency to address data users’ needs. As both the number of users and the number of types of users of small area data grew, their demand played a central role in the Census Bureau’s adoption of new geographic entities and the expansion of the data it published.

EARLY ATTEMPTS TO EXPAND DATA PRODUCTS: 1880 AND 1890 CENSUSES

Before the 20th century, few people or government entities made much use of census data below the state level. From 1790 to 1880, the Census Office concentrated almost exclusively on its constitutionally

³ The Census Bureau released data products from ACS tests prior to 2006. For more details on ACS test data releases, refer to Chapters 3 and 4.

mandated task of making a count of the population for the purposes of apportioning representation and taxation. According to an overview of the uses of census data in the 19th century, the major use of small area data was by civic boosters boasting of the size or growth rate of their municipalities or counties.⁴ The last two censuses of the 19th century, however, broke new ground when public health officers succeeded in persuading the Census Office to publish summary details of cities broken down into political districts. Since 1875, the American Public Health Association (APHA) had been calling for a national survey of sanitation.⁵ Waste disposal and overcrowding in housing were major concerns. For the 1880 Census, the Census Office hired John Shaw Billings and George E. Waring, Jr. to oversee the collection of data on death rates and the social statistics of cities. The two men were fresh from their work on the National Board of Health's survey of sanitary conditions in Memphis in the aftermath of a yellow fever outbreak there. The reports that Waring and Billings compiled for the 1880 Census expanded that work from Memphis to a few more cities before funding ran out. The Census Office published statistics on population, the number of dwellings, number of marshlands, and total land area broken down by political wards for a handful of cities.⁶ Small area variations within most of the nation's growing cities were buried in citywide summaries. In addition, users had access to statistics on race and the number of foreign-born residents for towns with more than 4,000 inhabitants but not for comparably sized areas of most cities. John Shaw Billings included a call for a national system of recording births and deaths either under a permanent Census Office or the National Board of Health in his presidential address to the APHA in 1880.⁷

The Census Office appears to have agreed with that sentiment when it hired Billings in 1889 to oversee the

⁴ Turner and Bohme, pp. 5–10; Carroll Wright, commissioner of Labor, and William C. Hunt, chief statistician, *The History and Growth of the United States Census*, GPO, Washington, DC, 1900.

⁵ Walter F. Willcox, "The Past and Future Development of Vital Statistics in the United States: I, John Shaw Billings and Federal Vital Statistics," *Journal of the American Statistical Association*, Vol. 21, No. 155, September 1926, p. 258.

⁶ Francis A. Walker, *Report of the Superintendent of the Census to the Secretary of the Interior*, 1881, GPO, Washington, DC, 1881, p. 11; Fielding H. Garrison, M.D., "The Scientific Work of Dr. John Shaw Billings," chapter of *National Academy of Sciences Biographical Memoirs*, Volume VIII, National Academy of Sciences, Washington, DC, 1917, pp. 395, 399–400; and George E. Waring, Jr., *Tenth Census, 1880. Report on the Social Statistics of Cities*, GPO, Washington, DC, 1886, pp. vii, 138–146, 282–284, 328.

⁷ Willcox, pp. 257–266.

Vital Statistics Division.⁸ Billings and his team greatly expanded what the Census Office published in terms of the number of cities for which the 1890 Census reported small area data. A special census report featured 27 cities for which it divided the population by ward and death rate per 1,000 persons by ward.⁹ The Census Office also published a smaller number of special reports on major cities for which agents from Billings' division, with advice from local health officials, had subdivided wards into "sanitary districts" purported to have uniform housing and population characteristics (Figure 1).¹⁰ For these cities, the publication reported major cause of death by age, sex, immigration status, and even by Irish and German immigrants in each ward.¹¹ Under Billings' supervision, census clerks assembled death records from city coroners, hospitals, and public health agents for 6 years preceding 1890 and assigned each death to the deceased's ward or district of residence. The primary purpose of the Billings study was to investigate the effects of ethnic heritage, population density, climate, and drainage on sicknesses to build programs—such as housing codes—to eradicate diseases.¹²

FROM 1910–1945, NEWLY AVAILABLE CENSUS TRACT DATA USED BY SOCIAL WELFARE AGENCIES, LOCAL BUSINESSES, AND GOVERNMENTS

Researchers interested in Billings' ward-level data found them inadequate and in the first decade of the 20th century, they developed a more useful data field from which to aggregate data.¹³ Rev. Dr. Walter Laidlaw, a Presbyterian minister, was doing research

⁸ The Census Office had compiled and reported births and deaths since the 1850 Census but tabulated the data by state or groups of states. Records are unclear on when various divisions of the Census Office were established. National Archives staff indicated in their guide to census records that division chiefs were named in the records from the 1870s and 1880s but did not mention the names of the divisions or their purpose. Katherine M. Davidson and Charlotte M. Ashby, *Records of the Bureau of the Census, Preliminary Inventory*, National Archives and Records Administration, Washington, DC, 1997, pp. 16–21, 31. For Billings' appointment, refer to Robert P. Porter, *Report of the Superintendent of the Census to the Secretary of the Interior, Organization to June 30, 1889*, GPO, Washington, DC, 1889, p. 3.

⁹ John Shaw Billings, M.D., *Report on the Social Statistics of Cities in the United States at the Eleventh Census: 1890*, GPO, Washington, DC, 1895, pp. 11–14.

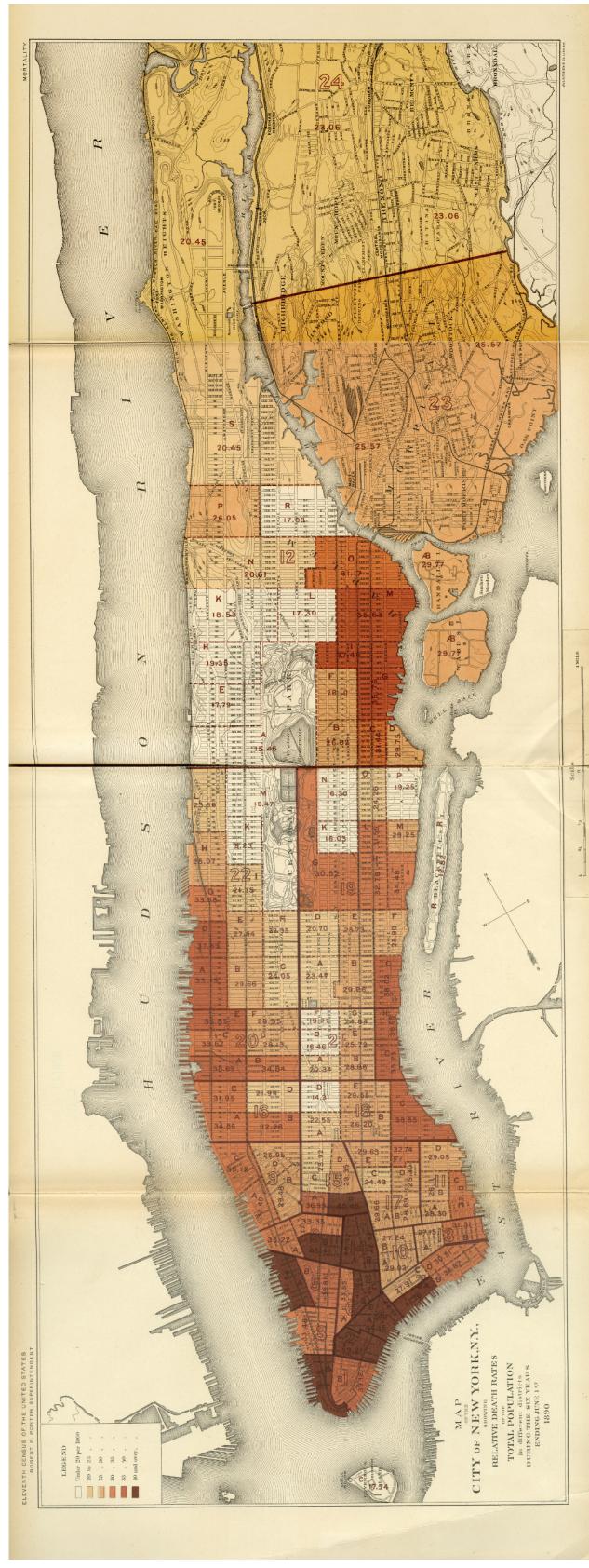
¹⁰ Robert P. Porter, *Report of the Superintendent of the Census 1890*, GPO, Washington, DC, 1890, p. 17, and Robert E. Chaddock, "Sanitary Districts in the Analysis of Municipal Mortality and Morbidity Data," *American Journal of Public Health*, Vol. VI, No. 6, June 1916, p. 538.

¹¹ John Shaw Billings, *Vital Statistics of the District of Columbia and Baltimore Covering a Period of Six Years Ending May 31, 1890*, GPO, Washington, DC, 1893, Tables 6–12 and pp. 51–56.

¹² Porter, 1889, pp. 3, 8–10 and Garrison, pp. 389–396.

¹³ Chaddock, pp. 538–541.

Figure 1.
Map of Billings Sanitary Districts in Manhattan



Source: John Shaw Billings, Vital Statistics of New York City and Brooklyn: covering a period of 6 years ending May 31, 1890, Government Printing Office, Washington, DC, 1894, p. 164.

to help New York City's churches. He wanted to help them figure out which congregations would find their parishioners displaced by business and industries and which would need to change their recruiting and outreach to accommodate new residents from different ethnic and occupational backgrounds.¹⁴

Directing research for the New York Federation of Churches, Laidlaw found that he could not compare the same areas over time because New York state changed the boundaries of election districts in 1905.¹⁵ He suggested dividing cities into more permanent geographic units for study. The New York City Tenement House Department seconded Laidlaw's suggestion and recommended creating districts that were relatively homogeneous in terms of ethnic groups and types of housing.¹⁶ The Tenement House Department even asked that data be tabulated by city block, but the Census Bureau, renamed when the Census Office became a permanent federal agency in 1902, argued that the burden on the agency would be too great. Under Laidlaw's lobbying, the Census Bureau agreed that the next decennial census (in 1910) would collect data using a new unit (eventually called a "census tract") for New York City and would make the initial tabulations, but it would leave preparation of final tables based on these data and their publication to interested groups. The Federation of Churches paid \$60,000 for the Census Bureau's tabulations for New York City, the publishing of the tables, and an accompanying study.¹⁷ On the study's release date, the Federation of Churches encouraged churches to aid the "new immigrants" whose numbers the study documented.¹⁸ The 1910 and 1920 Censuses also tabulated basic tract data for the eight largest cities, but these data elicited little interest for several years.¹⁹

¹⁴ U.S. Census Bureau, *Census Tract Manual*, Fourth Edition, GPO, Washington, DC, 1958, p. 1.

¹⁵ U.S. Census Bureau, *Census Tract Manual*, Fourth Edition, GPO, Washington, DC, 1958, p. 1.

¹⁶ Howard Whipple Green and Leon E. Truesdell, "Census Tracts in American Cities," Bureau of the Census, Washington, DC, December 1934, p. 1.

¹⁷ The Tenement House Department would have preferred statistics on 49,000 city blocks for New York City as they would be much more homogeneous in terms of population and the characteristics of the housing in each, but the Census Bureau's consultant balked at the cost and effort such tabulations would entail. Arthur L. Swift Jr., dean of the New School of Social Research, "Doctor Laidlaw's Vision: The Early Years," *Golden Anniversary of Census Tracts*, paper presented at the Annual Meeting of the American Statistical Association, Sept. 5, 1956, American Statistical Association, Washington, DC, 1956, pp. 4-5; and Howard Whipple Green, *Census Tract Manual*, 1947, p. 1.

¹⁸ "Churches Will Aid Foreign-Born Here," *New York Times*, February 2, 1914.

¹⁹ Green and Truesdell, 1934, p. 1.

Social workers, community chests, and leaders of not-for-profit health organizations laid out tracts in more cities in the 1920s and paid for tabulations.²⁰ Howard Whipple Green, the secretary of the Cleveland Health Council, heard of Laidlaw's work in 1926 and raised money to pay for the final tabulation of tract data for Cleveland from 1910 and 1920. Green also delineated tract boundaries in adjacent suburbs, becoming the first person to do so. Green's intent was to provide evidence to organizations about where they should concentrate efforts to prevent the spread of tuberculosis and reduce infant mortality.²¹

The Cleveland Plain Dealer assisted the effort by paying the \$10,000 required for the final tabulation because its editors, Green later recalled, "had been convinced [tract data] would be helpful in showing prospective advertisers the Cleveland market."²²

Green presented Cleveland's tract data to other social workers who began laying out tracts in their cities. Green's outreach coincided with the rise in popularity of the work of Sociologist Ernest W. Burgess. Burgess and his students argued that cities could be understood by studying the zones of activity and neighborhoods within them.²³ In time for the 1930 Census, census tract committees in 18 cities had delineated tracts, won the Census Bureau's approval of their tracting, and raised money to pay for tabulations.²⁴

In the 1930s, representatives from social welfare charitable groups continued to figure prominently in the ranks of potential users urging the collection of small area data. They were joined by an increasing number of officers from state and municipal governments in pressing the Census Bureau to recognize and tabulate data for tracts in their cities. Seven employees

²⁰ Community chests were umbrella organizations coordinating work amongst charities and providers of social assistance. Some took on a role akin to an auditor of a city's community organizations.

²¹ Green saw the data as useful in determining where to site facilities and to target efforts from code enforcement to educational outreach on hygiene. Howard Whipple Green, "A Period of Great Growth and Development: 1926-1946," *Golden Anniversary of Census Tracts*, paper presented at the Annual Meeting of the American Statistical Association, Sept. 5, 1956, American Statistical Association, Washington, DC, 1956, pp. 11-13. The Cleveland Health Council according to Case Western University's *Encyclopedia of Cleveland History* was a nonprofit organization that pulled together representatives from 14 of the city's hospitals, <<https://ech.cwru.edu/ech-cgi/article.pl?id=CFHACHA>>, accessed December 2010.

²² Green, 1956, pp. 11-13.

²³ Green, 1956, pp. 11-13; and Ernest W. Burgess, Robert Ezra Park and Roderick McKenzie, *The City*, University of Chicago Press, Chicago, 1925.

²⁴ Green and Truesdell, 1934, p. 1.

of municipal governments together with an equal number of state employees served as the leaders of census tract committees in 1937.²⁵

State and local governments willingly devoted months or years of staff time to laying out tracts in part because of the growing scope of municipal activities. Between 1912 and 1927, for example, municipal expenditures in cities with populations over 100,000 swelled from \$690 million to over \$2.5 billion.²⁶ New Deal programs responding to the Great Depression significantly expanded federal aid to cities and states. Federal, state, and municipal emergency and unemployment relief in 1929 was estimated at around \$80 million; by 1934, it exceeded \$2.5 billion.²⁷ Cities, counties, and states also received New Deal monies to build public works. Prodded in part by this flow of funds, interest in using small area data had spread so much that Green and Leon Truesdell, the Census Bureau's chief statistician, published a manual in 1934 establishing guidelines for city committees to draw tract boundaries. While the federal government allocated grants-in-aid to states for emergency relief based on formulas that relied heavily on the total populations of states, Green and Truesdell argued that census tract data were "invaluable for unemployment relief and other emergency

activities."²⁸ Beyond relief planning, cities used small area data when planning where to situate the facilities and services they had started expanding between 1912 and 1927 and continued to build with federal aid in the 1930s. Speaking to the Convention of Local Planners in 1939, Vergil Reed, an assistant director of the Census Bureau, said that census tract data could serve as "scientific yardsticks upon the need for streets and viaducts and parks, and your ability to maintain them." The data would show planners, he said, which areas had the population growth to warrant new facilities and the likely future tax base to pay for them.²⁹ Truesdell, Green, and the heads of tract committees from 64 cities then convinced the Census Bureau to publish data for all cities that had been tracted in time for the 1940 Census.³⁰

From the mid-1930s onward, the spread of statistics for business uses brought with it a demand for even more details for small areas, data for small geographic areas beyond tracted cities, and data even for areas smaller than tracts. During the late 1920s and early 1930s, businesses' demand for census data expanded beyond their previous desire mostly for national-level measures of economic productivity and industries.³¹ By 1934, business users of small area data included real estate boards, street railways, and companies selling cars, refrigerators, and natural gas.³² Vergil Reed attempted to recruit new business users by showing an assembly of statisticians the possibilities as already used by other firms. A grocery chain, Reed pointed out, had created a Brooklyn study to identify areas where it should open new stores based on the number of food stores in each tract enumerated by one of the first business censuses.³³ In response to numerous mid-1930s requests to "furnish intra-city

²⁵ Howard Whipple Green, "Census Tracts in American Cities," Department of Commerce, Bureau of the Census, December 1937, pp. 3-5. Recognizing the value that small area data could yield, the American Statistical Association established the Committee of Census Enumeration Areas in 1931 to recruit people in more cities to delineate tracts. Green served as its chair and chief recruiter. He, in turn, appointed "key people" in each city who would form a committee drawing members from social service agencies, universities, and local government to set up tracts for her/his city. Green, 1956, pp. 12-15.

²⁶ Solomon Fabricant, *The Trend of Government Activity in the United States Since 1900*, New York, National Bureau of Economic Research, 1952), pp. 77-83; and C. H. Woody, "The Growth of Governmental Functions," Chapter 25, *Recent Social Trends in the United States*, McGraw-Hill, NY, 1933, as in Solomon Fabricant, *The Trend of Government Activity in the United States Since 1900*, National Bureau of Economic Research, New York, 1952, p. 81.

²⁷ Paul Webbink, "Unemployment in the United States, 1930-1940," *American Economic Review*, Vol. 30, No. 5, (Feb 1941), pp. 259-260. Total government spending on public aid between 1933 and 1940 amounted to \$25.78 billion or roughly 5.2 percent of national income for that period. National Resources Planning Board, "The Economic Effects of the Disbursement and Collection of Public Aid Funds," Chapter XI of *Security Work and Relief Policies*, GPO, Washington, DC, 1942, p. 325. By 1935, such grants stood at over 34 percent of the federal budget. The Council of State Governments, *Federal Grants In Aid*, 1949, and The Council of State Governments, *Federal Grants In Aid*, 1949, found in Margo Anderson, *The American Census: A Social History*, Yale University Press, New York, 1988, p. 179.

²⁸ Joseph P. Harris, "The Social Security Program of the United States," *The American Political Science Review*, Vol. 30, No. 3, June 1936, pp. 455-493; J. Kerwin Williams and Edward A. Williams, "New Techniques in Federal Aid," *The American Political Science Review*, Vol. 34, No. 5, October 1940, p. 954; Elias Hazar, "Federal Unemployment Relief Policies: The First Decade," *The Journal of Politics*, Vol. 2, No. 3, August 1940, pp. 330-331; and Green and Truesdell, p. 5.

²⁹ Vergil D. Reed, assistant director of the Bureau of the Census, "What the 1940 Census Will Mean to Cities," an address delivered before the annual convention of the American Municipal Association at Chicago, IL, Nov. 1, 1939, pp. 6, 9.

³⁰ Green, 1956, p. 15.

³¹ Wesley C. Mitchell, ed., *Income in the United States, Its Amount and Distribution, 1909-1919*, NY: National Bureau of Economic Research, Inc., 1922 and *Handbook of Marketing Research*, McGraw-Hill, Inc., New York, 1974, pp. 1-7 ff., as in Turner and Bohme, pp. 6-7.

³² Green and Truesdell, 1934, p. 5.

³³ Vergil Reed, "Some Suggested Uses for Census of Business Data," address delivered before the American Statistical Association, Chicago, IL, December 28, 1936, pp. 2-3, 9-10. The speech was republished in the *Journal of Marketing* in April 1937.

business tabulations” on population and business sales broken down by “market areas,” the Census Bureau worked to refine, between 1934 and 1936, the central business district (CBD) paradigm in the primary city of a metropolitan district. Sociologist Ernest Burgess had first introduced the CBD paradigm in 1925, but its proponents had not elaborated on how to delineate a CBD’s boundaries. Other areas that the Census Bureau asked businesses to consider as “market areas” included neighborhood business streets clustered in outer areas of the city. The agency also worked with business groups to observe whether it would be feasible to use data from accumulations of blocks or block frontages but, in 1936, said that it might not be able to disclose information for that small of an area. In some places, special tabulations for that small of an area could lead to the danger of the Census Bureau disclosing information on an individual entity, thereby violating laws requiring the confidentiality of responses.³⁴

Interest in the “market areas” and CBD concepts spread to the private sector as Nelson Seubert, the head of research for a major marketing firm, floated a proposal that the American Marketing Association (AMA) consider market areas as being sets of minor civil divisions (MCDs) and remainders of counties outside of the central city (refer to the section on population movement and new geographic units that follow).³⁵ Estimating that the Census Bureau could not afford to “double its workload” by making that many tabulations, Reed suggested that businesses order special tabulations of combinations of sets of enumeration districts and/or minor civil divisions. A business, Reed argued, could purchase such tabulations for “market areas” that it defined as matching the extent of its sales area or the market for its

³⁴ Malcolm J. Proudfoot, research geographer of the Bureau of the Census, “Intra-City Business Areas for Principal Cities,” paper presented at the Annual Convention of the American Marketing Society, November 27, 1936, republished in the *Journal of Marketing*, January 1937, Vol. 1, Issue 3, pp. 231–237; and Burgess, Park, and McKenzie, pp. 50–52. For the history of confidentiality laws and policies pertaining to census data, refer to Census Bureau, *A Monograph on Confidentiality and Privacy in the U.S. Census*, July 2001, pp. 14–15 available online at <www.census.gov/history>, accessed June 2011.

³⁵ Seubert’s firm Media Records, Inc. (MRI) was known for tracking advertising expenditures and providing independent audits of newspapers’ circulation numbers. Vergil D. Reed, “Some Statistical Possibilities of Defining Market Limits,” paper presented at the American Marketing Association, Atlantic City, N.J., December 1937 reprinted in *Journal of Marketing*, July 1, 1938, pp. 5–6; and Nelson H. Seubert, “How Big Is a Market Area,” *Journal of Marketing*, July 1938, Vol. 3, Issue 1, pp. 37–38.

services.³⁶ By 1941, business leaders responded by using such data in the following ways:

- Radio stations had used locally generated block information along with census tabulations by enumeration district to report to the Federal Communications Commission how many households lived “within certain intensity bands.”
- Banks and real estate firms used tract information to evaluate market values for properties and assess the credit risks of making loans.
- A chamber of commerce used that data to help young doctors choose locations to set up practices.
- Movie theaters used tract data to determine where to build and open new theaters.³⁷

This growing level of demand led the Census Bureau, after the 1940 Census, to justify the costs of preparing limited housing information on blocks in 191 cities of 50,000 or more and making block maps showing details for cities of 100,000 or more. Reed correctly predicted in 1941 that many firms would combine that data on blocks to decide how and where they conducted business. (refer to Figure 2 for the relationship of blocks to tracts and MCDs.)³⁸

Depression-era statisticians additionally used small area data as a sample frame for the newly adopted tool of sample surveys.³⁹ Agencies needed to know how many people were unemployed and in what areas they lived; however, recordkeeping among myriad public aid programs had taken a back seat to funneling money and jobs to Americans in need. The Civil Works Administration conducted a Trial Census of the Unemployed in late 1933, to measure unemployment and also to test sampling using block

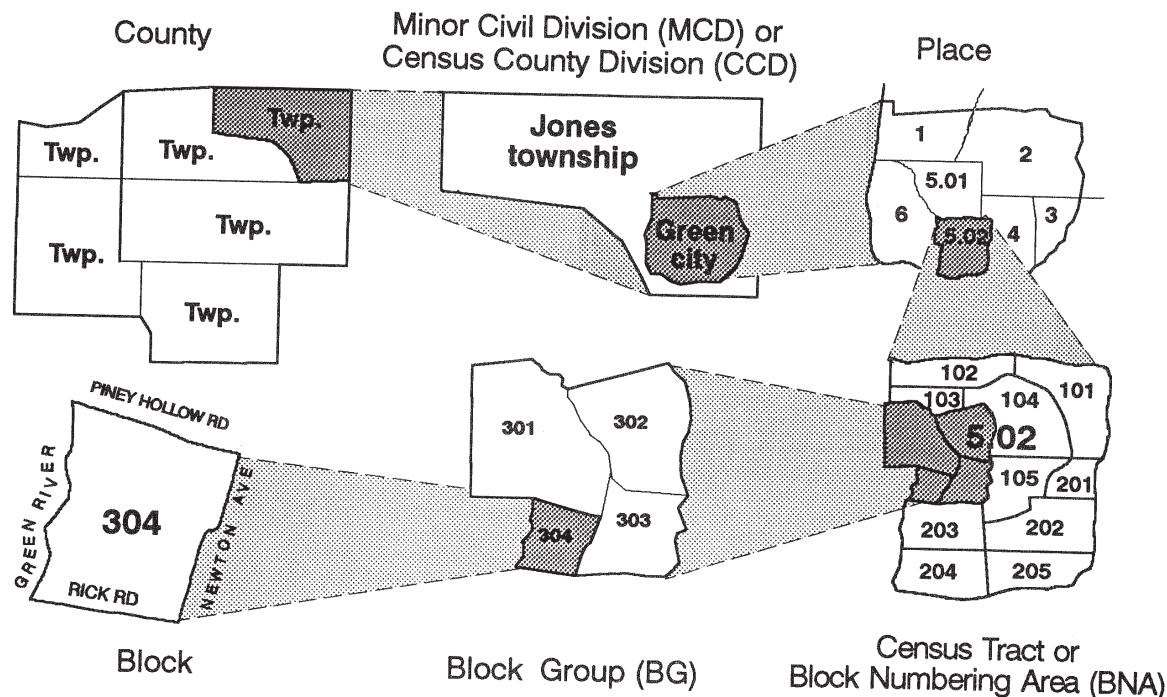
³⁶ Reed, 1937, pp. 9–10.

³⁷ Vergil Reed, “Business Uses of Data by Census Tracts and Blocks,” paper presented before the annual meeting of the American Statistical Association, December 29, 1941, pp. 3–6.

³⁸ A. Ross Eckler and E. P. Staudt, “Marketing and Sampling Uses of Population and Housing Data,” *Journal of the American Statistical Association*, Vol. 38, No. 221, March 1943, p. 91, paper originally presented at the Annual Meeting of the American Statistical Association, Cleveland, OH, December 29–31, 1942; and Reed, 1941, pp. 5–7.

³⁹ Refer to Herman M. Somers, “Adequacy of Data in the Field of Public Aid,” *Journal of American Statistical Association*, Vol. 36, No. 213, March 1941, for the inadequacy of administrative records. Refer to Joseph W. Duncan and William C. Shelton, *Revolution in United States Government Statistics, 1926–1976*, GPO, Washington, DC, 1978, pp. 39–47, for the adoption of sampling surveys.

Figure 2.
Census Small Area Geography



Source: U.S. Census Bureau and Association of Public Data Users, *A Guide to State and Local Census Geography*, June 1993.

segments in urban areas as a sampling frame.⁴⁰ Politicians in the 1930s authorized sample surveys to meet the need for intercensal data when they found a mid-decade census too costly and politically unfeasible.⁴¹ The Works Progress Administration (WPA) responded to the continued need to observe how aid programs had changed conditions when it launched the Sample Survey of the Unemployed in 1940. Its monthly interviews of 20,000 sampled households were drawn from strata of urban and rural counties and were selected using a technique now called “cluster sampling,” which essentially consisted of selecting households from every nth block in urban

⁴⁰ Duncan and Shelton, pp. 37–38 and Somers, p. 87. In contrast, Census Bureau statisticians involved in the 1937 Enumerative Check Census of Unemployment ruled out using cluster sampling based on census blocks as requiring too much advance planning, instead they drew its sample from sets of the nation’s residential postal routes. They first categorized all of the nation’s residential postal routes by the degree of urbanization of the area and then put each route into sets of 50 postal routes in similarly urbanized or rural areas. The statisticians then selected the nth postal route from each set of 50, and postal workers enumerated every household in the route. Calvert Dedrick and Morris Hansen, “The Postal Route Sample,” Appendix E, *The Enumerative Check Census*, Vol. IV, *The Final Report on Total and Partial Unemployment*, GPO, Washington, DC, 1938, pp. 159–161.

⁴¹ Anderson, 1988, p. 177.

areas and selecting ones in rural areas from every nth section of townships.⁴²

As a later generation did in the 2000s with the American Community Survey, politicians in the 1930s authorized sample surveys to meet the need for intercensal data when they found a mid-decade census too costly and politically unfeasible.

As the WPA began to wind down operations, the Census Bureau took over the WPA Survey of the Unemployed in 1942, expanded it, and renamed it twice—first, the Monthly Report on the Labor Force and then the Current Population Survey in 1947.⁴³ The Census Bureau also added weighting to the

⁴² Duncan and Shelton, p. 47.

⁴³ As unemployment declined during World War II, the federal government terminated several WPA programs and transferred several others. An executive order transferred the survey to the Census Bureau in August 1942. Census Bureau, *Annual Report of the Director of the Census, July 1, 1942–June 30, 1942*, 1943, p.1; and Duncan and Shelton, pp. 47, 54–55.

samples—samples from a given small area were weighted based on the frequency in the total country of small areas of similar characteristics.^{44, 45} Small area data were also used in such studies by statisticians to check the representativeness of the small areas for which they chose their samples versus the larger national, statewide, or metropolitan population of small areas.⁴⁶

By the early 1940s, sample surveying had spread far beyond federal agencies. Marketing companies conducted surveys that used the boundaries of enumeration districts as a geographic control on how their interviewers selected households and the characteristics of such districts as a means to quickly find the demographic segments they wanted to survey.⁴⁷

POPULATION MOVEMENT AND GROWTH DROVE THE ADOPTION OF BOTH COMPUTING POWER AND NEW GEOGRAPHIC UNITS: 1946-1964

Rapid population growth after World War II expanded local governments' use of census data to plan where to build facilities in newly urbanized areas; this led the Census Bureau to extend the number of cities for which it provided tract data and to publish new figures on metropolitan areas. Much as they had used small area data in the 1930s, city, county, and state governments drew upon tract data when extending sewer lines, building new roads, and approving proposed locations for hospitals and shopping centers.⁴⁸ Population growth in suburbs and in lands newly annexed to cities meant that officials

⁴⁴ The weight for a responding unit in a survey dataset is an estimate of the number of units in the target population that the responding unit represents. In general, since population units may be sampled with different selection probabilities and since response rates and coverage rates may vary across subpopulations, different responding units represent different numbers of units in the population. The use of weights in survey analysis compensates for this differential representation, thus producing estimates that relate to the target population.

⁴⁵ Frankel and Stock, *Journal of the ASA*, March 1942, as in Duncan and Shelton, p. 47.

⁴⁶ Hansen and Hurwitz, *Annals of Mathematical Statistics*, Vol. 14 1943, pp. 333-362, as in Duncan and Shelton, pp. 54-55.

⁴⁷ Alfred Watson, "Use of Small Area Data in Marketing Analysis," *Journal of Marketing*, April 1942, Part 2, Vol. 6, Issue 4, pp. 42-47. Watson had published widely in the field of marketing research and was working in the division of Commercial Research for the Curtis Publishing Company. His paper had been presented at a joint session of the American Statistical Association and the American Marketing Association.

⁴⁸ Robert W. Burgess, director of the U.S. Census Bureau, "The Relation of Census Tracts to the General Census Program," paper presented at the 113th Annual Meeting of the American Statistical Association, December 30, 1953, and A. Ross Eckler, "Possibilities for a Quinquennial Census," paper presented at a Special Meeting called by the New York Chapter of the American Statistical Association, December 3, 1952, p. 3.

from many more cities and counties asked the Census Bureau to approve tract delineations and provide data for them. Fueled in part by the "baby boom," 49 of the nation's counties grew by over 100 percent from 1950 to 1960. These included three counties in suburban Washington, DC, and one county adjacent to each of the following large cities: Philadelphia, New York City, Denver, Los Angeles, Detroit, New Orleans, and Miami.⁴⁹ In this period of growth, local government officials used small area data on the population of tracts combined with the number of children of preschool age to project upcoming school enrollments to decide where to site new schools.⁵⁰

Commercial use extended as well. Bus companies used small area data when planning stops in growing areas and when eliminating them or changing routes to express lines in shrinking neighborhoods.⁵¹ The Census Bureau responded to the need for data on the expanding fringes of cities by modifying how it tabulated and published data. In fiscal year 1948, for example, the Census Bureau cooperated with the Bureau of the Budget (BoB) and other federal agencies to define standard metropolitan areas (SMAs) in time for the 1947 Census of Manufactures. The agencies defined a metropolitan area as a county containing a central city of 50,000 or more population and one or more whole adjacent counties (or their statistically equivalent units). An exception was made for Washington, DC, where the entire district stood in for a central metropolitan county. (BoB, later renamed the Office of Management and Budget [OMB], gained responsibility for defining metropolitan areas in 1950 and has modified their definitions several times since then.)⁵² In essence, the federal authorities used the American Marketing Association's (AMA) proposed definition from 1938 (refer to the previous section on business uses). Previously, different federal agencies had compiled statistics for cities and their surrounding

⁴⁹ U.S. Census Bureau, *The Eighteenth Decennial Census of the United States, Census of Population, 1960, Vol. I Characteristics of the Population*, GPO, Washington, DC, 1964, p. XXVIII.

⁵⁰ *Census Tract Manual*, 1947, p. 7.

⁵¹ *Census Tract Manual*, 1947, p. 7.

⁵² BoB replaced the term SMA with the term standard metropolitan statistical area (SMSA) in 1959. OMB made substantial changes to the metropolitan area classification for the 1980 and 1990 Censuses and after 2000. Terminology also changed from SMSA to metropolitan statistical area (MSA) in 1983, to the general term metropolitan areas (MAs) in 1990, which encompassed primary metropolitan statistical areas (PMSAs) and consolidated metropolitan statistical areas (CMSAs). These in turn were modified to metropolitan and micropolitan statistical areas and core based statistical areas (CBSAs) in 2000. Refer to U.S. Census Bureau, *Geographic Areas Reference Manual*, U.S. Department of Commerce, Washington, DC, 1994, pp. 13-3 to 13-6, 13-11; and Census Bureau, "Geographic Terms and Concepts, Appendix A," *2010 Census Redistricting Data (Public Law 94-171) Summary File*, pp. A-15, A-16.

suburbs using their own definitions of and boundaries for the metropolitan areas, making the resulting data from different agencies hard to match.⁵³

In addition, the 1950 Census, for the first time, delineated and reported data on urbanized areas (UAs)—which in 1950, meant cities of at least 50,000 people along with the adjacent closely settled areas. Where incorporated places contiguous to such cities had more than 2,500 inhabitants or were densely settled, the Census Bureau included them in urbanized areas. Unlike earlier metropolitan districts and other units for which the Census Bureau presented data, the boundary of the urbanized area also enveloped densely settled land in unincorporated areas continuous to urban areas. The goal in establishing such areas was to capture the number and characteristics of residents of counties who did not live inside the incorporated boundaries of cities or MCDs but who lived in areas that were not considered rural because of characteristics such as density of housing, urban land uses, and proximity to urban centers.⁵⁴

The Census Bureau also published small area data from the 1950 Census for 11 SMAs in their entirety. Almost all tract committee heads surveyed in 1944 had expressed an interest in extending tracts to cover entire metropolitan districts. The Census Bureau encouraged them to do so in the 1950s. Tract committees brought the total number of entirely tracted SMAs to 133 and nearly doubled the number of tracts for which the Census Bureau tabulated data in the 1960 Census (Figure 3).⁵⁵ This gave planners and marketers—who were anxious to make population projections in such metropolitan areas—data delineated down to smaller areas to work with at that time and in the coming decades.

Paralleling the demand for data on suburban growth was the need for more stable boundaries on which to tabulate and report data on county subdivisions. By the 1940s, users of data on minor civil divisions (MCDs) told the Census Bureau that in a number of western and southern states the boundaries of some

⁵³ Bureau of the Census, *Annual Report of the Bureau of the Census, July 1, 1947–June 30, 1948*, p. 2; and Seubert, 1938, pp. 34–38.

⁵⁴ U.S. Census Bureau, *United States Census of Population: 1950, Characteristics by Size of Place*, GPO, Washington, DC, 1953, pp. 22–23; U.S. Census Bureau, *Annual Report of the Bureau of the Census, July 1, 1948–June 30, 1949*, p. 4; and U.S. Census Bureau, *Census Tract Manual*, Fourth Edition, GPO, Washington, DC, 1958, pp. 36–37.

⁵⁵ R. Burgess, 1953, p. 5; Green, 1944, p.1; and U.S. Census Bureau, *Census Tract Manual*, Fifth Edition, GPO, Washington, DC, 1966, p. 2.

county subdivisions were too obscure and changed too frequently to make the data useful. State health agents, highway planners, agriculture department officers, and members of state chambers of commerce told the Census Bureau that they had so much trouble tracking changes within shifting MCDs that they found them too “non-standardized” to combine into recognizable areas with common social or economic characteristics. In response, the Census Bureau and the Bureau of Agricultural Economics set down rules for drawing census county divisions (CCDs) and authorized states and local committees to create their own boundaries. After the 1960 Census published data on CCDs in 18 states, the data were widely used by local government planning agencies and by marketing agencies (Figure 2).⁵⁶ At least one federal agency soon amended its regulations to mandate that states use these small area data to determine eligibility for programs that use federal rural redevelopment monies.⁵⁷

After World War II, city planning agencies launched a period of epic growth in the use of census small area data when they began engaging in urban redevelopment. Between 1941 and 1942, legislatures in Illinois, New York, and Michigan passed laws enabling cities to engage in urban redevelopment of “blighted” or “slum” areas, but the real work was shelved during WWII.⁵⁸ In 1947, legislators in Illinois gave redevelopment commissions the power to identify blighted and slum areas and develop plans to repair, reconstruct, or demolish dilapidated structures within them or, if need be, to demolish the whole area. As the law spelled out, redevelopment planners could target a neighborhood based in part on factors census takers had identified in 1940—the age of dwellings, the lack of proper plumbing, state of disrepair, and the number of inhabitants per bedroom, among others (Figure 4).⁵⁹ Later laws were more detailed on what “blight” meant. For example, Illinois mandated in 1953 that a local agency had to show that at least 50 percent of the targeted area’s housing was more than 35

⁵⁶ Robert Charles Klove, “Census County Divisions, Past and Future,” Department of Commerce, Bureau of the Census, Washington, DC, 1973, and Bureau of the Census, Bureau of Agricultural Economics, and Washington State Census Board, “Statistical Areas on a State-wide Basis,” n.d. circa 1948, Appendix A, Klove, 1973.

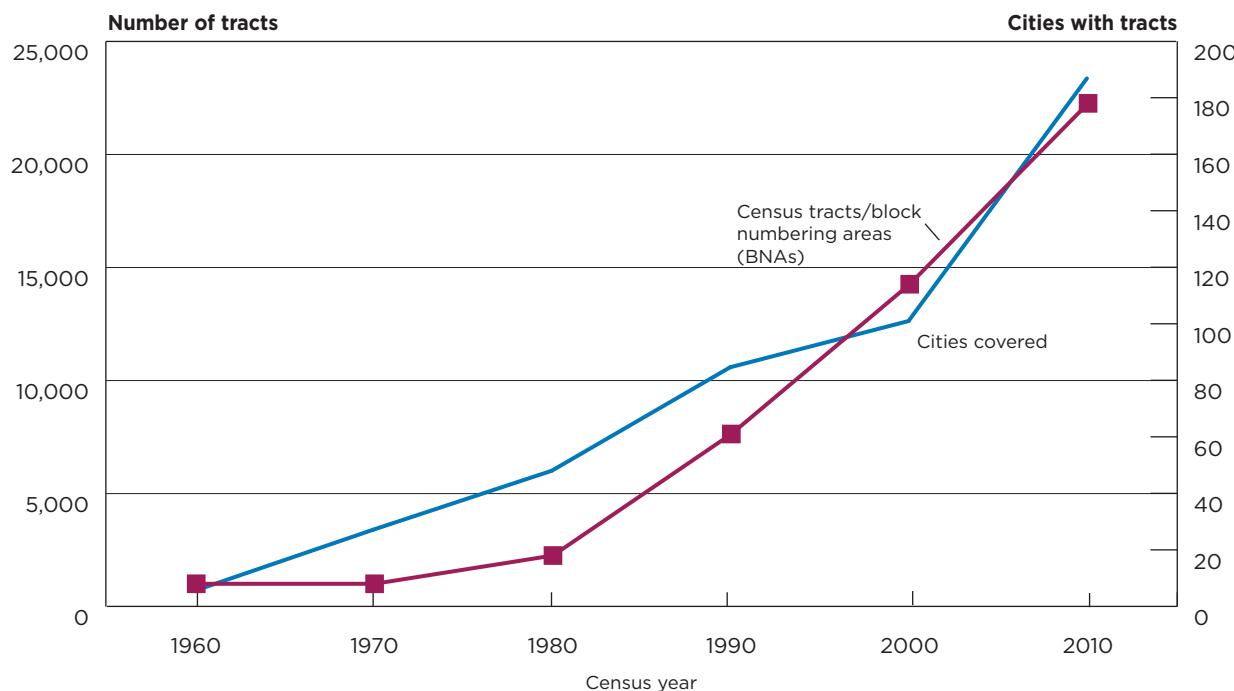
⁵⁷ Sterling M. McMurrin, U.S. commissioner of Education and Abraham Ribicoff, secretary of Health, Education, and Welfare, “Title 45–Public Welfare,” 26 Federal Register 5316, 1961.

⁵⁸ Jon C. Teaford, *Rough Road to Renaissance: Urban Revitalization in America, 1940–1985*, Johns Hopkins University Press, Baltimore, MD, 1990, pp. 34–35.

⁵⁹ Neighborhood Redevelopment Corporation Law of 1947, Chapter 67 1/2, par. 253-11, 315 ILCS 20/3-11.

Figure 3.

Number of Census Tracts: 1910-1960



Sources: Arthur L. Swift Jr., "Doctor Laidlaw's Vision: The Early Years," paper presented at the Annual Meeting of the American Statistical Association, Sept. 5, 1956; Howard Whipple Green and Leon E. Truesdell, "Census Tracts in American Cities," Bureau of the Census, Washington, DC, December 1934; and Marshall L. Turner, Jr., and Frederick G. Bohme, "The National Census: The Parts Are Greater Than the Whole," paper prepared for presentation at the Social Science History Association annual meeting, November 5-8, 1992.

years old.⁶⁰ Cities nationwide received massive boosts in redevelopment efforts when the Housing Act of 1949 provided federal loans to match redevelopment funds raised by local government for local public agencies.⁶¹ The Pittsburgh Planning Commission's study and plans for the city's North Side gave examples of how planners used census data after the 1949 act (Figure 5 and Figure 6). It recommended one portion of the neighborhood for clearance based in part on the area's overcrowding (calculated from the 1950 Census figures for the number of dwellings per census block and percentage of dwellings having more than 1.51 persons per room).⁶² In addition to eradicating "blight," urban redevelopment planners sought to

⁶⁰ Urban Community Conservation Act of 1953, Ch. 67 1/2, paragraph 91.8, 315 ILCS 25/1. Source: Laws 1953, p. 1240.

⁶¹ Housing Act of 1949 as in Conference Report, 81st Congress, 1st Session, House of Representatives, Report No. 975, p. 3.

⁶² In addition, the district slated for demolition had a higher than citywide average percentage of dwellings which census takers had checked off as dilapidated (Figure 4). Pittsburgh Regional Planning Commission and the Pittsburgh City Planning Commission, "North Side Study," April 1954, pp. 7, 10, 44; and U.S. Census Bureau, *Urban and Rural Enumerator's Reference Manual: 1950 Census of the United States*, U.S. Department of Commerce, Washington, DC, 1949.

help central city shops compete with suburban shopping centers by building freeways to relieve traffic congestion in urban shopping districts.⁶³

The Federal Aid Highway Act of 1956 transformed the urban landscape by authorizing the federal government to assume 90 percent of the cost on the construction of 5,300 miles of urban freeways.⁶⁴ As with slum clearance, the plans for these roads boosted the need for small area data. By the mid-1950s, state highway departments were using census tract data to conduct origin and destination surveys; and the Federal Highway Act of 1962 required planning using census block population data for any project in an urbanized area.⁶⁵ Between 1950 and 1954, urban and regional planning bodies authored over 100

⁶³ Roger Van Tassel, "Economic Aspects of Expressway Construction," *Journal of the American Planning Association*, Vol. 20, No. 2, 1954, pp. 83-86.

⁶⁴ Teaford, pp. 93-4.

⁶⁵ A. Ross Eckler, "A Period of Expanding Use of Tract Statistics: 1946-1956," paper presented at the Golden Anniversary Luncheon, Annual Meeting of American Statistical Association, Detroit, MI, September 8, 1956, p. 3; U.S. Census Bureau, "Minutes of the Census Advisory Committee on Small-Area Data," July 19-20, 1965, p. 20; and Appendix H in Turner and Bohme, p. 17.

Figure 4.

Instructions to Enumerators on Evaluating Whether or Not a Dwelling Was Dilapidated



"On the outside you see the run-down front steps and porch. These are insufficient to classify the unit as dilapidated but warn you to look further. Inside you see that the interior also is in disrepair. In combination these deficiencies are sufficient to classify the unit dilapidated."

Source: U.S. Census Bureau, "Urban and Rural Enumerator's Reference Manual: 1950 Census of the United States," U.S. Department of Commerce, Washington, DC, circa 1949.

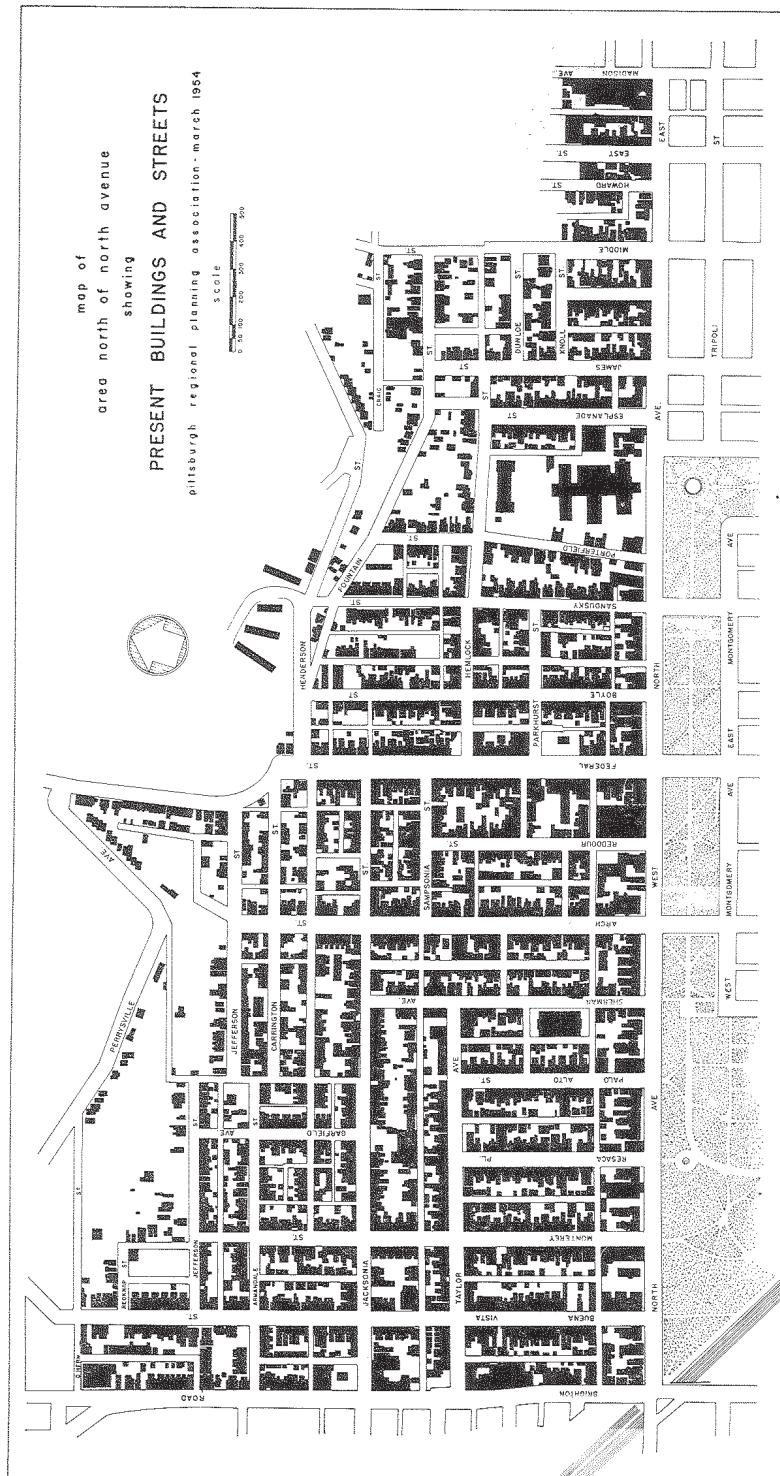
publications using block or tract data.⁶⁶ According to Conrad Taeuber, assistant director of the Census Bureau, planners and others led the Census Bureau to publish limited population data by blocks in the 1960 Census along with the housing data previously provided. (Refer to the statement by Census Bureau

Assistant Director Morris Hansen to marketers later in this section).⁶⁷

⁶⁶ Conrad Taeuber, assistant director of the Census Bureau, "Comments for Workshop on the 1960 Census," statement for workshop on the 1960 Census of the American Society of Planning Officials, San Francisco, CA, March 18, 1957, p. 4; and Morris Hansen, assistant director of the Census Bureau, "The Impact of the 1960 Census," a talk presented at the Seventh Annual Public Utilities Seminar of the American Marketing Association, Houston Texas, March 2, 1961, p. 9f.

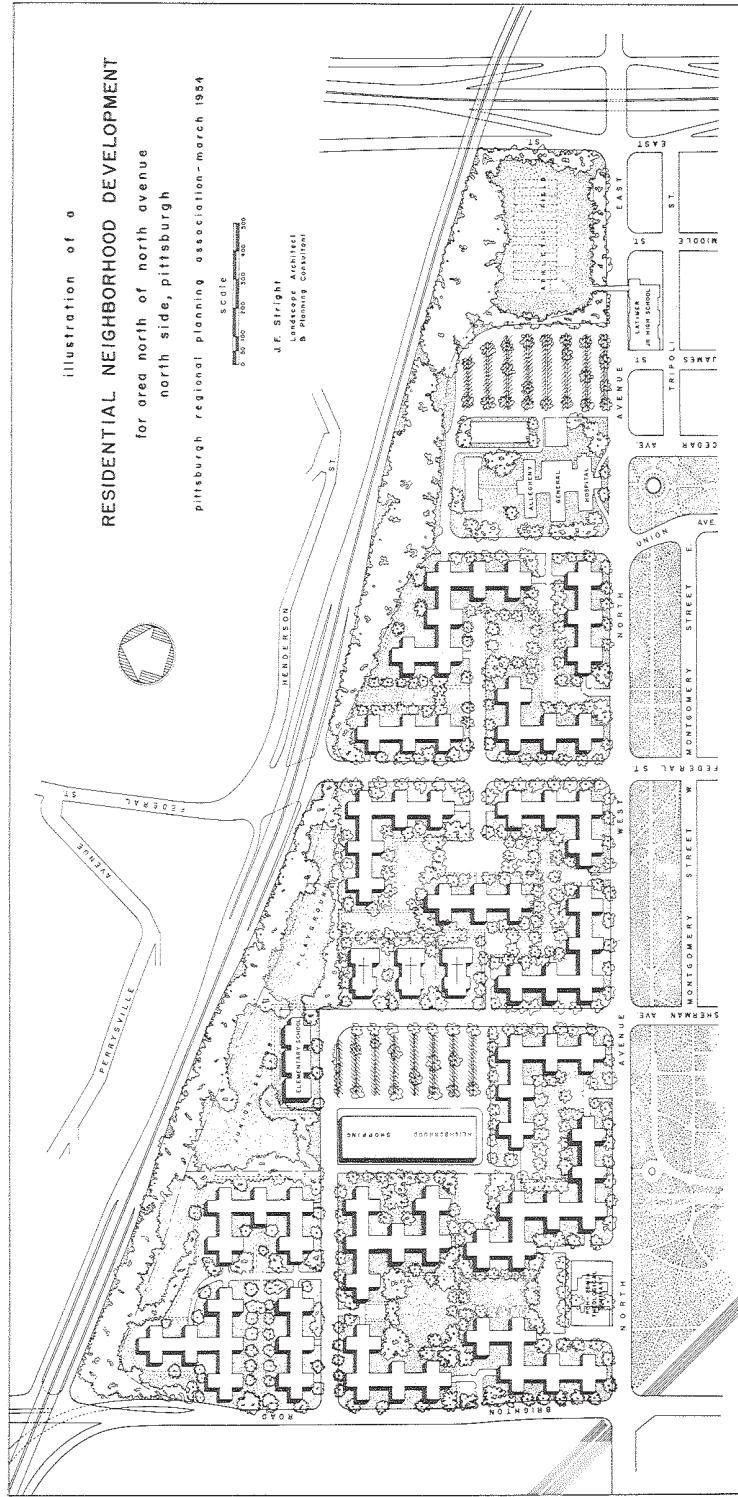
⁶⁶ Eckler, 1956, pp. 3, 19.

Figure 5.
Portion of Pittsburgh's North Side Showing Housing and Surface Streets in 1954



Note: Urban planners used maps such as the one above as a graphic representation of the overcrowding that they uncovered in census data on areas to be redeveloped. Victorian-era houses, garage apartments, and other structures outlined in black occupied most of the space save for a grid of residential streets and alleys.
Source: Pittsburgh Regional Planning Association and the Pittsburgh City Planning Commission, "North Side Study," April 1954, p. 44; Government Printing Office, 1894, p. 164.

Figure 6.
Map of High-Rises and Freeways Proposed to Replace Existing Dwellings in a Portion of Pittsburgh's North Side



Note: Urban planners displayed their design for the reengineered neighborhood. High-rise apartments, pedestrian-oriented green space, two freeways, and a suburban-style shopping plaza would replace the existing neighborhood.

Source: Pittsburgh Regional Planning Commission, "North Side Study," April 1954, p.44.

In addition to the urban redevelopment commissions, suburban school districts, and highway planners previously noted, demand for data by civil defense agencies and public health researchers pushed the Census Bureau to adopt faster technologies for inputting and calculating data. In the 1960s, the Federal Civil Defense Administration used tract statistics as a measurement of daytime and nighttime population in order to draw up evacuation plans and locate fallout shelters.⁶⁸ In addition, public health departments were looking to deepen their analysis of mortality statistics. The Public Health Conference on Records and Statistics reported great interest among its members in examining the effect of air pollution on mortality across cities using tracts or groups of tracts of similar socioeconomic status as a control factor.⁶⁹ Between the 1940s and the 1960s, the Census Bureau's decision to meet small area data users' needs for more and more tabulations and more sample surveys compelled the agency to adopt the latest computer technologies. Former Census Bureau Director A. Ross Eckler remembered the situation with the following words:

"In the 1940's, it became evident that the punched card system . . . was unable to keep abreast of the new censuses and surveys, the greater number of inquiries, and the increased complexity of tabulations called for by users."⁷⁰

In response, the Census Bureau purchased UNIVAC I in time for this computer system to tabulate part of the 1950 Census.⁷¹ UNIVAC and its successors made it possible for the 1960 Census to be the first one fully processed on computers.⁷² To speed up the input of millions of forms, the Census Bureau collaborated with the National Bureau of Standards to develop the Film Optical Sensing Device for Input to Computers (FOSDIC). Together the computer processors and FOSDIC made census data available to the public sooner. Most notably, during the 1960 Census, the FOSDIC machine reduced the amount of time it took to capture the information on completed question-

⁶⁸ Eckler 1956, p. 3; unpublished draft of a report by Edwin D. Goldfield, "Uses of Tract Statistics," August 13, 1964, p. 5; and Henry Sheldon, "Special Census Program of the Bureau of the Census," *The American Statistician*, April 1957, p. 7.

⁶⁹ Elizabeth J. Coulter and Lillian Guralnick, "Analysis of Vital Statistics by Census Tract," *Journal of the American Statistical Association*, Vol. 54, No. 288, December, 1959, pp. 730-736.

⁷⁰ A. Ross Eckler, *The Bureau of the Census*, Praeger Publishers, New York, NY, 1972, p. 116.

⁷¹ Duncan and Shelton, pp. 126-129.

⁷² Howard G. Brunsman, "Significance of Electronic Computers for Users of Census Data," *Emerging Techniques in Population Research*, proceedings for the 1962 Annual Conference of the Milbank Memorial Fund.

naires by 7 months.⁷³ With these technological breakthroughs, the Census Bureau was able to overcome some of the cost and human resource limitations that in prior decades had hampered its ability to keep up with increased demands for small area data.

As the use of sampling and computers spread throughout the economy, businesses and marketing firms succeeded in pushing the Census Bureau to publish block level data after the 1960 Census. When the agency surveyed marketing and business users on their needs, it found that they were using small area data for cities and their fringes to grade neighborhoods by buying power.⁷⁴ By the early 1960s, large firms showed that they were well aware of the population's movements and were planning their sales accordingly. Marketers and urban renewal planners in the 1960s lobbied Congress for a mid-decade census or a sample survey similar in scope to what the American Community Survey now does. Ford's market research division manager testified in mid-decade census hearings in 1961 that the company used census data on the larger growth rates of the fringes of the country's 212 metropolitan areas between 1950 and 1960 to assess where to locate new car dealerships.⁷⁵

Meanwhile, consulting firms used census population data in their analyses to aid smaller firms. For instance, in 1961 the president of the Real Estate Research Corporation cited upwards of 10,000 private clients for whom his firm helped identify investment opportunities using census data from enumeration

Marketers and urban renewal planners in the 1960s lobbied Congress for a mid-decade census or a sample survey similar in scope to what the American Community Survey now does.

⁷³ A. Ross Eckler, Census Technical Paper 29, as in Duncan and Shelton, p. 133.

⁷⁴ A. Ross Eckler, "Census Statistics for Local Use," paper presented before the Raleigh Advertising Club, in Raleigh, North Carolina, on November 9, 1954.

⁷⁵ Its marketing research manager cited census data showing a 10.6 percent increase in central areas versus a 49 percent increase in portion of metropolitan areas outside the central areas. Statement of R. J. Eggert, marketing research manager, Ford Division, Ford Motor Company, to the U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, *Hearings on Mid-Decade Census, Part 1*, Chicago, IL, October 25, 1961, 87th Cong., 2nd Sess., 1962, pp. 18-41.

districts.⁷⁶ Marketing operations furthermore had grown much larger in scope, adding to the demand for up-to-date data of firms that employed direct mail advertising. The president of the International Association of Cross Reference Directory Publishers told Congress in 1962 about using small area data because mailings might run as high as 5–20 million families.⁷⁷ Census Bureau officials made it clear to marketers in the early 1960s that it had extended its publishing to accommodate their demands. Census Bureau Assistant Director Morris Hansen cited marketers as the group demanding small area data the most and the chief driver behind the decision to present “statistics by blocks not only for the 300 cities of 50,000 or more inhabitants but also for 170 smaller places.”⁷⁸ By publishing limited population statistics by blocks in 1960, the Census Bureau increased marketers and other users’ access to statistics for which they would have previously had to pay for special tabulations.⁷⁹ By the late 1960s, the Census Bureau was exploring with marketing associations to determine how it could provide data based on ZIP codes since business people recognized these units more readily than they did census tracts or blocks when examining population data.⁸⁰

INCREASED FEDERAL DEMANDS FOR DATA TO DOCUMENT PROGRAMS AND EMPOWER LOCAL COMMUNITIES/MINORITIES: 1964–1975

Civil rights laws, court decisions, and antipoverty programs greatly expanded the scope of small area data needed to qualify for funds, assess program effectiveness, and/or monitor compliance. For instance, cities had to create community profiles of the inner-city neighborhoods for which they wanted

⁷⁶ Statement of Richard L. Nelson, president of the Real Estate Research Corporation, to the U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, *Hearings on Mid-Decade Census, Part 1*, Chicago, IL, October 25, 1961, 87th Cong., 2nd Sess., 1962, pp. 52–61, 53, 55.

⁷⁷ Statement of Jack R. Cole, president of the Mail Advertising Corp of America, to the U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, *Hearings on Mid-Decade Census, Part 1*, Chicago, IL, October 25, 1961, 87th Cong., 2nd Sess., 1962, pp. 130–138.

⁷⁸ Morris Hansen, assistant director of the U.S. Census Bureau, “The Impact of the 1960 Census,” a talk presented at the Seventh Annual Public Utilities Seminar of the American Marketing Association, Houston, Texas, March 2, 1961, p. 9f.

⁷⁹ Conrad Taeuber, assistant director of the U.S. Census Bureau, “Comments for Workshop on the 1960 Census,” statement for workshop on the 1960 Census of the American Society of Planning Officials, San Francisco, CA, March 18, 1957, p. 4.

⁸⁰ Morris Hansen, “Outlook for Census Information by Zip-Code Areas,” paper presented at the Meeting of the Direct Mail Advertising Association, Inc., Washington DC, March 8, 1967, Revised Version, July 12, 1967, pp. 1–5.

to set up community action programs under the Economic Opportunity Act.⁸¹ The use of small area data in New Haven served as an experiment later taken nationwide. There, in an effort to assess the effectiveness of several Great Society programs, the Census Bureau proposed getting the needed data from a full mid-decade census or a smaller sample survey. In 1965, officials in charge of the programs had concerns with either an annual survey or a mid-decade census because they feared that the proposed projects would not deliver the needed small area data until 2–7 years after the date of the census or survey.⁸² The Census Bureau, other federal agencies, and local governments developed methods to match state and local administrative records with census data at the block level in order to determine if these programs actually had reduced poverty rates and improved health outcomes in New Haven’s program areas.⁸³ Users found so much value in the study’s data linkages that the New Haven police department added its crime data to the database and the Office of Economic Opportunity had the Census Bureau replicate those same methods in Los Angeles (CA), Atlanta (GA), Phoenix (AZ), and Mound Bayou (MS).⁸⁴

The fight to make voting and legislative representation more equitable made a larger number of politicians even more interested in small area data. After *Baker vs. Carr* and subsequent cases established the one-person, one-vote doctrine, advocates paid statisticians to develop computer models to propose

⁸¹ A. Ross Eckler, “Emerging Federal Developments Related to State and Local Data Needs,” paper presented at the National Conference on Comparative Statistics, sponsored by the National Governor’s Conference in cooperation with the Council of State Governments, Washington, DC, February 25, 1966, pp. 2–3.

⁸² Statement of Dr. Raymond T. Bowman, assistant director for Statistical Standards, Bureau of the Budget, to the U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, *Hearings on Mid-Decade Census, Part 1*, Washington, DC, May 4, 1965, 89th Cong., 1st Sess., 1965, p. 54. Also, the written statement by Sargent Shriver, director of the Office of Economic Opportunity to the Honorable Harley O. Staggers, chairman, U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, April 30, 1965, in the *Hearings on Mid-Decade Census, Part 1*, May 4, 1965, p. 11.

⁸³ Samuel P. Korper, John C. Deshaies, Leo A. Schuerman, Ronald E. Crellin, “Composite Social Indicators for Small Areas—Census Use Study—Recent Developments in Methodology and Uses,” paper presented at the Conference on Small Area Statistics of the American Statistical Association, Montreal Canada, August 1972, p. 2.

⁸⁴ Korper, et. al., pp. 7–9; Samuel P. Korper, “Census Use Study Health Information Study Interaction With New Haven Data Users in the Health Area,” paper presented at the Seminar at the Health Services Mental Health Administration (DHEW), Rockville, MD, March 22, 1971, pp. 6–9.

In 1965, officials in charge of Great Society programs seemed to have objected to either an annual survey or mid-decade census because they feared that the proposed projects would not deliver the needed small area data until 2–7 years after the date of the census or survey.

redrawn state legislative districts in Delaware and Connecticut.^{85,86}

Congress, moreover, used small area data from the 1960 Census in drafting the Voting Rights Act of 1965. The 1965 act authorized federal authorities to oversee elections in areas where census data indicated that the number of voters had fallen below 50 percent of the voting-age population. Also, the Department of Justice paid the Census Bureau to run special tabulations on voter turnout versus the voting-age population by enumeration district in a Mississippi case.⁸⁷

Small area data usage for redistricting grew in the 1970s. Legislators, governors, and other officials flooded the Census Bureau in 1970–71 with around 1,200 phone calls a month asking for data, and the Census Bureau responded with voluminous printouts and “bed sheet” sized maps. To align census data more readily with voting districts, Congress passed Public Law 94-171 in 1975, which required the Census Bureau to provide state legislatures with the small area census population tables (printouts, data tapes, and data packages for redistricting purposes) within 1 year of Census Day. Seventeen states handed the Census Bureau their proposed voting district (VTD) boundaries in time for the agency to release voting district data after the 1980 Census.⁸⁸ In addition, five states entered into contracts to draw block areas for all areas of the state not covered by the Census Bureau’s block program.⁸⁹

⁸⁵ Baker v. Carr was a 1962 Supreme Court ruling establishing the role of the judiciary in redistricting.

⁸⁶ Margo Anderson and Stephen E. Fienberg, “To Sample or Not to Sample? The 2000 Census Controversy,” *Journal of Interdisciplinary History*, 30.1, 1999, pp. 14–15; Stuart S. Nagel, “Simplified Bipartisan Computer Redistricting,” *Stanford Law Review*, Vol. 17, No. 5, May 1965, pp. 863–899; and S. W. Hess, et. al., “Nonpartisan Political Redistricting by Computer,” *Operations Research*, Vol. 13, No. 6, November–December 1965, p. 1001.

⁸⁷ Oral history interview with Marshall Turner, interviewed by David M. Pemberton, August 21, 2001.

⁸⁸ Marshall L. Turner, Jr. and Robert A. LaMacchia, “The U.S. Census, Redistricting, and Technology,” *Social Science Computer Review*, Vol. 17, No. 1, spring 1999, pp. 17, 20.

⁸⁹ Testimony of Marshall L. Turner, Jr., assistant chief of the Decennial Census Division, U.S. Bureau of the Census before the U.S. House of Representatives Subcommittee on Census and Population. Field Hearing, Part X, Houston, TX, May 4, 1979.

Following a 1983 meeting with representatives of the Department of Justice and both major political parties, the Census Bureau agreed it would extend census tracts and blocks nationwide and make block group data available for the entire United States for the 1990 Census (Figure 7 and Figure 8).⁹⁰

SMALL AREA DATA GROW MORE ACCESSIBLE, USE EXPANDS AS COMPUTING POWER EXTENDS, AND GOVERNMENTS INSIST ON VERIFIED RESULTS FOR THEIR ALLOCATIONS: 1970–2010

The start of the 1970s saw a modified rollback of Great Society programs and the federal government’s return of authority to the states merely shifted more of the demand for small area data to them. In place of Great Society programs in which inner-city neighborhoods ran programs with federal funds, the federal government returned tax monies it collected to states and cities. President Richard Nixon’s revenue-sharing programs distributed federal tax revenues back to some 39,000 local and state governments. Even the smallest minor civil divisions became dependent on census population data and income data to receive their allocated funds.⁹¹ Meanwhile, the federal government continued grants in aid and other programs with eligibility and allocation of funds based on small area data. These included the 1980s Urban Development Action Grants and HUD Low Income Housing credits.⁹²

In the late 1960s, local governments’ takeover of hundreds of public transit systems and federal regulations on highways and mass transit led the Census Bureau to develop Traffic Analysis Zones

⁹⁰ Turner and LaMacchia, p. 23.

⁹¹ J. Gregory Robinson, et. al., “Illustrative Assessment of the Impact of Census Underenumeration and Income Underreporting on Revenue Sharing Allocations at the Local Level,” paper presented at the American Statistical Association Meeting, August 1979.

⁹² Refer to Gonzalez for the allocation formulas for CETA, LEA, and LEAA. Refer to GAO/HRD-87-28 for the eligibility criteria for UDAG “pockets of poverty.” Also, Maria Elena Gonzalez, “Characteristics of Formulas and Data Used in the Allocation of Federal Funds,” *The American Statistician*, Vol. 34, No. 4, (Nov., 1980), pp. 202–204. U.S. General Accounting Office, “Grant Formulas: A Catalog of Federal Aid to States and Localities,” GAO/HRD-87-28, Washington, DC, March 23, 1987, pp. 150–153; and Internal Revenue Code of 1986, 26 U.S.C. 42(d)(5)(C).

Figure 7.
Number of Census Tracts/Block Numbering Areas: 1960–2010

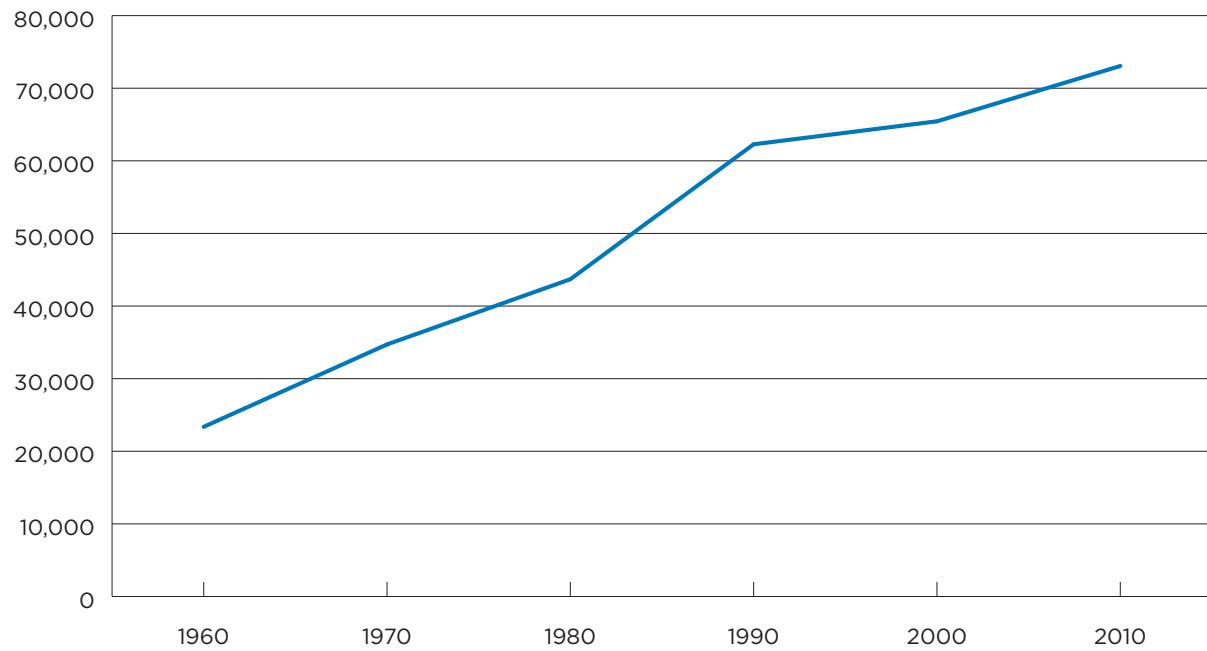
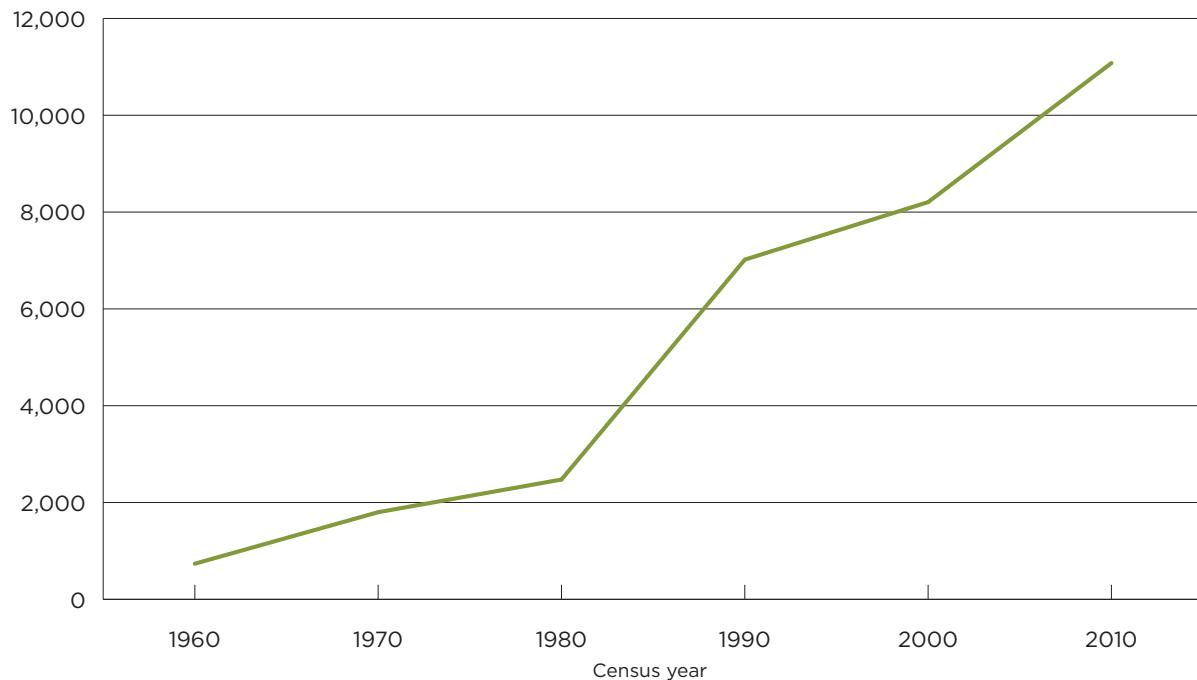


Figure 8.
Number of Census Blocks: 1960–2010



Source: Marshall L. Turner, Jr., and Frederick G. Bohme, "The National Census: The Parts Are Greater Than the Whole," paper prepared for presentation at the Social Science History Association annual meeting, November 5–8, 1992; U.S. Census Bureau and Association of Public Data Users, *A Guide to State and Local Census Geography*, June 1993; U.S. Census Bureau, *2000 Census of Population and Housing History*, Vol. 2., GPO, Washington, DC, 2009.

(TAZs) and other data products.⁹³ To meet the planning needs of cities, such as Chicago, Oakland, and Dallas, the Census Bureau distributed the 1970 Urban Transportation Planning Package (UTPP). The package gave transportation planners the data needed to analyze census population and commuting data aggregated from blocks into TAZs or ZIP Codes (later Zip Code Tabulation Areas [ZCTAs]). (Figure 9.)⁹⁴ The passage of amendments to the Clean Air Act in 1990 served to ramp up the usage and importance of small area data for transportation planners. States with metropolitan areas that had not met federal air quality standards had to demonstrate that any transportation improvement projects using federal funds would relieve congestion and air pollution before receiving funding. The Census Transportation Planning Package (CTPP) from the 1990 Census became one of the most valuable tools in states' efforts to develop statewide transportation plans to meet the requirements of the Clean Air Act and Intermodal Surface Transportation Efficiency Act.⁹⁵

The Census Bureau's efforts to extend block data nationwide for redistricting purposes led it to create a geographic Information system (GIS), which dramatically reduced the workload for users seeking to customize their data. The agency had been working on such geocoding programs since the New Haven Study in 1967.⁹⁶ Census Bureau employees input the geographic coordinates of street addresses and tract/block/corporate boundaries into computer databases. The resulting Geographic Base File/Dual Independent Map Encoding (GBF/DIME) system

⁹³ Steven J. Kish, "Local Government Financing of Public Transportation: a Case Study of Georgia Transit Systems," Chapter 3 in George M. Guess, ed., *Public Policy and Transit System Management*, Greenwood Press, NY, 1990; and Paul T. Manka, "Concepts and Procedures Used in Tabulating 1970-Census Data for the Urban Transportation Planning Package," National Research Council, *Census Data and Urban Transportation Planning*, proceedings of a conference held in Albuquerque, New Mexico, August 21–23, 1973; and Washington, Transportation Research Board, National Research Council, 1974, p. 11.

⁹⁴ Siim Soot, "Census Data Use in Illinois by Research and Academic Community," *Decennial Census Data for Transportation Planning: Case Studies and Strategies for 2000*, Conference Proceedings 13, Vol. 1, National Academy Press, Washington, DC, 1997, pp. 12–18.

⁹⁵ Thabet Zakaria, Delaware Valley Regional Planning Commission, "Conversion and Use of 1990 Census Transportation Planning Package in the Delaware Valley Region," and Alan E. Pisarski, "Summary and Recommendations," *Decennial Census Data for Transportation Planning: Case Studies and Strategies for 2000*, Conference Proceedings 13, Vol. 1, National Academy Press, Washington, DC, 1997.

⁹⁶ Geocoding is the process of taking an address and attaching or calculating longitude and latitude coordinates.

developed in that study was extended to 80 other urban areas for the 1970 Census.⁹⁷ Throughout the 1980s, the Census Bureau and the U.S. Geological Survey (USGS) extended geocoding to rural addresses and geographic features to create the Topologically Integrated Geographic Encoding and Referencing (TIGER) system.⁹⁸

By its 1988–1990 nationwide launch, the TIGER system not only formed the basis for geographic information needed to conduct the 1990 Census but also provided a platform for the ongoing maintenance and dissemination of geographic information. With its work on TIGER, the Census Bureau was able to extend its enumeration by blocks and tracts and their equivalents to the entire nation because it quickly could produce customized high-quality maps for enumerators to find the boundaries of these units. Figure 7 and Figure 8 show the resulting growth of the number of tracts and blocks.⁹⁹ Furthermore, the spread of personal computers able to download data or process census CD-ROMs soon enabled people working on redistricting to analyze the effect of changing the proposed boundaries of voting districts almost in real time. The TIGER system enabled the Census Bureau to retrieve the demographic data for the blocks making up the new districts quickly for the people proposing or evaluating them.¹⁰⁰ Soon a wide array of users with access to GIS adopted the TIGER/Line files to match their own geocoded data with census data for micromarketing and/or local planning.¹⁰¹ By automating the changes revealed by the agency's Boundary and Annexation Survey of all governmental units (including tribes), the agency also allowed these governments to use data for their most current geography when participating in programs that allocated hundreds of billions of dollars in public funds.¹⁰² In addition, the Census Bureau decided to maintain and update information in the TIGER/Master Address File database instead of starting from scratch in building address files as it had in previous decennials. The

⁹⁷ U.S. Census Bureau, *1970 Census of Population and Housing: Procedural History*, Washington, DC, GPO, 1976, 1/7-8, 13/2-5; and Turner and Bohme, p. 18.

⁹⁸ U.S. Census Bureau, *1990 Census of Population and Housing History*, Washington, DC, GPO, 1993, pp. 3-18-3-27.

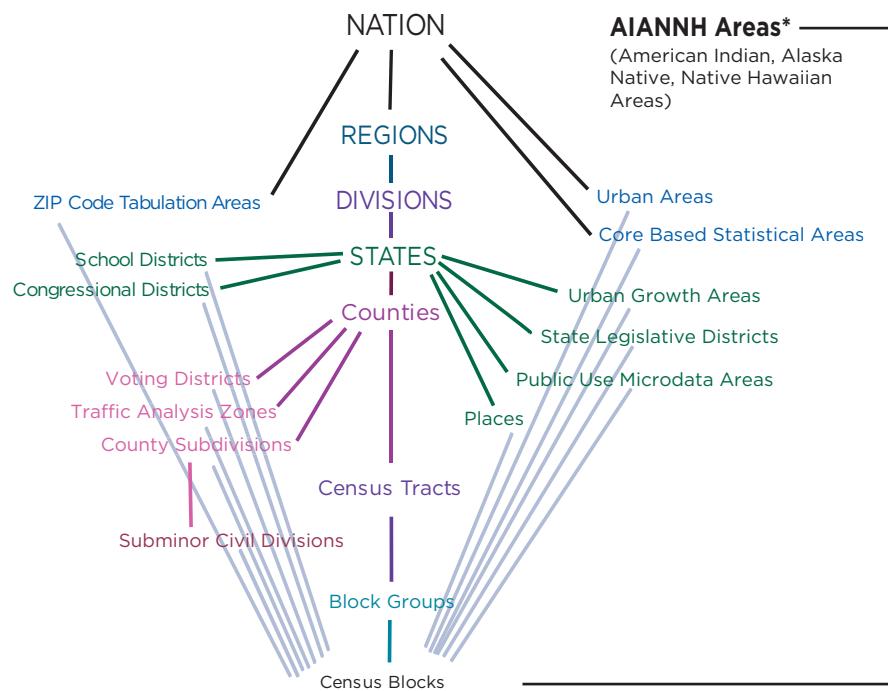
⁹⁹ Turner and Bohme, pp. 14, 22–3.

¹⁰⁰ Turner and LaMacchia, pp. 23–25.

¹⁰¹ Turner and Bohme, p. 22f.

¹⁰² U.S. Census Bureau, 1993, pp. 3-4-3-6; U.S. Census Bureau, *2000 Census of Population and Housing History*, Vol. 2, Washington, DC: GPO, 2009, pp. 321–322; and Andrew D. Reamer, *Surveying for Dollars: The Role of the American Community Survey in the Geographic Distribution of Federal Funds*, Washington, DC, Brookings Institution, Metropolitan Policy Program, 2010, pp. 8–13.

Figure 9.
Hierarchy of Census Geographic Entities in the 2010 Census



Source: U.S. Census Bureau, "Standard Hierarchy of Census Geographic Entities," October 2010, <www.census.gov/content/dam/Census/data/developers/geoareaconcepts.pdf>.

Census Bureau's decision to maintain and update its TIGER/Master Address File eventually gave it a database with information sufficiently current to provide the sampling frame for a continuous survey such as the ACS.¹⁰³

More recently, the internet age ushered in an era of citizens demanding transparency, and federal agencies responded by making searchable information readily available online about small areas to observe if programs were available or enforcement was being carried out equitably. For example, the U.S. Environmental Protection Agency (EPA) launched the Window to My Environment website (later called MyEPA and EJView) in 2001, which allowed users to enter a ZIP Code or address to find pollution levels, permitted sources of pollutants, and census data on the income and racial characteristics of the area. In part, growing out of the environmental

justice movement, the website allowed users to observe how pollution and its regulation differed between minority and nonminority communities.¹⁰⁴ The Community Development Financial Institutions Fund (CDFI), the Health Resources and Services

The Census Bureau's decision to maintain and update its TIGER/Master Address File eventually resulted in a database with current information from which it could extract the sampling frame for a continuous survey such as the ACS.

¹⁰³ U.S. Census Bureau, *Design and Methodology: American Community Survey*, Washington, DC, GPO, 2009, pp. 3-9.

¹⁰⁴ In the early 1990s, the EPA had launched studies on environmental disparities by census block and formed the Office of Environmental Equity, after meeting with the Congressional Black Caucus, academics, and activists. National Academy of Public Administration, "Environmental Justice in EPA Permitting: Reducing Pollution in High-Risk Communities Is Integral to the Agency's Mission," December 2001, pp. 19, 20, and 41. For details on the launch of the website, refer to Julie Klocher, et. al., "Getting Information to People in Forms They Can Use and Understand," public session notes from the National Environmental Innovations Symposium, December 6-7, 2000, Kansas City, MO, available online at <www.epa.gov>, accessed July 2010.

Administration (HRSA) and others launched websites similar to EJView that enabled local officials and service providers to search by ZIP Code, census tract, or CCD to identify if their areas have the demographic characteristics to qualify for federal assistance or grants. The websites also let average citizens see what services are available in their areas.¹⁰⁵

CONCLUSION

By the late 1980s, planners within the Census Bureau sought to simplify the decennial census in order to run a mid-decade census or a survey delivering data more frequently and sooner after it was collected (Figure 10). Cost concerns and a desire to reduce the burden on respondents drove a number of stakeholders following the 1990 Census to back alternative designs for the 2000 Census. Several of those designs might have dropped the long-form sample questionnaire entirely with no replacement or reduced the content on the questionnaires. In response, users lobbied Congress pointing out that for many small businesses and small towns, Census Bureau data were the only source available or affordable to them for their planning.¹⁰⁶ In response, the Census Bureau created a prototype for what became the American Community Survey (ACS) with a sample size large enough to derive estimates for census tracts and block groups. Throughout the creation of the prototype of the ACS and its field testing from 1995–2004, the Census Bureau consulted with small area data users. One issue they raised was that while

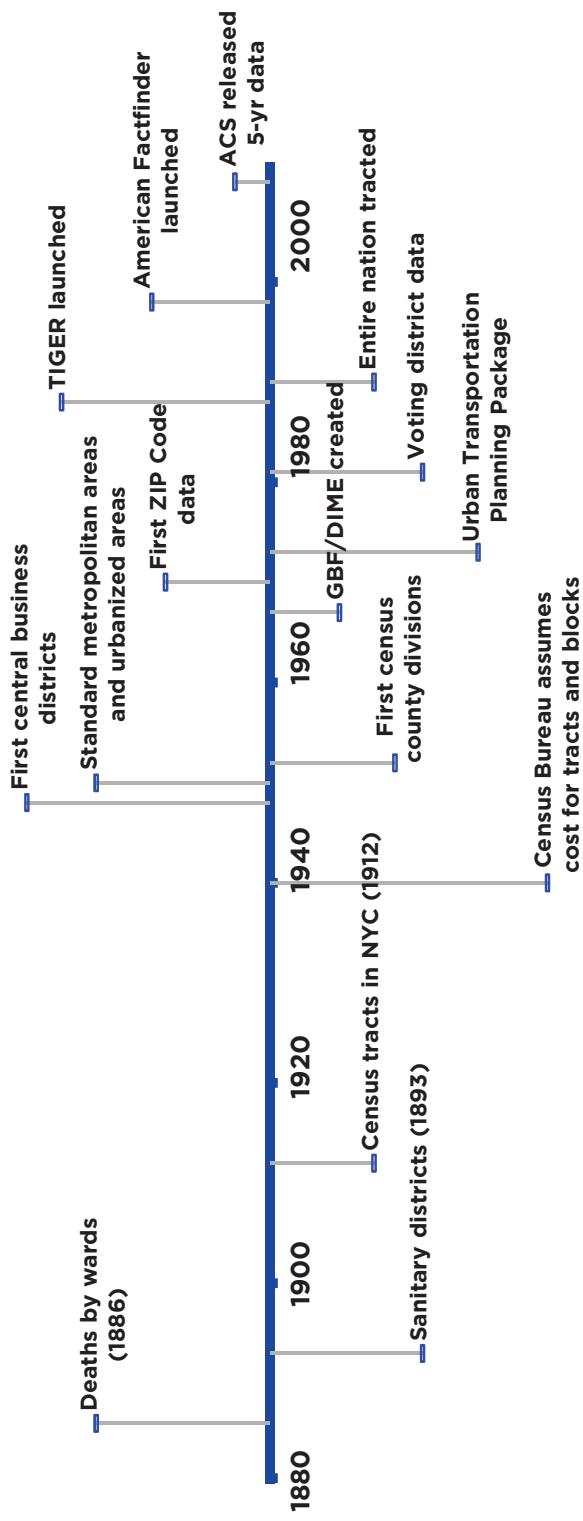
the survey would bring more frequent release of data versus the decennial sample survey, the estimates produced would have higher sampling errors.¹⁰⁷ In 2010, the Census Bureau no longer needed the long-form sample as the ACS provided small area data in the same detail as the long form formerly did. It also continued exploring ways to improve on the reliability of those estimates with small area data users. In creating the ACS and seeking to improve it, the agency kept to its long tradition of responding to the growing demand of small area data users by innovating in data collection and dissemination. This book will look at how the Census Bureau reconfigured the 210-year-old decennial census and transformed the long-form sample into the ACS. Chapter 1 sets out the agency's early efforts to develop methods to meet users' needs for data updated more than once every 10 years. Chapters 2 and 3 lay out the development of the theory and techniques of continuous measurement and their early implementation. Research and evaluation of those trial runs follows in Chapter 4. Finally, Chapter 5 surveys the national implementation of the American Community Survey.

¹⁰⁵ HUD User GIS Maps: <<http://209.48.228.153/qctmap.html>>. Find Shortage Areas: HPSA by State & County, <<http://hpsafind.hrsa.gov/HPSASearch.aspx>>. CDFI Fund Mapping System: <www.cdfifund.gov/mapping-system>, accessed June 2010. Resources: NMTC Qualifying Census Tracts/Non-Metro Counties, <www.novoco.com/resource-centers/new-markets-tax-credits/nmtc-mapping-tool>, accessed June 2010.

¹⁰⁶ House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, *20th Century Planning: Decennial Questionnaire Content*, 102nd Cong., 2nd Session, October 1, 1992, pp. 1-3, 29, 37, 43-48, 97-100, 124.

¹⁰⁷ U.S. Census Bureau, *Design and Methodology: American Community Survey*, GPO, Washington, DC, Issued April 2009), pp. 1-6.

Figure 10.
First Publication of Small Area Data



GLOSSARY

Definitions provided in this section come from the U.S. Census Bureau, “History: 2000 Census of Population and Housing,” Government Printing Office, Washington, DC, 2009, and U.S. Census Bureau, *A Guide to State and Local Census Geography*, Government Printing Office, Washington, DC, 1993.

Assignment area (AA). A geographic area established by the Census Bureau for a specific field operation for the census. An AA consists of one or more census blocks for most operations and is assigned to a single enumerator, lister, or other field staff to obtain information about the residents and living quarters within the boundaries of the AA. Formerly called an address register area and an enumeration district.

Block. A geographic area bounded on all sides by visible or nonvisible features shown on census maps. A block is the smallest geographic entity for which the Census Bureau collects and tabulates decennial census information.

Boundary and Annexation Survey (BAS). An annual survey of all incorporated places and all counties conducted by the Census Bureau to determine the correct legal limits and related information as of January 1 of the survey year. Refer to TIGER®.

Census county division (CCD). A subdivision of a county that is a relatively permanent statistical area established cooperatively by the Census Bureau and local government authorities. Used for presenting decennial census statistics in those states that do not have well defined and stable minor civil divisions that serve as local governments.

Census block. Refer to Block.

Census tract. Refer to Tract.

Enumeration district. Obsolete term. Now called an assignment area.

Geocode. A code that identifies a specific geographic entity. For example, geocodes needed to identify a census block for data collection are the state code, the county code, and the block number.

Geocoding. The assignment of an address, structure, key geographic location, or business name to a location that is identified by one or more geographic codes.

Geographic information system (GIS). A computer system for the input, storage, processing, applications development, retrieval, and maintenance of information about the points, lines, and areas that represent the streets and roads, rivers, railroads, geographic entities, and other features on the surface of the Earth. Information that previously was available only on paper maps.

Long form (LF). The decennial census questionnaire containing 100 percent and sample questions; distributed to approximately 1 in 6 households.

Master address file (MAF). The MAF is a list of every living quarters nationwide and their geographic locations. The computer file was created by combining the addresses in the 1990 address control file with the current versions of the U.S. Postal Service delivery sequence file, and supplementing this with address information provided by state, local, and tribal governments. The MAF ties to the TIGER® database. The MAF is updated throughout the decade to provide addresses for delivery of decennial questionnaires, to serve as the sampling frame for the Census Bureau's periodic demographic surveys, and to support other Census Bureau statistical programs.

Minor civil division (MCD). For demographic census purposes, an MCD is a primary government, such as a township or an administrative subdivision of a county, e.g., a precinct or magisterial district.

Topologically Integrated Geographic Encoding and Referencing (TIGER®). A computer database that contains a digital representation of all census-required map features (streets, roads, rivers, railroads, lakes, etc.), the related attributes for each, and the geographic identification codes for all entities used by the Census Bureau to tabulate data for the United States, Puerto Rico, and Island Areas. The TIGER® database provides a resource for the production of maps, entity headers for tabulations, and automated assignment of addresses to a geographic location in a process known as “geocoding.” TIGER® was preceded by the GBF/DIME (Geographic Base File/Dual Independent Map Encoding) files. Refer to Boundary and Annexation Survey and Geocode.

TIGER®/Line File. The computer-readable extract of the TIGER® database that the Census Bureau makes available to the public. It contains data representing the roads, railroads, bodies of water, boundaries of legal and statistical entities, and other visible and nonvisible features, along with their attributes (names, address ranges, geographic codes, census feature class codes, etc.).

Tract. Small, relatively permanent statistical subdivisions of counties delineated by local committees of census data users in accordance with Census Bureau guidelines for the purpose of collecting and presenting decennial census data. These neighborhoods contain between 1,000 and 8,000 people, typically approximately 1,700 housing units and 4,000 people. Tracts are designed to have homogeneous population characteristics, economic status, and living conditions at the time they are established. Census tract boundaries normally follow visible features but may follow governmental unit boundaries and other nonvisible features.

Traffic analysis zone (TAZ). An area defined by a metropolitan planning organization for tabulating transportation statistics from the census.

Urbanized area (UA). An area, consisting of one or more places and the adjacent urban fringe, containing at least 50,000 people and an overall population density of at least 1,000 people per square mile of land. The Census Bureau uses published criteria to determine the qualification and boundaries of UAs.

Voting district/legislative district (VTD). Any of a variety of types of areas such as election districts, precincts, wards, and legislative districts established by state and local governments for purposes of elections.

Zip Code (ZIP). ZIP Codes are administrative units established by the U.S. Postal Service for the distribution of mail. ZIP stands for zone improvement plan. It is a 5-, 7-, 9-, or 11-digit code assigned by the U.S. Postal Service to a street or portion of a street, a collection of streets, a business, or other establishment or structure, or a group of post office boxes to expedite the delivery of mail. The Census Bureau uses only 5-digit ZIP Codes for the addresses and address ranges in most 2000 Census operations.

ZIP Code tabulation area (ZCTA). A statistical entity developed by the Census Bureau to approximate the delivery area for a U.S. Postal Service 5-digit ZIP Code in the United States and Puerto Rico. A ZCTA is an aggregation of one or more census blocks that have the same predominant ZIP Code associated with the mailing addresses in the Bureau's Master Address File. Thus, the Postal Service's delivery areas have been adjusted to encompass whole census blocks so that the Census Bureau can tabulate census data for ZCTAs. For areas larger than 25 square miles for which the Census Bureau's Master Address File contained no addresses with ZIP Codes, the Census Bureau used the first 3 digits of the ZIP Code(s) that serve the area or a nearby areas. A water feature that could not logically be assigned to a specific ZCTA is assigned a 3-digit code followed by "HH" to indicate that the water feature could not be assigned meaningfully to any adjacent land ZCTA. ZCTAs do not include all ZIP Codes used for mail delivery. The Census Bureau first created ZCTAs for the Census 2000 Dress Rehearsal census. Refer to ZIP Code.

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Chapter 1. Data Needs for a Changing Society

INTRODUCTION

At the behest of the Bureau of the Budget, in the early 1940s the U.S. Census Bureau began to explore ways to conduct a sample census of population, housing, and agriculture to occur between the constitutionally mandated decennial censuses of population, taken in years ending in "0." This initiative recognized the needs of government, business, and the general public for population and housing information to supplement the benchmark decennial census data.¹ At the annual meeting of the American Statistical Association in late December 1941, Philip Hauser, a senior Census Bureau official, presented the rationale for an annual sample census, the type of data to be collected, and the sampling approach to be implemented.²

Hauser's presentation emphasized the "urgent need for social and economic statistics" at the start of American involvement in World War II. Referring to a "deluge of inquiries" for postcensal population estimates for states and cities, Hauser noted that recent internal migration made providing such data problematic. State and local officials wanted this information to plan for the provision of public services, the calculation of vital statistics, and the allocation of funds.

Defense industries, military agencies, and civil defense officials wanted to be able to assess the effects of these large population movements on efforts to protect the nation's citizens from coastal attacks and to mobilize war production. Further, as millions of young Americans began the shift from the labor force to military service, current labor force information was needed to reposition the domestic economy for military production. Federal housing agencies and private construction firms requested current housing statistics as an aid to providing housing for newcomers to production and administrative centers.

¹ "Annual Report of the Secretary of Commerce," 1941, p. 41; "Annual Report of the Secretary of Commerce," 1942, pp. 25-26; and "Annual Report of the Secretary of Commerce," 1944, p. 17.

² Philip M. Hauser, "Proposed Annual Sample Census of Population," *Journal of the American Statistical Association*, V. 37, No. 217, March 1942, pp. 81-88. An earlier version, "A Tentative Plan for Annual Census Statistics on a Sample Basis," was presented at the Census Advisory Committee meeting in June 1941. National Archives and Records Administration, Record Group 29, Series 148, Box 76. I wish to thank Margo Anderson for locating this version.

During the late 1930s, the Census Bureau was one of several federal agencies that began to incorporate the theory and methods of probability sampling into its professional activities.³ Between 1935 and 1940, the Census Bureau hired a number of young employees with backgrounds in academic statistics (including Stuart Rice, Calvert Dedrick, Morris Hansen, William Hurwitz, and Harold Nisselson) who became leaders in federal statistics over the next few decades. A successful sample census of unemployment in 1937 convinced many doubters of the value of probability sampling and led to the incorporation of sampling into the 1940 Census.⁴

PROPOSED ANNUAL SAMPLE CENSUS

To meet the challenges for more up-to-date information, the Census Bureau proposed taking an annual sample census of population and housing (and the economic and business aspects of agriculture). The agency's plan included obtaining information on general population characteristics as well as labor force and housing. General population information would incorporate age, sex, race, marital status, relationship to household head, and place of residence at the time of the last census (1940). Responses to the latter question would be used to estimate the flows and rates of migration into and out of areas. Among the labor force questions proposed were employment status, occupation, industry, and class of worker. The housing items were to include location; type, condition, and age of structure; occupancy status; number of rooms; and monthly rent. An annual sample census would also allow for rotating questions on and off the form, thereby broadening the scope of the information to be obtained.⁵

Hauser proposed using what he called the "migration method" to estimate the total population of the country, each state, and large cities (with populations of at least 100,000). Using the 1940 Census as a base, this method would add the number of births

³ These included the Bureau of Agricultural Economics, the Bureau of Labor Statistics, Federal Reserve Board, and the Civil Works Administration. Refer to Joseph W. Duncan and William C. Shelton, "Revolution in United States Government Statistics," 1926-1976 Washington, DC, GPO, 1978, pp. 36-38.

⁴ Joseph W. Duncan and William C. Shelton, "Revolution in United States Government Statistics," 1926-1976 Washington, DC, GPO, 1978, pp. 43-46.

⁵ Hauser, "Annual Sample Census," p. 82.

and in-migrants and subtract the number of deaths and out-migrants. Today, we call this method “demographic analysis.”⁶

While Census Bureau statisticians preferred using a sampling scheme similar to that employed in the 1940 Census, Hauser argued that the cost of creating a complete listing of the population made this impractical. Rather, he suggested using some kind of geographic sampling. Hauser realized that small areas were preferable from the statistical point of view, but noted larger areas were cheaper to enumerate and tabulate. He suggested a compromise that consisted of selecting areas (termed parcels) scattered throughout the country that contained about 100 people each. In urban areas, parcels would consist of blocks or parts of blocks. In the rest of the country, portions of enumeration districts used in the 1940 Census would serve as parcels. Sample parcels would be stratified based on geography and other characteristics, such as urban or rural, farm or nonfarm, in or out of a metropolitan area, renter or owner, and possibly other characteristics. Within the various strata, sample parcels would be selected at random. To avoid large sampling errors, some special universes (such as large institutions, prisons, army posts, and large new apartment buildings) would have to be sampled separately.⁷

The proposed sample census would consist of either 2 percent or 5 percent of all the parcels in the country. Using the method outlined above, the Census Bureau calculated that a 5 percent sample of a city of one million inhabitants would produce an average total population estimate with a sampling error of less than half a percent, and that would rarely be as much as 1 or 2 percent in any given case. Estimated populations of smaller cities would involve proportionately greater error.⁸

The sample census would not be able to provide total population estimates or simple counts of characteristics for small areas; those would require a complete census. Hauser suggested combining the sample census with quinquennial censuses taken in years ending in “5” and “0.”⁹

DEVELOPMENT AND DEMISE OF THE ANNUAL SAMPLE CENSUS

During the 1940s, the Census Bureau continued to develop its plans for a sample census. In 1941, the agency proposed taking a sample census of the Washington, DC, area both to provide local authorities with information they needed for planning and administration and to serve as a proving ground for the desired national sample census.¹⁰ Due to the outbreak of World War II, national defense agencies were also anxious to have the data provided by the sample census on the population and housing characteristics of Washington, DC. The local test would allow the Census Bureau to evaluate alternative sample designs and stratification methods, using the recently constituted centralized technical sampling staff.

In partnership with the Works Projects Administration, the Census Bureau reported in 1942 that it had improved its methods for identifying effective sampling units and stratification variables for use in estimating certain population and housing characteristics.¹¹ In 1944, plans for a sample census were included in President Franklin Roosevelt’s “Reconversion Statistics Program,” and in its slimmed down successor, the “Basic Statistics Program,” the following year. Congress did not appropriate the requested funds in either year.¹²

In 1946, the Census Bureau argued that the end of World War II did not reduce the need for statistical data, stressing that the conversion of a wartime economy to a peacetime economy required more rather than less statistical information. Among other things, the Census Bureau argued that the economic and demographic shifts that took place during the war needed to be benchmarked and described in detail. While the agency’s survey responsibilities were increased during and after the war, the quest for authorization and appropriations to take a sample

⁶ Hauser, “Annual Sample Census,” p. 84.

⁷ Robert Jenkins, “Procedural History of the 1940 Census,” The Center for Demography and Ecology, University of Wisconsin, Madison, WI, 1983, pp. 19–22.

⁸ Hauser, “Annual Sample Census,” pp. 85–87.

⁹ Hauser, “Annual Sample Census,” p. 87.

¹⁰ “Annual Report of the Secretary of Commerce,” 1941, p. 41.

¹¹ Created by President Franklin D. Roosevelt in 1935, the Works Progress Administration (WPA) was the largest New Deal agency. By the time Congress and wartime employment ended the need for the WPA in 1943, it had become the nation’s largest civilian employer. WPA statisticians took advantage of the periodic counts of recipients of public relief to conduct sample surveys, often in cooperation with other agencies. The agency was renamed the Work Projects Administration in 1939. WPA statisticians collaborated with their Census Bureau counterparts in testing sampling and estimation techniques during the early 1940s. For more on the role of the WPA in applying probability sampling to human populations, refer to Duncan and Shelton, *Revolution in Government Statistics*, pp. 39–40, 47.

¹² “Annual Report of the Secretary of Commerce,” 1942, pp. 25–26; “Annual Report of the Secretary of Commerce,” 1944, p. 17; and “Annual Report of the Secretary of Commerce,” 1945, p. 5.

census of population went for naught. Congress hesitated at the prospect of paying for a new statistical program as it was trying to reduce the size and scope of the U.S. government.¹³

A MID-DECADE CENSUS

Nineteenth-Century Origins

Efforts to persuade the executive and legislative branches of the U.S. government that detailed statistical information describing the nation's population was needed more than once every 10 years did not begin in the 1940s, or even in the twentieth century. As early as 1872, the Superintendent of the Census, Francis A. Walker, urged his boss, the Secretary of the Interior, to champion the "propriety and expediency" of taking an intermediate census in 1875. In addition to serving as a "noble monument" to mark the completion of the nation's first century, Walker wrote that adding a mid-decade census in 1875 would go far to remedy the "positively painful" situation in which journalists, politicians, and philosophers found themselves when they tried to use census data to explain changes in the nation's social, economic, or political situation 5 or 6 years after the census was taken.

Rapid change made the data obsolete a few years after they were published. In Walker's view, once the nation experienced the benefits of a quinquennial census, ". . . it is not likely that a longer period would ever thereafter be allowed to intervene between the Federal censuses."¹⁴

Walker's recommendation met with the approval of President Ulysses Grant, who included it in his annual messages to Congress in 1872 and 1873. Walker continued to press for the legislative changes needed to conduct a mid-decade census, but was ultimately unsuccessful. When Congress passed the law authorizing the 1880 Census in 1879, the legislation included provisions for the U.S. government to reimburse state governments for roughly half of the data collection costs they incurred if they chose to take a mid-decade census in 1885. Three states and two territories took advantage of this offer. The

reimbursement provision was not repeated when the 1890 Census was authorized.¹⁵

The attempt to institute a mid-decade census did not seriously reemerge until the mid-twentieth century. In the meantime, U.S. census operations underwent significant modifications. Until 1902, censuses in the United States were taken by temporary offices. Data collection, processing, and dissemination were all temporary functions. Once these activities were completed, the Census Office was disbanded until the next year ending in "9." Then Congress would again authorize the creation of a new Census Office to take the next census.

Creation of the Census Bureau

Senior federal officials began urging the creation of a permanent Census Bureau before the Civil War.¹⁶ However, a new federal statistical agency generally did not rank high on the priority lists of congressional and administration policymakers. Then, there was the vexing question of what the agency would do after completing the statistical publications from the last census before it was time to begin preparing for the next. Intermittent efforts continued through the last half of the nineteenth century, but only in the late 1890s did they begin to develop sufficient traction to get the job done. With the support of prominent statisticians, such as Carroll Wright and Walter Willcox, coupled with the persuasive presentations of former governor William Merriam (R-MN), appointed superintendent of the 1900 Census in 1899, proponents of a permanent census agency began to make inroads among members of Congress.

At the end of 1901, President Theodore Roosevelt recommended that the agency be made permanent. In March of the following year, Congress passed legislation establishing a permanent Census Office in the Department of the Interior. In addition to its already mandated responsibility to conduct the decennial censuses of population, agriculture, and manufactures, the new Census Office was also charged with collecting the nation's vital statistics, overseeing an

¹³ "Annual Report of the Secretary of Commerce," 1946, p 3.

¹⁴ "A Compendium of the Ninth Census," Government Printing Office, Washington, DC, 1872, pp. 4–5.

¹⁵ The three states were Florida, Nebraska, and Colorado; the territories were New Mexico and Dakota. In addition, at least nine other states took mid-decade censuses on their own in 1885 without the assistance of the federal government. Refer to Carroll D. Wright and William C. Hunt, "The History and Growth of the United States Census," GPO, Washington, DC, 1900, pp. 58, 67.

¹⁶ Refer to J. D. B. DeBow, "Compendium of the Seventh Census," Senate Printer, Washington, DC, 1854, pp. 18–19, and more generally, Wright and Hunt, "History and Growth of the United States Census," pp. 79–84.

annual survey of cotton production, and doing general statistical work for the federal government.¹⁷

Initially part of the Department of the Interior, the Census Bureau was transferred to the newly created Department of Commerce and Labor in 1903, and then assigned to the Commerce Department when the combined department split into its two components in 1913. During the first half of the twentieth century, the Census Bureau established itself as the preeminent general statistical agency of the U.S. government.

The New Deal and the Census

Early in President Franklin D. Roosevelt's first term, Census Bureau officials and several members of Congress suggested taking a special mid-decade census to provide the administration with more current population and unemployment data. This effort would also have allowed the agency to advance its research program, especially in the field of probability sampling. Applying probability sampling to finite populations was neither widely understood nor accepted in the early 1930s. Testing sampling techniques and estimation methodologies in conjunction with a complete census would allow census statisticians to compare the results of sample studies to a complete count.

A bill introduced by Representative Ralph Lozier (D-MO) passed in the House of Representatives but expired in the Senate in June 1934. Later that year the Central Statistical Board championed the mid-decade census and urged the U.S. Congress to authorize it for 1935.¹⁸ As Anderson, author of *The American Census: A Social History*, has pointed out, the Roosevelt administration vetoed the idea for fiscal and political reasons. In addition to its cost (estimated at \$13.25 million, \$215.6 million in 2010 dollars), a mid-decade census would have revealed that despite the administration's efforts, unemployment was not diminishing rapidly enough. An expensive census that would not reflect favorably on the administration was to be avoided, not welcomed.¹⁹

¹⁷ Margo Anderson, "The American Census: A Social History," Yale University Press, New Haven and London, 1988, pp. 109-115.

¹⁸ The Central Statistical Board was established by Executive Order No. 6225 in July 1933 to coordinate the statistical services of the U.S. government in carrying out the mandates of the National Industrial Recovery Act (1933). "The Central Statistical Board," *Journal of the American Statistical Association*, Vol. 30, No. 192, December 1935, pp. 714-716.

¹⁹ Anderson, *The American Census*, pp. 175-178.

THE CENSUS BUREAU IN THE INFORMATION AGE

As the Census Bureau moved into the information age, senior officials continued to try to persuade the statistical community, the administration, and Congress of the value of a mid-decade census. In late 1952, the agency's deputy director, A. Ross Eckler, urged the adoption of a mid-decade census at a special meeting of the New York chapter of the American Statistical Association. Acknowledging that the nation's programs of defense and foreign-aid spending tended to overshadow the population and housing census program, Eckler persevered by pointing out that governmental and private-sector uses of statistical information had increased significantly since the 1930s and 1940s. He added that quinquennial censuses had become the norm in most other fields of census taking such as the censuses of agriculture, mineral industries, governments, manufacturing, and transportation. He also emphasized the dramatic, roughly 50 percent increase in the number of primary school children. Eckler argued that this huge cohort, now known as the "baby boom," would generate dramatically increased requirements for information that could be best garnered by implementing a mid-decade census.²⁰ Unfortunately for supporters of this program, the competition for the estimated cost of the quinquennial census, \$22 to \$24 million (between \$181 and \$197 million in 2010 dollars), proved too powerful to resist. The Watkins Committee put it this way, just over a year later:

"There is a demand for a simplified population census, covering a few principal items, at the midpoint of each decade; but the Committee does not believe that the increased benefits would justify the cost . . . Research on low-cost sampling methods for estimating population for small areas or for problem areas impresses the Committee as more important at this stage than provision for a mid-decade census."²¹

Further efforts to promote a mid-decade census stalled for the remainder of the 1950s. However, the

²⁰ A. Ross Eckler, "Possibilities for a Quinquennial Census," paper presented at a special meeting of the New York Chapter of the American Statistical Association on December 3, 1952.

²¹ U.S. Department of Commerce, "Appraisal of Census Programs: Report of the Intensive Review Committee to the Secretary of Commerce," GPO, Washington, DC, 1954, p. 3. The Watkins Committee, named after its chairman, Ralph J. Watkins, was formally titled "The Intensive Review Committee to the Secretary of Commerce." Named by Commerce Secretary Sinclair Weeks in October 1953, the committee's charge was to evaluate and make recommendations concerning the Census Bureau's major programs.

1960s began with Rep. Stewart Udall (D-AZ) urging that a mid-decade census be taken in 1965.

Throughout the decade, legislation supporting this goal was introduced in almost every legislative session. In the fall of 1961 and the spring of 1962, hearings on a mid-decade census were held in Chicago, Los Angeles, New York, and Washington, DC, but they appear to have generated little momentum.²²

State and local officials, city planners and housing officials, and experts in population, education, housing, marketing, and similar fields voiced “strong support for the legislation,” but the Census Bureau and its allies were unable to persuade their colleagues in the administration and in Congress to fund the program.²³

OPTIONS FOR A MID-DECADE CENSUS

In a documentary submission, the Census Bureau proposed four options for the type and amount of data to be collected in a mid-decade census:

Level one consisted of a complete population count of the nation, including for each individual, the following six characteristics: name, address, relationship to head of household, sex, age, and race. The agency estimated this option would cost between \$55 million and \$60 million (\$405 and \$442 million in 2010 dollars).

Level two included all the information collected in level one plus basic housing characteristics (type of unit, condition, occupancy status, number of rooms, tenure, and plumbing facilities). The estimated cost of this option was between \$70 million and \$75 million (\$516 and \$553 million in 2010 dollars).

Level three was a 25 percent sample of the population that would provide about the same level of detail as the 1960 Census for both population and housing items. Reliable cross tabulations could be published for states, counties, metropolitan areas, and larger cities. “Fairly reliable” population estimates would be produced for areas of 25,000 or more. The Census Bureau estimated this option would cost between

²² U.S. House of Representatives, Subcommittee on Census and Government Statistics of the Committee on Post Office and Civil Service, Hearings on “Mid-Decade Census,” Part 1, Chicago, IL, Oct. 25–26, 1961, 87th Cong., 1st Sess., 1961; Part 2, Los Angeles, CA, Nov. 15–16, 1961, 87th Cong., 1st Sess., 1961; Part 3, New York, NY, Nov. 29–30, 1961, 87th Cong., 1st Sess., 1961; Part 4, Washington, DC, May 1–2, 4, 1962, 87th Cong., 2nd Sess., 1962.

²³ U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, Hearing on “Mid-Decade Census,” May 4–5, 12, 1965, 89th Cong., 1st Sess., 1965, p. 2.

\$45 million and \$50 million (\$332 and \$368 million in 2010 dollars). By reducing the sample size to 10 percent, the cost would drop by about \$10 million (\$74 million in 2010 dollars), but reasonable population estimates would be produced only for geographic areas of 75,000 or more.

The level four option was largely a replication of the 1960 Census in scope, content, and sampling ratio. It would provide complete count information for all geographic areas, complete counts for limited population and housing characteristics, and a 25 percent sample for population and housing characteristics similar to those obtained from the 1960 Census. This option was the most expensive and would cost between \$100 million and \$110 million (\$737 and \$810 million in 2010 dollars).²⁴

RESPONSE OF THE BUDGET BUREAU

At an estimated cost of between \$45 million and \$110 million (\$332 and \$810 million in 2010 dollars), the proposed mid-decade census faced stiff opposition from the Bureau of the Budget. The Budget Bureau’s representative, Dr. Raymond Bowman, testified that the main arguments for a mid-decade census held that the nation was experiencing a very high rate of change in the size, distribution, and characteristics of the American population.

Similar changes were taking place in the nation’s housing supply. Only a census could provide the needed local area data. A census that provided age, race, and sex or one that produced basic population and housing characteristics would not be sufficient. The Bureau of the Budget concluded that only a complete census that included family composition, income, educational attainment, labor force status and unemployment status, and housing characteristics would meet the needs of most witnesses.²⁵

Bowman agreed that a decennial census was necessary to have uniform data for all areas to make interarea comparisons possible and to provide benchmarks for intercensal estimates. However, there were several reasons his agency believed that alternatives to a mid-decade census made more efficient use of the available technical methods. One of the main

²⁴ U.S. House of Representatives, Subcommittee on Census and Government Statistics of the Committee on Post Office and Civil Service, Hearings on “Mid-Decade Census,” Part 1, Chicago, IL, Oct. 25–26, 1961, 87th Cong., 1st Sess., 1961, pp. 2–3.

²⁵ U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, Hearings on “Mid-Decade Census,” Part 4, Washington, DC, May 1, 2, and 4, 1962, 87th Cong., 2nd Sess., 1962, pp. 548–550.

justifications for a mid-decade census was the rapidity with which changes in population and employment were then taking place in American society. While the Budget Bureau supported the development of more prompt and efficient techniques of obtaining population counts and characteristics, a mid-decade census would not adequately meet the expressed needs of many local and state officials. Since many areas change only slowly over a decade, it would be wasteful to collect information for all areas when only some vitally needed it. Using the decennial census as a benchmark, the most efficient method of obtaining both national and local estimates was by developing specially directed sample surveys. The Budget Bureau encouraged the Census Bureau to develop and implement such surveys as needed. Finally Bowman argued that special surveys were also preferred when the collection of certain highly detailed data was necessary and conducting a complete census was not feasible. The Budget Bureau believed that new programs often called for new and expanded statistical data, but also felt that new federal programs did not create a pressing need for data that could only come from a mid-decade census.²⁶

Bowman offered several examples of the kinds of statistical programs his agency would support. He suggested the Census Bureau expand and strengthen its population estimates and projections programs. This would involve producing annual population estimates for the 200 largest metropolitan areas and for other areas of special interest; helping states and localities develop their own population estimates programs; expanding methodological research aimed at improving state and area estimates; increasing the detail of population characteristics for state and area estimates; producing population projections for states and selected areas; and developing a series of analytical surveys and studies relating critical demographic, economic, and social trends to changing birth rates, educational attainment levels, population mobility, and employment.²⁷

The second recommendation focused on the creation of an intensive program of labor force surveys and analysis aimed at improving the data needed for broad national policy formulation and furnishing information to meet current local requirements. This initiative

would involve implementing a once per year increase in the size of the Current Population Survey by up to 400 percent to produce improved estimates for several categories of the employed and unemployed population, to develop labor force surveys for metropolitan areas over the decade between censuses, to improve monthly estimates of the characteristics of employed and unemployed people at the state and local levels (which in the 1960s were based largely on administrative records),²⁸ to implement a program of research and experimentation in labor force measurement both nationally and for selected local areas, to examine reasons for entering and leaving the workforce, and to develop extensive surveys of such subjects as characteristics of the unemployed, frequency and methods of job seeking and job changing, and occupational mobility.²⁹

Bowman's third series of recommendations dealt with expanding the housing statistics program to guide national policy formation, to assist communities in formulating local housing and urban renewal programs, and to provide business and industry with data to be used for operational purposes. Among the examples he gave were the establishment of a components of change survey to be conducted every 5 years that would provide national data and information for metropolitan areas (separated into central cities and suburbs) covering losses and additions to the housing supply, the characteristics of housing units involved in change, and changes in the rental rates, value, and condition of housing. Bowman also suggested expanding the quarterly vacancy survey to include a selected group of metropolitan areas and developing a program to assist localities in taking their own vacancy surveys, transforming a one-time survey of the sales prices of new housing into an annual series that also included more information on home purchasers, upgrading currently available data on mortgage financing to include interest rates, discounts, fees, the volume of loan commitments, secondary financing, and mortgage terms, and developing an ongoing program to provide information on residential land costs, journey to work, and modes and cost of transportation and their impact on the housing market.³⁰

²⁶ U.S. House of Representatives, Subcommittee on Census and Government Statistics of the Committee on Post Office and Civil Service, Hearings on "Mid-Decade Census," Part 4, Washington, DC, May 1, 2, and 4, 1962, 87th Cong., 2nd Sess., 1962, pp. 550-551.

²⁷ Ibid.

²⁸ Administrative records refer to individual records concerning people, companies, and/or geographic locations that are contained in files collected and maintained by administrative or program agencies and commercial entities.

²⁹ Ibid., pp. 551-552.

³⁰ Ibid., p. 552.

In response to a question, Mr. Bowman said that the program he recommended would cost approximately \$68 million (\$491 million in 2010 dollars) more than the Census Bureau's current expenditures over a full decade.³¹

SCAMMON'S PROPOSAL

Following the failure to pass mid-decade census legislation in 1962, the measure's supporters introduced similar legislation in each of the next 3 years. In a letter to the chairman of the House Committee on Post Office and Civil Service, Tom Murray (D-TN), Census Bureau Director Richard Scammon noted that "nearly all of the witnesses who testified [at the 1961–1962 hearings] favored a mid-decade census." He pointed out that business people supported the measure because they used census information to locate factories, to plan production, and to develop marketing programs. State and local government representatives needed census data to keep abreast of rapidly changing demands for public services such as schools, hospitals, public utilities, recreational facilities, and traffic control. The housing industry needed current information on the housing situation for metropolitan areas and their component communities. Federal officials closely followed developments in individual metropolitan areas, redevelopment areas, river basins, and other small areas. Many witnesses testified that they "depend[ed] on up-to-date benchmarks in making their own projections. They stated that the surveys on projections which they make to meet specific needs depend very heavily on the validity and recency of census materials."³²

Scammon also pointed out that testimony from the representatives of the Bureau of the Budget supported an alternative program of sample surveys and estimates. Some parts of this program were approved in FY 1964 and others were requested in FY 1965. He admitted that sample surveys and estimates would produce information that became available annually or more often. However, that information would not cover most cities, counties, or census tracts. Scammon concluded that the information provided by the Bureau of the Budget's proposal would meet somewhat different needs "from those that would be met by a quinquennial census. Neither method is an adequate substitute for the other."³³

³¹ Ibid., pp. 556–557.

³² Letter (draft) from Richard Scammon to Tom Murray, March 16, 1964.

³³ Ibid.

MID-DECADE CENSUS AND THE GREAT SOCIETY

In March 1965, acting Census Bureau Director Ross Eckler urged the Secretary of Commerce to support H.R. 1966 calling for a mid-decade census to take place in the fall of 1966.³⁴ Given the government's concern "with voting rights, with the war on poverty, with depressed areas . . . the time has passed when the Nation can depend on a census taken every 10 years."³⁵ In May 1965, the Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service held another hearing on the mid-decade census. In his opening remarks, Representative Arnold Olsen (D-MT) stated that since the 1961–1962 hearings, "the need for a mid-decade census, in our opinion, has become even more crucial. We simply cannot visualize how we can get the President where he wants to be with the Great Society, nor how the legislation we are now passing can best work, if the program is to be based on obsolete statistics."³⁶ He noted that the debate on the education bill (H.R. 2362) had to be based on statistics that went back to 1959. With the antipoverty bill (H.R. 11377), "the same situation prevails. The formula calls for allocations to the states based on 'the number of related children under 18 years of age living in families with incomes of less than \$1,000'" (\$6,900 in 2010 dollars). Data from the 1960 Census would be used because "There are no more recent data available. It's as simple as that."³⁷

Olsen pointed out that while the Bureau of the Budget had recommended against the proposed mid-decade census, "it is the Congress who has the responsibility for legislation in these important matters and who makes the appropriations." He added that members of Congress were also "accountable to the people for the success of these programs and the cost too."³⁸

³⁴ Letter (draft) from A. Ross Eckler to John T. Conner, Secretary of Commerce, March 22, 1965. Eckler suggested fall 1966 for the census because it required 15 months lead time, adding that a fall census would provide data in the spring and summer of 1967, 3 1/2 years earlier than the results of the 1970 Census.

³⁵ Ibid. H.R. 1966 was sponsored by Rep. Arnold Olsen (D-MT) and was identical to five other bills pending in the House of Representatives supporting a mid-decade census.

³⁶ U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, Hearing on "Mid-Decade Census," May 4, 5, and 12, 1965, 89th Cong., 1st Sess., 1965, p. 2. In the absence of Harley Staggers (D-WV), chairman of the subcommittee, Rep. Olsen chaired the hearing.

³⁷ Ibid.

³⁸ Ibid.

Testimony during the hearing followed the pattern of the earlier hearings, with many witnesses supporting the mid-decade census and the Bureau of the Budget opposing it. Again, Bowman represented the Budget Bureau and opposed the mid-decade census.³⁹ His main argument was that “the same amount of money will produce better results if spent in a different way than that of taking the census . . .” The subcommittee did not agree with the administration’s position and concluded “that a complete census enumeration is the only fully effective solution to the need for statistics on the people of the Nation which exists today . . .” Both the subcommittee and the full committee voted for the mid-decade census bill, renumbered as H.R. 6183, but the administration’s opposition, together with that of the Republican minority, were sufficient to doom the bill’s prospects in the full House.^{40, 41, 42}

A mid-decade census plan (H.R. 7659) proposed by Rep. William Green (D-PA) in 1967 differed from its predecessors in several significant respects.⁴³ Earlier plans generally proposed taking a census within a year or two of the time the legislation was signed into law and every 10 years thereafter. Renewed interest in a mid-decade census during the 1960s did not translate into successful legislation until the following decade. It became apparent that support for the mid-decade census tended to grow in the first half of the decade, then waned as the decennial census year approached. Green’s bill skipped the mid-decade census in the 1960s and proposed beginning the process in 1975. This would allow the Census Bureau sufficient time to plan the details of the 1970 Census and coordinate those plans with the longer range preparations for the 1975 Census. The draft legislation did not envision the mid-decade census as

a mere repetition of the decennial effort but offered the Secretary of Commerce substantial leeway in designing the new census. It also encouraged the Secretary to take currently available information into consideration in designing the mid-decade census and to “make maximum use of sampling procedures consistent with statistical needs.”⁴⁴ The statement of purpose and need accompanying the proposed legislation pointed out that progress was being made in developing methods for “obtaining some of the more critical data obtained in decennial censuses on an even more current basis than once every 5 years. This includes population and family income distributions for all counties in the United States each year, based largely upon information provided in income tax returns.”⁴⁵

THE BUDGET BUREAU CHANGES ITS MIND

The acting Secretary of Commerce, A.B. Trowbridge, sent the committee a statement making it clear that the decennial census would remain the most important demographic benchmark and that the mid-decade census should be seen as updating the basic census and “filling in voids that develop during the decade . . .”⁴⁶ The Census Bureau’s openness to the expanded use of sampling, population estimates, and possibly of administrative records, were sufficiently reassuring to the Bureau of the Budget to help turn around the agency’s former opposition to the mid-decade census and to obtain its support for Green’s legislation. In previous testimony, Census Bureau representatives described a number of options to subcommittee members but underscored that some kind of complete count would be needed to provide data for small geographic areas down to the tract level. Raymond Bowman, testifying once again on behalf of the Budget Bureau, stated at the outset that H.R. 7659 and several identical bills were “consistent with the administration’s objectives and are supported by the Bureau of the Budget.” He drew particular attention to the legislation’s injunction to “make maximum use of sampling procedure consistent with statistical needs.” This legislative language “has great significance and is a major reason for the Bureau of the Budget’s support . . .” Bowman emphasized that the bill “permits maximum flexibility

³⁹ Ibid., pp. 40–55, 141–146.

⁴⁰ Ibid., pp. 146–147.

⁴¹ U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, “Mid-Decade Censuses of Population, Unemployment, and Housing,” Report No. 780, August 12, 1965, 89th Cong., 1st Sess., 1965, p. 2.

⁴² Ibid., p. 16. The minority position was that a mid-decade census was “both unnecessary and very poorly timed.” In addition to supporting the Budget Bureau’s opposition, the minority also pointed to the “vital needs of national defense making more demands on our budget,” a reference to the rising cost of the conflict in Vietnam, and concluded that “we must begin using prudence in spending the taxpayers’ dollar, and the rejection of this bill would be a good place to start.”

⁴³ U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, hearing on “Mid-Decade Census,” April 25–26, 1967, 90th Cong., 1st Sess., 1967, p. 3. Identical bills were introduced by eleven members of Congress and related bills by three others. William J. Green III won a special election in April 1964 to fill the vacancy caused by the death of his father. He was reelected six times and chose not to run in 1976, instead running for a Senate seat against H. John Heinz. Green lost that race.

⁴⁴ U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, hearing on “Mid-Decade Census,” April 25–26, 1967, 90th Cong., 1st Sess., 1967, p. 2.

⁴⁵ Ibid., pp. 2–3.

⁴⁶ Ibid.

in conducting a mid-decade statistical effort in order to insure that high priority data needs are met in the most efficient and effective manner.”⁴⁷ While future data needs “may require a complete enumeration,” he thought it unwise to assume the need for one. He admonished subcommittee members that it was “essential to sound administration of the statistical system that options remain open—both as to content and coverage.”⁴⁸

To emphasize the importance of cost-effectiveness and flexibility, Rep. Green proposed an amendment to his bill removing housing and unemployment from the census and focusing solely on population. A second Green amendment prohibited using population data from any mid-decade census for apportionment or redistricting.⁴⁹ Green’s amended bill passed in the House of Representatives in August 1967.

The Senate Committee on Post Office and Civil Service convened a hearing on its version of the legislation (S. 1997) in February 1968. Census Bureau Director Eckler began his testimony by pointing out that “the need for a census more often than once every 10 years is continually brought home to us in the Bureau of the Census by our inability to provide up-to-date information to meet many needs of Government agencies and the Congress.” He continued by noting that “When the National Advisory Commission on Civil Disorders needed census data to portray the situation within individual large cities, most of what we could supply was information collected in 1960, which no longer reflects the present situation.” A series of special censuses the Census Bureau had taken between 1960 and 1967, in eight major cities, revealed that the 20 million people added to the U.S. population since 1960 had not been evenly distributed across the country. In each of the cities counted, “we found that the population of these cities declined, that their suburban areas increased, and that the Negro population in the central cities increased while the number of white residents declined. There are indications that this has occurred

in many other cities as well.”⁵⁰ Eckler added that the population and housing census was the only one of the regular censuses taken on a decennial basis in the United States. The others (agriculture, manufactures, mineral industries, transportation, business, and governments) were all taken every 5 years. Indeed a number of other countries have established their population censuses on a 5-year basis including Canada, Japan, New Zealand, Australia, the United Kingdom, Ireland, Turkey, and Denmark. He urged the senators to support the bill and recommended that the census cover unemployment and housing (which had been removed from the House bill) as well as population.⁵¹ For the remainder of his testimony, Eckler responded to inquiries about whether the questions invaded respondents’ privacy, whether responses should be voluntary or mandatory, the appropriateness of punishments for nonresponse, and census costs. Many of the other witnesses also supported the mid-decade census. However, the bill languished in committee and was not voted on by the full Senate. As a result, the Kerner Commission and the federal agencies responsible for implementing and evaluating the progress of the Great Society laws and programs—such as the Civil Rights Act of 1964, the Voting Rights Act of 1965, the war on poverty, the Elementary and Secondary Education Act of 1965, and the Social Security Act of 1965—continued to use 1960 Census data until 1970 Census data began to become available in the spring of 1971.

⁴⁷ Ibid., p. 5.

⁴⁸ Ibid., pp. 5–6.

⁴⁹ U.S. House of Representatives, “Mid-Decade Censuses of Population, Unemployment, and Housing,” H. Report No. 480, July 10, 1967, 90th Cong., 1st Sess., 1967, pp. 2–4.

⁵⁰ U.S. Senate, Committee on Post Office and Civil Service, Hearing on “Mid-Decade Census,” February 14, 1968, 90th Cong., 2nd Sess., 1968, pp. 4–5. The cities in which special censuses were taken were Buffalo, NY; Rochester, NY; Providence, RI; New Haven, CT; Louisville, KY; Cleveland, OH; Des Moines, IA; and Wilmington, DE. The National Advisory Commission on Civil Disorders was known as the “Kerner Commission” after the name of its chairman, Otto Kerner, Jr., Governor of Illinois. President Lyndon Johnson appointed the commission in July 1967 to investigate the causes of the 1967 race riots in the United States and to provide recommendations for the future. In earlier testimony Eckler was more specific. He noted that between 1960 and 1964, West Virginia continued to lose population, as it had done during the 1950s. Nevada experienced the highest population growth rate (43 percent), followed by Arizona (21 percent). California added the largest number of people (2.4 million). The population of Huntington Beach, CA, was 4.5 times larger in 1962 than it had been in 1960. Population growth within states was also uneven. The farming population declined by 2.7 million between 1960 and 1964. Most of the nation’s increase in population occurred in the suburbs, which accounted for three-fourths of the 78 percent population growth that took place in metropolitan areas. U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, hearing on “Mid-Decade Census,” May 4, 5, and 12, 1965, 89th Cong., 1st Sess., 1965, p. 38.

⁵¹ Ibid., pp. 5–7.

THE NIXON ADMINISTRATION AND THE MID-DECADE CENSUS

Similar bills were introduced in 1969, 1971, 1972, 1973, 1975, and 1976, and hearings were held in 1971, 1973, 1975, and 1976 by the Census Bureau's oversight subcommittee. In testimony delivered in 1971, the Census Bureau's director, George Hay Brown, described four options for taking a mid-decade census and provided rough cost estimates for each:

Option 1 consisted of a 100 percent count of the population together with each person's name, address, relation to household head, gender, race, presence of Spanish origin, and age. Data products would cover all levels of census geography down to the tract level for metropolitan areas and to the enumeration district for aggregation to specialized areas such as voting and school districts. The Census Bureau estimated that this option would cost between \$150 million and \$160 million (\$808 and \$861 million in 2010 dollars).⁵²

Option 2 included the population characteristics in option 1 plus basic housing characteristics such as type of unit, condition, occupancy status, number of rooms, and tenure. Data products would be available for the same geographic entities as in option 1, and the project would cost between \$165 million and \$175 million (\$888 and \$942 million in 2010 dollars).

Option 3 consisted of a 25 percent sample of households and would contain the same questions (both 100 percent and sample that came to be known as the short form and the long form) that were asked in the 1970 census of population and housing. The Census Bureau estimated that it could produce population counts and characteristics for states, metropolitan areas, and cities and counties with populations over 25,000, with sampling errors of less than 3 percent. This level of accuracy would not be available for areas under 25,000. The Census Bureau estimated the cost at between \$170 million and \$180 million (\$915 and \$969 million in 2010 dollars).

Option 4 replicated the 1970 census of population and housing and would include both short- and long-form questions. The data would be tabulated and published at the tract level and similar levels for nonmetropolitan areas. The Census Bureau estimated that the cost of replication of the 1970 census in 1975

⁵² An enumeration district consisted of one or more census blocks assigned to a single enumerator, whose job was to collect information about the residents and living quarters in that district. This term is now obsolete and has been replaced by the term, "assignment area."

would amount to between \$230 million and \$240 million (\$1.2 and 1.3 billion in 2010 dollars).⁵³

These options were quite similar to those presented at congressional hearings a decade earlier, but the estimated costs had risen substantially.

Since the last major hearings on the mid-decade census in 1967–1968, the Nixon administration succeeded the Johnson administration. The new administration was less supportive of Johnson's Great Society programs and was not as solicitous toward those its predecessor was trying to assist. The Nixon administration focused more on the expansion of law enforcement programs and on "Vietnamizing" the Vietnam conflict. Support for the mid-decade census had definitely waned since the last years of the Johnson administration. In his 1971 testimony, Census Bureau Director Brown clearly conveyed the administration's view, though he recognized the increasing demand for small-area data. He stated that the Census Bureau was engaged in "extensive work" on the use of administrative records to fill the void. In contrast to Brown's statement, former director A. Ross Eckler testified, "It is now about 10 years since my first presentation of this subject to a different chairman and a completely different subcommittee . . . It is my sincere conviction that the case for a mid-decade census at this time is even stronger than it was in 1967." In a recent analysis of the "existing statutes governing the distribution of funds or the making of grants," which Eckler conducted in his relatively new role as a statistical consultant, he found that population was one of the factors most frequently used to distribute funds. "On an annual basis, the cost of [a] mid-decade census would be well below 1 percent of the funds distributed by the Federal Government on the basis of population data."⁵⁴ Rep. Charles Wilson (D-CA) said that "our census subcommittee has heard from hundreds of witnesses over a period of 2 and a half years without hearing one single witness oppose the mid-decade census." While he might have exaggerated a little about the unanimity of these witnesses, Wilson did express great disappointment and perplexity at the administration's opposition, especially since he thought that Secretary of Commerce Maurice Stans expressed the need for a mid-decade

⁵³ U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, Hearing on "Mid-Decade Census," May 18, June 2 and 10, 1971, 92nd Cong., 1st Sess., 1971, pp. 127–129.

⁵⁴ Ibid., p. 140.

census and that there was very little opposition to it in Congress. Given the administration's position, Wilson said there was little reason for Congress to "consider preparing a bill and submitting it for consideration by the committee."⁵⁵

To eliminate any uncertainty at the Commerce Department about the administration's policy on the mid-decade census, the director of the Office of Management and Budget (OMB), George Shultz, wrote to Secretary Stans the following month stating that "As matters now stand, the Administration will not support a full-scale mid-decade census or any of the various large-scale alternatives which have recently been proposed or considered by the Bureau of the Census which would entail costs ranging anywhere near \$100 million" (\$538 million in 2010 dollars). Instead, Shultz proposed vigorous pursuit of modest-sized sample surveys coupled with "the maximum feasible use of administrative records, at an estimated total cost not to exceed \$40 million" (\$215 million in 2010 dollars).⁵⁶

The General Accounting Office (GAO) had already contacted the Census Bureau to ask for documentation of the estimated costs of the mid-decade census options.⁵⁷ In response to earlier comments from the GAO, a member of his staff informed Associate Director for Demographic Fields Conrad Taeuber that the nearest alternative to the mid-decade census that the Census Bureau had already priced was a proposal for a 1972 large-scale sample survey of 3 million housing units using the 15 percent questionnaire from the 1970 census. Originally planned for 1969, this survey was estimated to cost \$32 million at that time (\$190 million in 2010 dollars) and would probably have come close to the \$40 million (\$238 million in 2010 dollars) cost ceiling noted by the OMB.⁵⁸ Such a survey would not meet the small-area data needs of many mid-decade census supporters. However, given the cost limitations placed on the Census Bureau, the staff member suggested this was the kind of program the Census Bureau should investigate.

⁵⁵ Ibid, p. 129. Wilson inserted into the record an article by Jack Rosenthal of the New York Times noting that "the Nixon Administration withdrew its support today [June 10, 1971] for any kind of special census in 1975" and quoted an OMB official as saying that "'budgetary reasons were the principal factor' in the policy change." See, Ibid., pp. 140-141.

⁵⁶ Letter from George P. Shultz to Maurice Stans, July 13, 1971.

⁵⁷ General Accounting Office, Report to the Subcommittee on Census and Statistics, Committee on Post Office and Civil Service, "Bureau of the Census: Cost Estimates for Mid-Decade Census Proposals," July 27, 1971.

⁵⁸ Memorandum from Theodore Clemence to Conrad Taeuber, March 26, 1971.

The following year, the Census Bureau responded to questions from the Subcommittee on Census and Statistics on the sampling errors and data characteristics of mid-decade sample surveys covering a 10 percent sample, a 20 percent sample, and a 25 percent sample of addresses.

Census Bureau Director Brown stated that a 10 percent sample would produce estimates of the characteristics of the population of adequate accuracy for areas of 100,000 inhabitants or more. A 20 percent sample would yield good quality data for areas of 50,000 or more inhabitants; and a 25 percent sample would do the same for areas of 25,000 or more. The latter was estimated to cost about \$170 million (\$887 million in 2010 dollars), while the 10 percent sample would cost about \$100 million (\$522 million in 2010 dollars).⁵⁹

A 2 PERCENT SAMPLE CENSUS

Within several months, the discussion on how to provide intercensal small-area data had reverted to a much less expensive option—a 2 percent national sample survey coupled with "full-scale use" of administrative records.⁶⁰ By the early 1970s, administrative records research seemed to hold much promise for providing "reasonably reliable information on population totals for areas above 250,000 [inhabitants], and counts of satisfactory quality down to areas of 50,000." Integrating sample survey data with information from administrative records appeared to offer an opportunity "to overcome some of the major limitations of that program [a sample survey]."⁶¹ However, the available documents did not specify the type of administrative records research under consideration nor did they indicate how administrative records data would be combined with those of the survey.⁶²

The planned sample survey would include 2 percent of the households in the United States and 2 percent of the individuals in large group quarters. The Census

⁵⁹ Memorandum from George H. Brown to Charles H. Wilson, March 22, 1972.

⁶⁰ Background paper, "Program Proposal for Mid-Decade Two Percent Sample Survey," sent from Robert L. Hagan (deputy director, U.S. Census Bureau) to Mr. Peterson (assistant administrator, Social and Economic Statistics Administration), July 14, 1972.

⁶¹ Ibid.

⁶² Part of the research seems to have pertained to geographic coding of administrative records. Refer to memorandum from Joseph Wright, Jr., deputy administrator, Social and Economic Statistics Administration (SESA), to James Gord, General Counsel's Office, DOC, April 26, 1972. Birth and death records were among those considered; other candidates would have included driver's license records, income tax returns, and social security records.

Bureau expected that the survey would supply population characteristics that administrative records could not provide. The sample survey was to be designed to improve the population estimates for large areas such as states and major metropolitan areas (places with populations of 500,000 or more). The sample survey also was expected to assist in population estimation for smaller places (for example, reducing estimation error by regressing the population estimate on the survey results) and for subareas of larger cities for which administrative records are not useful. Finally, the sample survey was expected to provide a mechanism for evaluating the population estimates produced by the administrative records program.

The Census Bureau was satisfied that the sample survey itself would provide estimates "of adequate reliability" for cities and other political units of 500,000 or more. It was thought that for subareas of cities of 100,000 to 200,000, larger errors could be tolerated. For characteristics, only simple distributions would be available for areas containing total populations of 50,000 to 100,000 people. On the other hand, the agency felt it could not make reliable estimates for places with less than 50,000 inhabitants nor city subareas with less than 100,000 or 200,000. This grouping would rule out sample data for any tract or even moderate-sized neighborhoods. A 1 percent sample would produce a range of reliable data only for areas of 500,000 or more, while estimated population totals and simple distributions were all that would appear for areas of 100,000 to 500,000. A 1 percent survey would probably cost more than \$30 million (\$156 million in 2010 dollars). A 2 percent sample household survey was estimated to cost about \$43.5 million (\$227 million in 2010 dollars), as opposed to a 25 percent sample, which would cost about \$170 million (\$887 million in 2010 dollars), or a 10 percent sample which would cost around \$100 million (\$522 million in 2010 dollars).⁶³

For the remainder of 1972 and early 1973, Census Bureau staff developed the details of sample design, tabulation plans, and address list improvement for a mid-decade sample survey. By April 1973, the Census Bureau reduced its proposed sample size to 1 million households, at an estimated cost of \$45 million (\$221

million in 2010 dollars).⁶⁴ This approach would provide cross-tabulations of characteristics for areas of 250,000 or more and summary statistics for areas of 50,000 or more. The administration's proposal did not persuade the Committee on Post Office and Civil Service, which submitted a bill (H.R. 7762) calling for a 25 percent national survey at an estimated cost of \$200 million (\$982 million in 2010 dollars).⁶⁵ As had occurred previously, the bill passed in the House but died in the Senate. The tumultuous events surrounding the resignation of President Nixon in August 1974 appear to have played a role in the delay of consideration of conducting a mid-decade sample survey until 1975. In May of that year, Census Bureau Director Vincent Barabba testified about various proposals for a mid-decade census at a hearing of the Census Bureau's oversight subcommittee. Rep. Patricia Schroeder (D-CO), chairwoman of the subcommittee, stated that one reason the mid-decade count had been "around for 14 years and . . . was suddenly changed from mid-decade census to a survey was the fear of reapportionment." She asked if "anyone ever said anything about that?" Barabba replied that the question of whether there would be an apportionment following a mid-decade census was one of the issues that might have to be addressed but that the Census Bureau had no expertise in this area. Rep. Schroeder pointed out that another issue was the comparative cost of a census versus a survey. The question is "whether or not it's worth the additional money and time to do the census" rather than a survey. If the figures from the mid-decade effort were to be used for revenue sharing or other federal programs, Schroeder wondered whether relying on a survey would be at all "fair." She continued, "Wouldn't you have to do a full census to really make the figures usable?"⁶⁶ In response, Barabba noted that a 25 percent sample survey would provide estimated population totals for areas containing 25,000 or more people, but would not provide data for places under 25,000, which account for about 41 percent of the U.S. population. Associate Director for Demographic Fields Daniel Levine added that for places of 50,000 or more, the results of 25 percent sample probably

⁶³ Background paper, "Program Proposal for Mid-Decade Two Percent Sample Survey," sent from Robert L. Hagan (deputy director, U.S. Census Bureau) to William H. Peterson (assistant administrator, Social and Economic Statistics Administration), July 14, 1972.

⁶⁴ U.S. House of Representatives, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, Hearing on "Mid-Decade Census," April 9, 1973, 93rd Cong., 1st Sess., 1973, p. 2.

⁶⁵ U.S. House of Representatives, Committee on Post Office and Civil Service, Report to Accompany H.R. 7762, Report No. 93-246, June 4, 1973, 93rd Cong., 1st Sess., 1973, p. 15.

⁶⁶ U.S. House of Representatives, Subcommittee on Census and Population of the Committee on Post Office and Civil Service, Hearing on "Proposals for a Mid-Decade Census," May 16, 1975, 94th Cong., 1st Sess., 1975, p. 3.

could be used directly for revenue sharing purposes. For places of 25,000 to 50,000, the Census Bureau would probably have to use synthetic techniques to estimate total population size, and the reliability of those estimates would be much less than for those whose populations were greater than 50,000. Finally, for places with populations below 10,000, even synthetic estimates would have a wide range of error on average. Barabba added that this was the tradeoff between relying on a sample rather than taking a full census. With the sample, “you will not have as good data for the smaller places.” Schroeder said she thought the 25 percent sample was “the only realistic one [program].” She then asked if “the 25-percent sample ha[d] \$160 million (\$648 million in 2010 dollars) more value datawise than the 1.5 percent sample?” Barabba replied, “That’s a judgment this committee is going to have to make.” Levine added that it was important to distinguish between “just getting population counts,” which were used for revenue sharing, “and the wide variety of characteristics data that you’re looking at, namely the detail of cross-tabulation, income by family size, poverty. There a 25 percent sample does give you a much greater reliability than would a 1.5 percent sample.”⁶⁷

MID-DECADE CENSUS BILL BECOMES LAW

The two bills (H.R. 2556 and H.R. 3704) that Schroeder’s subcommittee discussed with Barabba and Levine in May 1975 did not emerge from committee. However, Schroeder introduced another mid-decade census bill in the House in December 1975. This bill (H.R. 11337) passed in the House of Representatives the following April and was referred to the Senate. The House bill authorized the Secretary of Commerce to conduct a mid-decade census in 1985 and every 10 years thereafter. The bill also recognized the importance of obtaining respondents’ characteristics as well as simple counts of age, race, sex, etc., and encouraged the Secretary to incorporate sampling methodology whenever feasible. In its hearing on the Senate version of the bill, 3688, the Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service heard the representatives of the Office of Management and Budget,⁶⁸ Fernando Oaxaca and Joseph Duncan, support the proposed legislation on the mid-decade census. The Congressional

Budget Office (CBO) estimated that a complete census would cost \$517.5 million (\$2.0 billion in 2010 dollars) and that up to \$490.6 million (\$1.9 billion in 2010 dollars) of that could be offset by reducing or eliminating intercensal demographic programs across the executive branch aimed at updating decennial census data.⁶⁹ An amended version passed the Senate in September, and President Ford signed the bill into law on October 17, 1976. At the signing ceremony, Ford noted that the new law (P.L. 94-521) would provide “ . . . a major opportunity to improve the statistical information which is often the basis for decisions on major issues of public policy . . . we will no longer need to rely on data which are often obsolete. The historic method of counting the population every 10 years simply does not meet the Nation’s current needs...I commend the Congress for passing this legislation. It will provide us with better data, of greater consistency, at a reduced cost.”⁷⁰

When the mid-decade census law was signed, the Census Bureau was just completing work on its fiscal year (FY) 1978 budget request. To begin planning for the 1985 Census, the agency requested and received \$500,000 (\$1.5 million in 2010 dollars) in its FY 1979 budget. Final planning for the 1980 Census delayed the establishment of the mid-decade census staff until February 1979. Within a couple of months, a four-person staff had been assembled, and the challenge of planning the first mid-decade census had begun in earnest.⁷¹

Since the legislation establishing the mid-decade census did not specify its scope or content, these were among the first considerations. As the Census Bureau began to assess the data needs for 1985 and beyond, the basic objectives of the mid-decade census were to update population totals and characteristics for the distribution of federal funds to state and local governments and for the administration of federal program benefits to various segments of the population. Through the Statistical Policy Coordination Committee and the Federal Agency Council on Demographic Censuses, the Census Bureau solicited agency data needs and the geographic levels

⁶⁷ U.S. Senate, Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, hearing on “Mid-Decade Census Legislation,” July 29, 1976, 94th Cong., 2nd Sess., 1976, pp. 71-74, 54-57.

⁶⁸ Public Papers of the Presidents: Gerald R. Ford, 1976-77: Book III “Statement on Signing the Bill Providing for a Mid-Decade Census of Population,” October 18, 1976, GPO, Washington, DC, 1979.

⁶⁹ Memorandum from Joseph W. Duncan, director, Office of Federal Statistical Policy and Standards, U.S. Department of Commerce, to Lucille Reifman, deputy director for Program Evaluation, Department of Commerce, July 31, 1980.

⁷⁰ Ibid., pp. 4-6.

⁷¹ President Richard Nixon reorganized the Bureau of the Budget into the Office of Management and Budget in 1970.

at which the data were required. The Census Bureau considered two basic options:

- A complete count, if block-level data were needed, using either a single form (equivalent to the 1980 short form) or a combination of a short form and a long form.
- A sample survey, if the lowest level of geography for which data were needed was the governmental unit participating in the revenue sharing program.⁷²

The sample survey approach could use a single questionnaire or multiple questionnaires. In the latter case, each questionnaire would contain core data items plus one or more modules asking for more detailed characteristics. Data from the core items could be tabulated for the lowest geographic level needed (e.g., census tract or governmental unit) while the data from the modules would be produced for larger geographic areas.⁷³

IMPLEMENTING THE MID-DECADE CENSUS

The legislation creating the mid-decade census encouraged the Census Bureau to explore ways to use sampling to collect the data. By the summer of 1979, this suggestion, together with concerns about respondent burden and the rapidly escalating cost of the 1980 Census (to roughly \$1.1 billion, \$2.9 billion in 2010 dollars) led the Census Bureau to propose that the 1985 effort be a sample survey.⁷⁴ An early proposal was unveiled at the American Statistical Association annual meeting in 1979.⁷⁵ The authors proposed that the survey collect data at the following geographic levels: states, standard metropolitan statistical areas (SMSAs), central cities, balance of SMSAs, and balance of state. The option of using the 39,500 general

⁷² Federal revenue sharing referred to the distribution of a portion of federal tax revenue to states and municipalities. Federal legislation established the program in 1972 under the Nixon administration. The program continued until 1987, when the Reagan administration replaced it with the federal block grant program.

⁷³ U.S. Bureau of the Census, "1985 Mid-Decade Census: Background Paper for the Federal Agency Council Meeting," May 2, 1979.

⁷⁴ Memorandum from George E. Hall to Joseph W. Duncan, July 17, 1979. Prior to July 1979, George Hall was deputy director of Social Statistics in the Office of Federal Statistical Policy and Standards. In July 1979, Hall accepted the position of associate director for Demographic Fields at the Census Bureau and served in that position until May 1981.

⁷⁵ Marie G. Argana and Daniel B. Levine, "Preliminary Thinking of the Design and Content of the Mid-Decade Census," paper delivered at the annual meeting of the American Statistical Association on August 13-16, 1979. Marie Argana joined the Census Bureau in 1963 and was appointed chief of the Mid-Decade Census Staff in 1979. She served in that position until the staff was abolished in 1980. Daniel Levine was associate director for Demographic Fields of the Census Bureau from 1973 to 1979, then deputy director until his retirement in 1982.

purpose governmental units as the lowest geographic level was rejected as not being cost effective. About 71 percent of these units had populations of less than 3,000 people but accounted for only 10.4 percent of the U.S. population. One possible approach to obtaining data on smaller governmental units was through the use of a "nested" survey.⁷⁶ This involved administering different questionnaires to different subsamples of the same universe. All samples would be asked some core questions and one subsample could include all questions on all the questionnaires. The resulting data would be used to develop estimators that could be applied to the governmental units that could not be sampled directly. In addition to providing population counts, the mid-decade survey would have to produce characteristics of the population as well.

Many data users were not satisfied by the approach summarized by Argana and Levine because they wanted statistics for smaller areas, more detail on rural areas, or more information on characteristics. A preliminary review of responses from federal agencies to a Census Bureau request for the geographic level for which information was needed suggested that the county was the lowest level most frequently mentioned, but census tract also figured prominently.⁷⁷

Meanwhile, the Census Bureau continued polling federal agencies about their data needs, and made plans to contact state and local government agencies and a list of over 15,000 interested data users that was developed from the 1980 Census planning meetings. Census Bureau personnel also prepared presentations on plans for the mid-decade program for delivery to selected groups, such as the census advisory committees and national professional associations.

Several federal departments (e.g., Transportation; Health, Education, and Welfare; and Labor) indicated that if the mid-decade survey were not implemented, they would request expansion of other surveys or new special purpose surveys to obtain data they needed for their own programmatic reasons. The Internal Revenue Service (IRS) reported that a relatively small expenditure would pay for an IRS/

⁷⁶ For more on nested surveys, refer to the Office of Federal Statistical Policy and Standards, "A Framework for Planning U.S. Federal Statistics for the 1980s," GPO, Washington, DC, 1978, pp. 371-372, 406.

⁷⁷ Memorandum from Joseph W. Duncan, director, Office of Federal Statistical Policy and Standards, U.S. Department of Commerce, to Lucille Reifman, deputy director for Program Evaluation, Department of Commerce, July 31, 1980; U.S. Census Bureau, "Mid-Decade Census Content Suggested by Federal Agencies," March 4, 1980.

Census Bureau match in conjunction with the mid-decade program. This would make possible small-area estimates with substantial subject matter detail. The Office of Federal Statistical Policy and Standards (OFSPS) notified the Office of Management and Budget that withholding FY 1981 planning funds for the mid-decade program would undermine the most important planning phase of the project.⁷⁸

The Census Bureau's early planning for the 1985 mid-decade census took place in an exceedingly difficult economic climate. The second oil crisis of 1979, which accompanied the fall of the Shah of Iran and the coming to power of Ayatollah Ruhollah Khomeini, led to a significant increase in the price of gasoline. The beginning of the Iran-Iraq war the following year severely curtailed oil extraction in both countries. The Iran hostage crisis, which began on November 4, 1979, outraged many Americans and contributed to a renewed sense of vulnerability and increased attention to the military budget. In addition, the late 1970s were a period of slow economic growth and high inflation in the United States. While gross domestic product (GDP) growth rates remained in the 1-2 percent range, inflation jumped from an annual average of 8 percent from 1974 through 1978 to 10.75 percent in the first 9 months of 1979. Interest rates increased even faster than inflation, with the prime rate more than doubling from October 1977 (7.5 percent) to November 1979 (15.5 percent).⁷⁹ As James T. McIntyre, director of the Office of Management and Budget, put it in a letter to Secretary of Commerce Philip Klutznick, "It is the President's objective that this budget [FY 1981] contribute significantly to a moderation in the inflation rate while at the same time providing adequate resources to maintain a strong national defense, to reduce dependence on imported oil, and to assist the disadvantaged and the needy."⁸⁰ This context was not conducive to the launching of new federal statistical programs.

DEMISE OF THE MID-DECADE CENSUS

Primarily for budgetary reasons, the mid-decade census found itself under major assault in the fall of 1979. OFSPS Chief Joseph W. Duncan appealed to a senior OMB official, stating that the use of IRS data

⁷⁸ Ibid.

⁷⁹ Richard Sutch and Susan B. Carter (eds.), "Historical Statistics of the United States, Earliest Times to the Present," Volume 3, New York, Cambridge University Press, 2006, pp. 3-27, 147-167, 594-595, 812-827. Also refer to James Patterson, "Restless Giant," Oxford University Press, New York, 2007.

⁸⁰ Letter from James T. McIntyre to Philip Klutznick, February 11, 1980.

alone without the supplementary information provided by the mid-decade program would be inadequate to bridge the gap between estimates drawn from national surveys and small area population and income statistics. Program planning and policymaking might be compromised. Reliance on population estimates instead of the mid-decade census information would result in a less equitable distribution of federal funds for Community Block Development Grants, Comprehensive Employment and Training Act funding, and Highway Research, Planning, and Construction. Not funding the mid-decade program would also undermine the planning for a more efficient statistical system in the 1980s. Duncan argued that the alternative proposed by OMB was inadequate. It "would not provide statistics required for effective program planning and policy decisions in the latter half of the 1980's. The system proposed by Census and OFSPS used the mid-decade as a critical link between estimates from national surveys and small-area population and income estimates."⁸¹ Duncan's appeal failed, and in January 1980, he wrote to the members of the Federal Agency Council to cancel a meeting called for the following month to discuss planning for the mid-decade program.⁸²

As word spread within the data-user community of the cancellation of the mid-decade census, state and local governments began registering their complaints. A consultant for the Department of Health of New York City noted that he had testified at a congressional hearing in support of collecting "small-area population data more frequently than every 10 years." No sample survey that he was aware of would be able to provide such data. While sample data might be adequate for federal purposes, they would not fulfill local needs. "But, what about local needs? A mid-decade census was proposed in order to eliminate the need for the expensive special censuses undertaken at local cost in earlier years; local communities can no longer afford this. I recognize that a complete census is extremely expensive. But actions taken in ignorance of facts can be even more expensive" (emphasis in original).⁸³ The state statistician of Hawaii echoed these comments, "For a wide variety of State and local purposes, accurate statistics at the State, County, and census tract levels are essential.

⁸¹ Memorandum from Joseph W. Duncan to Joyce Walker, deputy associate director, Transportation, Commerce, and Housing, OMB, November 19, 1979.

⁸² Memorandum from Joseph W. Duncan to Members of the Federal Agency Council for Demographic Censuses, January 29, 1980.

⁸³ Letter from Carl L. Erhardt to Vincent P. Barabba, May 15, 1980.

Only a 100 percent enumeration of population and housing units, accompanied by sizable samples on population and housing characteristics can meet the intercensal need with the necessary accuracy at the county and census tract levels.”⁸⁴ The manager of the Oregon state data center (SDC) wrote that the proposed plan for a large sample survey in 1985 producing data for states, SMSAs, central cities, balance of SMSAs, and balance of states “will not result in information that will greatly benefit the state of Oregon or its local governments.” The need for small-area data was so great that the Oregon SDC was willing “to sacrifice data content for the sake of greater geographic precision.”⁸⁵ On the other hand, the executive vice president of the Great Falls (MT) Chamber of Commerce applauded the Census Bureau’s plans for a 1985 sample census, noting that even though it “will be only a large sample survey,” it “will nonetheless be very, very important to the nation’s business community as it does market research and other economic database fact finding.”⁸⁶ These different views from various data users were a reflection of the different uses to which census data were put. However, most data users opposed the proposed cancellation of the mid-decade census.

OMB objected to funding the program because no federal agency had demonstrated “clearly compelling” national data needs. OMB suggested that a more modest alternative would be improved population estimates combined with data from current and special censuses. In early summer 1980, Secretary of Commerce Philip Klutznick noted that the Census Bureau by itself might not be able to meet the mandate of Public Law 94-521 (Mid-Decade Census Act) that required the mid-decade census and suggested that “given the broad uses for improved subnational data,” it seemed “more appropriate to level the cost of the program on the data users who will benefit the most.”⁸⁷ Pointing out that one of the largest uses of mid-decade census data would be to allocate funds via the general revenue sharing program, Secretary Klutznick suggested that “a small percentage of the funds appropriated for general revenue sharing

⁸⁴ Letter from Robert C. Schmitt to Director, Office of Federal Statistical Policy and Standards, May 6, 1980.

⁸⁵ Letter from Jon Roberts to Marie Argana, chief of the Mid-Decade Census Staff, March 26, 1980. Roberts included in his letter quotations from the “Federal Statistics Users’ Conference Alert,” dated February 12, 1980.

⁸⁶ Letter from Roger W. Young to Marie Argana, February 26, 1980.

⁸⁷ Draft memorandum from the Secretary of Commerce (Philip Klutznick) to James T. McIntyre, Jr., director, Office of Management and Budget, June 25, 1980.

program” should pay for the census. Other major federal uses of small-area census data were for the distribution of community development block grants (Housing and Community Development Act of 1974), CETA funding (Comprehensive Employment and Training Act), and the Department of Education’s elementary and secondary school assistance (Elementary and Secondary Education Act). Klutznick also recommended exploring “other alternative sources of funding.” Then he proposed developing “a multiyear plan for strengthening and updating the subnational data base.” The options to be explored included:

- Using statistical techniques, such as synthetic estimation, to increase the usefulness of existing data bases.
- Improving the utility of administrative record systems.
- Upgrading the demographic estimates program.
- Revising some of the current household surveys.⁸⁸

The Secretary also included a description of a program of subnational data improvement that might replace a mid-decade census, formulated by the Commerce Department’s chief economist, Courtenay Slater. Slater’s proposal was estimated to cost about \$160 million (\$423 million in 2010 dollars) and would consist of a multiyear, multiagency effort in which the Census Bureau would play a key part.

As described, the Census Bureau would contribute improved population projection and demographic estimation techniques, administrative records research, and expanded large-scale surveys.⁸⁹ In response, the OMB said that although the administration generally opposed set-asides of general revenue sharing funds, given the importance of improved small-area data for the Office of Revenue Sharing (ORS), the administration would consider funding a portion of the initiative with revenue from the ORS and from other data users.⁹⁰

Over the next year or so, the Census Bureau devoted more resources to this alternative plan and wound down its preparation for a mid-decade census. However, the congress denied funding for major components of this initiative during its review of the Census Bureau’s proposed budget for FY 1982. Since

⁸⁸ Ibid.

⁸⁹ Ibid., attachment, “Small Area Data Initiative for FY 1982.”

⁹⁰ Memorandum from James T. McIntyre, Jr. to Philip M. Klutznick, August 1, 1980.

the Census Bureau was required by law to submit to its oversight committees the list of subjects to be included in the 1985 Census in April 1982, senior Census Bureau officials proposed informing the Congress that there would be no mid-decade statistical program in 1985.⁹¹

CUMULATIVE ROLLING SAMPLES: AN ALTERNATIVE TO A MID-DECADE CENSUS

As the Census Bureau wound down its mid-decade census program, another set of options for using sampling to obtain intercensal data for small areas was proposed by Leslie Kish, a leading statistician at the University of Michigan.⁹² The House Subcommittee on Census and Population asked the Congressional Research Service (CRS) to look into how increased use of sample surveys could improve the collection of statistical information. One area of particular concern was the need for intercensal small-area data about population characteristics for general revenue sharing and other purposes. CRS contracted with the Institute for Social Research (ISR) at the University of Michigan to analyze the issue and explore ways to improve the use of Census Bureau resources to produce more accurate and timely information about the size and characteristics of the American population. On behalf of the ISR, Kish wrote the paper, and CRS distributed it to several leading researchers for their comments.⁹³

Kish noted that efforts to produce improved small-area data could involve either collecting new data or finding ways to derive new estimates either from data available in registers or from sample surveys—together with census results. He suggested that the latter might be cheaper and would definitely reduce respondent burden.

KISH'S PROPOSAL

Kish's Suggestion Had a Number of Components

Using address listing procedures, the Census Bureau could collect and cumulate information on living quarters, their occupants, or both, on a weekly,

⁹¹ "Abstract of Secretarial Correspondence," prepared by Daniel B. Levine, October 20, 1981.

⁹² Leslie Kish, "Using Cumulated Rolling Samples to Integrate Census and Survey Operations of the Census Bureau," produced at the request of the U.S. House of Representatives, Committee on Post Office and Civil Service, 97th Congress, 1st Session, Committee Print No. 97-2, June 26, 1981.

⁹³ The reviewers were Ivan Fellegi (Statistics Canada), Philip Hauser (University of Chicago), and Robert Hill (National Urban League).

monthly, quarterly, annual, and 5-year basis.⁹⁴ The data collected by the new survey could consist of: a simple count of housing units or dwellings; a count of living quarters plus a brief interview to collect basic demographic information on all the occupants; an extensive set of inquiries dealing with demographic, occupational, and residential information; or some combination of these.

The agency could institute a new, large-scale survey with a sample size of up to 10 to 20 times larger than the more than 80,000 households then included in the Current Population Survey (CPS)—a monthly labor force survey sponsored by the Bureau of Labor Statistics and carried out by the Census Bureau.

The new survey's relationship to the CPS could be either completely independent, linked to the CPS in some clearly defined way, or could consist of a substantial expansion of the CPS.⁹⁵

The data the new survey tabulated and released to the public would consist of cumulated rolling samples. A rolling sample is one in which a particular area, such as a county, is sampled at regular intervals. Separate, nonoverlapping samples are selected from the same area over a given period of time—for example once per month for a year.⁹⁶ For small areas obtaining sufficient sample size to produce reliable estimates requires cumulating the data over a period of several years.

Listing Procedures

Both decennial censuses and household surveys depend on accurate listing procedures.⁹⁷ Listing dwellings involves compiling them by location, number, and other identifiers. Kish pointed out that

⁹⁴ The Census Bureau recognizes two types of living quarters: housing units and group quarters. Housing units are defined as houses, apartments, mobile homes or trailers, groups of rooms, or single rooms occupied as separate living quarters or, if vacant, intended for occupancy as separate living quarters. All people not living in housing units are classified by the Census Bureau as living in group quarters, which include such places as college dormitories, correctional institutions, nursing homes, group homes, mental hospitals or wards, hospices, and military quarters.

⁹⁵ Two events are independent if the probability of one is the same whether the other event occurs or not. Two surveys are independent of each other if their sample selection processes are distinct and separate from each other, and their data collection and data processing systems are separate.

⁹⁶ A more technical definition of a rolling sample is the joint selection of k nonoverlapping probability samples, each of which constitutes $1/F$ of the entire population. One sample is interviewed each time period until all the sample has been interviewed after k periods.

⁹⁷ The address list developed for the decennial census served as the sampling frame for most Census Bureau household surveys, including the Current Population Survey and the Consumer Expenditure Survey.

changes, especially increases, in the number of dwellings in a particular area have historically provided the best index of changes in that area's population and have served as an excellent basis for current population estimates. Population changes in the years since the last census can have drastic effects on small-area estimates.⁹⁸

Kish described several address listing procedures that could serve as alternatives to more censuses. To reduce the unit cost of these listings, Kish suggested confining them to dwellings. Limiting the listing to dwellings would be the cheapest alternative because it would not require that the person compiling the list contact anyone at the address being listed. Kish estimated that address listing cost between \$1 and \$2.50 per address (in 1981 dollars; between \$2.40 and \$6.00 in 2010 dollars).⁹⁹ Adding simple information about the housing unit (such as occupancy status and type of structure) would require "occasional inquiries on the street or at the door" and would probably double the cost to between \$2 and \$5 (\$4.80 and \$11.99 in 2010 dollars) per dwelling.¹⁰⁰ To obtain reliable population estimates, it would be necessary to contact a respondent at each sample dwelling and to ask about the relationships of the people within each dwelling and the permanent address of each inhabitant. This would allow the estimates to be corrected for errors and biases and could increase the cost by up to five times the amount needed for an estimate of dwellings only. These costs could be reduced by subsampling the sample of dwellings.¹⁰¹

Adding sex, age, and a few other characteristics for each household member would increase the cost still further. This kind of data collection would be similar to that collected from 100 percent of households in the decennial census. The most expensive option would be to collect the full range of information about each inhabitant of the sample dwellings as would be obtained from those who completed the sample questionnaires in the decennial census.¹⁰²

Sample Size

Since Kish was interested in providing data for both small areas and the nation as a whole, he emphasized the importance of large samples. A weekly rolling sample of one dwelling in 520 (1:520) would cumulate

to an annual sample of one dwelling in ten (1:10). This would cumulate to complete national coverage every 10 years.¹⁰³ Regardless of the type of listing operation selected, a large sample of dwellings per month would be needed to maintain full national coverage while minimizing unit cost. Samples taken in different weeks or months could be cumulated to produce quarterly, yearly, biennial, or quinquennial statistics. As the period of cumulation increased from months to years, information about smaller geographic areas would become available.¹⁰⁴

Cumulated Rolling Samples

A rolling sample is a nonoverlapping probability sample of a specific geographic area repeated at regular intervals over a specified period of time. For example, a rolling sample of a small county would involve drawing a number of samples from an address list of that county, and administering questionnaires at housing units falling into the sample every month for a period of several years. The information elicited from respondents would be added (cumulated) together, so that the sample size after several years of data collection would be large enough to produce reliable estimates of the characteristics of the population and housing stock of the county.

Relationship Between the New Rolling Samples and the CPS

The differences among the three listing procedures Kish discussed depended on their relationship to the listing procedure used in the Current Population Survey (CPS). One option involved listing dwellings completely separately from the CPS and from any other Census Bureau survey. To maintain the independence of the listing procedure would require a separate sample design, operations, and personnel. This approach would maintain maximum flexibility for both the CPS and the rolling sample.¹⁰⁵ The large overlapping samples currently in the CPS design would continue, as would the spatially concentrated interviews.¹⁰⁶ Kish indicated that counts and lists of dwellings would yield "adequate" estimates of major population changes for small areas, but added that reliable estimates of the characteristics of households, families, and individuals required obtaining

⁹⁸ Kish, 1981, pp. 20, 38.

⁹⁹ Ibid., p. 38.

¹⁰⁰ Ibid., pp. 38-39.

¹⁰¹ Ibid., p. 39.

¹⁰² Ibid., pp. 39-40.

¹⁰³ Ibid., p. 7.

¹⁰⁴ Ibid., pp. 5-7, 19.

¹⁰⁵ Ibid.

¹⁰⁶ The overlapping sample in the CPS referred to the sample design that placed a dwelling in the CPS sample for 4 consecutive months, out of the sample for the next 8 months, then back in the sample for 4 months.

information about each of the individuals in each sampled dwelling. Recording the characteristics of every person in a sampled unit would increase the cost per dwelling by a factor of between three and five. Field testing would provide the cost and benefit data required to choose among the options, which could include enumeration of subsamples to reduce costs.¹⁰⁷

Kish's second option was to incorporate the listing operation into the CPS as a preliminary step. In the early 1980s, the CPS average monthly sample was between 1 in 1,000 dwellings and 1 in 2,000 dwellings. He suggested increasing the listing operation by a factor of 10 or 20, to approximately 1 in 100 dwellings per month, or roughly 12 percent of the nation's dwellings each year. He estimated that an increase of this magnitude would only double the cost of current surveys because the unit cost of listing dwellings "may be" only about 10 percent of the unit cost of interviewing. As noted earlier, limiting the listing to dwellings would minimize the cost because it could be done mostly from outside the dwellings. He pointed out that listing and counting 10 to 20 dwellings for each dwelling included in the CPS would probably improve small-area estimates more than doubling the size of the survey samples. This would be true if most error in a local estimate was due to an unusual increase or decrease in the area's population since the last census. Population changes since the last census can have dramatic effects on estimates for small areas. Kish thought it more likely that small-area estimates could be improved by designing cumulated rolling listings as part of the CPS than by designing them as an independent operation. However, verifying this hypothesis would require statistical investigation and testing.¹⁰⁸

Kish's third alternative involved using cumulated rolling listings to extend the CPS. To accomplish this, it would be necessary to substantially increase the size of the CPS sample. Other modifications included:

- Designing the rolling sample as a yearly sample of 1 or 5 percent of the nation's dwellings.
- Eliminating the overlaps in the CPS to include more dwellings each decade.
- Including all other current surveys in the listing operation.

- Supplementing these changes with additional listings to achieve the required size for the cumulated rolling listing.¹⁰⁹

These changes would allow the collection of richer data than either of the other options. They would probably provide sufficient precision for current population estimates for states and counties but not for tracts or for most of the 39,000 revenue-sharing entities.

Kish stressed that the Census Bureau had the statistical and operational expertise to plan and implement cumulated rolling samples. He noted several points about doing so. In compiling these samples, there should be no overlaps. If overlaps were required for other reasons, the rolling sample could consist of the nonoverlapping portion. As an example, he posited a 1.5 percent yearly sample with a one-third overlap; the rolling sample could contain the nonoverlapping 1 percent of the sample. Also, he pointed out that 5-year cumulations of the sample could be made continuously, yearly, or even monthly. Data obsolescence could be reduced by using moving averages, with a larger weight given to more recent years. Data would become available for areas with large populations over a shorter period of time, while less populated areas would require a longer time period for the rolling sample to attain sufficient size. Single year cumulations could be produced for states and large SMSAs; areas with smaller populations would need much longer. Lastly, weekly national samples of 15,000 or 30,000 dwellings (especially if they included person counts) could serve as the lists from which CPS samples were selected. These lists of dwellings (with or without person counts) could also be used: when the nation needed an ad hoc survey to respond to certain emergencies; for annual or quarterly surveys for other reasons; or as the screening phase for surveys of special populations such as those with physical, mental, or emotional conditions, or men or women of draft age.¹¹⁰

Kish argued that weekly or monthly rolling samples could serve as almost continuous population samples, preferable in some ways to decennial censuses that are taken as of a single reference date every 10 years. Periodic samples produce more accurate

¹⁰⁷ Kish, 1981, pp. 19-20.

¹⁰⁸ Ibid., pp. 20-21.

¹⁰⁹ Ibid., p. 8.

¹¹⁰ Ibid., pp. 30, 32.

reflections of the changing location of people than censuses do.¹¹¹

Kish noted that cumulated rolling samples would pose significant challenges for the Census Bureau's field staff because each sample would have to include all counties in the United States (assuming that counties would be the primary sampling units). A weekly sample of 1 dwelling in 2,600 (clustered into large workloads) would have to be spread over large, sparsely populated areas. This sampling rate would yield about 1 dwelling in 600 monthly, 1 in 200 quarterly, and 1 in 50 (2 percent) annually. To accomplish this in conjunction with the CPS, as Kish proposed, would mean changing the sampling procedure for the CPS and increasing its workload to approximately 130,000 households per month—roughly equivalent to the total number of housing units Census Bureau interviewers contacted on a monthly basis for all household surveys the agency conducted in the early 1980s. If the CPS and the other household surveys could be modified to dovetail with the rolling sample concept, this would mean that the workload could be reorganized rather than expanded to accommodate cumulative rolling samples.¹¹²

A major problem with expanding the CPS in this way was the overlap in the sample.¹¹³ Since CPS interviewers repeated their contacts eight times, they only visited 1/16 of the different households that were needed for the cumulated rolling sample. A second problem arose because cumulated rolling samples would have to cover the entire country, whereas the CPS covered only about 70 percent of the areas in which most of the population resided.¹¹⁴

One solution to this problem would be to increase the size and area coverage of the CPS. While an enlarged CPS could provide the sample size required for current local listings, the magnitude of the increase would have to be on the order of 10 to 20 times the

¹¹¹ Ibid., p. 32. These samples would collect data throughout the year, and the reference dates would change with the addition of each new monthly sample. The decennial census collects all its data as of April 1 of the census year. Seasonal adjustments would probably be needed to align sample data with decennial census data.

¹¹² Ibid., pp. 33–34.

¹¹³ Refer to footnote number 15 for a discussion of the overlap sample used in the CPS.

¹¹⁴ Ibid., pp. 34–35. For the purposes of the CPS, about 65 percent of the population lives in "self-representing areas," i.e., areas with a sufficiently large population that they are selected for the CPS sample with certainty. The rest of the population lives in "nonself-representing areas," i.e., those that are randomly selected to represent themselves as well as other areas not selected for the sample. State supplements to the CPS reduced the nonself-representing areas somewhat.

size of the CPS to bring the yearly sample up to 2 percent of the nation's dwellings, or to 10 percent every 5 years. Kish thought it unlikely that a tenfold increase in the size of the CPS would be acceptable.¹¹⁵

THE MID-1980s AT THE CENSUS BUREAU

Kish's proposals for collecting cumulated rolling listings did not result in any immediate research program at the Census Bureau or elsewhere. The early 1980s were a time of tight federal budgets. The Census Bureau experienced substantial layoffs in 1982. Still, Kish's ideas percolated through the statistical community and became one of a number of possibilities for improving the timelines of small-area data. Other options under discussion included using model-based estimation techniques and administrative data. When, in the mid-1980s, the Census Bureau considered how it might use sampling to obtain population and housing unit counts in the 1990 census, the four alternatives examined did not include Kish's concept of rolling samples.¹¹⁶ However planners considered the possibility of conducting a sample census, that is, a census that did not count the inhabitants of all dwellings directly but relied on a sampling procedure to produce final population, housing unit, and group quarters estimates. Census Bureau staff noted that a sample census would require the prior creation of a complete, geocoded, national address list that would serve as the sampling frame for a sample census.¹¹⁷ They also pointed out some of the legal, political, and perceptual issues that would accompany a shift to a sample census, such as the need to modify the Census Bureau's statute (Title 13, U.S.C.) to allow sampling to be used to produce the official population count, potential political opposition to using sampling for the count, and the public reaction to a census that did not try to count everyone.¹¹⁸

In 1987, Peter Bounpane, assistant director for Decennial Census, raised the question of whether a sample census was a possibility in the United States and whether such a census might consist of one or more large-scale surveys or rolling cumulative surveys. Inexorably rising census costs; the 2- to 3-year time lag between the completion of data collection and the release of detailed characteristics data;

¹¹⁵ Ibid., p. 35.

¹¹⁶ Susan Miskura, Henry Woltman, and John Thompson, "Research Plan: Uses of Sampling for the Census Count," 1984 Annual Meeting of the American Statistical Association, Proceedings, Social Statistics Section, pp. 458–463.

¹¹⁷ Ibid., pp. 458, 460.

¹¹⁸ Ibid., p. 459.

concerns about census accuracy; and expanding reliance on census data by government, commerce and industry, and the scientific community combined to lead the Census Bureau to reconsider its reliance on a complete-count census.¹¹⁹

Bounpane summarized the uses of census data (reapportionment, redistricting, distribution of federal funds, statistical benchmarking, etc.) and concluded that most of them required reliable small-area data. He pointed out the difficulty of accurately estimating the populations of small cities or counties and concluded that if a sample census were to replace the complete-count version, data users would have to make decisions about the error levels they could tolerate. After reviewing the ways sampling had been incorporated into American censuses between 1940 and 1980, he remarked that it was no longer a question of whether censuses should include sampling but how much sampling should be included.¹²⁰

Bounpane considered two options for a sample census, each of which would replace the traditional complete count of the population. The first option consisted of a single-stage sample of the entire population taken as often as needed. The second option was a cumulative rolling sample along the lines suggested by Kish (refer to the “Kish’s Proposal” section in this chapter). The benefits of a sample census included lower cost, increased accuracy, more timely data releases, and reduction of respondent burden. While he included caveats for each benefit, he thought that many could be reduced, if not eliminated. One serious drawback of a sample-based census was the likelihood of “substantially poorer coverage” than could be obtained from a complete census. Indeed, the Census Bureau concluded that based on internal “analysis of issues related to a completely sample-based census,” a sample census could not be substituted for a complete enumeration because the level of coverage error would be “unacceptable.” It would raise significant, unavoidable concerns about differential undercoverage and about the benchmarking of current surveys and population estimates. The census was also the only attempt “to include every person in the United States” in a single, national activity and, in the process, “generate[s] a sense of national ceremony.” Bounpane doubted whether the

“national ceremonial mood” could accompany a sample census. Finally, the U.S. Constitution stated that seats in the U.S. House of Representatives were to be divided among the states “according to their respective numbers” (i.e., to each state’s population as determined by the decennial census). Modifications made to the basic census law (Title 13, U.S.C.) in 1976 prohibited the use of sampling for apportionment purposes. Employing a sample census instead of a complete count for apportionment purposes would require a legislative change and would be subject to a constitutional challenge. The Supreme Court would then make the final decision.¹²¹ Because of these issues, the Census Bureau was not actively researching replacing a complete census in 1990 with a sample census.

RETHINKING THE DECENTNIAL CENSUS AT THE END OF THE 1980s

While the leadership of the Census Bureau did not consider a dramatic change for the immediate future, it began to weigh alternatives for 2000 and beyond. It encouraged two small, research groups within the agency to explore options to simplify the decennial census by reducing the number of questions asked and developing ways to make subnational demographic and housing data available more frequently than once every decade.

It is not entirely clear why the Census Bureau allowed two initially independent teams to investigate a similar problem, overhauling the decennial census, rather than adopting a unified approach. Part of the explanation may be attributed to the differing origins of the two teams.

Beginning in 1987, an informal group, headed by Roger Herriot, senior advisor to William P. Butz, associate director for Demographic Fields, began to explore modifications to the decennial census that included: separating the long (sample) form from the short-form data collection effort; collecting sample data on an ongoing basis throughout the decade; and providing subnational data between censuses.¹²²

¹¹⁹ Ibid., pp. 77–81.

¹²² Roger Herriot, David V. Bateman, and William F McCarthy, “Oral Presentation Notes,” n.d. [spring 1988], in Sheree W. Alston, “Discussions of the Future of the Decennial Census,” October 14, 1988. Bateman and McCarthy were among the Census Bureau’s experts whom Roger Herriot persuaded to lend their talents to the development of the Integrated System of Area Statistics. See also, Roger Herriot, David V. Bateman, and William F. McCarthy, “ISAS—Integrated System of Area Statistics—A New Approach for Meeting the Nation’s Needs for Sub-National Data,” unpublished paper, May 3, 1988.

¹¹⁹ Peter A. Bounpane, “A Sample Census: A Valid Alternative to a Complete Count Census?” in the Proceedings of the 46th Session of the International Statistical Institute, held in Tokyo, Japan, in August 1987, Booklet of Invited Papers, pp. 71–87.

¹²⁰ Ibid., pp. 73–75.

According to Butz, Herriot had a flair for imaginative, innovative thinking, and Butz gave him broad latitude to investigate important problems that might produce significant benefits for the Census Bureau in the long run.¹²³ Butz added that Herriot also had an uncanny ability to persuade or inspire “people who were supposed to be working for someone else to work informally for him instead.” One Census Bureau division chief told Butz that “Roger goes up and down the hall getting Pop[ulation] Division people to work on his stuff. (But don’t worry, I can handle it.)” With more than a hint of exasperation, another division chief reported, “It says here on the Division roster that Bob Fay [a highly regarded applied statistician] is working for me, but as nearly as I can tell, he’s really working for Herriot.” A third division chief turned down a request for the assistance of three of his managers on a project with the comment, “They’re working on that idea of Herriot’s.”¹²⁴

The second team was headed by Bruce Johnson, chief of the 21st Century Decennial Census Planning Staff. The Census Bureau’s Director John G. Keane tried to establish this planning staff in the spring of 1987. He recommended that it “report directly to the Census Bureau Deputy Director,” C. Louis Kincannon, because the unit had to be “free to pursue very new ideas.” In asking Kincannon to create this staff, Keane noted that, “Were the group to report to any associate director, none has the overall organizational perspective and responsibility equaling the Deputy Director’s.”¹²⁵ Keane’s vision for the new census planning staff was quite broad—“No area which offers promise of improving our population census-taking should be closed to the group. Indeed the group needs to address all the major aspects of the census-taking environment and then of the census-taking itself . . . ” Keane wanted to establish the decennial census planning staff by July 1987 and hoped to have

a staff of about 20 people working on it within a year or two.¹²⁶

Kincannon discussed offering Johnson the position as head of the planning staff as early as March 1987.¹²⁷ However, the Department of Commerce expressed some reservations over the responsibilities of the new staff and its position in the Census Bureau’s organization.¹²⁸ The position was approved and offered to Johnson in the spring of 1988. Johnson accepted the appointment. Kincannon’s marching orders for Johnson included a mandate to examine approaches that could “simplify the basic decennial census and concentrate on constitutionally related requirements,” and “expand and make more-timely subnational demographic and housing data collected outside of the basic decennial census.”¹²⁹

For several months, these two teams appear to have worked independently of one another.¹³⁰ Butz kept his boss, Kincannon, generally aware of the progress Herriot’s informal group was making.¹³¹ Meanwhile, Kincannon may have paid more attention to Johnson’s reports on the expanding activities of the 21st Century Planning Staff. However, as time passed, Herriot and Johnson became increasingly aware of each other’s work, particularly their shared interest in developing alternative concepts of the decennial census, such as a short-form-only census coupled with an intercensal rolling sample for collecting sample data. In late spring 1988, the Census Bureau’s executive staff held a one day offsite meeting to discuss the future of the decennial census, focusing on Herriot’s proposal for an Integrated System of Area Statistics. Senior staff may have concluded that the time had come for the two groups to work more closely together to develop a more unified plan. Members of

¹²³ William P. Butz, “Out of the Box: Again and Again: Roger Herriot at the Census Bureau,” Proceedings of the American Statistical Association, Government Statistics Section, 1995, pp. 71-76. See especially, “Table 1, Roger Herriot’s Major Innovations,” p. 75. Email from William P. Butz to David M. Pemberton, November 3, 2010.

¹²⁴ William P. Butz, “Out of the Box: Again and Again: Roger Herriot at the Census Bureau,” Proceedings of the American Statistical Association, Government Statistics Section, 1995, p. 73.

¹²⁵ Memorandum from Jack Keane to Louis Kincannon, “21st Century Decennial Census Study Group,” March 20, 1987. Prior to his appointment as head of the Census Bureau, Keane had been an expert in strategic planning. Long-range planning for future decennial censuses was one of the functions that Keane wanted to institutionalize.

¹²⁶ Memorandum from Jack Keane to Louis Kincannon, “21st Century Decennial Census Study Group,” March 20, 1987. In this memo, Keane summarized 11 topics and trends the planning staff should examine, including technological advances, organizational structure, census marketing, alternative data collection procedures, legal issues, questionnaire content, and residence rules.

¹²⁷ Letter from Bruce Johnson to C. Louis Kincannon, March 27, 1987.

¹²⁸ Memorandum from Kay Bulow, assistant secretary [of Commerce] for Administration to John G. Keane, “Staffing of 21st Century Decennial Census Planning Staff,” December 28, 1987. Until these issues were resolved, Bulow asked Keane to “put all recruiting and hiring actions affecting this Staff on hold.”

¹²⁹ Bruce Johnson, Roger Herriot, and Sandra Rowland, “Directions for the Future of the U.S. Decennial Census in the 21st Century,” Proceedings of the American Statistical Association, Social Statistics Section, 1989, pp. 339-344. Sandra Rowland was one of the first people Johnson hired after his selection as chief of the 21st Century Decennial Census Planning Staff.

¹³⁰ Email from Bruce Johnson to David M. Pemberton, November 14, 2010.

¹³¹ Interview with C. Louis Kincannon, December 8, 2010.

both teams attended the meeting, and a member of Johnson's staff prepared a report summarizing the meeting's activities.¹³²

Since Herriot was the leader of one group and a sometime collaborator with the second, it is not surprising that the proposals the two teams generated shared several components:

- Decoupling the sample (long-form) questionnaire from the decennial census and distributing the collection of sample data across the intercensal period.
- Collecting data more frequently and releasing estimates of the population, housing, and characteristics of areas with large populations more often.
- Producing intercensal survey data for smaller areas.
- Expanding the population estimates program and initiating more timely release of intercensal data gleaned from administrative records.

A SHORTER DECENTNIAL CENSUS

Census Bureau officials were well aware that collecting sample data during the census added operational difficulties and increased cost. Separating sample data collection from the mandatory questions needed for reapportionment and redistricting was an attractive option to those who were reconceptualizing the census.

Both the Herriot and Johnson groups proposed resolving the apportionment issue by conducting a shorter decennial census, to be taken in years ending in "0." This census would still include the entire population of the United States and all housing units and group quarters. A reduced set of short-form data (e.g., age, race, Hispanic origin, sex) would be collected from the residents of each living quarters. It would also include limited housing unit data (e.g., vacancy status, units in structure, and tenure). With only a few questions on the census form, the array of data products would be limited. In addition to the redistricting and reapportionment data, simple cross-tabulations of age, race, and sex would be made available for a wide variety of geographic areas.¹³³

¹³² Sheree W. Alston, "Discussions on the Future of the Decennial Census," October 14, 1988.

¹³³ Herriot, Bateman, and McCarthy, "ISAS," pp. 9-10; Bruce Johnson, Roger Herriot, and Sandra Rowland, "Directions for the Future of the U.S. Decennial Census in the 21st Century," in Proceedings of the American Statistical Association, Social Statistics Section, 1989, pp. 339-344.

To replace the data gathered by the decennial census long form, Herriot, Bateman, and McCarthy suggested introducing a new survey that would consist of rolling samples and would provide data for states, MSAs, and areas with a population of 50,000 or more on an ongoing basis with a new sample coming online each month.¹³⁴ They proposed a core set of questions supplemented by a number of demographic and housing modules that would vary over the decade. Data collection would include a telephone survey and a personal visit survey, with the latter serving as a vehicle for including households without telephones. The sample size would be about 200,000 per month, 2.5 million annually, and about 25 million per decade. A sample this size would produce reliable data for larger areas (i.e., states and larger MSAs) on a monthly or quarterly basis. Reliable annual estimates could also be calculated for population groups of 50,000 or more.¹³⁵

Johnson, Herriot, and Rowland proposed implementing one or more sampling procedures between censuses to collect the more detailed demographic and housing information lost when the long form was separated from the simple census. They presented three sampling options and emphasized that these alternatives were not mutually exclusive.

The first option would be for the Census Bureau to collect a mid-decade national sample census. Since the Census Bureau was already authorized to conduct a mid-decade census (refer to the "Mid-Decade Census Bill Becomes Law" section), this survey could be substituted as a way to collect tract-level data at lower cost than with a complete census.¹³⁶

A second option was to apply a modified version of the rolling sample concept devised by Leslie Kish, discussed earlier in this chapter. In this version of the concept, contiguous states would be sampled in groups of roughly six states per year with new samples selected from those states each month. The sampling rate would be about 20 percent of all housing units. Demographic and housing data would be cumulated annually for states, counties, cities, governmental units, tracts, and other small areas. Each state would fall into the sample once every 10 years. Questionnaire content would be similar to that found on the census long form. Telephone interviewing would be the primary data collection methodology.

¹³⁴ This new survey would be based on Leslie Kish's work on rolling samples described above.

¹³⁵ Herriot, Bateman, and McCarthy, "ISAS," pp. 4-5.

¹³⁶ Johnson, Herriot, and Rowland, pp. 341-342.

As with the mid-decade sample census, the rolling sample would require reliable population estimates to serve as weighting controls. Data for different groups of states would not be directly comparable because the data would be collected at different times.¹³⁷

The third sampling alternative was a large-scale monthly survey that would include all geographic areas containing at least 100,000 people and produce annual estimates of population size, the number of housing unit, and their characteristics. Data collection would consist of telephone interviews and personal visits. The results would be cumulated over the course of a year to achieve the needed sample size. This alternative would produce comparable statistics for states, MSAs, and cities of 100,000 or more people but would not supply small-area data. Questionnaire content would be determined after extensive consultation with data users. The samples would be nonoverlapping, with a group of core questions supplemented by subsamples containing differing inquiries.¹³⁸

INTERCENSAL DATA FOR SMALL AREAS

Herriot, Bateman, and McCarthy suggested collecting and publishing tract statistics for a different group of MSAs annually during years "2" through "9" each decade. They grouped the nation's MSAs into eight sets of approximately equal sample size and proposed to interview one set per year for 8 years. The data for each tract would be updated once per decade and would be considerably less extensive than that collected for larger areas. They maintained that the primary use of tract data was to compare different tracts within MSAs rather than among them. Their approach emphasized collecting all the tract data within an MSA at one time, while leaving MSAs in other parts of the country for later data collection.¹³⁹

A second component of the group's small-area data program consisted of collecting data on small governmental units with populations of less than 50,000 people and possibly, nonhousehold populations (residents of group quarters such as college dormitories, correctional institutions, nursing homes, and military quarters). Data collection would take place once per decade during the year following the census. It would focus on small towns and rural areas of 2,500 or fewer people and would consist of

a sample of approximately 4.6 million households. Most of the interviews would be done by telephone. Questionnaire content would be mainly determined by the requirements of federal and state programs for small areas.¹⁴⁰

The Johnson, Herriot, and Rowland proposal for small-area data was incorporated into the group's plan for one or more intercensal surveys described above.

EXPANDING THE POPULATION ESTIMATES PROGRAM

In the late 1980s, the Census Bureau's population estimates program calculated monthly national estimates for age, sex, race, and Hispanic origin. Annual estimates of state and county populations by age and sex were also produced. The estimates program also generated total population estimates for approximately 36,000 governmental units every other year.

As part of its overall program for a reengineered census, the Herriot group proposed modest changes to the estimates program. The program would continue to provide state and county population estimates annually and update estimates for all governmental units every other year, but it would rely on administrative records to update the components of change. The group hoped that factoring in data from the new large-scale survey described above would bring about improved estimation. The estimates program could also be used in the weighting process for the new large survey to reduce coverage bias.¹⁴¹

The group composed of Johnson, Herriot, and Rowland, among others, urged a more extensive expansion of the estimates program than the group originally organized by Herriot had suggested. A key element in the Johnson group's proposal focused on reducing the time lag between the reference date of the population estimates and the dates the estimates were released. These lags varied from 1 to 2 months for the national estimates to 12 to 15 months for the county and governmental unit estimates. The expanded estimates program would require monthly population estimates for states and annual estimates for substate areas. They recommended a lag time for producing the estimates of no more than 6 months and concurrently upgrading the agency's computer systems to process the greater volume of

¹³⁷ Johnson, Herriot, and Rowland, p. 342.

¹³⁸ Johnson, Herriot, and Rowland, p. 342.

¹³⁹ Herriot, Bateman, and McCarthy, "ISAS," pp. 6-7.

¹⁴⁰ Herriot, Bateman, and McCarthy, "ISAS," p. 8.

¹⁴¹ Herriot, Bateman, and McCarthy, "ISAS," p. 10.

administrative records that would be required to produce the more frequent estimates. Methodological innovations would also be needed to extend the estimates program to small geographic areas.¹⁴²

DIFFERENCES BETWEEN THE TWO PROPOSALS

With one exception, the differences between the two groups' proposals were relatively minor. The Herriot group's initial proposal for an Integrated System of Area Statistics (ISAS) relied on the address list the Census Bureau compiled prior to taking the decennial census. During the census, enumerators updated the address list as they collected information from nonrespondents. The revised version, entitled the Decade Census Program, pointed out the importance of maintaining the Census Bureau's address list throughout the decade to serve as the base from which ongoing survey samples would be selected.¹⁴³

CENSUS BUREAU REVIEWS OF THE PROPOSALS

According to Associate Director Butz, Herriot was aware of many of his proposal's strong points but felt he needed a thorough understanding of its weaknesses—both to try to resolve some of them and to be fully aware of the scope of future work.¹⁴⁴ He realized his ideas needed a critique from people knowledgeable about the various elements of census and survey-taking. Herriot suggested the names of a number of Census Bureau experts and managers as candidates for a review panel. He and Butz reviewed the proposed membership list, and Butz appointed the members of the Demographic Area Committee.¹⁴⁵

If Herriot wanted a thorough critique of the ISAS proposal, the Demographic Area Committee did not disappoint him.¹⁴⁶ The committee identified several problem areas that members felt should be addressed in future revisions:

¹⁴² Johnson, Herriot, and Rowland, p. 342.

¹⁴³ Roger Herriot, David V. Bateman, and William F. McCarthy, "The Decade Census Program—A New Approach for Meeting the Nation's Needs for Sub-National Data," Sept. 27, 1988 (draft); published in the Proceedings of the American Statistical Association, Social Statistics Section, 1989, pp. 351–355.

¹⁴⁴ Email from William P. Butz to David M. Pemberton, November 3, 2010.

¹⁴⁵ Email from William P. Butz to David M. Pemberton, November 3, 2010.

¹⁴⁶ The Demographic Area Committee to review the proposal consisted of Charles Alexander, Richard Blass, David Chapman, Arthur Dukakis, Lawrence Ernst, William Hill, Lawrence Long, Dawn Nelson, Leonard Norry, Paula Schneider, and Preston J. Waite (chair), "Report of the Demographic Area Committee to Critique ISAS," September 2, 1988.

- The cost of implementing ISAS in its entirety might well exceed the whole decennial census budget. Committee members suggested that budgetary cutbacks in any given year were likely to lead to difficult short-term trade-offs, including possible reductions in sample size, elimination of some questions, or other undesirable compromises.¹⁴⁷
- Reviewers feared that ISAS might engender conflicts with other government agencies, notably with the OMB, because OMB would see multiple Census Bureau operations taking place simultaneously (ISAS, CPS, the American Housing Survey, the Consumer Expenditure Survey, and others) and demand that some of these data collection efforts be combined. The reviewers argued that the Census Bureau would find itself in the unpleasant position of trying to mediate between OMB and other government agencies that feared the integrity of their surveys might be compromised if the Census Bureau acceded to OMB's requests.¹⁴⁸
- Collecting census-type information for groups of states, metropolitan areas, and cities in different years over the decade would pose another set of problems. Since these data would be used to distribute billions of dollars in federal and state aid and expenditures, the reviewers suggested that some jurisdictions were likely to complain that their labor force data and other characteristics were collected at the peak of the business cycle while other areas' data were collected at less prosperous times. Presumably, the top of the business cycle would represent the most prosperous period for any given area; jurisdictions whose data were collected during the trough of the business cycle would probably display more negative economic statistics, making them eligible for more federal and state spending. Changes in the year data were collected from one area to another could result in an unfair distribution of federal and state monies.¹⁴⁹
- Committee members were concerned that ISAS did not fully address the increasing demand for small-area data by business, government, and planners of all kinds. Instead, it focused on providing annual data for large areas (e.g., states, metropolitan areas, and places containing populations of at least 50,000 people) while relegating

¹⁴⁷ "Report of the Demographic Area Committee," pp. 2–3.

¹⁴⁸ "Report of the Demographic Area Committee," p. 3.

¹⁴⁹ "Report of the Demographic Area Committee," pp. 3–4.

small towns, tracts, and user-defined areas to data releases appearing once or twice per decade.¹⁵⁰

The committee pointed out that implementing ISAS presented potential problems for internal Census Bureau data users. The ISAS proposal included a reduced set of questions for the intercensal sample used to produce small-area statistics. The loss of data on residence 5 years ago, place or country of birth, citizenship, and year of immigration constituted a particular problem for the estimates and projections program. While ISAS would provide more frequent survey data on migration, it would do so at the cost of a comprehensive, simultaneous set of migration data for all parts of the country, which was used for standardization and controls. Similarly, since ISAS was designed to provide only minimal data at the block level, it could restrict the content of the TIGER database. The loss of data in the proposed ISAS would also affect a number of current surveys because some of the information used to design efficient samples would no longer be available from the census.¹⁵¹

Johnson's 21st Century Decennial Census Planning Staff also reviewed the proposed ISAS, but its evaluation was not as one-sided as that of the Demographic Area Committee.¹⁵² In addition to noting many of the same drawbacks the latter group found, the Johnson's staff summarized a number of strong points:

- ISAS would provide new intercensal data to the federal statistical community and result in faster delivery of decennial census information to external data users (because of the smaller number of variables to be tabulated).¹⁵³
- ISAS could produce improvements in data quality because the intercensal components would probably allow the Census Bureau to hire full-time interviewers to administer the questionnaires. This would also spread some of the peak demand for interviewers from the census year (years ending in "0") across the period between censuses.¹⁵⁴
- The use of computer-assisted telephone interviewing (CATI) would allow for the more efficient use of data processing technology by reducing the time and equipment needed for data capture of paper

questionnaires. The presence of CATI facilities in each region would also reduce the time needed for telephone follow-up during the decennial census. CATI technology is particularly compatible with administering rolling sample surveys because the equipment will be used over the intercensal period rather than only in the decennial census year. Ongoing use of CATI facilities could reduce interviewer variance and improve retention rates.¹⁵⁵

- Response rates during the decennial census may increase because there will be no long form to administer. Respondent burden would be reduced during the census but increased by the intercensal surveys, with the result that respondent burden would probably be about the same over the entire decade.¹⁵⁶
- ISAS might be cheaper and more efficient than the current decennial census in the long run because the resulting data files would be smaller and easier to manage and update; states and survey sponsors may want to piggyback on ISAS allowing for cost sharing; and the program could reduce funding vulnerability by spreading the cost of census-taking over the entire decade rather than retaining a very large peak expenditure in the decennial census year.¹⁵⁷

Not surprisingly, virtually none of these early suggestions for intercensal collection of detailed sample data was adopted for the American Community Survey without substantial modification. Subsequent chapters will discuss how and why some components of these early proposals were modified and others were rejected. For example, Kish's concept of rolling samples became a crucial component of the American Community Survey, but not the version Herriot and his colleagues described in the late 1980s. However, these pioneering efforts succeeded in jostling the thinking of senior Census Bureau executives. Herriot, Johnson, and their colleagues produced alternatives to the conventional wisdom about census-taking in the United States. Following significant, sometimes harsh, criticism of the high cost of the 1990 Census, coupled with an increase in the undercount, the Census Bureau chose to devote significant resources to reconceptualizing the decennial census along some of the same lines suggested by the Herriot and Johnson teams half a decade earlier.

¹⁵⁰ "Report of the Demographic Area Committee," pp. 4-8.

¹⁵¹ "Report of the Demographic Area Committee," pp. 9-11.

¹⁵² Sheree W. Alston, "Discussions on ISAS as an Alternative to the Decennial Census," September 22, 1988.

¹⁵³ "Discussions on ISAS as an Alternative," p. 2.

¹⁵⁴ "Discussions on ISAS as an Alternative," pp. 2-5.

¹⁵⁵ Ibid., p. 4.

¹⁵⁶ Ibid., pp. 4-5.

¹⁵⁷ Ibid., p. 5.

THE STATUS OF INTERCENSAL DATA COLLECTION PROGRAMS AT THE END OF THE 1980s

Toward the end of the 1980s, a number of ideas that would later become key components of the ACS were circulating throughout the Census Bureau. These included: separating the minimal census data needed for reapportionment and redistricting from the more voluminous data collected on the census sample form, creating a master address file that would be maintained between censuses, adapting rolling samples to the collection and dissemination of intercensal data, and identifying ways to produce small-area data between censuses.

The proposals advanced thus far had been fairly general in nature. While suggesting there were important

linkages among the various elements, these had not been rigorously analyzed. The needs of data users had been acknowledged but not yet solicited in detail. Potential changes in Census Bureau organization, data collection operations, and data capture and processing requirements had been hinted at but not described in detail. Conceptual and methodological issues abounded with regard to sample size and design; modified residence rules; changing from a fixed reference date to reference periods; and in the meaning and use of multiyear, cumulated data on educational attainment, journey to work, and income. In the aftermath of the 1990 Census, the Census Bureau selected Charles Alexander to provide conceptual coherence and technical expertise in putting the continuous measurement program together. That program will be examined in the next chapter.

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Chapter 2. The Emergence of Continuous Measurement

...the demand for statistical information will continue to increase rapidly. This is an inevitable concomitant of the growing size and complexity of a nation in which the interdependence of individuals and institutions is constantly increasing.

—A. Ross Eckler, “The Future of the Bureau,” 1972¹

INTRODUCTION

At the end of the 1980s, U.S. Census Bureau planners, following in the tracks of former Director Ross Eckler (quoted above), envisioned ways of meeting demand for more data and a more frequent release of such data. The challenges of that demand included rising costs, tighter budgets, and an insistence that Census Bureau officials lower the burden on respondents. In conjunction with the development of these plans, cost overruns and the undercount in the 1990 Census generated external support and funding needed to pursue new data collection methods.

The planners reshaped elements from the Decade Census Program along with Leslie Kish’s proposals on rolling sample surveys into a design for a Continuous Measurement System.² Under this proposed system, the Census Bureau would no longer collect detailed demographic, financial, educational, housing, and employment data during the decennial census on a long-form questionnaire sent to a sample of households. In place of the long form, the new system would instead collect these data through a continuous sample survey conducted throughout the decade. This decoupling of the collection of detailed data from the enumeration of the population was one of several census design recommendations considered by census planners. Continuous measurement emerged as the preferred alternative census design strategy because it would produce more timely data and had the greatest potential for reducing the overall cost of census-taking. Ongoing data collection activities associated with a continuous survey could also achieve improvements in the quality and completeness of sampling frames for intercensal surveys that formerly benefited only from address updating

activities clustered near the end of the decade, just prior to a decennial census.

In 1995, challenges to the estimates of cost savings arose by the time the Census Bureau prepared to launch tests of the Continuous Measurement Survey.³ Additionally, key stakeholders believed that the Census Bureau had not yet dispelled the fears of some data users that they would lose data if the Census Bureau replaced the decennial’s long-form survey with a Continuous Measurement Survey. Such fears were especially pressing for rural and small governments and small population groups.⁴ In the wake of those fears and as Congress threatened to cut its budget in 1995, the Census Bureau announced it would work towards running both a long-form survey and a continuous measurement instrument in 2000. This chapter covers how the Census Bureau went from an open-ended discussion of an intercensal sample survey as a part of larger census reform to concrete and detailed proposals for a Continuous Measurement Census Test to take place in 1996.

DEVELOPMENT OF SUPPORT FOR REFORM OF COLLECTION OF LONG-FORM DATA: 1989-1993

Need for Change? The Status of Proposals: 1988-1990

As the 1990 Census approached, Census Bureau executives advocated making a major overhaul in decennial data collection methods. This would provide timely community-level data, while also anticipating and heading off long-term problems in the field and reduce budgets. The repeated failure of

³ The General Accounting Office (later renamed Government Accountability Office) and the National Academy of Science’s Committee on National Statistics’ Panel on Census Requirements in the Year 2000 and Beyond made such statements the most prominently. Statement of L. Nye Stevens, director, Planning and Reporting, General Government Division, *Decennial Census: Test Design Proposals Are Promising, But Fundamental Reform Is Still at Risk*, GAO/T-GGD-94-12, October 7, 1993, pp. 5-6; memo from Charles H. Alexander, Demographic Statistical Methods Division to Robert Tortora, associate director for Statistical Design, Methodology, and Standards, “Further Exploration of Issues Raised at the CNSTAT Requirements Panel Meeting,” *Internal Census Bureau Reports*, CM-13, U.S. Census Bureau, Washington, DC, January 31, 1994; and Committee on National Statistics (CNSTSAT), National Research Council, *Modernizing the U.S. Census*, National Academy Press, Washington, DC, 1995, pp. 126-131.

⁴ As detailed later in this chapter, metropolitan planners, rural advocates, and officials from small local governments lobbied Congress on behalf of keeping the decennial long form. So did the CNSTAT panels evaluating the Census Bureau’s plans for the 2000 Census.

¹ A. Ross Eckler, “The Future of the Bureau,” Chapter V of *The Bureau of the Census*, New York, Praeger Publishers, 1972, p. 208.

² These are described in Chapter 1. Refer to “Cumulative Rolling Samples: An Alternative to a Mid-Decade Census?”

mid-decade census proposals to find funding, most recently in 1986, left the Census Bureau looking for alternative vehicles to deliver such data to the public. Deputy Director C. Louis Kincannon hired Bruce Johnson to build the 21st Century Decennial Census Planning Staff (21st Century Staff) to do strategic planning. From 1988 to 1990, this team investigated ways to provide more intercensal data and investigate problems that would likely plague traditional methods of census data collection.⁵ For example, staff members analyzed how response rates had fallen for household surveys and predicted that trend might afflict the 1990 Census. They also noted the Census Bureau had trouble recruiting enough enumerators for its 1988 prelist operations and predicted that the 1990 Census would have similar difficulty.⁶ The 21st Century Staff in 1988–1989 conducted surveys of senior Census Bureau staff and held several off-site daylong meetings of Census Bureau executives and other personnel, pulling together their ideas for change.⁷ Finding widespread, though not universal, support within the Census Bureau for restructuring the decennial, some staff prepared to move forward with testing and evaluations of proposals.

One of the proposals the 21st Century Staff evaluated was put forward by Roger Herriot, David Bateman, and William McCarthy. From 1988–1990, Herriot was working at the Census Bureau as a senior adviser to William Butz, the associate director for Demographic Programs. Herriot persuaded Bateman and McCarthy, two Census Bureau experts, to help him develop ideas for new data collection methods. Their proposal called for establishing a Decade Census Program (DCP)⁸ that would replace the decennial census's long-form sample with a set of intercensal surveys. The proposed system broke new ground by using data primarily collected from monthly telephone surveys in place of the decennial census's millions of mailed sample questionnaires that collected data based on census day. The idea was also novel in

⁵ Memorandum from Jack Keane to Louis Kincannon, "21st Century Decennial Census Study Group," March 20, 1987.

⁶ The prelist operation was where the Census Bureau sent enumerators to canvass geographic areas where it lacked address ranges and had them compile a residential address mailing file for the area along with the geocodes for addresses. Bruce Johnson, Roger Herriot, and Sandra Rowland, "Directions for the Future of the U.S. Decennial Census in the 21st Century," Proceedings of the American Statistical Association, Social Statistics Section, 1989, p. 16.

⁷ 21st Century Decennial Planning Staff, "Overview of Issues and Research Needs," n.d., but after November 1988, pp. 8–9 and 21st Century Decennial Planning Staff, "Questionnaire," September 1988, pp. 8–12.

⁸ The DCP was originally named the Integrated System of Area Statistics.

that its surveys would employ computer-assisted telephone interviewing (CATI) in an era before the Census Bureau's household surveys used such technology as their first means of contact. In addition, the DCP called for the Census Bureau to survey one group of states each year then move to a different group of states the next year until it had "rolled" across the entire nation over the course of the decade. By this means, it would generate tract-level data once each decade for any given metropolitan statistical area (MSA).

The agency would provide small-area estimates for population and housing characteristics for a different group of states and MSAs each year. The DCP also proposed a second survey to provide estimates annually for the total populations of all states and large areas, such as regions and MSAs.⁹ These estimates would include only a core set of characteristics previously covered by the census long form and provide several benefits for the decennial census. This reduction in the number of questions asked would lower the response burden on those being interviewed.¹⁰ It also would reduce the time needed to tabulate and publish data, an improvement over the release of tract data from the 1980 Census 3 years after it was collected.

Some other proposals for increasing intercensal data collection or overhauling the decennial census had long-standing support and continued to find backers within the agency. For example, former Census Bureau Director A. Ross Eckler's book, *The Future of the Bureau*, recommended shortening the decennial

⁹ Herriot and his colleagues thought they could reduce the questionnaire content because they believed that only a core set of 12–15 content items were needed at the small domain or tract level for federal programs. Roger Herriot, David V. Bateman, and William F. McCarthy, "The Decade Census Program—A New Approach for Meeting the Nation's Needs for Sub-National Data," September 27, 1988, pp. 4, Appendix 1, 3, 6–7. For the state of the Census Bureau's use of telephone interviews see Ramula Basu, "A Monograph on CASIC," January 1997, pp. 3–6. For the Census Bureau's release of small-area data from the 1980 Census see Census Bureau, *1980 Census of Population and Housing History*, Chapter 8, pp. 8–69 to 8–77. Herriot and his coauthors had said in an earlier version of the proposal that at best, decennial census data were 2 years old when released, but averaged 7 years old. Roger Herriot, David V. Bateman, and William F. McCarthy, "Oral Presentation Notes on ISAS—Integrated System of Area Statistics—A New Approach for Meeting the Nation's Needs for Sub-National Data," May 3, 1988 in Sheree Alston, principal reporter, "Discussions on the Future of the Decennial Census," 21st Century Decennial Planning Staff paper presented to the Technical Advisory Committees, October 14, 1988, p. 60.

The specifics of the Decade Census Program are set out in greater detail in Chapter 1. Refer to Chapter 1 section titled "Introduce a New, Large-Scale Survey to Collect Detailed Data."

¹⁰ Response burden refers to the efforts or perceived efforts of respondents in answering surveys, such as providing time and personal information.

questionnaires and using the resulting cost savings to run annual sample surveys or a mid-decade census.¹¹ In the late 1970s, both the Census Bureau and the U.S. Commerce Department recommended that the Census Bureau meet intercensal data needs with a mid-decade sample census.¹² By the late 1980s, the Bureau of Labor Statistics and the Census Bureau put forward plans to provide intercensal and state-level data via an expanded Current Population Survey.¹³ The 21st Century Staff, a combination of senior and mid-level census staff assembled to plan for the 2000 Census and beyond, encountered agency personnel advocating each of these alternatives to the DCP in the Census Bureau off-site meetings in 1988–1989.¹⁴

Supporters of the DCP had to contend with a wide array of Census Bureau concerns about the feasibility and advisability of implementing the proposed program. Within weeks of DCP's unveiling, a committee of statisticians and supervisors from within the Census Bureau brainstormed all the problems likely to arise if it was implemented. The committee, called

¹¹ Eckler, p. 212.

¹² Census Bureau and Office of Federal Statistical Policy and Standards, "Mid-decade Program Assessment," September 28, 1979, p. 2, attachment to Secretary of Commerce to the Honorable James T. McIntyre, Jr., director of the Office of Management and Budget, n.d. but cleared for transmittal June 30, 1980.

¹³ Alan R. Tupek and Preston J. Waite, "Sample Expansion Plans for the Current Population Survey," Paper presented at the Joint Statistical Meetings, August 1990, pp. 71–77.

¹⁴ When the 21st Century Staff polled Census Bureau executives and senior staff on Herriot's proposal and other ideas for overhauling the decennial census, they found a split opinion. An October 1988 questionnaire asked them about the DCP and the three options noted above. It also queried them about other options including: replacing decennial enumeration with sampling for the count; expanding the Current Population Survey (CPS) to replace parts of the decennial census; and using administrative records instead of censuses or surveys to collect some data. The 21st Century Planning Staff found that 84 percent of senior Census Bureau staff favored further research on the DCP. The questionnaire also asked respondents how strongly they agreed with the statement that "the DCP would facilitate the success of the decennial census." The DCP averaged 5.7, where a score of 7 indicated "strong agreement" and 1 indicated "strong disagreement" with that statement. The questionnaire treated the DCP separately from other proposals and found support for each. When the 21st Century Staff asked senior staff to rank proposals other than the DCP, the mid-decade sample census tied for first along with cutting the decennial questionnaire to 10–14 questions. A full census done mid-decade came in third. A vast majority of Census Bureau management favored the generalized notion of changing the methods of collecting or processing decennial census data. However, support declined for specific major changes such as shifting the long-form questions to intercensal surveys. On average, respondents were neutral when asked if that proposal would "facilitate the success of the decennial census." One respondent commented that the decennial census might be overly complex, but it still provided the baseline for intercensal surveys. 21st Century Decennial Planning Staff, "Overview of Issues and Research Needs," n.d., pp. 1–2, 8–9, but after November 1988, pp. 8–9; 21st Century Decennial Planning Staff, "Questionnaire," September 1988, pp. 8–12; and Sheree Alston, principal reporter, "Discussions on the Future of the Decennial Census," 21st Century Decennial Planning Staff paper presented to the Technical Advisory Committees, October 14, 1988, p. 23.

the Demographic Area Committee to Critique the DCP, identified potential problems including likely opposition from officials from MSAs and states whose jurisdictions were not included in the sample and estimates in a given year. Those committee members suggested that the cost of the DCP that Herriot had calculated to be \$1.8 billion likely would be higher, perhaps far higher, than conducting the census long-form survey.¹⁵ In addition, the Demographic Area Committee suggested that budgets for the program could be cut in succeeding years, destroying its ability to deliver estimates based on cumulated samples. Some of the evaluators even remarked that deep cuts could doom the agency's ability to provide estimates for new sets of MSAs and states of a quality comparable to those it had already provided to previously sampled groups of states.¹⁶

At the end of 1988, Census Bureau executives prepared to make a decision on whether to pursue funding for a major research and development project. Among the alternative data collection methods, the DCP was the most developed and had received the most discussion. The 21st Century Staff singled out the DCP and asked the executives to come to a consensus on whether they found it promising enough to begin consulting "users, oversight groups, and other outside stakeholders." However, based on the results of the survey of senior staff, results from the off-sites, and the Demography Area Committee's critiques, the 21st Century Staff recommended to Census Bureau executives that the Census Bureau move forward with research on several fronts, not just the DCP.¹⁷ The 21st Century Staff noted that research projects should begin by concentrating on elements common to all the proposals, such as ways to update the master address list.¹⁸ The associate director in charge of decennial operations felt the same way, and said that the Census Bureau ought to proceed with research on sampling methods. This method would potentially help several of the suggested designs, ranging from

¹⁵ Charles Alexander et. al, "Report of the Demographic Area Committee to Critique the Proposed DCP," September 30, 1988, pp. 6–7, 16–17. The Demographic Area Committee did not supply a cost estimate for the long form. Herriot, Bateman, and McCarthy, "The Decade Census Program," pp. 19–20.

¹⁶ Charles Alexander et al, "Report of the Demographic Area Committee to Critique the Proposed DCP," September 30, 1988, pp. 5–7. The committee's concerns with the Decade Census Program are set out in greater detail in Chapter 1, "Census Bureau Reviews of the Proposals."

¹⁷ Bruce Johnson to Executive Staff, memorandum, October 28, 1988, pp. 1–2.

¹⁸ 21st Century Staff, "Overview and Issues," p. 4.

sampling for nonresponse follow-up and the DCP to a sample-only census.¹⁹

Executives and senior staff of the Census Bureau scheduled a December 1988 off-site meeting to consider plans for the future of the agency's decennial efforts. In advance of this meeting, the 21st Century Staff sent every Census Bureau executive a binder with the DCP proposal, the committee's critique, and the staff's analysis of the focus groups and survey.²⁰ Accompanying that binder, supporters of the DCP circulated a proposal for a DCP pilot study and plan. It called for testing to begin in selected areas from 1991–1995. Under this plan, the DCP system could be fully operational nationwide by 1995.²¹

However, Bruce Johnson, head of the 21st Century Staff, floated a counterproposal arguing that the mid-decade sample census solved the DCP's equity problems between states and thus required less research. Referring to cost estimates that showed the DCP or other intercensal data collection increasing Census Bureau spending and mindful of federally mandated spending caps, Johnson proposed a major departure for the decennial census. Johnson proposed requiring states, local governments, and other federal agencies to pay for a large share of the data collection and reporting.²²

While Johnson was sending out his idea to add a mid-decade sample modification to the DCP, Charles (Chip) Alexander drew up a brand new alternative. In 1988, Alexander had worked as a senior mathematical statistician and branch chief within the Statistical Methods Division.²³ He had also served as the editor of the Demographic Area Committee's critique of the DCP prior to writing an alternative to it. He said his new plan was a compilation of ideas from the committee's members, showing that its concepts extended beyond himself or his division.

¹⁹ Charles Jones to C. L. Kincannon, "Year 2000 Planning," memorandum, February 9, 1989, p. 2.

²⁰ 21st Century Staff, "Overview of Issues and Research Needs," pp. 8–9.

²¹ 21st Century Staff, "Overview of Issues and Research Needs," pp. 8–9.

²² Bruce Johnson to "the File," "Possible Revisions to the Decade Census Program," memorandum, October 28, 1998, pp. 1–4. The memo was included in with the blue binder of reports sent to everyone attending the December 8, 1988, off-site meeting. In the memo, Johnson did not directly refer to the Gramm-Rudman-Hollings Act spending caps and mandatory budget reductions for each federal agency, but he did in a 1990 report, *Census Bureau, Deep Currents: The Case for Change*, U.S. Department of Commerce, February 1990.

²³ Later renamed Demographic Statistical Methods Division [DSMD].

Alexander's alternative likely circulated only among experts in the Census Bureau at the time but would have huge ramifications within a couple of years.²⁴ He recommended making the rolling sample survey national. Like Johnson, Alexander thought the DCP's sampling of one set of states each year was untenable. In Alexander's plan, the Census Bureau would survey one-ninth of the blocks or tracts in every county or MSA each year. The Census Bureau would use survey results to make estimates for those blocks surveyed. The Census Bureau would make small-area, model-based projections for all blocks not sampled that year based on the estimates from similar blocks in the sample, changes in the master address list for the block in question, and the most recent population data for the block from a short-form only decennial. From the estimates and the model-based projections, the Census Bureau would create census tract-level data and some preliminary estimates for larger geographic areas. In its 1988 incarnation, Alexander's plan would not entail multiyear estimates.^{25, 26} In a 1990–1991 revision, he stated why by explaining that small-area data users would neither understand nor accept such estimates.²⁷ Estimates for counties and MSAs would not rely on projections but would aggregate from survey results. While doing survey work in the field, interviewers also could spot demolished buildings or potential problem areas for the Census Bureau's proposed master address list. In blocks where interviewers spotted major new construction or demolished buildings or where building permits or postal service records showed major changes, the Census Bureau would do extra sampling. Alexander sent his original idea just to his supervisor, Preston J. Waite (then serving as chief of the Statistical Methods Division), members of the Demographic Areas Committee, the authors of the DCP, and Bruce Johnson.²⁸ Alexander saw his plan's advantages over the DCP as making better use of the continuously updated address list, creating model-based

²⁴ Alexander's memo outlining his proposal was addressed to only a handful of people, but one of Alexander's contemporaries says it was the topic of many conversations around the Census Bureau. Cynthia Taeuber, email message to author, July 31, 2011.

²⁵ Charles Alexander to Preston Jay Waite, "Possible Modifications of DCP," memorandum, October 31, 1988, pp. 3–4.

²⁶ The American Community Survey currently creates multiyear estimates from data pulled from several annual samples.

²⁷ Charles Alexander to Jay Waite, "Master Structure Address List," memorandum, n.d. circa 1990–1991, p.1. While the memo included no date, Alexander said in 1999 that the fact that it was attached to a 1990 conference agenda made it likely from that year. Alexander's use of the term "master structure address list" dates the memo before 1992 when that term had fallen out of use, replaced by the term "master address file." Charles Alexander correspondence to Census Bureau historian David Pemberton, 1999.

²⁸ Alexander, "Possible Modifications of the DCP," p. 8.

projections every year, as opposed to once a decade, potentially eliminating the need to rehire field staff in different parts of the country each year.²⁹

Parts of Alexander's idea withered away due to a lack of support, while others laid the foundation for what became the Continuous Measurement Alternative Design for the 2000 Census. In 1988, even Alexander expressed reservations with parts of his modification. In particular, he thought research on model-based projections might not have advanced enough to provide single-year projections for every small area by 2001. In contrast, the following ideas, all departures from the DCP, formed the backbone of later proposals for a Continuous Measurement System:

- Spreading the sample nationwide.
- Using field staff to update the master address list in addition to automated updating from postal service address files, building permits, utility company hookups, etc.
- Using the master address list to help provide data used in weighting in creating some estimates, not just as a sample frame for survey samples.
- Having flexibility in methods over time in line with W. Edwards Deming's theory that quality measurement leads to "continuous quality improvement" in the processes measured.³⁰

When Census Bureau executives gathered at the December 1988 off-site meeting, rather than expressing support for additional research on one or more proposals, Acting Director Louis Kincannon declared that the executives had not settled on a single option. Instead, they determined possible directions for how the Census Bureau would approach future decennial censuses. He requested that the executive staff direct a select group of senior staff members and their branches examine and test the potential of several proposed decennial methodologies.³¹ Explaining his intentions, Kincannon wrote to senior Census Bureau staff:

The Census Bureau will seriously consider and explore: (1) ways to simplify the basic decennial census and (2) ways to expand and make more timely

subnational demographic data collected outside the basic decennial census.³²

Kincannon intended that internal and external stakeholders would be asked to weigh in on each method to move long-form sample data collection to intercensal data collection.³³

Census Bureau executives at the off-site directed Johnson and Herriot to collaborate on a brief statement outlining the different proposals in language clear enough for outside stakeholders to understand. In addition, Preston J. Waite was tasked with "formally" laying out the feasibility, timing, and budget requirements of the various intercensal surveys proposed.³⁴ This assignment would figure prominently in all subsequent plans for intercensal data collection as it kept Chip Alexander working on moving data collection from the decennial census to intercensal projects.

During the process of gathering feedback about a possible shift to intercensal data collection within the Census Bureau, the 21st Century Staff uncovered a significant number of concerns. For example, regional directors echoed the Demographic Area Committee on the issue of budgets and questioned whether dropping the long form would lessen the workload of field staff. They argued that the difference in response rates from the 1980 long and short forms had been small, maintaining that "getting in the door," not questionnaire length, was the bigger challenge for enumerators.³⁵ Teams from the Census Bureau later realized that, for the continuous measurement concept to gain acceptance, it would have to address these potential impediments along with testing the feasibility of the proposals for providing timelier census data. The research and testing needed to accomplish this end would take the better part of the 1990s.³⁶

²⁹ C.L. Kincannon, deputy director to Distribution List, "Thank You," memorandum, January 12, 1989. The memo went to all executive staff, all regional directors, the Year Zero Analysis Team, the Demographic Area Committee, and the 21st Century Staff.

³⁰ C.L. Kincannon, deputy director, to the Executive Staff, "Follow Up to Hagerstown Meeting on Future of the Decennial Census," memorandum, December 14, 1988, p. 1.

³¹ Kincannon, "Follow Up to Hagerstown Meeting on Future of the Decennial Census," p. 2.

³⁵ Bruce Johnson to Stanley D. Matchett, "Report on Meetings with Field Regional Directors," memorandum, November 16, 1989, pp. 17-19.

³⁶ Charles Alexander, editor, "Report of the Demographic Area Committee to Critique the Proposed DCP," September 30, 1988.

²⁹ Alexander, "Possible Modifications of DCP," p. 3.

³⁰ Charles Alexander, untitled handwritten notes on creating estimates from the Master Address List, n.d.

³¹ C. Louis Kincannon, deputy director, to the Executive Staff, "Follow Up to Hagerstown Meeting on Future of the Decennial Census," memorandum, December 14, 1988.

Early Feedback From Outside Stakeholders

While teams within the Census Bureau were finding both support and opposition within the agency to making major changes in census methods, the 21st Century Staff encountered enough opposition among external stakeholders to slow implementation. Throughout 1989, the 21st Century branch discussed alternatives to the traditional census with data users throughout the United States and found that most data users saw no need for drastic change from the traditional collection methods.³⁷ More importantly, staffers reported that users felt “threatened”—fearing that the difficulty in designing, funding, and implementing subnational intercensal surveys would result in data being lost.³⁸

Towards the end of the summer of 1989, Bruce Johnson reported to Kincannon that, based on those reactions and the views of the Commerce Department, plans for reform should be slowed. Executives with the Commerce Department and the Office of Management and Budget (OMB) rejected the Census Bureau’s request for funding to evaluate proposals. Johnson recognized that funds for planning the 2000 Census would be “more scarce as the 1990 Census approaches.” In addition, an executive with the Commerce Department, while expressing interest in “profound changes” considered by the December off-site, said he wanted the Census Bureau to prioritize other activities within its budget and evaluate proposals with a small staff and a limited budget at least through 1991.³⁹

In Johnson’s analysis, as Congress, members of President George H. W. Bush’s administration, data users, and the statistical community felt “no sense of an impending crisis,” the Commerce Department felt

no sense of urgency.⁴⁰ Coming out of the December 1988 off-site the goal had been to run a research program with a focus on evaluating and choosing from among 2-3 possible major changes. Given the Commerce Department’s input, Johnson called for a “mid-course correction.” He recommended slowing down full implementation and called for research to evaluate the “profound changes” suggested by the Census Bureau and smaller means of altering traditional census methods such as using optical character recognition. Johnson stated that preliminary research on alternative methods should address elements common to several methods such as telephone interviewing. For the time being, the Census Bureau would treat all the census alternatives, large or small, “as co-equals.”⁴¹

Herriot and his two co-creators of the DCP proposal revised their paper, shepherded it through internal review, and presented their idea for the DCP to the American Statistical Association in August 1989. Unlike the earlier version, this paper included detailed expositions on the major changes put forward in the December off-site, blunting the force of its advocacy of moving forward with the DCP.⁴²

In the ensuing months, the 21st Century Staff fought back against the slow approach, building a broad case for reform by highlighting problems and threats to the traditional means of conducting the decennial census. In February 1990, the 21st Century Staff issued “Deep Currents,” a report highlighting the obstacles the Census Bureau faced in running the decennial census with traditional methods.⁴³ The report cited how local governments, mindful of revenue sharing and appropriations and minority groups seeking recognition, had increasingly challenged

³⁷ The 21st Century Staff presented their work on directions for the future of the Census Bureau at Joint Census Advisory Committee meetings several times 1988–1990. Staff members also presented that work and papers on more specific data collection and processing methods at conferences ranging from the Human Resources Conference, the American Society for Public Administrators, the Joint Statistical Meetings, and the Black Child Development Institute. 21st Century Decennial Planning Staff (TCS), “The RAPP Sheet: Research, Activities, Projects, and Plans,” U.S. Census Bureau, September 1990, p. 1.

³⁸ U.S. Census Bureau, 21st Century Staff, “Deep Currents: The Case for Change,” U.S. Department of Commerce, February 1990, p. 1.

³⁹ Bruce Johnson, chief, 21st Century Staff to C. L. Kincannon, deputy director Census Bureau, “Mid-Course Correction to a Multiple Front Strategy,” memorandum, August 18, 1989, p. 1.

⁴⁰ Johnson, “Mid-Course Correction,” p. 1. Officials at the Commerce Department also called inadequate the Census Bureau’s justification for its budget requests for the 21st Century Staff’s and other year 2000 decennial out-year budget increases. They also asked for clarification of the different roles of the 21st Century Staff and the Decennial Census Directorate. Refer to “FY 1990 Passback Guidance Received from the Department of Commerce,” Appendix A of memo from C. L. Kincannon to Kay Bulow, assistant secretary for Administration of the Commerce Department, “Response to FY 1990 Budget Passback Guidance Information Request,” January 13, 1989.

⁴¹ Johnson, “Mid-Course Correction,” p. 1.

⁴² Roger Herriot, David V. Bateman, and William F. McCarthy, “The Decade Census Program—A New Approach for Meeting the Nation’s Needs for Sub-National Data,” *Proceedings of the American Statistical Association, Social Statistics Section*, 1989. It would appear from these changes that Herriot and his co-authors were pressured to weaken their proposal when executives at the off-site told them to include alternatives to their plan when writing it up for broader circulation.

⁴³ While the layout and wording of “Deep Currents” suggest it was intended for a wider audience, it is not clear how widely it circulated.

numbers they deemed low or inaccurate. It also warned that even if the 1990 Census were a success, "what works in 1990 may not work in the year 2000 or into the 21st century" because of major socioeconomic changes. Future possible obstacles included:

- Growing demand for data on small areas and small population groups.
- Difficulty recruiting enumerators.
- Falling response rates.
- Budget cuts despite rising costs.⁴⁴

The 21st Century Staff concluded its argument about the societal and economic pressures facing the decennial census by challenging detractors to counter argue which trends would mitigate those pressures.

Reaction to the 1990 Census

Census Bureau supporters of alternative designs for census taking gained ground in the wake of what was viewed as a less than satisfactory 1990 Census. When skeptics within the Census Bureau, users, and external decision-makers saw the statistical and fiscal results of this census, some became more receptive to reorganizing the decennial. In this climate, defenders of the traditional methods and the data they delivered faced a threat of lost funding.

At her long-delayed 1990 confirmation hearing, Census Bureau Director Barbara Everett Bryant, signaled that upper management at the Census Bureau believed a major overhaul of census enumeration procedures was needed. Bryant cited the facts that the American public was not as responsive to mail surveys as it had been in 1970 or 1980 and that declines in response rates had boosted the amount of canvassing of nonrespondents in 1990 by 25 percent, more than the Census Bureau had expected. This situation had forced the Census Bureau to seek additional emergency appropriations approved by Congress in order to complete the 1990 Census. While the facts Bryant cited were sobering, her conclusion had an even larger impact. Her comments gave de facto marching orders to all Census Bureau staff, including those reluctant or skeptical of plans offered so far. Bryant said in that hearing that she would make major reform of the census her

priority during her tenure and called for "fundamental rethinking."⁴⁵

Bryant found at least one Congressional figure in harmony with that view. Thomas C. Sawyer, a representative from Ohio who chaired the Congressional committee overseeing censuses, said he "envision[ed] a fundamentally different census in the year 2000." He wanted the decennial to "focus the data collection on the constitutional purpose of the census" and added: "Rolling samples throughout the decade can be used to meet a wide range of the information needs for the purposes of planning, developing, and administering programs."⁴⁶

With those words, Sawyer appeared to invoke Kish and Herriot's ideas. While Sawyer did not mention their research, Census Bureau staff and Daniel Melnick from the Congressional Research Service likely briefed Sawyer and the staff of the census oversight committee on such ideas before that July 1990 hearing.⁴⁷

When mentioning rolling samples in July 1990, Sawyer did not yet bring up a theme from Kish on which Sawyer would later dwell—the imprecision of data from the 10-year headcount. In a 1981 report to Congress, Kish had made Congress aware that many programs used census data that was up to 14 years old. Kish argued that bias due to the obsolescence of decennial census data was "perhaps greater even than the famous biases due to undercoverage."⁴⁸ Melnick had repeated that argument to the Congressional oversight committee in 1987 saying, "Some experts believe that the changes which occur after the census are larger than the differences between the census results and the real situation on census day."⁴⁹

⁴⁵ Senate Committee on Governmental Affairs, *Census Overview and Nomination of Barbara Bryant*, 101st Cong., 2d session, July 13, 1990, pp. 36–38. Testimony of Dr. Barbara Everett Bryant, director, Census Bureau before the Senate as quoted in the GAO, "1990 results show need for fundamental reform," GAO/GGD-92-94, Washington, DC, June 9, 1992 p. 19.

⁴⁶ Testimony of Hon. Tom Sawyer, Senate Committee on Governmental Affairs, "Census overview and nomination of Barbara Bryant," July 13, 1990, p. 14.

⁴⁷ TerriAnn Lowenthal, former chief of staff of Representative Thomas C. Sawyer, interview by author, May 8, 2012. Melnick had worked with Kish to publish Kish's 1981 report on using rolling samples to gather long-form data. Daniel Melnick, "Improving Census Accuracy," a report/prepared by the Congressional Research Service for the Subcommittee on Census and Population of the Committee on Post Office and Civil Service, U.S. House of Representatives, Washington, DC, GPO, 1987.

⁴⁸ Leslie Kish, "Using Cumulated Rolling Samples to Integrate Census and Survey Operations of the Census Bureau: an Analysis, Review, and Response," printed for the use of the Committee on Post Office and Civil Service," GPO, Washington, DC, 1981.

⁴⁹ Melnick, "Improving Census Accuracy," 1987, p. 82.

⁴⁴ Deep Currents, February 1990, p. 1.

The Commerce Department displayed support for major changes in census taking as the first inklings that the undercount had widened became public in 1990. In August 1990, when the Census Bureau released preliminary population and housing figures, dozens of municipalities spoke out, similar to the response to the crisis Bruce Johnson predicted as necessary to nudge outside support for change. Local officials wrote to the Census Bureau, the Commerce Department, and Congressional committees overseeing census operations venting their disagreement with the counts. In many communities, the preliminary counts were lower than Census Bureau estimates published for 1989. Local government officials reacted from the positions "Deep Currents" had ascribed to them, a fact which undoubtedly bolstered its other conclusions. For example, the mayor of Shelby County, Tennessee, wrote to Congress that his county's preliminary undercount would lessen its share of Tennessee state tax revenues by \$3.2 million a year.⁵⁰

Census Advisory Committee Member Eugene Erickson warned Congress in September 1990 that discrepancies in housing figures, particularly in census blocks with more than a 50-percent minority population, indicated that a differential undercount had taken place.⁵¹ One census critic decried how response rates had fallen from the 1980 Census despite the Census Bureau's expenditure of \$2.6 billion on the 1990 Census, a 65-percent increase in constant 1990 dollars over what was spent on the 1980 Census.⁵²

Some of the problems predicted in "Deep Currents" had come to pass, and government agencies answerable for the 1990 Census responded quickly. In November 1990, scarcely 3 months after the initial predictions of an undercount and concurrent criticisms of costs, the Census Bureau and the Commerce Department formed the Task Force for Planning the Year 2000 Census and directed it to engage in an

⁵⁰ Mayor William M. Morris Jr. to Representative Jim Sasser, October 8, 1990, as published in House Subcommittee on Census and Population of the Committee on Post Office and Civil Service and the Senate Subcommittee on Government Information and Regulation of the Committee on Governmental Affairs, "Review Progress of Coverage Evaluation and Adjustment Procedures of the 1990 Census," 102d Cong., 1st sess., March 19, 1991, pp. 22-23.

⁵¹ House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, *1990 Census Coverage Evaluation Operations*, 102d Cong., 1st sess., September 11, 1990.

⁵² GAO, June 9, 1992, p. 24f. The authors of the GAO report used the Census Bureau's figures for the full-cycle cost of the 1980 Census from initial planning through final publications and evaluation and the Census Bureau's 1992 projections for the total full-cycle cost of the 1990 Census. The report did not state how it calculated inflation for 1980 dollars.

open process of evaluating different census designs.⁵³ The task force was to present its findings to both agencies and provide advice on the best features and plans to adopt.⁵⁴

In another development from November 1990, the Commerce Department and the Census Bureau formed the Year 2000 Research and Development Staff (2KS) with the goal of making operational plans out of the 21st Century Staff's broad outlines for reform. Critically, it also received funds from the Commerce Department to begin planning how best to conduct the 2000 Census. Like the work of the 21st Century Planning Staff, these steps were unprecedentedly early. For example, funding for planning for the 1990 Census had begun only in 1984. In creating the Task Force and the 2KS, the Census Bureau and authorizing officials in the Commerce Department acknowledged that the Census Bureau would have to have time to propose, evaluate, and win support for major projects to change census methods.⁵⁵

Whether the Census Bureau would have sufficient funds to start the necessary research remained in doubt until the General Accounting Office (GAO), the OMB, and the Congressional oversight committee announced their support in mid-1991. Earlier that year, the Senate proposed cutting \$30 million from the Census Bureau's budget, a move Bryant told Congress would hamper not only ongoing research

⁵³ The process would include representation on the Task Force from other government statistical agencies, state and local governments, minority groups, and members of statistical professional associations.

⁵⁴ The full title of the body was the Task Force for Planning the Year Census 2000 and Census-Related Activities for 2000-2009. Subcommittee on Census, Statistics, and Postal Personnel of the House Committee on Post Office and Civil Service, *Review Major Alternatives for the Census in the Year 2000*, 102d Cong., 1st sess., August 1, 1991, p. 15.

⁵⁵ Susan Miskura, "Research and Development for the Census 2000," paper presented at the Census Advisory Committee of the American Statistical Association, Census Advisory Committee on Population Statistics, and the Census Advisory Committee of the American Marketing Association at the Joint Advisory Committee Meeting, April 25-26, 1991, in Alexandria VA, p. 1. An official from the GAO expressed similar belief to Congress that the Census Bureau could not wait that late into the decade to plan for the 2000 Census. By 1984, he said, "It was already too late to design, test, and implement fundamental changes in census methodology." Statement by L. Nye Stevens, director of the Government Business Operations Issues of the General Government Division of the General Accounting Office, "Census Reform Needs Attention Now," the GAO, T-GGD-91-113, March 12, 1991. Harry Scarr, then serving as the deputy assistant secretary for Statistical Affairs at the Commerce Department, said, "Beginning now will allow for at least the possibility of major changes in the way the census is conducted; beginning later would not." Harry Scarr, "Opening Remarks at the First Meeting of the Task Force Advisory Committee," Washington DC, December 9, 1991, as quoted in the Task Force for Designing the Year Census 2000, *Reinventing the Decennial Census: Global Report of the Task Force for Planning the Year Census 2000*, April 1995, p. 5.

for the next census, but also the release of long-form data products from the 1990 Census.⁵⁶ The OMB demonstrated its support for undertaking the necessary research to evaluate major changes by doubling what had been sent previously to the Census Bureau for its research budget request.⁵⁷ The GAO argued that it would be counterproductive of those seeking to cut the agency's budget to punish it for cost overruns, undercoverage, and differential undercounting of minorities. The official from the GAO testified before the Congressional oversight committee that the Census Bureau required increased funding to investigate and innovate ways to improve coverage, increase automation, and evaluate how sampling could cut census costs.⁵⁸

Gathering Ideas for Design Alternatives

Empowered by the support of the Census Bureau's tradition of innovation and expanded data delivery and mindful of the threat to the Census Bureau's operations if it did not make the case for change, the 2KS began gathering ideas from stakeholders and Census Bureau staffers. Between December 1990 and December 1991, the 2KS held over 20 focus groups to identify various methods to conduct the 2000 Census. They encountered support among various groups for features that would form the basic components of continuous measurement and also for competing design alternatives.⁵⁹ Roger Herriot and other supporters of using rolling samples to collect intercensal data advocated successfully for a rolling sample census to be included among the design alternatives⁶⁰ (Figure 4). Susan Miskura, the head of the Year 2000 Research and Development Staff stated that one design being formulated included rolling sample surveys and administrative records.⁶¹

⁵⁶ Rep. Tom Sawyer and Barbara Everett Bryant in House Committee, Review major alternatives for the census in the year 2000, August 1, 1991, p. 26.

⁵⁷ Representative Tom Sawyer to Barbara Everett Bryant in House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, "Review the Census Bureau's Proposed Budget for Fiscal Year 1992," 102d Cong., 1st sess., March 12, 1991.

⁵⁸ Stevens, "Census Reform Needs Attention Now," pp. 53-66.

⁵⁹ Susan Miskura, "Forward From 1990: Designing the Census 2000," paper presented at the Joint Statistical Meetings, August 1992 Boston, MA as excerpted in Appendix 1 of Robert D. Tortora, associate director SDMS and Susan M. Miskura, Year 2000 R&D Staff, "Research Plans for the Census 2000," paper presented to the Census Advisory Committee of the AIAN, API and Black and Hispanic Populations, November 5-6, 1992, Appendix 1, p. 1 and Tortora and Miskura, p. 1.

⁶⁰ Paula Schneider's oral history interview by Dave Pemberton of the History Staff of the Census Bureau, March 22, 2001, p. 40.

⁶¹ Census Bureau, "Minutes and Recommendations of the Census Advisory Committee," April 24-25, 1991, p. 24.

Voices outside the Census Bureau supported some elements of the proposals to simplify the decennial and provide intercensal data. A "bare bones census" is what one local official suggested to Congress for approval in June 1991. Citing the differential undercount numbers released just a few days before, Mayor Thomas Bradley of Los Angeles made a very specific recommendation that any future census should have a form with "questions limited to those of constitutional significance—those on race, sex, and age." Bradley said, "The Census Bureau could acquire other information via sampling."⁶² Members of the Census Advisory Committee asked if a mid-decade census and rolling sample surveys figured into the agency's plans, thus signaling their willingness to consider those data collection methods. Frequent delays in mailings and disputes over address counts encouraged New York City Mayor David Dinkins's office to recommend maintaining the Census Bureau's database of geocoded corporate boundaries and addresses throughout the decade. That office argued that if the Census Bureau continuously updated its database, called the Topologically Integrated Geographic Encoding and Referencing (TIGER) system, it would be more accurate at the start of the next decennial census. Mayor Dinkin's office cited how the undercount, costs, and delays had mounted when 500,000 census questionnaires destined for Brooklyn were held up as undeliverable.⁶³ A continuously updated Master Address File (MAF) and geocoded address database would later figure prominently in plans for a Continuous Measurement Survey, and data users lent their support to this important tool from 1990 onwards.

Data collection methods other than rolling samples received support as well. In March 1991, Census Bureau Director Barbara Bryant prioritized shortening questionnaires and using information from administrative records to take the place of the census

⁶² Los Angeles Mayor Thomas Bradley in House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, Review the role of local governments in the 1990 Census and to hear recommendations for the Census 2000, 102d Cong., 1st sess., June 15, 1991, p. 112. Bradley also recommended having adequate bilingual information including questionnaires and sufficient numbers of bilingual telephone operators.

⁶³ The TIGER database included the geographic coordinates of addresses, major geographic features such as rivers and highways, and the corporate boundaries of states, counties, cities, and other incorporated places. NYC Office of the Mayor, "1990 Census Project: Mayor's Response to Senator Glenn's and Kohl's Request for Information on the Role and Operations of the 1990 Census," July 11, 1990, included with Mayor's Dinkins' testimony to the Joint Committee hearings, House Committee, "Review the Role of Local Governments in the 1990 Census," p. 22.

or certain data collected.⁶⁴ The GAO supported the Census Bureau's February 1991 statement before Congress announcing that it might want to use sampling for nonresponse follow-up instead of attempting to contact or return to every nonresponding household as many as six times.⁶⁵ When Director Bryant outlined design alternatives in April 1991 to the Census Advisory Committee, she spent most of her time talking about every design alternative other than rolling sample surveys. The alternatives she mentioned included: using administrative records for content, reducing the census to cover only items for apportionment and redistricting, and possibly using sampling to replace enumeration or using sampling to replace some of the content.⁶⁶

Consideration of cost looked likely to favor these other design alternatives over the rolling sample census described in Herriot's Decade Census Program (DCP). 21st Century Decennial Planning Staff weighed the costs of the census against the value of the statistics to be collected according to the Herriot plan.⁶⁷ Miskura told the joint advisory committees that the Census Bureau would "consider the cost effectiveness of technical options as well as effects on quality."⁶⁸ During the Congressional hearings in August 1991 on "Major Alternatives to the Census," Director Bryant took pains to inform Congress that all the design alternatives that the Census Bureau was proposing would be evaluated based on cost and balanced with the agency's ability to improve the quality of the census.⁶⁹ Among the available options, two seemed the best to be able to perform within these constraints: (1) replacing the entire enumeration with a one-time

⁶⁴ Bryant in House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, "Review the Census Bureau's Proposed Budget for Fiscal Year 1992," 102d Cong., 1st sess., March 12, 1991.

⁶⁵ L. Nye Stevens, "Census Reform Needs Attention Now," General Accounting Office, T-GGD-91-13, March 12, 1991, p. 6.

⁶⁶ Susan Miskura, "Research and Development for the Census 2000," paper presented at the Census Advisory Committee of the American Statistical Association, Census Advisory Committee on Population Statistics, and the Census Advisory Committee of the American Marketing Association at the Joint Advisory Committee Meeting, April 25-26, 1991 in Alexandria, VA, pp. 1-6.

⁶⁷ Census Bureau discussions of cost-benefit analysis simultaneously recognized the difficulty of putting a value on statistical data they produced and realized that OMB, the Department of Commerce, and the GAO would require the Census Bureau to provide more concrete information on the "use of statistics and its impact on the economy." Jay Keller and Sandra Rowland, "21st Century Census Planning: A Cost-Benefit Approach," 21st Century Census Decennial Planning Staff, presented at the Census Advisory Committee on Population Statistics, April 18, 1990.

⁶⁸ Miskura, "Research and Development for the Census 2000," April 25-26, 1991, p. 2.

⁶⁹ House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, "Review of Major Alternatives for the Census in the Year 2000," 102nd Cong., 1st sess., August 1, 1991, p. 29.

sample survey or (2) substituting information already collected by other federal agencies for the headcount and census content. Enacting these changes would possibly require legal changes to Title 13 and perhaps even a constitutional amendment but would likely reduce the costs of the decennial dramatically. Bryant, however, did not provide cost estimates to support this assertion.⁷⁰ In contrast, Herriot, Bateman, and McCarthy estimated that the DCP would cost more than the long form.⁷¹

A departure from traditional census methods worked in favor of conducting a rolling sample census as officials with power over Census Bureau operations demanded a break with previous census methods. The chair of the Congressional committee overseeing censuses stated succinctly that he wanted to see significant changes. "I am convinced," Representative Sawyer said, "that the census needs fundamental reform." He continued, "I am certain that the Census [Bureau] simply will not be able to take a census in the year 2000 like the one that was taken in 1990."⁷² Viewing the preliminary numbers on the differential undercount coming out of the post-enumeration survey (PES), the GAO said that the traditional census methodology had reached the limits of its effectiveness.⁷³

Congress then broadly supported the effort to push forward alternative census designs that made fundamental changes. More importantly for the continuous measurement proposal, Congress legislated that research regarding rolling samples should continue. In August 1991, Director Bryant provided Congress with design alternatives including a rolling sample survey census, an administrative records census, and "an improved 1990-style design with incremental technical changes" census.⁷⁴

At the same August 1991 Congressional hearing at which Director Bryant testified, Daniel Melnick, then working as a senior advisor at the National Science Foundation, detailed implications of implementing a rolling sample survey in the context of the decennial census. Melnick described how that same Congressional oversight committee had

⁷⁰ House Committee, "Review of Major Alternatives for the Census in the Year 2000," pp. 11, 20, and 42.

⁷¹ Roger Herriot, David V. Bateman, and William F. McCarthy, "The Decade Census Program-A New Approach for Meeting the Nation's Needs for Sub-National Data," September 27, 1988, pp. 19-20.

⁷² House Committee, "Review the Role of Local Governments in the 1990 Census," p. 1.

⁷³ Stevens, March 12, 1991, p. 2.

⁷⁴ Bryant in House Committee, "Review of Major Alternatives for the Census in the Year 2000," August 1, 1991.

commissioned Leslie Kish to analyze rolling sample surveys as a means of providing census data throughout the decade and reducing the size and complexity of decennial census operations.⁷⁵ In “The Census of 2000 A.D. and Beyond,”—a document from Melnick’s subcommittee hearing that Charles Alexander later would credit as vital in winning support for the Census Bureau’s research on continuous measurement—Melnick said “We use census data as if they are still current, but we know they are not.” Melnick even addressed sampling error when he said, “changes since the last census are often, many times, the reported errors in the figures.”⁷⁶

The day following Bryant’s presentation, Representative Sawyer introduced the Decennial Census Improvement Act, which put into law the requirement that the Census Bureau give full consideration to rolling samples as an alternative to the traditional enumerations methodologies. The act ordered the Census Bureau to contract with the National Research Council’s Committee on National Statistics (CNSTAT) to form a panel to study “alternative methods for collecting the data needed for a basic population count.” The bill mandated that the panel evaluate methods, “such as any involving administrative records, information from subnational or other surveys, and cumulative or rolling data-collection techniques” for gathering census material. The Decennial Census Improvement Act became law in late October 1991.⁷⁷

Proposing Design Alternatives

From fall 1991 to summer 1992, Census Bureau experts analyzed and fleshed out what they considered a “complete inventory of different ways . . . that the major features of a decennial census could be done.” They drew ideas from consultations with stakeholders that had continued since December 1990. In January 1992, the Technical Committee of the Year 2000 Task Force identified an initial set of 15 design alternatives and evaluation criteria. Internal meetings with stakeholders produced potential designs between January and May 1992. The task force then eliminated and redesigned several features

⁷⁵ Daniel Melnick, “The Census of 2000 A.D. and Beyond,” in House Subcommittee, Review Major Alternatives for the Census, August 1, 1991, p. 73.

⁷⁶ Daniel Melnick, “The Census of 2000 A.D. and Beyond,” in House Subcommittee, Review Major Alternatives for the Census, August 1, 1991, p. 63.

⁷⁷ H.R.3280, Decennial Census Improvement Act of 1991 at <www.congress.gov/bill/102nd-congress/house-bill/3280>, accessed December 15, 2023.

into a new design alternative. The task force also brought up technical and policy issues that needed to be resolved to determine if a design should continue to be considered for the 2000 Census. During the summer and fall of 1992, the chief of the Year 2000 Research and Development staff presented a list and description of 14 design alternatives at the Joint Statistical Meetings and at the Census Advisory Committees Meetings.⁷⁸ (Text Box 1.)

The 14 alternative designs presented by the 2KS included one (by then) named the “Continuous Measurement Survey,” along with alternatives that might supersede it. The design proposal for the Continuous Measurement Survey called for shortening the questionnaire for the enumeration of 100 percent of households and replacing the long-form sample with data collected via a sample continuously collected over a longer time frame. Another of the 14 alternatives merely simplified the decennial questionnaire and shortened it considerably. The more radical alternatives would replace the decennial census with either estimates from administrative records or a one-time sample survey. Several of the alternative designs simply modified the procedures that had been carried out in 1990.⁷⁹

At this stage the designs were not set out in great detail. For example, the Continuous Measurement Survey proposal did not elaborate in depth about the “ongoing data collection/production system throughout the decade.” The research and development program for 1992–1995 would have to determine what design elements would best balance “data needs and costs.” Even the basic alternatives envisioned that the new census would draw upon demographic surveys, administrative records, and the Census Bureau’s estimates programs to produce data.⁸⁰

Continuous measurement appeared attractive because it promised to reduce operational spikes and produce more frequent data. The head of the 2KS identified a potential downside in that the activities involved in continuous measurement might increase

⁷⁸ Susan Miskura, August 1992, pp. 4, 6, and 9–10.

⁷⁹ Miskura, August 1992, Appendix 1 pp. 9–10.

⁸⁰ Miskura, August 1992, Appendix 1 pp. 9–10.

Text Box 1.

The 14 Design Alternatives Recommended for the 2000 Census

- **Multiple-response options.** Added response options such as telephone, computer, fax, and interactive cable television to the mailout/mailback method that required respondents to complete and return paper questionnaires.
- **High-tech options.** Combined multiple-response options with the use of administrative records and statistical estimation.
- **Expanded content.** Would collect additional data by using a variety of long-form questionnaires (matrix sampling).
- **Truncated/more estimation.** Limited nonresponse follow-up (NRFU) among nonrespondents to the initial census questionnaire, allowing for substantial cost savings and requiring sampling and estimation to complete NRFU.
- **Sample census.** Would expand the use of statistical sampling to the entire mail-out universe; all census counts would be sample-based estimates.
- **Target enumeration barriers.** Census-taking methods primarily designed for hard-to-reach populations.
- **Administrative records only.** The census would be taken using administrative records only. No direct enumeration would take place and no census questionnaire would be used.
- **Administrative records with enumeration support.** The census would be based on the data in administrative records, supplemented by enumeration and follow-up with respondents for whom few or no other records existed.
- **Voting rights data only.** Similar to the methods using administrative records but involving only the collection of data required by the Voting Rights Act (i.e., number of persons by age, race, and Hispanic origin at the block level).
- **Reapportionment and redistricting counts only.** Would collect only reapportionment and redistricting data—a basic headcount for each block. This design would collect less data than previous censuses but would include statistical “adjustment” for over and undercounts.
- **Redistricting counts only/no estimation.** This basic headcount would collect and publish block-level population counts to meet redistricting requirements; it would incorporate neither coverage-improvement operations nor statistical “adjustment” of the counts.
- **Reapportionment only/no estimation.** This “bare bones” headcount would tabulate and publish population counts for states only and would not include procedures for coverage-improvement or statistical adjustment.
- **Two-stage.** One-hundred percent (short-form) data collected on Census Day. Sample data would be collected later in the year.
- **Continuous measurement.** Ongoing data collection throughout the decade. Minimal data would be collected in the year 2000.

Source: Census Bureau, 2000 Census of Population and Housing, History, Vol. I, December 2009, p. 39.

the costs.⁸¹ However, the belief that since continuous measurement design minimized content in the census year it might increase response rates and thereby reduce costs helped to lessen those concerns. In addition, census planners hypothesized that field operations enjoying higher response rates might reduce the undercount by shifting greater resources to hard-to-enumerate populations.⁸² As the list of design alternatives coalesced, Census Bureau planners showed that the system would borrow from data collection methods used in other countries, most notably Germany and Sweden. Robert Groves, the associate director with authority over all Census Bureau's statistical design and methodology, informed the Census Advisory Committee that these two countries gathered census information using large demographic surveys of 1-2 percent of their populations.⁸³

Early Development of the Design Alternative in the Demographic Statistical Methods Division

Since both Roger Herriot and Bruce Johnson were no longer at the Census Bureau by 1991, the 2KS search for the mathematical statistician to develop the Continuous Measurement Design Alternative Recommendation quickly focused in on Charles Alexander as the logical choice for the position. Alexander's previous work critiquing the DCP helped cement his selection and he accepted the assignment.⁸⁴ Even before he began work on the design recommendation, Alexander and his supervisor, Preston J. Waite, expressed interest in the project. They were convinced that an updated MAF would help in redesigning and carrying out the other surveys for which their division provided statistical and

methodological support.⁸⁵ In fact, Alexander had worked on over 20 surveys at the Census Bureau and for other statistical agencies and had overseen the first widespread tests of the Random Digit Dialing Computer-Assisted Telephone Interviewing System. That experience would be crucial to his development of ideas on continuous measurement and his ability to speak with colleagues from other federal statistical agencies. Alexander's personality played a role as well. He was well-respected and able to establish a rapport with the stakeholders. He willingly listened to the data users and considered their needs in his recommendations.⁸⁶

Alexander possessed communication skills that could draw audiences' attention. When Alexander served as a discussant at the 1992 Joint Statistical Meetings he displayed this trait by opening with an unusual line for the professional conference—"My father used to tell me stories about Morris Hansen when I was a kid." Alexander relayed how his father, a coworker of Hansen's, had used Hansen's example to teach his son to save his allowance and not spend it on candy. Hansen, the elder Alexander said, had money for his other projects because he saved the Census Bureau money by incorporating sampling in the decennial census.⁸⁷

Alexander quickly and fundamentally reshaped Census Bureau plans for providing intercensal data. He and others had foreseen likely problems that would arise with Herriot's proposal to sample one set of states each year as a result of states jockeying for inclusion or of decision-makers wanting to evaluate comparable data among metropolitan statistical areas (MSAs). To counter these potential issues, Alexander suggested substituting nationwide

⁸¹ Miskura, August 1992, Appendix 1, pp. 9–10. Miskura's words were later echoed in Congress. Congressional representatives in 1993 realized that continuous measurement might raise the Census Bureau's costs to collect data but encouraged the agency to demonstrate what the tradeoff was for more timely data and how a Continuous Measurement System might provide a lot more data overall. Congressman Tom Sawyer, opening statement, "Hearing to Review the Status of Planning for the Census 2000," October 7, 1993, p. 2.

⁸² Miskura, August 1992, Appendix 1, p. 9 and Miskura, 1991, p. 4.

⁸³ Minutes and Recommendations of the Census Advisory Committee of April 24, 1992, p. 14.

⁸⁴ Larry McGinn to David Pemberton, personal correspondence, January 19, 2011.

⁸⁵ "Year Zero Analysis Team Report," September 23, 1988, p. 13. Paul Schneider Oral History Transcript, p. 40, and Jay Waite as quoted in Dave Pemberton, "Notes From the Continuous Measurement Discussion/ACS Meeting," June 29, 1999, p. 1.

Alexander's involvement with the committee did not signal that he was against the DCP and later recanted. The committee's write-up was not a whole-hearted dismissal of Herriot's proposal. Instead it functioned in the role of what quality management at that time would have called a "murder board." A panel of experts gathered to challenge every aspect of a proposal to allow its authors to (a) anticipate criticisms from outside the organization and (b) make it stronger before its public debut.

⁸⁶ Alan M. Zaslavsky, "Chip Alexander and the American Community Survey," discussant paper, Proceedings of the 2003 Joint Statistical Meetings Section on Survey Research Methods, p. 4714. Cynthia Taeuber, email message to author, August, 2011. "Chip Alexander: A Prince of a Human Being," 2003.

⁸⁷ At the start of the 1960s, Morris Hansen served as assistant director for Research and Development of the Census Bureau when Charles H. Alexander, Sr. served as chief of the Census Bureau's Budget and Management Division. Charles H. Alexander, Jr., "Discussion," Proceedings of the 2003 Joint Statistical Meetings Section on Survey Research Methods, p. 49.

sampling to deliver estimates for areas nationwide.⁸⁸ Furthermore, he proposed shifting the primary means of collecting data from the DCP's primary reliance on telephone interviews to mailed responses.⁸⁹ As telephone interviews cost more on a per-interview basis than having households answer questionnaires mailed to them, Alexander's change aligned with the marching orders given by Congressional critics to rein in costs.

Within the Census Bureau, Alexander also broadly circulated his idea of using model-based estimates for small areas. In 1988, he preferred creating such estimates annually for small areas to the multiyear averages advocated by Roger Herriot and Leslie Kish.⁹⁰ Alexander included models among the methods for continuous measurement after learning that Bruce Johnson told Acting Director Kincannon about essential research on estimation techniques used by private vendors and other agencies. Johnson, in an August 1989 memo to Kincannon, which Alexander also received, argued that estimation from smaller surveys and administrative records had great potential to reduce costs and respondent burden.⁹¹ Alexander also revived this idea because it received outside validation when statistician Fritz Scheuren, of the Internal Revenue Service, presented a similar plan to the Council of Professional Associations on Federal Statistics (COPAFS) conference in 1990.⁹²

⁸⁸ Johnson, Herriot, and Rowland, August 1989, p. 11, and Charles H. Alexander, "An Initial Review of Possible Continuous Measurement Designs (Internal Census Bureau Report CM-2)," U.S. Census Bureau, Washington, DC, December 1992, pp. 9 and 19.

⁸⁹ Alexander, December 1992, pp. 12 and 13. Charles H. Alexander, "Overview of Continuous Measurement for the Technical Committee (Internal Census Bureau Report CM-4), Washington, DC, U.S. Census Bureau, February 1993, p. 4, and Charles H. Alexander, "A Prototype Design For Continuous Measurement" (Internal Census Bureau Reports CM-7), U.S. Census Bureau, Washington, DC, n.d. but by May 1993, p. 4.

⁹⁰ Kish, "Using Cumulated Rolling Samples to Integrate Census and Survey Operations," 1981 and Herriot, Bateman, and McCarthy, "The Decade Census Program," 1988.

⁹¹ Bruce Johnson, "Mid-Course Correction to a Multiple Front Strategy," p. 3. As Johnson was writing his memo, John Beresford of the 21st Century Staff was evaluating the accuracy of census tract estimates made by Donnelley Marketing with 1980 Census data. A separate paper by Beresford provided a primer on how to produce estimates by age, sex, per capita income, race and Hispanic heritage. John C. Beresford, "Comparison of Bureau and Donnelley Small Area Estimates," Memorandum, November 7, 1989 and John C. Beresford, "Primer on Bureau's Population Estimates: Subjects, Geography, Frequency, Currency, and Methods," Memorandum, November 30, 1989 as abstracted in 21st Century Decennial Planning Staff (TCS), "The RAPP Sheet: Research, Activities, Projects, and Plans," U.S. Census Bureau, September 1990, p. III-2.

⁹² Fritz Scheuren, "Paradigm Shifts: Administrative Records And Census-Taking," paper presented May 22-23, 1990 at a seminar hosted by the Council of Professional Associations on Federal Statistics (COPAFS), Statistical Policy Working Paper 20 - Seminar on Quality of Federal Data, Office of Management and Budget, March 1991.

However, when Waite tapped him to work with the 2KS to develop the Continuous Measurement Survey, Alexander proposed determining if the use of such modeling would be preferable to multiyear cumulated estimates or running a large rolling sample census on a yearly basis.⁹³ Unlike the proposal for modeling described in Alexander's 1988 memo, this time his idea received wide circulation even if it was only one of several possible methods for running continuous measurement.

In addition to a rolling sample of different states, Alexander worked through and rejected several other initial proposals on continuous measurement. Some of the proposals outlined different ways to collect data such as:

- Relying on model-based estimates provided annually for small areas derived from a new survey, combined with administrative records and changes in the address list.⁹⁴
- Initiating a mid-decade sample census, measuring the entire nation at one point in time during one of the middle years of the decade.
- Replacing the decennial census with a set of intercensal estimates collected by one of the methods listed above or from a nationwide sample survey with 5-year cumulations for small areas.⁹⁵

Although the 21st Century Staff's 1988 survey of senior staff at the Census Bureau had found strong support for the mid-decade sample census alternative, by late 1992, Alexander would merely mention it as a proposal that had been ruled out. He pointed out that previous mid-decade census proposals had not made a convincing case that they reduced the cost or improved operations of the decennial.⁹⁶ By the time Alexander was working on the Continuous Measurement Design Alternative Recommendation (DAR), Kish had widely circulated his observation that 10-percent sample censuses in two other countries had cost half as much as a full decennial census.⁹⁷

⁹³ Alexander, December 1992, pp. 7, 16.

⁹⁴ Alexander did not elaborate how changes in the address list would provide content but previous documents, several of which are mentioned in this chapter, had suggested them for characteristics of housing in areas and as a barometer of population trends.

⁹⁵ Alexander, December 1992, p. 1. Alexander quickly rejected outright replacement of the decennial census with a rolling sample census because the decennial census was required under the U.S. Constitution.

⁹⁶ Alexander, December 1992, p. 17.

⁹⁷ Leslie Kish, "Rolling Samples and Censuses," Survey methodology, v. 16, no. 1, Statistics Canada, June 1990, p. 65.

Alexander referred to this cost figure as a “rule of thumb” when he rejected a mid-decade option. He also argued that a mid-decade sample census would not likely aid in updating the MAF in ways that would improve the following decennial.⁹⁸ A continuous operation, he said, would gain from a more efficient, permanent field staff, while a one-time, mid-decade census would not.⁹⁹

Alexander, moreover, did not consider it likely that the Census Bureau could convince stakeholders by 2000 of the “validity and usefulness” for redistricting of continuous measurement’s model-based estimates from a sample.¹⁰⁰ He therefore ruled out replacing the decennial’s head count with estimates modeled via continuous measurement. Instead, he concluded that the Continuous Measurement System would have to leave in place either a full decennial census or a short-form-only decennial. Alexander’s proposed system would keep the short-form enumeration and replace the long-form sample survey with intercensal estimates created from continuously collected data.¹⁰¹ Discarding these options left Alexander with three different data collection methods that he would present to the Census 2000 Task Force in February 1993. Refer to Table 1 for side-by-side comparisons of the proposals from 1988–1993.

⁹⁸ Charles H. Alexander, “A Continuous Measurement Alternative for the U.S. Census” (Internal Census Bureau Report CM-10), U.S. Census Bureau, Washington, DC, October 23, 1993, p. 17.

⁹⁹ In 1990, Alexander thought that a permanent field staffer working on a continuously updated master address list would likely be more efficient and accurate than his/her less well trained counterpart hired temporarily to work on the decennial. He said, however, that he “wouldn’t want to guess whether a permanent staff would be cheaper or more expensive than the current way of doing things.” By late 1992, Alexander said that permanent field staffers might be more efficient as interviewers too. He may have thought by 1992 that spreading the sample nationwide would help a Continuous Measurement System attract and retain experienced interviewers leading to higher quality data, but he did not spell out that assumption until an April 1993 report. Alexander would have been well aware of that assumption about data quality and permanent field representatives before 1993 as it had been floating around the Census Bureau since the early 1970s. In addition, Herriot’s 1988 DCP proposal had argued that a rolling sample survey would benefit from permanent interviewers skilled in persuading interviewees to answer and less likely than temporary enumerators to impose their own bias on responses. One of Alexander’s critiques of the DCP in 1988 was that the Census Bureau would have a hard time retaining field representatives when the sample rolled to other states and regions. Alexander, “Master Structure Address List,” 1990, p. 6; Alexander, December 1992, p. 21; Alston, p. 2; and Alexander, ed., 1988, p. 22. Having worked on numerous Census Bureau household surveys such as the Current Population Survey, Alexander was well aware of the abilities of permanent field representatives even though he did not mention that fact in his research papers.

¹⁰⁰ Alexander, December 1992, p. 19.

¹⁰¹ Alexander, December 1992, p. 19.

Narrowing the Field of Alternative Designs for the Census: 1992–1993

In 1992 and 1993, the Census Bureau narrowed the field of 14 Design Alternative Recommendations, thereby boosting the standing of the Continuous Measurement Survey proposal. The Census Bureau eliminated the idea of using only a sample survey to make population estimates because legal reviews showed that a headcount was required for apportionment.¹⁰² Three designs that called for the Census Bureau to collect only enough data to provide the population estimates for states or states and counties were found to violate constitutional provisions of the Voting Rights Act requiring race and ethnic data.¹⁰³ In addition, investigation of Social Security files, immigration records, and state driver’s license databases showed that using administrative records alone would not yet provide sufficient or consistent enough data on the ethnicity and race of individuals to give accurate counts needed for redistricting under the Voting Rights Act.¹⁰⁴

In 1992, the Census Bureau narrowed the list of alternative designs to one or two for testing in 1995–1996.¹⁰⁵ The elimination of many designs that made major changes to census-taking left only continuous measurement and variations of the basic methods used in 1990 as possible alternatives. Besides pushing forward with research on continuous measurement, the Census Bureau was left with altering proposals that included starting post-enumeration surveying earlier, running nonresponse follow-up operations on only a sample of the nonresponding households, and conducting matrix sampling for the long form using several different long-form questionnaires in each census block.

¹⁰² Jay Keller and Carol Van Horn, p. 136. Representative Tom Ridge in August 1991 had expressed this opinion from the beginning of the public portion of the decennial planning process. He said, “And as my colleagues and friends on this committee know, ‘I think the constitution says you count, you don’t survey.’” House Committee, “Review of Major Alternatives for the Census in the Year 2000,” p. 43. Margaret Mikyung Lee, “Legal Issues for Census 2000,” Congressional Research Service, 1993.

¹⁰³ Year 2000 Development and Research Staff, Content Requirements and Design Alternatives for the 2000 Decennial Census, Design Alternative Recommendation (DAR) # 2, September 1992.

¹⁰⁴ Year 2000 Development and Research Staff, Design Alternative Recommendation (DAR) # 2, September 4, 1992. Statement of L. Nye Stevens, director, Planning and Reporting, General Government Division, U.S. General Accounting Office, “Census Reform: Major Expansion in Use of Administrative Records for 2000 is Doubtful,” (GAO/T-GGD-92-54, June 26, 1992).

¹⁰⁵ Miskura, “Forward From 1990,” p. 40.

Table 1.

Side-by-Side Comparison of Proposals for a Continuous Measurement System

Proposal Title (Abbreviated)	The Decade Census Program	Memo: "A Possible Modification of DCP"	Three General Prototypes for Continuous Measurement (CM-1)
Proposed by	Herriott, Bateman, and McCarthy	C. Alexander	C. Alexander
Date	9/27/1988	10/31/1988	1/8/1993
Audience receiving the report or statement	Census Bureau executives and senior staff.	<ul style="list-style-type: none"> Division chief of Statistical Methods Division (later renamed). Members of the Demographic Areas Committee to Critique the ISAS Proposal. Chief of the 21st Century Planning Staff. 	Unknown.
Components of the proposed system	<ul style="list-style-type: none"> A reduced short form decennial census. Rolling sample of states to give tract level information once a decade. Annual characteristic estimates for large areas (100,000 and over) and states. Module survey add on questions for large areas. Intercensal population estimates for governmental units (controls for surveys). 	<ul style="list-style-type: none"> A continuously updated "Master Structure Address List." A targeted survey of blocks with large changes in address units. A "census" of housing information of 1 in 9 blocks each year. A "survey" of a sample of households in 1 in 9 blocks. Annual "projections" of demographic characteristics for blocks or tracts using survey results and administrative records. 	Three alternative prototypes for CM: <ol style="list-style-type: none"> 1. A rolling sample census. 2. Cumulative rolling samples. 3. Integrated census updates.
Sample size	<ul style="list-style-type: none"> 204,000/mo for the survey providing data on tract/block groups areas. 110,000/mo for a survey to create annual estimates for large areas (100K+). 25,000/mo for a survey to give estimates for the largest areas (500K+). 	NA	The decade long sampling fraction would be determined later based on the nation's data needs.
Size of areas for which annual estimates	100,000 and over.	All areas.	NA
Size of areas for 5-yr estimates	No use of multiyear.	No use of multiyear.	Smaller areas.
Oversampling Y/N details	1 in 2 for small governmental units (SGUs).	NA	Perhaps extra canvassing to improve the Master Address File (MAF) in rural areas.
Reliability of Data (most often expressed in terms of the coefficient of variation (CV))	<ul style="list-style-type: none"> Did not specify reliability for tract and block level estimates beyond desired level of reliability. Estimates would have a 10 percent coefficient of variation (CV) for a 10 percent population characteristic for an area of 100,000. 	Unknown	NA
Projected start of full implementation	1995	After 2000.	NA
Relationship to CPS other household surveys	<ul style="list-style-type: none"> It would not replace them but they might use its address list as their sampling frames. It might help locate areas with rare populations for which they would want to oversample. 	NA	Integrated census updates would use their data for the counties where they were collected and thereby share costs.
Cost estimates for the proposed system	\$180 million/year.	No mention.	Did not give an estimate but said the cost from the intercensal estimates was a disadvantage, however other surveys would observe savings from the benefit from MAF, shared data, and shared travel expenses.

Source: U.S. Census Bureau.

Data Users Challenge a Headcount-Only Census, Cite Demand for Timelier Small-Area Data: 1992-1993

Theories and later research on the impact of questionnaire length on response rates helped garner key Congressional support for the idea of spreading out most data collection throughout the decade. This key part of the Continuous Measurement Survey proposal had been floated as a theory in the Census Bureau for a while, even spurring Herriot's and Johnson's proposals, and had made its way to Congress. In 1990, Representative Sawyer urged the agency to consider reducing the decennial questionnaire's burden on the public and eliminate what he called the "perception of intrusiveness" by focusing data collection on "core" information. Representative Sawyer had cited reducing privacy concerns when he suggested that the Census Bureau use rolling samples throughout the decade.¹⁰⁶

Surveys of census respondents bolstered that consideration over the next 2 years. A 1991 National Opinion Research Center (NORC) study contracted by the Census Bureau revealed that the gap between mail-return rates for long and short forms had widened since 1980.¹⁰⁷ More importantly, Sawyer pointed to the Census Bureau's 1992 research on response rates when he suggested to data users and his Congressional colleagues to consider the value of moving questions to other vehicles. Representative Tom Ridge from Pennsylvania, the minority chair of Sawyer's subcommittee, concurred with Sawyer on both ideas.¹⁰⁸ Sawyer advocated for removing questions from the decennial census and replacing the data collected by them with estimates from sample surveys. He encouraged the Population Association of America (PAA) and participants in a Census Bureau conference on the undercount to view alternative data collection methods as an opportunity to improve the accuracy of decennial census data and to gain detailed estimates more than once every 10 years.¹⁰⁹

That same research on response rates also could have been used to support an opposing position that could have stopped continuous measurement dead in its tracks were it not for witness after witness undercutting efforts to curtail data collection altogether.¹¹⁰ At Congressional oversight hearings in October 1992, data users defended the breadth of data collected in the long form from members of Congress who sought to curtail the decennial's content in the hopes of cutting its cost and improving its coverage rates. Some of those voices sought to do away with the collection of long-form data altogether, i.e., eliminate the decennial sample survey and provide no alternative to replace its data. Speakers invited to oppose this plan represented concerns ranging from the private sector to human resource planning services, to state and local government, and even included metropolitan planning organizations. All witnesses detailed their continuing need for census data for planning and eligibility for federal programs. They maintained the value of the data collection as a service to the country. They challenged contentions that census long-form data and small-area data were of use only to researchers and marketers.¹¹¹ For example, Joan Gentili Finch, the director of research and planning from the retail chain Dayton-Hudson, detailed how her employer still used census tract demographic data when selecting new sites. Ms. Finch said that her company, owners of the chains Target, Marshall Fields, and Mervyns, continued to rely on census data even though it could afford to purchase point of sale data and bought demographic data from several private vendors. In addition, she informed the Congressional representatives of the extent to which some of the private databases repackaged census small-area data for businesses. In the same hearing,

¹⁰⁶ Sawyer, July 13, 1990, p. 14.

¹⁰⁷ Minutes and Recommendations of the Census Advisory Committee, April 25-26, 1991, p. 12.

¹⁰⁸ House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, 20th Century Planning: Decennial Questionnaire Content, 102d Cong., 2d Session, October 1, 1992, pp. 1-3, and 43.

¹⁰⁹ Representative Tom Sawyer, "Rethinking the Census: Reconciling the Demands for Accuracy and Precision in the 21st Century." Proceedings of the Research Conference on Undercounted Ethnic Populations, U.S. Census Bureau, May 6, 1993, p. 434.

¹¹⁰ As later paragraphs will show, in October 1992, data users were not yet in support of shifting data from the decennial to a rolling sample survey. They merely defended the continued collection of the full content of the 1990 long form from voices questioning the need or wisdom of questionnaires they viewed as overly lengthy and potentially intrusive. When these data users spoke, however, they helped crystallize for the Congress members on the committee that the data needed to be collected, that it continued to be relevant, and that more frequent collection even at the small geographic level was worthwhile.

¹¹¹ Two years later Charles (Chip) Alexander argued that testimony in those hearings and in advisory committees had dispelled that contention. Charles H. Alexander, "Some Ideas for Integrating the Continuous Measurement System Into The Nation's System of Household Surveys (CM-19A)" draft, U.S. Census Bureau, Washington, DC, January 6, 1995. In a similar vein, Dr. Judith Lessler (from the research organization, Battelle) recalled a subcommittee hearing in the late 1980s where Congress asked to hear from "real users" not from "academic users" when the proposal at the time was to eliminate census tract level data. Minutes and Report of Committee Recommendations of the Census Advisory Committees, April 15-16, 1993, p. 24.

Judy McKinney-Cherry, of the Delaware Development Office, testified that smaller businesses also continued to rely heavily on census small-area data.¹¹² With these testimonies, the two experts countered the notion that data from private vendors had supplanted use of census small-area data among businesses.

Where other voices in Congress argued that the federal government ought not collect data that are used largely by the private sector, other speakers attested to the data's use by local governments. Ann Azari, representing the National League of Cities, spoke about sex and age data being crucial to planning new schools and vital for the new use of evaluating compliance with the Community Reinvestment Act. In addition, Azari was not acting in her capacity as co-chair of the Census 2000 Advisory Committee that day, but she reminded the members of Congress that 80 percent of municipalities had less than 5,000 people. "The U.S. Census," Azari said, "may be their only source of planning data," because of their size. Other speakers outlined the need of community colleges and other Jobs Training Partnership Act grantees for long-form data at the census tract level under the Act. Meanwhile a representative from the Atlanta Regional Commission ran through more than 20 variables used by planning organizations at the census tract or block group level.¹¹³ Adding more evidence to the case for continued small-area data collection by the Census Bureau, the Population Association of America (PAA) wrote to the subcommittee saying that when it surveyed its members, 60 percent of those responding said they used census data at the census tract level or below and that they could not identify alternative data sources.¹¹⁴

Those testifying during the October 1992 Congressional hearings provided Congress with a glimpse of the mindset of data users and an awareness that a potentially broad base of users still wanted frequent release of long-form data for small geographic areas and small population groups. In Congressional hearings on plans for the content of the questionnaire in October 1992, Joan Gentili Finch urged Congress to direct the Census Bureau to provide most of the information every 5 years. The data

¹¹² House Committee, 20th Century Planning: Decennial Questionnaire Content, p. 29.

¹¹³ House Committee, 20th Century Planning: Decennial Questionnaire Content, p. 37.

¹¹⁴ Linda Gage of the Population Association of America to Representative Thomas Sawyer, November 12, 1992, in House Committee, 20th Century Planning: Decennial Questionnaire Content, p. 124.

requested included population, number of households, age, race/ethnicity, and income. She made a statement that was crucial for the adoption of the Continuous Measurement Survey proposal, stating that "change occurs too rapidly in many communities to be assessed only once per decade."¹¹⁵ With such statements, data users reminded Congress of the multitudes of users who had spoken in support of mid-decade censuses since the 1960s.

Though the proposal for a Continuous Measurement System that had been circulated was in the bare bones, two-paragraph format that appeared in Miskura's 1992 papers, Congressman Sawyer had close ties to people familiar with the subject. He referred to this short description when he began asking data users testifying before the Oversight Committee to weigh in on the potential of rolling sample surveys to deliver the data they wanted.¹¹⁶ Most of the speakers in October 1992 said they did not know enough about rolling sample surveys to know whether they would deliver the small-area data they needed, but time and again they stated emphatically that simply expanding the Current Population Survey (CPS) would not meet their needs.

In September 1992, the Congressional appropriations committee directed the Census Bureau to investigate alternative ways of gathering decennial long-form data. It specifically mentioned rolling surveys or the expansion of existing surveys.¹¹⁷ Many of the data users testified that they believed continuing surveys like the longitudinal surveys of that era provided data only for the nation at large. Others said that those surveys, at their broadest, provided data only on a dozen large states. A speaker from Delaware described having to wait for 3 years of data from the CPS to draw any conclusions for her small state and that even then the data suffered from reliability problems. Joan Finch opposed the rolling sample survey as a substitute for the decennial because she believed it could provide only metro-level data, whereas Dayton Hudson and other retailers needed social and economic characteristics at the census tract

¹¹⁵ House Committee, 20th Century Planning: Decennial Questionnaire Content, p. 100.

¹¹⁶ TerriAnn Lowenthal, former chief of staff of Representative Thomas C. Sawyer, interview by author, May 8, 2012. House Committee, 20th Century Planning: Decennial Questionnaire Content, p. 100.

¹¹⁷ House Committee on Appropriations. Subcommittee on the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies, Making Appropriations for the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies for the Fiscal Year Ending September 30, 1993, Report 102-918, Washington, DC, September 28, 1992, pp. 66-67.

level.¹¹⁸ The co-chair of the Census 2000 Advisory Committee responded to the question in a way showing that she had heard only of Herriot's proposal for rolling samples of groups of states. She expressed her concern by saying, "we are going to get in a position where we have more recent data for some parts of the country than in others."¹¹⁹

Key members of the Congressional oversight committee took such testimony and feedback from other hearings to develop a vision of continuous measurement as a potential three-party compromise between:

- Data users demanding status quo collection of all 1990 long-form items.
- Data users needing more timely or current data.
- Census critics wanting the Census Bureau to collect only a bare minimum of information to provide a count of the population.

In their speeches at those hearings, the members of Congress did not directly bestow their blessing on continuous measurement, but they voiced support for key components of the concept, thus adding member support to the assumptions within the continuous measurement proposal.

Concurrent with those defenses of small area census data, Representative Sawyer began instructing users about the false precision of long-form estimates from 1990. According to Sawyer, when users argued that only the decennial long-form survey could collect small-area data accurate enough to be reliable, they were operating under a false premise. Representative Sawyer asked his audiences to consider that 1990 decennial data for small areas "looked accurate because it was precise." If the Census Bureau had published the margin of error on such data, they likely would reconsider that belief. Moreover, Sawyer said that if data users thought about how outdated decennial small-area data could be towards the end of the decade, then they would understand the advantage in the Census Bureau switching to a sample

survey providing "more timely" data throughout the decade.¹²⁰

The timeliness of census data took an even greater importance for Representative Sawyer along with his audience in May 1993 and his Congressional colleagues. Sawyer and other members of midwestern states had wanted estimates that were more accurate for school-aged children in poverty by school district by the time of Daniel Melnick's 1991 testimony about census data being out-of-date. They felt that incomes in their manufacturing-heavy states had not fared as well as they had in other states, but this fact would not be reflected if the income figures from 1989 were the basis of the formulas. By 1993, members of Congress from New England joined them. Several New England states, whose economies had been doing well at the time of the 1990 Census, experienced the recession that had earlier affected other states. If federal aid to school districts under Title 1 Local Education Agency (LEA) grants were still dependent on 1990 Census income statistics, those states would not receive their fair share. In addition, Census Bureau personnel working on continuous measurement had shown Sawyer and his staff the margins of error associated with the 1990 Census estimates for poverty rates at the census tract level. In this context, Representative Sawyer told audiences they should embrace continuous measurement's promise of up-to-date statistics. It also provided the context for which he requested the Census Bureau to create what became the Small Area Income and Poverty Estimates (SAIPE) and lobbied his colleagues to provide the funds to research their creation via continuous measurement.¹²¹ Later research in 1999–2002 showed that interviewers working on the American Community Survey (ACS) had achieved lower item nonresponse rates than had their 2000 Census counterparts.¹²²

Building an Initial Prototype for Continuous Measurement

After eliminating possible designs for continuous measurement in February 1993, Charles Alexander

¹¹⁸ House Committee, 20th Century Planning: Decennial Questionnaire Content, p. 97.

¹¹⁹ The co-chair of the Census 2000 Advisory Committee responded to the question in a way showing that she had heard only of Herriot's proposal for rolling samples of groups of states. She expressed her concern by saying, "we are going to get in a position where we have more recent data for some parts of the country than in others." House Committee, 20th Century Planning: Decennial Questionnaire Content, p. 48.

¹²⁰ Housing Committee, 20th Century Planning: Decennial Questionnaire Content, pp. 51–52, Sawyer, "Rethinking . . .," p. 434, and House Subcommittee on Census, Statistics, and Population of the Committee of Post Office and Civil Service, Review of Interim Report by the National Academy of Sciences on Census Reform, May 27, 1993, 103rd Cong., 2nd Sess., 1994, pp. 1–2.

¹²¹ Lowenthal, interview, May 8, 2012. Cynthia Taeuber, email message, September 10, 2011, and Sawyer, May 1993.

¹²² Refer to "Chapter 4, Studies Compare Census 2000, C2SS and Multi-Year Averages From ACS Test Sites [1999–2001]."

laid out three general prototypes to be tested and evaluated within the Census Bureau. Like Bruce Johnson and Roger Herriot before him, he sought primarily to simplify the decennial census so that the Census Bureau could deliver data more frequently and in a timelier fashion. All three prototypes aligned with key stakeholders' demands that the Census Bureau collect only a basic head count and minimal data during each decennial census. Census Bureau planners likely knew that a convergence of interests would provide the prototypes additional support within a Census Bureau eager to please decision makers controlling budgets within the Administration and the Congress. Data collection traditionally done by the decennial sample survey called the "long form" could be spread over the course of the decade. These first three prototypes of the "continuous measurement" designs were not mutually exclusive, and Alexander said the Census Bureau might consider pulling elements from all three.¹²³

In one prototype, the Census Bureau would conduct a rolling sample census each year. It would sample a fraction of the nation's addresses each year. From this rolling sample census, the Census Bureau would produce annual estimates for "long-form" characteristics for large geographic areas. If the Census Bureau received funding for a large enough survey, the rolling sample census would allow the agency to make annual estimates for "small" geographic areas. The Census Bureau also might be able to add supplementary modules to the questionnaires of this rolling sample census to produce additional content for large areas (subjects to be determined). Unlike later proposals, the reference date would likely be one fixed date with data collected in the 6 months around that date.¹²⁴

A second prototype would use a cumulative rolling sample. Each month, the Census Bureau would survey a fraction of the nation's addresses to produce long-form type information annually for large areas (monthly or quarterly for the nation) by cumulating the sample from each year. To provide data on smaller areas, the Census Bureau would use larger cumulations hypothesized at 2 years or 5 years. Also, data from surveys cumulated over 2 years or 5

¹²³ Charles H. Alexander, "Three General Prototypes for a Continuous Measurement System (CM-1)," U.S. Census Bureau, Washington, DC, January 8, 1993 pp. 3-4.

¹²⁴ Alexander said the sample size would determine how small the geographic areas were for which the system would estimate characteristics. Alexander, "Three General Prototypes," January 8, 1993, pp. 3-4.

years would be necessary for the Census Bureau to produce detailed cross-tabulations even for larger areas. The cumulated surveys would be large enough for the Census Bureau to provide annual, quarterly, and monthly national estimates and general characteristics for the population. They also would be large enough for the Census Bureau to make annual estimates for larger geographical areas and multi-year cumulative estimates for small geographical areas. With this model, the reference date would float throughout the year. Also in this model, the Continuous Measurement Program might draw some data from the Census Bureau's current household surveys, such as the CPS, as long as research showed that doing so would not harm those surveys' primary objectives such as providing monthly unemployment estimates. As with the rolling sample census, Charles Alexander envisioned that the Census Bureau might add supplements to acquire additional content.¹²⁵

Alexander called the third initial prototype for the Continuous Measurement System Integrated Census Updates (ICU), and it drew heavily on his proposal from 1988.¹²⁶ The Census Bureau would estimate basic census block-level characteristics using statistical models.¹²⁷ Most of these updates would be based on the MAF. The Census Bureau would produce estimates based on:

- A census of new addresses in blocks where updates to the MAF identified large changes.
- Data from a representative sample of old and new addresses in other blocks.
- Data from administrative files such as Internal Revenue Service (IRS) records.

¹²⁵ Alexander, "Three General Prototypes," (CM-1), January 8, 1993, pp. 5-6.

¹²⁶ Refer to chapter "Need for Change? The Status of Proposals 1988-1990."

¹²⁷ Alexander did not describe the methods by which the modeling would work but referred readers to works by Alvey and Scheuren and, given his later citations, was influenced by research then being conducted by Ghosh and Rao and Little and Rubin. For Alexander and his colleagues' early work on modeling, refer to Charles H. Alexander and S. I. Wetrogan, "Small Area Estimation With Continuous Measurement: What We Have and What We Want" (Internal Census Bureau Reports CM-14) Census Bureau, Washington, DC, paper to appear in the Proceedings of the 1994 Census Bureau Annual Research Conference, March 22, 1994. For explanations on modeling as conceptualized in 1993 and cited later by Alexander, refer to Wendy Alvey and Fritz Scheuren, "Background for an Administrative Record Census," American Statistical Association Proceedings of the Social Statistics Section, 1982; R. Platek, J. N. K. Rao, C.E. Sarndal, and M. D. Singh, eds., "Small Area Statistics: An International Symposium," Wiley, New York, 1987; M. Ghosh and J. N. K. Rao, "Small Area Estimation: An Appraisal," Statistical Science, 9, 1994, pp.55-93; and R. J. A. Little and D. B. Rubin, Statistical Analysis With Missing Data, John Wiley, New York, 1987.

The range of data products that the Census Bureau created in the Integrated Census Updates would include annual estimates of short-form characteristics for large areas, annual model-based estimates of short-form characteristics for small areas, and possibly model-based synthetic estimates of long-form characteristics for large and small areas.¹²⁸

Both the cumulative rolling sample and the integrated census updates prototypes estimated that the Census Bureau could reduce costs by incorporating data collected from the Census Bureau's current household surveys. The third prototype might use data from administrative records to help produce short-form-type characteristics data for blocks and in the long run might use them to produce long-form estimates.¹²⁹

By the time Alexander presented a rough outline of a Continuous Measurement System to the Technical Committee of the 2000 Census Task Force in February 1993, he and his colleagues had merged the three prototypes. They made that decision based on more brainstorming sessions on how to balance costs of a proposed Continuous Measurement System with methods they determined were feasible. For instance, Alexander informed the Technical Committee that the Census Bureau likely would not be able to meet long-form content needs at an acceptable price

¹²⁸ Alexander, "Three General Prototypes," (CM-1), January 8, 1993, pp. 6-8.

¹²⁹ Alexander, "Three General Prototypes," (CM-1), January 8, 1993, pp. 6-8.

without cumulations of samples. The Continuous Measurement Program would create estimates with data collected from current household surveys and a new Continuous Measurement Sample Survey (Table 2). That new survey would concentrate sampling in blocks identified by MAF updates as undergoing major change and areas not covered by the current household surveys.¹³⁰

In that February 1993 presentation, Alexander stated that data products created by the Continuous Measurement System would be asymmetrical. The Census Bureau would use longer cumulations of samples to create estimates for more detailed characteristics or small demographic groups at each geographic level. Estimates for a given year would have less detail even for large areas.¹³¹

Alexander laid out before the Technical Committee his vision for a large research project, one that likely would not bear results until after the 2000 Census. In February 1993, Alexander reported that he was uncertain whether the Census Bureau would win approval to test continuous measurement as a replacement for the decennial long form because continuous measurement may not have won enough public acceptance by 1995 or 1996.¹³² In particular, sponsors of current surveys might oppose a new

¹³⁰ Alexander, "Overview of Continuous Measurement for the Technical Committee," pp. 2-3.

¹³¹ Alexander, "Overview of Continuous Measurement for the Technical Committee," pp. 4-5.

¹³² Alexander, "Overview of Continuous Measurement for the Technical Committee," p. 9.

Table 2.

Household Surveys Evaluated in Relation to Continuous Measurement (Either as a Source for Data for Continuous Measurement or Later as a Survey Benefiting From Continuous Measurement's Screening, Estimates, or Address Listing)

Name of the Survey Conducted by the Census Bureau	Federal Agency Sponsoring the Survey
Current Population Survey (CPS)	Bureau of Labor Statistics (BLS)
American Housing Survey (AHS)	Department of Housing and Urban Development (HUD)
National Health Interview Survey (NHIS)	National Center for Health Statistics (NCHS)
National Survey of College Graduates (NSCG)	National Science Foundation (NSF)
National Crime Victimization Survey (NCVS)	Bureau of Justice Statistics (BJS)
Survey of Inmates of Local Jails (SIU)	Bureau of Justice Statistics (BJS)
Survey of Inmates of State Correctional Facilities (SISCF)	Bureau of Justice Statistics (BJS)
Consumer Expenditure Surveys (CES)	Bureau of Labor Statistics (BLS)
Bureau of Labor Statistics Rent Survey	Bureau of Labor Statistics (BLS)

Source: U.S. Census Bureau, Continuous Measurement Sample Survey.

survey collecting similar data for their surveys fearing it might open them to the danger that Congressional budget hawks would slash funding for programs they saw as redundant.¹³³ Moreover, the Demographic Statistical Methods Division (DSMD) also determined that the Census Bureau probably could not convince data users of the acceptability of model-based estimates by the deadline necessary to do the testing. For example, members of Congress, local governments, and journalists used to thinking of both the decennial short-form and long-form results as outright headcounts might fear modeling as open to manipulation. In addition, Alexander believed synthetic estimates and inclusion of data from current surveys might not be evaluated fully by 2000. Given all those uncertainties about public and stakeholder acceptance, he told the Technical Committee that the Census Bureau would likely drop the long form for 2000 only if Congress mandated it dropped or if small-area data were not needed.¹³⁴ Alexander's uncertainty would prove prophetic on public reaction but not on the Census Bureau's initial proposed timeline to implement such a program.

Mindful of political and fiscal constraints on the agency's research programs, the Technical Committee strongly advised Alexander to move ahead, while prioritizing those elements of the prototype that could be implemented in time to replace the 2000 long form. Members of the Technical Committee would have been well aware of the House Appropriations Committee's report from the previous September and its charge to the Census Bureau to concentrate research methods on cutting the cost of the next decennial. They also had to have known how that same budget report shaved \$8 million from the Census Bureau's budget request for 1993 while also stipulating that the agency's research that year examine rolling sample surveys.¹³⁵ In this context, Census Bureau executive staff on the Technical Committee advised Alexander to pursue a prototype to be used in the 2000 Census.¹³⁶

¹³³ Alexander, "Overview of Continuous Measurement for the Technical Committee," p. 6; and Charles H. Alexander, "A Prototype Design For Continuous Measurement," (CM-7), U.S. Census Bureau, Washington, DC, n.d. the draft was circulated as an attachment to an April 8, 1993 memo, p. 12.

¹³⁴ Alexander, "Overview of Continuous Measurement for the Technical Committee," p. 5. Alexander, "A Prototype Design For Continuous Measurement," p. 8.

¹³⁵ U.S. House of Representatives, "Making Appropriations," Report 102-918, p. 67.

¹³⁶ Charles Alexander in David Pemberton's notes on a discussion with Charles Alexander, Jay Waite, and Cynthia Taeuber, June 29, 1999, p. 5.

Alexander and his colleagues complied, modifying the prototype to eliminate components he believed would delay its approval or implementation. Alexander dropped the idea of using anything that would duplicate or replace the current surveys. In addition, he reduced the role of synthetic estimates to where they would serve as controls for estimates produced using survey data.¹³⁷

Considering that the properties of large sample surveys were "well known," unlike the use of modeling and incorporation of household survey data, Alexander reshaped the proposal into something that assumed the basic form of what later became the ACS.¹³⁸ The speed with which Alexander took over 20 general ideas for continuous measurement in December 1992 and made one prototype was remarkable, a testimony to his intelligence and writing ability. Also, it was testimony to the willingness of Alexander's superiors to fast-track approval of those drafts.

In April 1993, Susan Miskura, chief of the 2KS circulated Alexander's revised prototype to most senior executives and division chiefs at the Census Bureau and sent it to be refined in a Joint Application Development (JAD) workshop led by Arthur Cresce of 2KS. By that time, Alexander and his colleagues had made a cumulative rolling sample survey the main data collection method. They named the new survey the Intercensal Long Form (ILF) Survey and initially thought it would have a sample size of 250,000 households a month.¹³⁹

The prototype would still use modeling and administrative records but only to provide controls for estimates made from data from the sample survey. Ongoing research would help determine if the administrative data could be used to model content after 2000. In another innovation common to both the April 1993 prototype and the ACS, Alexander suggested following up with only a fraction of households not responding to the mailed questionnaire. That is, the system's interviewers would attempt to

¹³⁷ Memorandum from Charles H. Alexander of DSMD to Susan Miskura, chief 2KS R&D Staff, Proposed Technical Research to Select a Continuous Measurement Prototype & Status of Research on Continuous Measurement (Internal Census Bureau Reports CM-3). U.S. Census Bureau, Washington, DC, March 25, 1993, p. 14; Alexander, "A Prototype Design," p. 7; Alexander, "A Continuous Measurement Alternative," October 23, 1993, p. 40.

¹³⁸ Alexander, "A Continuous Measurement Alternative," October 23, 1993, p. 15. The April prototype did not elaborate how Alexander derived that number.

¹³⁹ Alexander, "A Prototype Design for Continuous Measurement," pp. 1, 4.

interview by telephone only a fraction of households that did not respond by mail and would personally visit a further fraction of potential interviewees missed by telephone. The April 1993 prototype was Alexander's first mention of this idea, one that would prove a key component of the ACS.¹⁴⁰

Winning Internal Stakeholders' Approval of Continuous Measurement to Go Public

In addition to bringing to light Alexander's ideas on how to revise the proposal, the presentation of a Continuous Measurement System to the Technical Committee brought the latest work on the prototypes into the spotlight for Census Bureau executives on the committee who would eventually make the decision to proceed with it. Census Bureau Acting Director Harry Scarr and several associate directors served on the committee, as did division chiefs from the Field and Decennial Statistical Studies divisions.¹⁴¹ Scarr was already a supporter of continuous measurement and had been before moving from the Department of Commerce to the Census Bureau to become acting director. Scarr liked the proposals' ability to deliver intercensal data and believed a mid-decade census was too costly to win funding in light of the benefits it offered.¹⁴²

Alexander pitched the prototype as one that met the senior executives' most pressing needs. These executives were on the verge of releasing a notice in the Federal Register laying out for public comment criteria by which the Census Bureau would judge any design alternative for the decennial census. Alexander's overview specifically addressed how continuous measurement would meet several of the criteria deemed most important by the Census Bureau. For example, it simplified the decennial census's job of producing apportionment and voting rights data by reducing the number of resources the Census Bureau would have to expend compared to the resources required for collecting responses to the long form's greater number of questions. Alexander said continuous measurement met all the "necessary criteria" as identified in the Federal Register.¹⁴³

Furthermore, Alexander told the Technical Committee that cost projections for the new system

¹⁴⁰ Alexander, "A Prototype Design for Continuous Measurement," p. 4-5.

¹⁴¹ Task Force for Designing the Year Census 2000, Reinventing the Decennial Census, p. 75.

¹⁴² Cynthia Taeuber, email message to author, September 5, 2011 and Paula Schneider, interview with author, October 27, 2011.

¹⁴³ Alexander, "Overview for the Technical Committee," p. 8.

were at that time flexible though imprecise. They depended on what data the ongoing content review determined as necessary at the small area and small domain level. If Census Bureau and OMB reviews of federal data requirements showed that small-area data were no longer needed in great detail, the Continuous Measurement System could get by with a much smaller and cheaper survey. In addition, if those reviews showed that a host of data previously collected by the decennial short form were no longer necessary, those variables could be shifted to continuous measurement.

As a result of that shift the decennial census could concentrate more efforts to improve coverage such as greater follow-up with hard-to-reach populations. When describing the model, Alexander directly stated how these possible benefits of continuous measurement met "desirable" criteria of cost reduction and improved coverage laid out in the Federal Register notice.¹⁴⁴ The committee therefore heard many well-grounded ideas that recommended continuous measurement as a major design alternative. Committee members already knew that members of the Congressional oversight and appropriations committees wanted the Census Bureau to seriously consider rolling sample surveys such as the Continuous Measurement Survey.¹⁴⁵ Now they had further evaluation stating continuous measurement might meet the Census Bureau's long standing dream of providing more intercensal data while at the same time helping it gather constitutionally mandated data and potentially fixing budget and coverage problems.

While Alexander's presentation to the Technical Committee helped spur the Continuous Measurement Survey's approval by the Census Bureau for research and development, his statements on content and small-area data paradoxically delayed its implementation. For two senior staff members on the Technical Committee, Alexander's comments created the impression that continuous measurement would not deliver small-area data at all. When those senior staff relayed that impression to data users, it

¹⁴⁴ Alexander, "Overview for the Technical Committee," p. 1. The Census Bureau earlier had gone public with its effort to increase such measures as noted by the GAO. GAO, "1990 Results Show Need for Fundamental Reform," June 9, 1992, p. 51.

¹⁴⁵ Refer to the section in this chapter titled "Gathering Ideas for Design Alternatives" for the Decennial Census Improvement Act.

sparked a firestorm of opposition to the Continuous Measurement Survey proposal.¹⁴⁶

The interpretations of Alexander's remarks to the Technical Committee also underscored a tension within the Census Bureau. Some staff believed that the Census Bureau should concentrate its research and development on making the decennial headcount as accurate as possible. Others prioritized long-form data for its value to data users and perceived its future assured as part of the decennial census. If long-form data was decoupled from the decennial census, the budget for that data collection could be cut and data users left with nothing. Others believed that data users were having to resort to their own data collection by the end of each decade because long-form data had grown too dated.¹⁴⁷

In the Joint Application Development Workshop held May 25–28, 1993, Census Bureau supervisors and statisticians identified benefits of the Continuous Measurement Survey prototype and weaknesses that would have to be evaluated. Workshop participants concluded that the prototype was operationally feasible and the cost estimates, while needing more

concrete numbers, were "not obviously prohibitive."¹⁴⁸ On that basis, in early June 1993, Susan Miskura recommended to Associate Director Robert Tortora and Acting Director Harry Scarr that the Census Bureau take the proposal public in the fall and dedicate the research and design resources needed for this effort. According to Miskura, senior staff saw the potential for the system to provide timely data. "Continuous measurement," Susan Miskura concluded, "is the kind of fundamental reform desired by important external stakeholders."¹⁴⁹ Miskura did not single out which stakeholders, but Acting Director Scarr and other executives had noted the words "fundamental reform" coming from the House Committee on Oversight and Accountability and the General Accounting Office (GAO).¹⁵⁰ Miskura recommended that the executives create a high-level steering committee and interdivisional working teams to flesh out key assumptions and features such as content, cost estimates, and stakeholder concerns.¹⁵¹ The executives agreed.¹⁵² Based in part on recommendations from Susan Miskura and a Joint Application Development Workshop, Census Bureau executives decided that the agency would go public with continuous measurement as one of the two designs it would commence testing in 1995–1996.

¹⁴⁶ Minutes and Recommendations of the Census Advisory Committee of April 15–16, 1993, p. 85. The GAO also interpreted Continuous Measurement proposals as saying that the system would not deliver small-area data. Statement of William M. Hunt, director, Federal Management Issues, General Government Division, United States General Accounting Office, Focused Action Needed Soon to Achieve Fundamental Breakthroughs, testimony before the Subcommittee on Census, Statistics, and Postal Personnel, Committee on Post Office and Civil Service, House of Representatives, GAO/T-GGD-93-32, May 27, 1993. For more information, refer to the section on Campbell Gibson's and William Butz's comments to the Census Advisory Committee

¹⁴⁷ Schneider, interview, October 27, 2011, Campbell Gibson, email message to author, September 1, 2011, Taeuber, email message to author, September 11, 2011.

¹⁴⁸ The document did single out likely operational problems in rural areas. Art Cresce, "Report of the Continuous Measurement Joint Application Development Workshop," Attachment 3 of Memo from Robert Tortora to Members of the Continuous Measurement Design Steering Committee, "First Meeting of the Continuous Measurement Design Steering Committee," June 30, 1993, pp. i-1 to i-3. Note: The JAD participants were "unwilling to claim any concrete benefits for year-zero census coverage or short-form data quality of eliminating the long form. Evidence . . . is lacking." And Continuous Measurement might add benefits for an improved MAF leading to 2010 Census quality or costs but little benefit for Census 2000 quality or costs was seen," p. i-4. Later documents clarified this point, saying initial cost benefits had evaporated when JAD participants proposed tripling sample sizes between 1998 and 2000 to deliver estimates from accelerated cumulations. After that initial 3-year period accelerated to replace data from the long form, sample sizes would fall.

¹⁴⁹ Susan Miskura, "Continuous Measurement—Thoughts for Discussion," a proposal to Census Bureau management, June 10, 1993, p. 1.

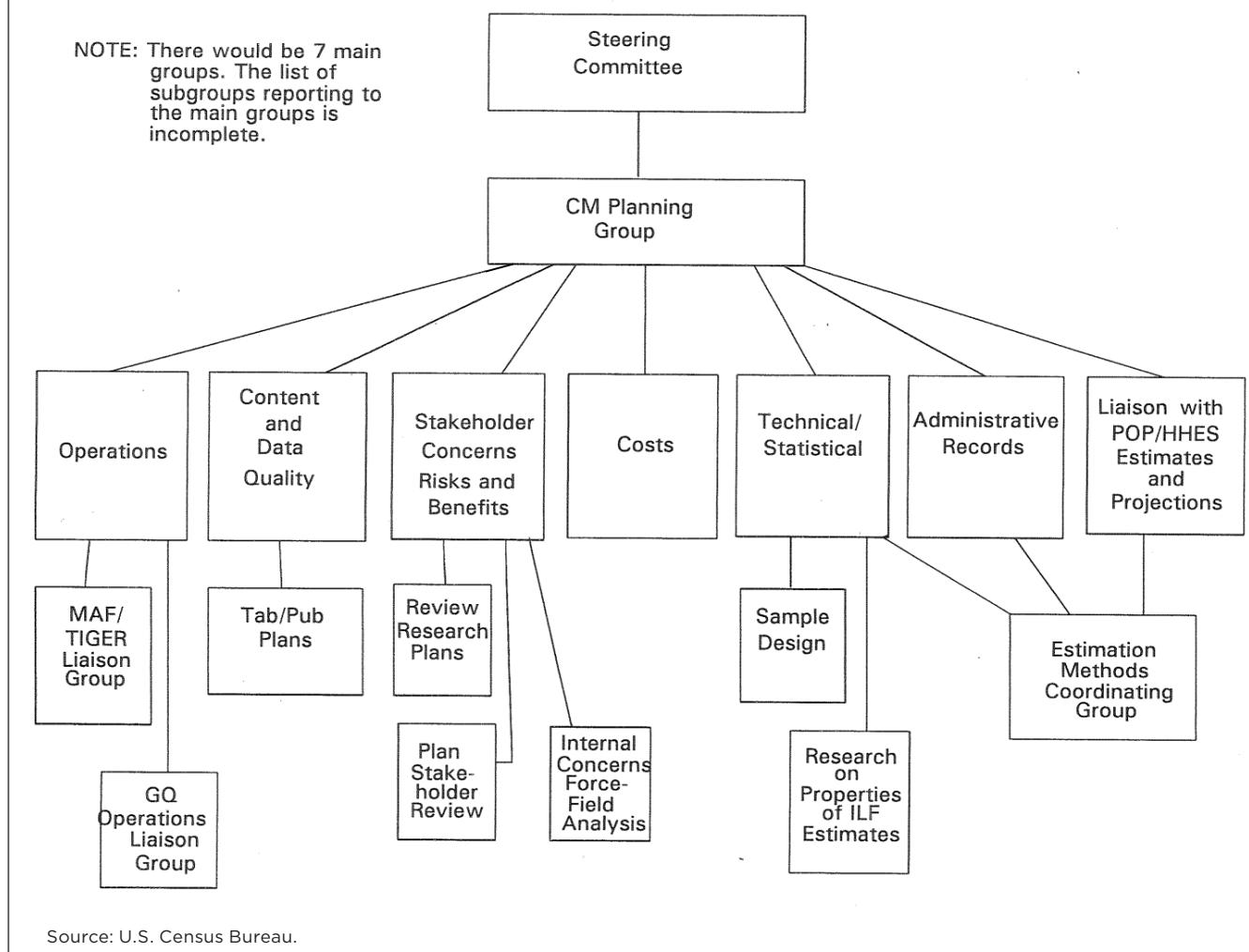
¹⁵⁰ Hearing, June 15, 1991 p. 1, and GAO, "1990 Results Show Need for Fundamental Reform," June 9, 1992.

¹⁵¹ Susan Miskura, "Continuous Measurement—Thoughts for Discussion," p. 1.

¹⁵² Email from Susan Miskura to Charles Alexander, Art Cresce, Jim Dinwiddie, and Joe Knot, June 12, 1993.

Figure 1.

Continuous Measurement Design Steering Committee Charters for Working Teams



Census Bureau executives also may have been swayed by how this model fit with other demands by Congressional and other major stakeholders. As mentioned above, the Appropriations Committee had gone on record instructing the Census Bureau to focus 2000 Census research and development on rolling sample surveys even before Alexander presented his proposal to the Technical Committee.

The Appropriation Committee's report making that stipulation reiterated its members' belief that reducing the number of questions on the decennial would increase response rates and census coverage, while reducing survey costs.¹⁵³ As Alexander's design was the only design alternative using a rolling sample survey, Census Bureau executives saw indications

¹⁵³ House Committee, "Making Appropriations," p 67.

from Congress that they should support continuous measurement.¹⁵⁴

The interim report of Committee on National Statistics (CNSTAT) urged a continuous measurement research program, though somewhat tentatively. The CNSTAT panel released its interim report in May 1993, between the time that Alexander's prototype circulated and the executives decided to go public with continuous measurement. In its report, the panel stated that it saw some promise in continuous measurement but was worried by its possibility to increase census costs. The CNSTAT panel saw more promise in the use of administrative records in census data collection and highly recommended that the Census Bureau engage in research on the probable use of these records for 2010.¹⁵⁵ The revised continuous measurement prototype included an ongoing evaluation of administrative records, making it a vehicle for the Census Bureau to comply with the CNSTAT panel's recommendation.

With these forces swirling in the background, senior executives responded enthusiastically and quickly to the recommendation to pursue continuous measurement in census tests. Tortora, who oversaw census statistical designs and standards, even stated that he wanted to chair a steering committee to bring together heads of various Census Bureau divisions and directorates to spearhead work on continuous measurement.¹⁵⁶ By the end of June 1993, the Census Bureau had created the Continuous Measurement Design Steering Committee and had drawn up char-

¹⁵⁴ Representative Tom Sawyer of Ohio may have given Census Bureau executives yet more reason to consider Continuous Measurement with comments he made in a Congressional oversight hearing in March 1993. At that time, Sawyer suggested that the Census Bureau ought not reject each of the 14 design alternatives for fatal flaws but instead ought to combine "building blocks" and promising elements from several designs. Alexander's revised design looked as if he drew inspiration from Sawyer's comments. It included use of administrative records as controls for estimates in 2000 and for further study as their potential use to provide content down the road. And, as mentioned previously, the model also included the use of sampling for nonresponse follow-up (SNRFU). With administrative records and SNRFU, the prototype incorporated major elements from at least three of the other design alternatives. In reporting the pursuit of Continuous Measurement to Congress, Acting Director Scarf showed the impact of Sawyer's statements. He echoed Sawyer noting that Continuous Measurement used building blocks from other designs. Moreover, he said it was the alternative design that "comes closest to your vision of fundamental changes." House of Representatives Subcommittee on Census and Population of the Committee of Post Office and Civil Service, Review Of Major Census Bureau Programs in 1993, March 3, 1993, p. 2; Susan Miskura, "Forward From 1990: Designing the Census 2000;" and House of Representatives, Planning for the Census 2000, October 7, 1993, p.2.

¹⁵⁵ CNSTAT, Planning the Decennial Census, May 1993.

¹⁵⁶ Sue Miskura to Chip Alexander, Art Cresce, Jim Dinwiddie, and Joe Knott, Untitled Memo, June 12, 1993.

ters for the working teams that would further develop the results of the JAD from May 1993 (Figure 1). With three associate directors (decennial, statistical methods and design, and demographic programs) included among its members, the Continuous Measurement Design Steering Committee had tremendous power within the agency. The committee also benefited from its membership including the divisions chiefs responsible for field operations, demographic surveys, statistical methods, computer-assisted data collection, and design of demographic surveys.¹⁵⁷ By creating and constituting this committee, the executives were cementing the divisions, their senior staff, and their division chiefs to the success or failure of the program.

ISSUES OF CONTENT, DATA COLLECTION, COST, DATA QUALITY, AND STAKEHOLDERS

Questionnaire Content

As previously noted, Census Bureau executives chose continuous measurement as one of two designs to test for the 2000 Census because they perceived it as a means to reduce the complexity of the decennial census by shifting content away from it. The proposal's creators also hoped it would lead to a product with less content than the 1990 long form. Three factors motivated Alexander and his associates in their goal to reduce content. First, they shared a desire with the authors of the Decade Census Program (DCP) of wanting to ask fewer questions of all areas to gain the flexibility to ask even more questions of a subsample of the population compared to the long-form.¹⁵⁸ Second, Alexander theorized the new system might be able to reduce respondent burden by incorporating data already collected by the current household surveys if the OMB and Congress eventually determined that many content items in the household surveys were not needed (Table 2).¹⁵⁹ Third, by April 1993, Alexander, like other Census Bureau staffers previously mentioned, as well as by Rep. Sawyer,

¹⁵⁷ Robert Tortora to members of the Continuous Measurement Design Steering Committee, June 30, 1993.

¹⁵⁸ They would accomplish that task by adding "modules" to the shorter "base" set of questionnaires nationwide or in selected areas. In exchange for providing less data on smaller areas, these modules, essentially supplements, would give Continuous Measurement the flexibility to deliver more data on larger areas or in a given region. Herriot, Bateman, and McCarthy, "The Decade Census Program," and Alexander, "Three General Prototypes," (CM-1), January 8, 1993, p. 6. Modules and supplements were still a goal of even the participants of the Continuous Measurement Joint Development Workshop in May 1993. Cresce, June 9, 1993, p. I-3.

¹⁵⁹ Alexander, "Overview for the Technical Committee," p. 8.

believed that a reduction in content could boost the mail-return rate and thereby reduce costs.¹⁶⁰

Alexander backed away from slashing content as evidence mounted between 1991 and 1993 that data users still needed most, if not all, of the content items. At the same time, the Task Force Policy Committee, particularly the federal agencies directly represented on it, as well as Census Bureau subject matter experts, reviewed legal mandates for census questions from fall 1991 to late 1992.¹⁶¹ For much of this period, Census Bureau subject-matter experts also conducted internal reviews to establish what questions were legally mandated. By February 1993, the Population Division and Housing and Household Economic Statistics Division informed continuous measurement planners that federal programs continued to use most of the items on the 1990 long form. Alexander concluded from that analysis that continuous measurement would have to collect most of the data collected by the 1990 long form and gather enough data on those items to produce estimates down to the tract or block group level.¹⁶² He wrote that the most definitive answer on content needs would come from the OMB, which, because of its role under the Paperwork Reduction Act, had responsibility for coordinating all federal data collection and the power to approve any agency's data collection from more than ten people.¹⁶³

In December 1992, shortly before Alexander met with the Population Division, the OMB formally requested that federal agencies specify their data needs, cite the federal laws and regulations requiring the use of data from the decennial census, and indicate whether continuous measurement could deliver that data to them.¹⁶⁴ In March and April 1993, as the OMB began sharing responses from federal agencies about their data needs to the Census Bureau, continuous measurement planners still hoped that they could eliminate several hard-to-answer questions. These included the respondent's industry and occupation.

¹⁶⁰ Alexander, "A Prototype Design for Continuous Measurement," (CM-7), May 1993, p. 10.

¹⁶¹ Global Report, April 1995, pp. 32–33, 35.

¹⁶² Campbell Gibson of the Population Division suggested, however, that Alexander did not need to view the internal analysis of data requirements as the final word on the subject. Charles H. Alexander of DSMD to Susan Miskura, chief 2KS R&D Staff, "Preliminary Conclusions About Content Needs for Continuous Measurement (DSMD 2KS Doc. #CM-6)," memorandum, U.S. Census Bureau, Washington, DC, February 24, 1993, pp. 1–3.

¹⁶³ Paperwork Reduction Act of 1980, (P.L. 96-511).

<www.congress.gov/bill/96th-congress/house-bill/6410>

¹⁶⁴ Global Report, April 1995, p. 7.

The planners felt that eliminating these questions would reduce the Census Bureau's tabulation costs because responses to them had to be coded by hand. Planners singled out other items for elimination because respondents had trouble recalling the information. These included utility costs and people's time spent commuting to work. As he prepared the April 1993 prototype, Alexander still hoped these questions could be eliminated, simplified, or replaced by the use of administrative records to collect the data.¹⁶⁵

By May 1993, most federal agencies had reported back to the OMB and the Census Bureau that they needed data from all the 1990 long-form items, most with data down to the tract or block group level.¹⁶⁶ In this context, members of the Continuous Measurement Joint Application Development (JAD) Content Group, joined later by the Continuous Measurement Content and Data Quality Work Team, decided to shelve plans to eliminate any of the questions from the 1990 long form on the new ILF questionnaire. In addition, the JAD group decided to keep them because of the questions' critical importance to government programs, even in cases where use of these data was not mandated by federal statute or judicial decisions.¹⁶⁷ JAD Content Group projected 1993–1998 as the timeframe to complete decisions about content for the nationwide launch of a Continuous Measurement Survey slated for 1998.¹⁶⁸

The JAD Content Group's timeline proved correct as debates on content raged through the mid-1990s. The House Appropriations committee expressed congressional intent in its 1993–1995 reports when it directed the Census Bureau to reduce the amount of data it collected. House Appropriations Subcommittee chairman Harold Rogers from Kentucky went so far as to say that certain questions, mandated or not, ought to be cut because he found them intrusive to the point they likely drove down

¹⁶⁵ Alexander, "A Prototype Design for Continuous Measurement," (CM-7), May 1993, p. 10.

¹⁶⁶ GAO, May 27, 1993, p. 15.

¹⁶⁷ Cresce, "Final JAD Report," pp. 1–3 and pp. 3–13.

¹⁶⁸ Even with the federal agencies' justifications, Continuous Measurement planners had to remain prepared for changes in content. The GAO's 1993 response to the OMB's initial review of federal data needs argued that government agencies had made similar statements about their need for data before the 1990 Census. The GAO pointed to its 1986 review of these agencies' prior statements on the legal or programmatic requirements for such data. That review had said that the requirements were not sufficiently demonstrated. In addition, under the Census Act of 1954, Congress and the OMB could reserve making final decisions regarding subjects and questions to be included until 1 year or so before the beginning of the decennial census. Cresce, "Final JAD Report," p. 4–1.

response rates.¹⁶⁹ On the other side of the debate, in its final report released in November 1994, the CNSTAT Panel filled hundreds of pages detailing ongoing data uses by federal agencies, businesses, and state and local governments.¹⁷⁰ Nonfederal data users successfully lobbied the OMB and the Census Bureau to survey several thousand data users about their needs.¹⁷¹ The Association of Public Data Users (APDU) analyzed and published the survey results defending what it called “at-risk” data.¹⁷² Most of the attention from Congress and data users focused on the short form and proposed shifts of content from the decennial to continuous measurement, but the new system’s designers had to be prepared to drop or add questions to the ILF as well.

Census Bureau research on long-form questionnaire response rates gave supporters of continuous measurement more flexibility to accommodate the questions that users demanded. By July 1993, Census Bureau scientists running the Appeals and Long Form Experiment (ALFE) shared their results with Charles Alexander and the continuous measurement work team. The ALFE demonstrated that even a lengthy questionnaire could achieve high response rates if it were accompanied by appeals to respondents emphasizing, for example, the benefits of the survey or the legal requirement to respond. The experiment also showed that response rates increased if forms were easy to read and if questions for individual household members were next to each other on the questionnaires.¹⁷³ Before that experiment, participants in the JAD calculated that the Continuous Measurement Survey would need to interview more households than the 1990 long-form sample, and they concluded that the new system would increase the

¹⁶⁹ Tom Jones, “Member Concerns From the Hearing Record,” n.d. (around 1995), p. 1.

¹⁷⁰ CNSTAT, Modernizing the U.S. Census, November 1994, pp. 113–139, 239–341.

¹⁷¹ Minutes and Recommendations of the Census Advisory Council, April 16, 1993, and Minutes and Recommendations of the Census Advisory Council, April 24, 1994.

¹⁷² Association of Public Data Users, APDU Year 2000 Content Working Group Final Report on Activities, Report I, April 12, 1995.

¹⁷³ Refer to Robert D. Tortora, Susan M. Miskura, Don A. Dillman, “Onward Towards A Census 2000 Design: Research Results,” Proceedings of the Joint Statistical Meetings, 1993, Keeley 1993. Refer also to James B. Treat, “1993 National Census Test Appeals and Long-Form Experiment. Appeals or Short-Form Component: Final Report,” DSSD Census 2000 Memorandum Series #E-62, U.S. Census Bureau, October 29, 1993; James B. Treat, “1993 National Census Test Appeals and Long-Form Experiment. Long-Form Component: Final Report,” DSSD Census 2000 Memorandum Series #E-63, U.S. Census Bureau, November 17, 1993, as referenced in Don A. Dillman, Jon R. Clark and James B. Treat, “Influence of 13 Design Factors on Completion Rates to Decennial Census Questionnaires,” a paper prepared for presentation at the 1994 Annual Research Conference of the U.S. Census Bureau, April 5, 1994.

burden on the average U.S. household. On the upside, the JAD participants had theorized that, if they could reduce nonresponse rates, they might be able to cut the sample size by 20 percent.¹⁷⁴ When the ALFE results came in, work teams planning the Continuous Measurement System raised their expected mail-return rate estimates for the ILF, and they cut the sample size accordingly.¹⁷⁵

With the ALFE results in hand and with an eye towards meeting federal and nonfederal data users’ needs as highlighted in the CNSTAT and APDU reports, the Census Bureau planned its Continuous Measurement Test to test a 16-page questionnaire. The questionnaire heeded the conclusions of the ALFE by incorporating respondent-friendly designs and understandable skip patterns.¹⁷⁶ Furthermore, Alexander played up the strengths of the Continuous Measurement System for federal and other users wanting more content. As the system collected data across the years, it could evolve to meet the new needs of data users, adding supplements of 5–10 questions.¹⁷⁷

Budget

Members of Congress had mandated research into rolling sample surveys as a measure to rein in cost increases from the decennial census even as planners in the Census Bureau initially thought such surveys would boost costs. At a 1992 meeting of the Census

¹⁷⁴ They based this conclusion on assumption that estimates from the Continuous Measurement Survey had to match the reliability measures of estimates from the 1990 Census sample. Continuous measurement would need to sample more households than did the 1990 Census, they theorized based on two factors. First, they assumed that response rates would be lower for a survey in a setting outside of the heightened publicity of the decennial census. Second, with continuous measurement’s sample spread over 3–5 years, it did not benefit from a finite population correction. Thus, with a larger number of households asked the questions, the total burden would rise even as the questionnaire length was the same. Cresce, pp. i-4, 2–6. Refer also to Charles Alexander, “Determination of Sample Size of the Intercensal Long Form Sample Survey Prototype,” (Internal Census Bureau Report, CM-8), pp. 6, 7.

¹⁷⁵ Alexander, “Continuous Measurement Alternative,” pp. 24 and 17; and Charles H. Alexander, assistant chief for Longitudinal and Expenditure Surveys to Barry Edmonston, study director Panel on Census Requirements in the Year 2000 and Beyond, August 24, 1994, Attachment A, p. 1.

¹⁷⁶ In terms of skip patterns, a respondent for whom the follow-up question did not pertain would be asked to skip ahead only a few inches down the form not several pages ahead. S. Love, D. Dalzell, and C. Alexander, “Constructing a Major Survey—Operational Plans and Issues for Continuous Measurement,” paper presented at the 1995 Annual Meeting of the American Statistical Association was published in the 1995 Proceedings of the Section on Survey Research Methods of the American Statistical Association Vol. 2, p. 584.

¹⁷⁷ Alexander, “Continuous Measurement Alternative,” pp. 5, 38, and Alexander, “A Prototype Continuous Measurement System for the U.S. Census of Population and Housing,” (Internal Census Bureau Report CM-17), paper presented at the Population Association of America, May 5, 1994, pp.14–15.

Advisory Committee (CAC), Susan Miskura warned statisticians and policymakers that over the course of a decade, Continuous Measurement costs might exceed those incurred by the decennial long form it replaced. Still, key members of Congress continued to believe that rolling sample designs would save money. Congressman Tom Sawyer and the House Appropriations Committee had mandated in 1992 and 1993 that the Census Bureau study rolling samples based on their belief that the public's low response to the long form in 1990 had boosted the overall cost of the decennial census.¹⁷⁸ Sawyer and the Appropriations Committee's statements that the system might cut decennial costs provided a major impetus for the Census Bureau to include continuous measurement as one of the designs it would study. Charles Alexander, the chief statistician planning continuous measurement, would later say that Congress' beliefs about continuous measurement's potential to contain costs helped get the proposal consideration, along with its promise to meet the Census Bureau's long-held desire to deliver more timely data.¹⁷⁹

In May 1993, when Acting Census Bureau Director Harry Scarr unveiled the Census Bureau's 14 alternative census designs (including continuous measurement) to Congress, he reiterated a prior statement that the Census Bureau would judge census redesigns based on their ability to contain costs as one of three overarching goals. Scarr, however, hedged on the issue during that testimony, saying that steps to reduce the differential undercount could come into conflict with the cost containment goal. As for the Continuous Measurement Design, Scarr said the Census Bureau would have a better idea of the cost estimates as it developed the prototype.¹⁸⁰

¹⁷⁸ Census Bureau, Minutes and Recommendations of the Census Advisory Committee of Professional Associations, April 24, 1992, p. 7; Appropriations Committee Report, September 1992; and Sawyer, May 6, 1993. Members of Congress were not alone in this train of thought. Census Advisory Committee member Velma Montoya in April 1992 said that continuous measurement might reduce costs because a short-form only decennial census would not require as large of an organization and effort. Montoya was serving at that time as one of George H. W. Bush's appointees to the OSHA Review commission and professor of finance at California State Polytechnic.

¹⁷⁹ Alexander, "Integrating the Continuous Measurement System Into Household Surveys," (CM-19), p. 21, and Charles H. Alexander, "A Prototype Continuous Measurement System for the U.S. Census of Population and Housing," (Internal Census Bureau Reports CM-17) U.S. Census Bureau, Washington, DC, May 5, 1994, presented at the Annual Meeting of the Population Association of America, p. 1.

¹⁸⁰ House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, Review of Interim Report by the National Academy of Sciences on Census Reform, May 27, 1993, pp. 28f and 65f.

The differences between Miskura's and Scarr's statements underscore a debate within the Census Bureau over the system's projected costs. The side advocated by Scarr had more support by May 1993. The circle around Alexander believed Miskura was wrong and that a short-form-only decennial census would boost response rates. They also thought that a simplified decennial census would benefit from lower training costs as enumerators did not need to learn about as many questions. Furthermore, local census offices could likely close sooner.¹⁸¹

Congressional appropriators reacted negatively to Scarr's lack of specifics, such as assumptions on the response rates of the proposed Continuous Measurement Survey and how its field and processing costs could be controlled, especially when others stepped in with their own figures. In the absence of cost estimates for the new system from the Census Bureau, the CNSTAT Requirements Panel's interim report served as an initial primary guide when presented to the Congressional oversight committee. The report's principal author, Charles Schultze from the Brookings Institution, told Congress that while precise cost estimates were not available and while continuous measurement would reduce the marked increase in costs around the decennial year, Herriot's 1988 work indicated that a Continuous Measurement Survey would cost much more than the 1990 Census.¹⁸² The House Appropriations Committee reacted strongly to the Census Bureau's release of its design alternative recommendations a few weeks later by seeking to cut 65 percent from the Census Bureau's funding request for 2000 Census planning.¹⁸³ In August 1993, American Demographics reported that the committee's members felt the Census Bureau had not presented design recommendations that gave it any clearer sense how the

¹⁸¹ Taeuber, October 10, 2011. Related discussions also centered on developing alternative cheaper options with smaller sample sizes. Taeuber, email message to author, October 10, 2011, and Navarro, email message to author, September 20, 2011.

¹⁸² House Subcommittee, Review of Interim Report, May 27, 1993, p. 28f.

¹⁸³ Some Census Bureau staff expressed the concern that the system's budget might be cut before it had cumulated 5 years of data. The House Appropriation Committee's actions intensified these concerns of many staff, who also had memories of 1980s budget cuts and staff reductions fresh in their minds. Electronic correspondence from Cynthia Taeuber and Campbell Gibson, September 2011.

proposed designs would reduce costs or improve census accuracy than it had in 1992.¹⁸⁴

Reminded by the GAO how mid-decade census proposals faltered when they failed to demonstrate cost savings, Alexander and the continuous measurement work teams developed detailed cost estimates; the first estimates were not encouraging. A work team from the Continuous Measurement-Joint Application Development (CM-JAD) Workshop had calculated that the Continuous Measurement System would need to mail out close to 800,000 questionnaires a month if it needed to match the long form's reliability at the census tract level and produce an initial set of 3-year estimates for 1999–2001. In June 1993, Edward Kobilarcik, a statistician from the 2KS Team, put the 800,000 questionnaire requirements and other assumptions from the CM-JAD through the 2KS cost model. He projected the system would cost \$116 million a year. He also calculated that the savings from dropping the long form in 2000 would pay for only about 2.25 years of continuous measurement, potentially validating critics.¹⁸⁵

As the high-cost estimates began circulating among staff working on continuous measurement and the executives overseeing it, Associate Director for Demographic Programs Bill Butz advised members of the Steering Committee that, if they were

¹⁸⁴ Linda Jacobsen, "Census Budget Slashed 65 Percent," *American Demographics*, August 1993, Vol. 15 Issue 8, p. 10. In addition, despite Harry Scarr telling a Congressional hearing in March 1993 that the overarching goal in designing the 2000 Census was reducing the undercount and containing costs, the Census Bureau's initial Federal Register notice had not ranked containing costs among the mandatory criteria by which said it would evaluate alternative census designs. Representative Sawyer responded by submitting official comments saying, "reduction of the differential undercount and containment of cost should be the two most important goals" for the next census. Harry Scarr's Written Responses to Questions submitted by Congressman Albert Wynn (MD), March 2, 1993, included in House Subcommittee on Census and Population, House Subcommittee on Census, Statistics, and Postal Personnel of the Committee of Post Office and Civil Service, Hearings, Review of Major Census Bureau Programs in 1993, March 2, 1993, 103rd Cong., 1st Sess., 1993, and Representative Thomas C. Sawyer, chairman of the Subcommittee on Census, Statistics, and Postal Personnel to Harry A. Scarr, acting director of the U.S. Census Bureau, April 9, 1993, on official subcommittee stationery, p. 2.

¹⁸⁵ Ed Kobilarcik to Members of the Continuous Measurement Design Steering Committee and Workshop Participants, "A First Look at Continuous Measurement Costs," memorandum, July 12, 1993. To project the costs of Continuous Measurement, Kobilarcik was instructed to assume the following: a response rate of 50 percent on the mailed questionnaires, 15 percent of returned questionnaires would require follow-up for missing content or coverage, telephone interviewers would follow up with 100 percent of households not responding by mail, personal visit follow-up with a subsample of households missed by mail and telephone. Planners working on Continuous Measurement also had Kobilarcik project costs for personal visit interviewers working to update the master address file in blocks where they were conducting an interview.

going to present several options, they should not deliver this most expensive option first.¹⁸⁶ Along those lines, through the late summer and fall of 1993, the Continuous Measurement Steering Committee requested Kobilarcik to run a gamut of cost models based on high-, middle-, and low-range assumptions for key variables such as response rates and rates for the availability of telephone numbers. In addition, he ran the numbers for cost projections, in which the Continuous Measurement System would produce 5-year estimates from a reduced mail-out of 500,000 questionnaires.

Census Bureau staff also moved forward with contemplating even less costly proposals. As part of the CM-JAD, Alfredo Navarro, a mathematical statistician from the Decennial Statistical Studies Division, had been assigned to work through the statistical underpinnings. He examined the claim that the Continuous Measurement System could produce estimates of comparable quality with a reduced sample size if its weighted non-response rate was half that of the 1990 Census long form.¹⁸⁷ For its part, the Continuous Measurement Team (CMT) requested Kobilarcik develop cost estimates for scenarios where the system would not oversample small governmental units (SGUs), and where the sample size was reduced to 64 percent of the figure after the oversample had been taken out. These changes would result in a mailout of 250,000 questionnaires a month.¹⁸⁸ According to Navarro's calculations, estimates from this reduced sample would be only slightly less reliable than comparable estimates from the 1990 long form. That is, for a characteristic shared by 10 percent of the population of an average-sized census tract, the coefficient of variation (CV) of an estimate would increase

¹⁸⁶ "Summary of 7/8/93 Meeting Continuous Measurement Steering Committee," Attachment C of Robert Tortora to Continuous Measurement Steering Committee, "Materials for August 4 Workshop," memorandum, August 2, 1993, p. 2.

¹⁸⁷ Art Cresce, "Report of the Continuous Measurement Joint Application Workshop Conducted May 24, 25, and 28," June 9, 1993, Chapter 1, p. 11. The exact wording from the CM-JAD report was as follows: "An improvement in response rates cuts into the sample size requirement." And "If ILF [the Intercensal Long Form of the Continuous Measurement System] cut the (weighted) long-form non-response rate in half (from 15 percent to 7 percent), we would be able to reduce the sample size by 20% to give data of a 'comparable' quality (provided this can be supported theoretically)," Chapter 1, p. 11.

¹⁸⁸ Cresce, "Report of the Continuous Measurement Joint Application Workshop Conducted May 24, 25, and 28," June 9, 1993, Chapter 1, p. 11. Paula Schneider confirmed that the Census Bureau was considering dropping the oversampling of SGUs. Paula Schneider, October 27, 2011.

by 25 percent from the same figure for the census long form.¹⁸⁹

For his part, Alexander argued that for many uses, the timeliness of the Continuous Measurement System's data and improvements over the decennial long form in terms of nonsampling error made the proposed system's data better in terms of overall error (or mean squared error, MSE) than what the decennial sample survey offered.¹⁹⁰ With Congress angered over a lack of savings, Kobilarcik and Navarro's projects became vital to the success of continuous measurement, but first the situation became even bleaker.

In September 1993, the Continuous Measurement Team presented the Census Advisory Committee with estimates forecasting that conducting Continuous Measurement would cost anywhere from \$58 million to \$100 million per year.¹⁹¹ The GAO picked up the \$100 million number and submitted testimony to Sawyer's congressional committee that, at that price level, data users had valid concerns that continuous measurement would not be funded.¹⁹² A month after the Continuous Measurement Team's (CMT) presentation, Representative Sawyer gave continuous measurement a lifeline in a Congressional hearing. In contrast to CMT projections, Sawyer suggested that while Continuous Measurement might raise the Census Bureau's data collection costs, the data collected would be timelier and, quite possibly, considerably more abundant.¹⁹³

After Sawyer's statement, the Continuous Measurement Cost Model Work Team advanced a list of other areas in which the system might save the Census Bureau money. For example, in May 1994, Alexander stated that a MAF updated by continuous

measurement might eliminate the need for address canvassing during the 2010 Census.¹⁹⁴

In addition to these possible cost savings, results of the ALFE enabled Alexander to report cost figures based on more favorable assumptions of 60 percent mail response rates. Thus, the Continuous Measurement Planning Group lowered cost estimates by the fall of 1993, and by the beginning of 1994, Alexander used figures derived from the mid-range scenario to support a \$58.5 million-a-year cost estimate. In this scenario the Census Bureau would not oversample SGUs, and the sample size would be 64 percent of his original estimate (Table 4).¹⁹⁵

With the reduced costs of the Continuous Measurement System in the prototype and with statements of costs savings in hand, Alexander and Scarr told audiences that under some of the scenarios, continuous measurement might be cost neutral in terms of the entire federal statistical system even if its data collection was more expensive than the long form. That is, in addition to reducing costs from the long form, continuous measurement could save the Census Bureau money when updating the MAF. Those cost savings, when added to the already mentioned savings to other federal surveys, might be more than the projected cost of running the Continuous Measurement System.¹⁹⁶

All of the work on cost estimates occurred in the context of data users fearing that the Continuous Measurement System's costs would mean it would never be implemented. From the beginning, data users and federal agencies sponsoring the Census

¹⁸⁹ Art Cresce, "Report of the Continuous Measurement Joint Application Workshop Conducted May 24, 25, and 28," June 9, 1993, Chapter 1, p. 11. The reports produced on Continuous Measurement 1993-1994 said of the reliability of estimates that "using 64 percent of the basic sampling rate increases coefficients of variation by 25 percent." Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 25.

¹⁹⁰ Alexander, "A Prototype Design For Continuous Measurement," (CM-7), n.d. but circulated by April 1993, p. 12.

¹⁹¹ Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 25.

¹⁹² Statement of L. Nye Stevens, director, Planning and Reporting, General Government Division, Decennial Census: Test Design Proposals Are Promising, But Fundamental Reform Is Still at Risk (GAO/T-GGD-94-12 October 7, 1993, p. 5).

¹⁹³ Congressman Tom Sawyer, Opening Statement, "Hearing to Review the Status of Planning for the Census 2000," October 7, 1993, p. 2.

¹⁹⁴ On this point, Alexander's expectation proved not to be feasible for the 2010 Census. In addition, Continuous Measurement might help locate members of rare subpopulations that other federal surveys, such as the National Health Interview Survey (NHIS), would otherwise spend a great deal of money to locate. Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 28, and Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, pp. 6 and 14.

¹⁹⁵ Charles H. Alexander, Demographic Statistical Methods Division (DSMD) to Robert Tortora, associate director, Statistical Design Methodology and Standards (SDMS), "Further Exploration of Issues Raised at the CNSTAT Requirements Panel Meeting," memorandum, (Internal Census Bureau Reports CM-13), U.S. Census Bureau, Washington, DC, January 31, 1994, p. 2, and Charles H. Alexander, assistant chief for Longitudinal and Expenditure Surveys to Barry Edmonston, study director Panel on Census Requirements in the Year 2000 and Beyond, August 24, 1994.

¹⁹⁶ U. S. House of Representatives Subcommittee on Census, Statistics, and Postal Personnel of the Committee on Post Office and Civil Service, Status of Planning for the Census 2000, Washington, DC, January 26, 1994, 103rd Cong., 2nd sess., 1994, pp. 36, 47, and Charles H. Alexander, "A Prototype Continuous Measurement System for the U.S. Census of Population and Housing," (Internal Census Bureau Reports CM-17), U.S. Census Bureau, Washington, DC, May 5, 1994, presented at the Annual Meeting of the Population Association of America, p. 6.

Bureau's current household surveys feared the system's budget would be cut in the middle of cumulating 5-year data (Tables 3a and 3b) based on similar recent events. Most notably, David Crowe, a witness representing the Housing Statistics Users Group (HSUG), told Congress in 1992 that he worried that any new survey or expansion of existing ones would suffer the same fate as the Annual Housing Survey. Its funding was cut back so severely in the early 1980s that it could be administered only biennially and had to be renamed the American Housing Survey.¹⁹⁷

Alexander responded to data users' concerns about the reliability of funding for the proposed system in April 1994, by saying that it would be easier to answer such questions once research and testing proved its workability and made its cost estimates clearer. He also argued to the Census Advisory Committee (CAC) that the system's frequently released data products might have an easier time winning Congressional budgetary support than would a long form producing data once a decade.¹⁹⁸ Unmoved by Alexander's argument, the GAO reminded data users and the Congressional committee overseeing the Census Bureau how Congressional appropriators had threatened the Census Bureau's budget in the previous 1993–1994 session.¹⁹⁹ Less than a month after Alexander's presentation to the CAC, some demographers and statisticians voiced alarm to a reporter from the New York Times that replacing the long form would mean "taking a valuable data-collection tool from the required once-in-a-decade head count, with no guarantee that Congress would finance the proposed monthly surveys." In comments to The New York Times, CAC member and director of policy studies at the Population Reference Bureau Inc., Martha Farnsworth Riche, said that potential threat to data products clashed with society's entry into an Information Age in which technology made Americans increasingly reliant on information.²⁰⁰

¹⁹⁷ As a result of those cuts, the survey was renamed the American Housing Survey. House Subcommittee on Census and Population of the Committee of Post Office and Civil Service, "20th Century Planning: Decennial Questionnaire Content," hearing, 102nd Congress session, October 1, 1992, p. 106.

¹⁹⁸ Census Bureau, Minutes and Recommendations of the Census Advisory Committee of Professional Associations, April 14–15, 1994, p. 22.

¹⁹⁹ William Hunt, "Bureau of the Census: Management Issues Require Prompt Attention," GAO T-GGD/AIMD-94-171, June 9, 1994, p. 1, and House Committee, Making Appropriations for the FY Ending September 30, 1993, pp. 66–67.

²⁰⁰ Steven A. Holmes, "Census Officials Plan Big Changes in Gathering Data," New York Times, May 16, 1994.

Data Collection

Changes in proposals for data collection were also driven by cost and coverage concerns. These changes went beyond Alexander's aforementioned move from the DCP's proposal of primary collection via telephone to collection via mail. By mid-1993, the team shelved initial proposals hypothesizing that the survey could draw data from current surveys—especially the CPS—not just because that move might cause technical and political problems but also because initial cost estimates showed that data collection method likely would be more expensive than running a separate Continuous Measurement Survey.²⁰¹ The model still projected that, after the current household surveys were redesigned to use the MAF as their sampling frame, the Census Bureau could link these data to the ILF data and previous census short-form data to make synthetic estimates. Linking data might also make it possible to reduce the sample size of the ILF after 2000 and thereby further reduce the costs of the Continuous Measurement System.²⁰²

Because of the high travel costs entailed in the procedure, Alexander and his colleagues shifted their thinking on the procedures for collecting data via personal visits in sparsely populated areas. Alexander had theorized in the first prototype in April 1993 that interviewers conducting the personal visit follow-ups in such areas might collect data for several months of samples at one time. This would allow them to pool the subsample personal interviews so that such interviews would be clustered.²⁰³ The participants of the CM-JAD workshop added that American Indian and Alaska Native areas might also have intermittent clustering of personal interviews.²⁰⁴ In March 1994, the Continuous Measurement Planning Group kept the subsampling rate in sparsely populated areas at 1 in 5.²⁰⁵

The initial proposal to eliminate the oversample of small governmental units was another change in data

²⁰¹ Charles H. Alexander, "Including Current Household Surveys in a 'Cumulated Rolling Sample' Design" (Internal Census Bureau Reports CM-5), U.S. Census Bureau, Washington, DC, n.d., p. 14.

²⁰² Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, pp. 4 and 13.

²⁰³ Alexander, "A Prototype Design," p. 6.

²⁰⁴ Cresce, "Final Version of JAD Report," August 31, 1993, Chapter 1, p. 2.

²⁰⁵ Charles H. Alexander and S. I. Wetrogan, "Small Area Estimation With Continuous Measurement: What We Have and What We Want," (Internal Census Bureau Reports CM-14), U.S. Census Bureau, Washington, DC, paper to Appear in the Proceedings of the 1994 Census Bureau Annual Research Conference, March 22, 1994, p. 16. The American Community Survey eventually did adopt the use of clustering interviews in Remote Alaska areas where travel costs are high and in certain types of group quarters.

Table 3a.

Proposals on the Continuous Measurement System for CM 10, 11, and 12: 1993-1994

Proposal Title (Abbreviated)	A Continuous Measurement Alternative (CM-10)	Overview of Research on the Continuous Measurement Alternative (CM-11)	Progress on Continuous Measurement Prototype (CM-12)
Proposed by	C. Alexander	C. Alexander	C. Alexander
Date	10/28/1993	8/10/1993	3/15/1994
Audience receiving the report or statement	Unknown	Joint Statistical Meetings	Unknown
Components of the proposed system	<p>Refer to CM-7:</p> <ol style="list-style-type: none"> 1. Continuous Improvement Frame (of MAF) (CIF). 2. Intercensal Long Form (ILF) survey for tracts or BNAs 3. Integrated Estimates Program (IEP)—an ongoing effort to integrate data from current surveys, the ILF and administrative records to create updated estimates for small areas to use as controls. 4. General Purpose Frame (GPF) to be used by all current surveys. 5. Drastic reduction of 2000 Census content to be replaced with ILF. <p>The IEP might eventually lead to cheaper ways to produce the ILF data.</p>	Whole paper is a condensed version of CM-10, sample from a continuously updated MAF, ILF, IEP—in the future the Census Bureau would link the ILF and household survey data to the MAF to make small area estimates with a smaller ILF survey.	MAF, ILF, Program of Integrated Estimates (PIE)—a R&D project would determine if after 2000 the Census Bureau could use the household surveys and ILF to make estimates.
Sample size	<ul style="list-style-type: none"> • 500,000/mo mailout 2002–2012 (effective sampling rate .173 over 5 years). • 800,000/mo mailouts for 1999–2001. • Would explore reducing the sample size as well (eliminate the oversample of small govt. units (SGUs), and reduce basic rate by 64 percent). 	500,000/mo mailout (but would consider taking out the SGU oversampling and reducing the sample by 64 percent).	250,000/mo, <400,000/mo for 1999–2001.
Size of areas for which annual estimates would be provided	250,000+	250,000+	250,000+
Size of areas for which 5-yr estimates would be provided	Under 250,000.	NA	Under 250,000.
Oversampling Y/N details	Possibly. If it oversampled small govt. units even more than did the 1990 long form, the CV would still be 1.10 X 1990; if no oversample, CV = 2.6 X 1990; if 64 percent, CV = 3.3 X 1990.	Oversample small govt. units.	NA
Reliability of data (most often expressed in terms of the coefficient of variation (CV))	The full sample would match the long form's 10 percent CV for a characteristic of 10 percent of the population at the tract level. A sample reduced to 64 percent of that "full" size would produce a 25 percent higher CV than what the 1990 long form did.	A 64 percent sample would produce a 25 percent higher CV than what the 1990 long form did.	25 percent greater than 1990 LF.
Projected start of full implementation	1999	1998	1999
Relationship to CPS, other household surveys	CM would replace portions of them.	From CM-5 onward determined that simply expanding household surveys would not work and the cost effectiveness of combining parts was small.	Greater integration after 2000, CM might replace portions of the NHIS sample, could not replace CPS except the PIE might be used in place of CPS population estimates.
Cost estimates for the proposed system	\$58-\$100M/yr (\$580-1000M for 2003-2012) might pay for itself thru savings—no long form in 2000 (\$300M) address list savings in 2010 (\$100M) and savings to household surveys.	NA, said would need to make decisions on 2KS cost model.	\$43-73M/yr (\$580M ±150 for 2003-2012) but savings of \$4-\$64M/yr. (\$340M ±100-300).

Source: U.S. Census Bureau.

Table 3b.

Proposals on the Continuous Measurement System for CM 13, 17, and 20: 1994-1995

Proposal Title (Abbreviated)	Responding to CNSTAT Meeting (CM-13)	A Prototype Continuous Measurement System (CM-17)	Continuous Measurement and the Statistical System (CM-20)
Proposed by	C. Alexander	C. Alexander	C. Alexander
Date	1/31/1994	5/5/1994	5/23/1995
Audience receiving the report or statement	Committee of National Statistics (CNSTAT), Census Bureau R&D experts, and the assoc. dir. for Statistical Methods.	Annual Meeting of the Population Association of America April 1994.	Annual Labor Market Information Conference.
Components of the proposed system	NA	<ul style="list-style-type: none"> • A sampling frame based on MAF with field operations to update it. • ILF. • Program of Integrated Estimates (PIE) use data from ILF, household surveys, AdRecs to create synthetic small area estimates that would be good for poverty, income, and housing quality estimates. 	MAF, CM survey, supplement surveys, PIE.
Sample size	250,000/mo. (233K mailout) (taking out the oversampling had reduced the sample to 402,000, 64 percent of that was 257,000).	250,000/mo. mailout (resulting in approximately 200,000 interviews/mo.) 400,000/mo mailout for 1999-2001.	250,000/mo. mailout 400,000/mo. mailout for 1999-2001.
Size of areas for which annual estimates would be provided	NA	NA	250,000
Size of areas for which 5-yr estimates would be provided	NA	Small areas and small domains.	All.
Oversampling Y/N details	Planned to drop oversampling of small govt. units unless users proved need.	No, planned for same rate for all places might modify if 2000 Census content determination process established that it was needed, or might send more mail to poor response areas or higher personal visit follow-up there.	Yes, for areas under 2,500 in population.
Reliability of Data (most often expressed in terms of the coefficient of variation (CV))	25 percent higher CV than 1990 LF, but the reduction in bias meant that the mean square error (MSE) for continuous measurement was better than that of the long form.	25 percent greater than 1990 LF (in part because sampling nonresponse follow-up would mean reaching 12.0M vs 14.5M for 1990 LF), loss of precision for group quarters and vacant units.	25 percent greater than 1990 LF.
Projected start of full implementation	NA	1999	1999
Relationship to CPS, other household surveys	NA	PIE: after 2000, all these surveys use MAF for samples, the PIE would help improve substate estimates for the CPS, where the CM survey revealed members of rare populations lists of those units could be given to other agencies doing surveys for them to use as a screen.	CPS from CM survey sample, other add on survey questionnaires being worked out with other statistical agencies.
Cost estimates for the proposed system	\$59.5M/yr. with some other savings on address list.	No direct cost estimates but said, "Some preliminary calculations for design purposes did suggest that, for the prototype sample size, there is some chance that the savings produced by CM over the entire federal system could equal or exceed the cost of the CM operation."	NA

Source: U.S. Census Bureau.

collection spurred by cost concerns. Paula Schneider, then head of the Field Division, pointed out to the Continuous Measurement Steering Committee that such oversampling was no longer necessary. It was added the 1980 Census would provide more reliable income figures to meet the needs of the General Revenue Sharing Act. But with the act no longer in effect, that requirement for oversampling had disappeared even if new uses for its data had emerged.²⁰⁶

Alexander and his colleagues deviated from cost concerns when it came to implementing data collection measures to offset coverage limitations, including differential undercoverage. The CM-JAD participants recommended mailing a Spanish-language questionnaire (something the 1990 Census had not done).²⁰⁷ They suggested that the system would increase sampling rates in areas it found to have higher nonresponse rates.²⁰⁸

Nonresponse Followup Operation (NRFU) and Coverage

Proponents of continuous measurement pitched the system's uses of technology and new procedures to address nonresponse, item nonresponse, and to improve survey coverage. The proposal depended on a continuously updated MAF to mitigate some of the effect where surveys were known to have higher undercoverage than did the census. A continuously updated MAF would help improve the accuracy of continuous measurement's sampling frame. The authors of later proposals added extra field listing operations and used the newly built Emergency 911 systems in areas with many noncity style addresses to improve coverage by ensuring against addresses missing from a MAF updated initially by the USPS Delivery Service File.²⁰⁹

Continuous measurement's use of subsampling and of experienced permanent field representatives would likely improve on data quality by adjusting for item nonresponse. In October 1993, Alexander still thought that continuous measurement would have similar item nonresponse rates to those of the 1990 Census

²⁰⁶ Cresce, "Final Version of JAD Report," August 31, 1993, Chapter 1, p. 2, and Chapter 1, p. 8; and Art Cresce, "Meeting Data Needs in a Continuous Measurement Environment," paper delivered to the Annual Meeting of the Population Association of America, May 5-7, 1994, p. 9.

²⁰⁷ Cresce, "Final Version of JAD Report," pp. 1-10.

²⁰⁸ Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 10. Refer to Chapter 4 for when this procedure was adopted as part of the ACS.

²⁰⁹ Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 6.

long form, but its staff of interviewers would have more opportunity to reinterview households because they were only going to a subsample of them. Also, permanent field staff would have more training than the 1990 Census army of temporary census takers. This training would help them improve the quality of the data they collected. At that time, Alexander's reports did not go into details.²¹⁰ However, Paula Schneider (who then served as the head of field operations at the Census Bureau and was actively involved in continuous measurement) recalled that "a lot of enumerators did not like to ask questions such as income."²¹¹ The Census Bureau would have greater ability to implement quality control over the work of continuous measurement's experienced interviewers than it did during the huge operation involved in the decennial census.²¹² Experienced interviewers would also likely have more success encouraging respondents to answer such questions.²¹³

By the time they were formulating operational plans for the 1995 test, staff from the Continuous Measurement Staff said they would research the effect of changing residence rules on undercoverage. Post-Enumeration Survey research had shown that about one-third of the undercoverage of Hispanic and Asian Americans came from people missed within households and that people responding to census or survey questions were confused frequently about whom they should include as a member of the household.²¹⁴ The Census Bureau had formed a formal office to work on continuous measurement by April 1994 called the Continuous Measurement Staff Office (CMSO),²¹⁵ and by 1995, it picked up research on residence rules. The CMSO staff decided to test their conclusion that a simpler set of instructions would

²¹⁰ Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 38.

²¹¹ Schneider, interview with author, October 27, 2011.

²¹² Alexander, "Overview of Research on the Continuous Measurement Alternative," August 1993, p. 2.

²¹³ Keith Rust, a statistician working for Westat, told an audience at the Joint Statistical Meetings in 1994 about another potential benefit of a Continuous Measurement System in terms of coverage. Maintaining a "continuous presence in local areas over the decade [would] enable those concerned with response and coverage improvement to conduct more effective outreach programs and improve public response to the census," he said. Rust, "Continuous Measurement Alternatives to Census Data Collection," 1994 JSM Proceedings, p. 85.

²¹⁴ Elizabeth A. Martin and Deborah H. Griffin, "The Role Of Questionnaire Design In Reducing Census Coverage Error," paper presented at the Joint Statistical Meetings, 1994.

²¹⁵ When the Census Bureau created an office to develop continuous measurement early in 1994, its name in the first few months was the Continuous Measurement Development Staff (CMDS), then Continuous Measurement Staff, and later the Continuous Measurement Office. For the sake of clarity this chapter refers to that office only under the name Continuous Measurement Staff Office (CMSO).

help offset the missed persons within the household that drove up the differential undercount. The CSMO staff did not say it in their statements of operational plans, but simpler rules would help respondents with limited English proficiency and improve the count.²¹⁶

Other plans for nonresponse follow-up awaited further research. In 1995, the CSMO staff's operational plans stated they needed more research to see if computer-assisted telephone interviews (CATI) as the first form of NRFU would alter response rates by delaying personal visits to households. The Census Bureau, likewise, had not decided whether to do mail follow-ups on addresses where the U.S. Postal Service "failure to deliver" system indicated that the unit might be vacant. Additionally, the agency had not yet decided what portion of those units it would have field representatives visit to verify if they were actually vacant. In addition, the agency would await cost information and 1996 test results. The Continuous Measurement Staff also had not decided yet how to use MAF updates and field representatives' observations to offset errors due to nonresponse of individuals or households that were not interviewed during data collection.²¹⁷

Data Quality

Right up to 1995, continuous measurement's proponents compared and contrasted the strengths and weaknesses of its ongoing collection process with the decennial long form's single point in time collection process in terms of the data quality. The CM-JAD earlier had identified the advantages of the proposed system in terms of data quality as:

Permanent Staff With Long-Term Training: By virtue of being permanent, the interviewers would receive continuous training over time and therefore would be likely to make fewer mistakes interpreting questions and respondents' answers than would the army of temporary staff hired for the decennial census.²¹⁸

²¹⁶ Love, Dalzell, and Alexander, "Constructing a Major Survey," 1995, p. 7. Such plans likely were influenced by this paper by Elizabeth A. Martin and Deborah H. Griffin, "The Role Of Questionnaire Design In Reducing Census Coverage Error," paper presented at the Joint Statistical Meetings, 1994.

²¹⁷ Love, Dalzell, and Alexander, "Constructing a Major Survey," 1995. Stakeholders' increasingly serious challenges to these early plans after 1994 will be covered in the section of this chapter titled "Challenges to Continuous Measurement's Theorized Effect on Coverage Rates."

²¹⁸ Cresce, "Final Version of JAD Report," (CM-9), 1993, p. 12. Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, p. 4, and Center for the Study of Social Policy, "Making Decisions Count: How the Census Bureau's New Survey Could Transform Government," October 31, 1995, p. 16.

Continual Improvement: Unlike the decennial census, continuous measurement would be able to identify and correct problems with questions midstream such as where respondents were misunderstanding what a question was asking.²¹⁹

Even Out Seasonal Effects: Having a reference date tied to the date of the interview rather than to a single reference date would even out discrepancies such as temporary residents of resort areas and statistics on industries such as agriculture where April is not a representative month for labor.²²⁰

Data collected by continuous measurements had the following disadvantages compared with the decennial long form:

- Residency: Respondents might have confusion over residence rules, and some people could be counted as part-year residents of more than one address.²²¹
- Even Out Seasonal Effects: A reference date of April 1 would actually give more representative data for the year about school attendance than would the floating reference date.²²²
- Recall and Income: Because of its proximity to tax day, respondents had better recall of income and its components around April 1. Members of the CM-JAD were concerned with respondents especially in November or December trying to recall income from the previous calendar year.²²³

By May 1995, the CM staff leaned strongly towards asking respondents about their income "over the previous 12 months."²²⁴

From 1993 to early 1995, planners working on continuous measurement were undecided about residence rules. Should they ask where the occupants of the housing unit usually resided during the year as did the census? Or should they ask where occupants

²¹⁹ Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, p. 7.

²²⁰ Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, p. 7.

²²¹ Alexander, Continuous Measurement and the Statistical System (CM-20), May 23, 1995, p. 5.

²²² Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, p. 7, and Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 18.

²²³ Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 35.

²²⁴ By 1994, members of the CM Staff were already saying that 5-year moving averages would be adjusted for inflation. Alexander, "A Continuous Measurement Alternative," (CM-10), October 28, 1993, p. 35, and Alexander, "Continuous Measurement and the Statistical System," (CM-20), May 23, 1995, p. 5.

lived “as of today?”²²⁵ By August 1995, planners decided that the 1996 continuous measurement test would ask respondents about people in the housing unit present at the time of the interview as long as they had lived or expected to live there for more than 2 months. With this wording they hoped continuous measurement would identify residents that lacked a usual residence, thereby improving within household coverage. They hoped as well that this wording would even out the effect of seasonal fluctuations and people counted more than once.²²⁶

Data Products

Proposed data products from continuous measurement from 1993 to 1995 remained largely static in terms of the size of areas for which they would disseminate estimates, but they evolved as the new Continuous Measurement Staff began exploring operational procedures. Until the CM-JAD, Alexander’s prototypes had not defined the size of areas for which the Census Bureau would release annual or multiyear estimates. He did say that the Continuous Measurement System might produce monthly or quarterly estimates for the nation as a whole, but that the estimates would have a time lag of several months.²²⁷ In addition, the Census Bureau could prepare estimates for users on nonstandard geographic areas such as traffic analysis zones (TAZs), local planning zones, and user-defined areas so long as they were defined as a set of census blocks. It also could prepare estimates for Congressional districts. Participants in the CM-JAD agreed with Alexander on the feasibility of such tabulations but did not specify if such estimates would be created as special tabulations for users or something users could generate through data downloads.²²⁸ After August 1993, the prototype that the CM-JAD group settled on included a Continuous

²²⁵ Alexander, “A Continuous Measurement Alternative,” (CM-10), October 28, 1993, p. 36, and Alexander, “Continuous Measurement and the Statistical System,” (CM-20), May 23, 1995, p. 5.

²²⁶ Love, Dalzell, and Alexander, p. 8f.

²²⁷ Alexander, “Overview of Continuous Measurement for the Technical Committee,” (CM-4), February 16, 1993, p. 4, and Alexander, “A Prototype Design for Continuous Measurement,” (CM-7), May 1993, p. 6.

²²⁸ Alexander’s had said that user defined areas would be possible only if they were sets of “block groups” in his April 1993 general prototype, whereas the CM-JAD Content Group revised the statement to say sets of census blocks. Alexander, “A Prototype Design for Continuous Measurement,” (CM-7), May 1993, p. 9, and Cresce, “Final Version of JAD Report,” (CM-9), 1993, p. 3-3. CM-JAD participants said that the Census Bureau would need to advise users of the reliability figures for such estimates and that they would need further testing to determine if the system could handle areas that involved splitting a census block. Cresce, “Final Version of JAD Report,” (CM-9), 1993, pp. 3-8.

Measurement System that would produce annual estimates for states and areas with populations greater than 250,000. It also would produce 5-year moving averages as estimates for the population characteristics for census tracts and block groups. Along with the annual estimates, the Census Bureau would update these 5-year averages yearly.²²⁹ That is, for example, it would release 5-year estimates for all areas for 2002-2006 and the next year a new set of 5-year estimates for 2003-2007.

Members of the new CMSO were very forward-looking in how they envisioned disseminating data products to users through the still nascent World Wide Web. They said the system might be able to disseminate data and estimates over the internet in as little as 6 months after it was collected.²³⁰ The precise balance of how much data still had to be released via printed reports and CD-ROM remained up in the air versus what would be available online. Alexander and Arthur Cresce from the 2KS hoped electronic dissemination would speed data release, allow users greater ability to customize tables, and save the Census Bureau printing costs.²³¹

Alexander apprised the demographers, statisticians, and marketers at the Population Association of America in May 1994 of a massive expansion in data the Census Bureau would make available because of the Continuous Measurement System. In addition to the annual and multiyear estimates, he said that the Continuous Measurement System might be able to provide users with detailed general purpose files within 6 months of collecting the data. The general goal was to produce files with data that users could cumulate to meet their needs. The Continuous Measurement Staff were exploring possible data releases that would include monthly tallies by census block or block group for each month. A second possible data release was a Public Use Microdata Sample (PUMS) file with individual household data where the personally identifiable information and detailed geographic information were suppressed.²³²

Alexander’s colleague, Art Cresce was a bit more circumspect when speaking to the May 1994 meeting of the PAA. He agreed that the Census Bureau would

²²⁹ Alexander, “Overview of Research on the Continuous Measurement Alternative,” (CM-11) August 10, 1993, pp. 487-488.

²³⁰ Cresce, “Meeting Data Needs,” May 1994, p. 13, and Alexander, “Continuous Measurement and the Statistical System,” (CM-20), May 23, 1995, p. 5.

²³¹ Cresce, “Meeting Data Needs,” May 1994, p. 11.

²³² Alexander, “A Prototype Continuous Measurement System,” (CM-17), May 5, 1994, p. 5.

be able to speed up data publication because survey data would be coming in each month and the agency could work on disclosure avoidance on the records on a flow basis. Cresce, however, cautioned that the effort required to process and code so many records so quickly was unprecedented. The Census Bureau was already doing similarly quick turnaround processing in the CPS and the Current Industrial Reports, but these operations were nowhere near the size of the proposed Continuous Measurement System. Cresce said that the new system could probably publish microdata files Alexander mentioned, but it would need size-area restrictions like those for the decennial census to protect households' privacy. Some users would want snapshots of how areas were changing by looking at characteristics month to month. Cresce warned that such estimates would not be reliable below the state level and, more importantly, would increase the risk of disclosure. The system would produce those monthly estimates, but it would release them on a quarterly basis only. The CMSO would have to prioritize addressing the procedures the new system would employ to protect households' confidentiality.²³³

Given the daunting nature of producing and ensuring the confidentiality of such a large volume of tabulations each month, it is not surprising that the CMSO scaled back their scope. By 1995, as they were gearing up for the field test of the monthly survey, the staff had opted to limit the proposed special tabulations for users, which were planning to be annual summary tabulations available only down to the census block group level.²³⁴

As Cresce pointed out to the PAA in 1994, the CMSO also would need to explore the ability of the system to make estimates for small populations, such as Samoans or Hmong, by adjusting data collection methods. As a possible solution, he recommended oversampling in areas of known concentrations of such groups. Cresce added that this method might allow the system to reduce the variance in estimates of characteristics for smaller population groups and

subgroups of larger populations, also known by the statistical term "small domains."²³⁵

Census Bureau Involvement of Stakeholders and Their Concerns About Continuous Measurement

The Census Bureau strongly encouraged stakeholder participation, beginning with the early planning of the 2000 Census in 1990, and through the agency's plans to test continuous measurement in 1995. The system's promise to increase the frequency of data products did win over powerful allies, such as some transportation planners and some members of the PAA. However, for data users, especially nonfederal ones, concerns mounted from early 1993 to late 1995 (Table 4). Two forces heightened those concerns. One was the fear that the new system would not or could not deliver small-area data, whether by design or by budget slashing. The second was borne of frustration among nonfederal users that the census planners were not consulting them about their data needs.

The OMB and Congress told the Census Bureau to work on a system that would give primary consideration to federally-mandated data and federal uses of data. The Census Bureau also was analyzing the needs of nonfederal users for data, but it lacked the budget to tell many nonfederal users it was taking their needs into account. Until mid-1994, the Census Bureau was constrained in talking only to those nonfederal users who were members of the CAC and members of the 2KS. The Census Bureau's public statements before 1994 responded to the desires for federal data by Congress and the OMB. The lack of many statements on other data users led nonfederal users to conclude that the Census Bureau was ignoring their needs.

Some of this distrust grew from a time lag in communications. Both federal and nonfederal data users participated in the first focus group, brainstorming components of alternative design recommendations held with CACs of both the professional associations and the Race and Ethnic Advisory Committees. Nonfederal users submitted their suggestions on data collection methods in those meetings.²³⁶ (Table 4).

In addition, leaders from local governments, along with members of Congress, had been among the first participants in census planning to suggest that

²³³ Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, p. 14.

²³⁴ Alexander told the audience at the Labor Market Information Conference that "Annual summary tabulations for areas down to block group will be available for use in time-series or regression models, but these individual estimates are based on too small a sample to be reliable as a stand-alone estimate." Alexander, Continuous Measurement and the Statistical System (CM-20), May 23, 1995, p. 4-5.

²³⁵ Cresce, "Meeting Data Needs," May 1994. This method of oversampling was not implemented for cost reasons and for how complicated it would be for field operations. Taeuber, October 10, 2011, and Paula J. Schneider, interview with author, October 27, 2011.

²³⁶ Minutes of CAC, 1991.

Table 4.

Stakeholders in the Census Planning Process

Committee	Relationship of Stakeholder to the Census Bureau	Relationship to Other Stakeholders
Congressional Oversight Committee	<ul style="list-style-type: none"> Approves decennial census plan. Approves census pretests. 	<ul style="list-style-type: none"> Clears initial legislative changes affecting census operations. Advises and lobbies other members of Congress on support for legislation to approve census plans. Informs data users of the political climate and likely Congressional actions.
Congressional Appropriations Committee	Approves or modifies budget requests down to line items on operations, research, and salaries.	<ul style="list-style-type: none"> Clears initial budget legislation. Advises and lobbies other members of Congress on support for legislation to fund census and other agency's statistical activities. Informs data users of the political climate and likely Congressional actions.
Senate Oversight Committee	<ul style="list-style-type: none"> Approves decennial census plan. Approves census pretests. Confirms Census Bureau director and political appointees. 	Advises and lobbies other members of Congress on support for legislation to approve census plans.
Task Force on the Year 2000 Census Advisory Committee	Officially develops plan for the 2000 Census.	<ul style="list-style-type: none"> Develops Census 2000 plan for the Commerce Department. Approves recommendations and work of other Task Force committees.
Task Force on the Year 2000 Census Technical Committee	Advises Census Bureau planners and executives on the feasibility of proposed methods of data collection, processing, and dissemination.	<ul style="list-style-type: none"> Advises Task Force Advisory Committee. Advises Commerce Department.
Task Force on the Year 2000 Census Policy Committee	Advises Census Bureau planners and executives on the legal and political ramifications of proposed plans and the likelihood of their approval.	<ul style="list-style-type: none"> Informs Congressional staff. Informs federal agencies. Inform and advise OMB.
Department of Commerce	Directs and oversees Census Bureau activities, modifies and submits Census Bureau's budget request before submitting it to the OMB.	Presents budget to Congress and OMB.
General Accounting Office (GAO, later renamed Government Accountability Office)	<ul style="list-style-type: none"> Advises Census Bureau on its plans and financial management. Audits its activities. 	<ul style="list-style-type: none"> Recommends Congressional fiscal and legislative actions. Advises Congress on Census Bureau plans and financial management. Performs audits for Congress.
CNSTAT Panel on Requirements	Evaluates the feasibility and appropriateness of requests for data collection and of design proposals ability to collect that data.	Reports on its findings on census designs.
CNSTAT Panel on Alternative Methods	Evaluates the feasibility and appropriateness of requests for data collection and of design proposals ability to collect that data.	Reports on its findings on census designs.
Office of Management and Budget (OMB)	Approves questionnaires, approves census pretests, coordinates data needs of federal agencies, monitors questionnaires for the burden they place on respondents, audits budgets and operations.	Modifies Commerce Dept's budget request, advises Congress on budget requests, approves of federal agencies' data collection.
Census Advisory Committee of Professional Associations (CAC)	<ul style="list-style-type: none"> Advises the Census Bureau on the technical feasibility of proposed plans. Advises the Census Bureau on data users' concerns. Informs the Census Bureau of statistical methods used outside the agency. 	Mobilizes data users in support of plans advises Congress.
Racial and Ethnic Advisory Committees (REAC)	<ul style="list-style-type: none"> Advises on boosting response in their communities and recruiting census takers. Informs the Census Bureau on sources of undercount and coverage errors, methods to improve coverage within households. 	<ul style="list-style-type: none"> Mobilizes data users in support of plans. Advises Congress.
Federal Agencies With Legally Mandated Use of Census Data or Sponsorship of Current Surveys	<ul style="list-style-type: none"> Pay for and approve of surveys. Advise Census Bureau of new statistical methods. Compete for statistical activities. Compete for limited budget resources. 	Advise Congress and OMB how Census Bureau plans affect their work.
State and Local Government Data Users	<ul style="list-style-type: none"> Pay for some specialized data collection. Advise Census Bureau of new statistical methods. Advise Census Bureau on data uses. 	Lobby Congress.
Business Data Users	<ul style="list-style-type: none"> Advise Census Bureau on data uses. Pay for a number of special tabulations. 	Lobby Congress.
State Data Centers	Advise Census Bureau on data uses.	Inform data users of proposed changes.

Note: Rep. Tom Sawyer (D-WI) chaired the subcommittee from the 101st to 103rd Congress (1989–1994). Rep. William Zeliff (R-NH) chaired the subcommittee 104th Congress (1995–1996) with authority over the Census Bureau, the subcommittee on National Security, International Affairs, and Criminal Justice.

Source: U.S. Census Bureau.

the Census Bureau use rolling sample surveys as an alternative means of collecting decennial data. More importantly, stakeholders played key roles in the bodies created to advise the Census Bureau and Commerce Department on any plans developed, i.e., the 2KS, and the CNSTAT panels created to advise the Census Bureau and its parent agency on census plans. Experts from the OMB along with the IRS and the Bureau of Labor Statistics (BLS), two federal agencies that sponsored large Current Household Surveys, held key positions on the technical committee of the task force. Ann Azari, mayor of Fort Collins, Colorado, co-chaired the Task Force Advisory Committee.²³⁷ Alexander's overview for the Technical Committee in February 1993 began a series of in-depth consultations with these stakeholders about facets of the proposed Continuous Measurement System, before any criticism was made by nonfederal users that their concerns were being ignored.²³⁸

From the beginning, however, nonfederal data users interpreted the duty assigned to the Census Bureau to make federally-mandated data requirements the priority as relegating the needs and wants of non-federal data users to a secondary status. As early as October 1992, members of the CAC on Population Statistics expressed fear that the OMB and the Census Bureau were consulting only federal agencies and not making content decisions about analyzing the 14 alternative designs based on the needs of local users of small-area data. Bob Tortora, the associate director overseeing planning of the 2000 Census, reassured them that local users would be consulted but that the Census Bureau's budget for 1993 limited

the committee to making presentations to meetings of national organizations, such as the PAA.²³⁹

A crucial development at the April 1993 CAC meeting also reinforced the concerns of nonfederal data users that continuous measurement would not meet their needs. At the time, Campbell Gibson was serving as a demographic adviser from the Population Division. Referring to Alexander's presentation to the Task Force Technical Committee but not to the revised general prototype, he told the CAC that continuous measurement might be feasible if data are not needed at the small-area (census tract/block group) level. Gibson was concerned that the system's budget would be cut midstream, but the minutes circulated to stakeholders from that meeting appeared to give some stakeholders the sense that the Census Bureau did not intend to produce data at that geographic level. In a similar vein, Bill Butz, associate director of Demographic Programs, warned CAC members that the "decade of the 1990s reflect[ed] the most threat to census content since 1900." Butz told users that, if they were concerned that the federal government might not continue delivering small-area data, they should make their views known to Congress, the Census Bureau, and the OMB.²⁴⁰ American Demographics picked up the story, quoting Butz as saying that one-half of the design alternatives under consideration by the Census Bureau "exclude data for small areas." Even as Alexander and participants of the CM-JAD moved to include all the 1990 long form's content and to expand the sample size to approach the levels of reliability of the 1990 long form provided, CAC members continued to request that data users oppose what they saw as a threat to data that nonfederal data users needed. Most notably, they

²³⁷ Global Report, April 1995, pp. 72-75; CNSTAT, "Modernizing the U.S. Census," November 1994, p.iii.

²³⁸ Refer to section titled, "Building an Initial Prototype for Continuous Measurement."

²³⁹ Minutes of the CAC, October 22, 1992, p. 42. The associate director overseeing Year Census 2000 research and development in April 1994 told the CAC that congressional subcommittees had believed previously that census content was almost exclusively determined by federal data needs and the appropriation's subcommittee only recently agreed to consider state and local governmental needs. Minutes of the CAC, April 14-15, 1994, p. 18. Members of the CAC repeated their frustration at the April 1993 meetings even as Marshall Turner, the head of the Census Bureau's Data Users Services Division, unveiled the Census Bureau's 1994-1995 schedule. This included plans to survey nonfederal users and to meet with them around the country to document their ideas regarding the data needs and uses in terms of content and reliability. Members of the PAA informed Turner that nonfederal data users' feared that their concerns about design criteria noted in their comments to the Federal Register were not being heard. Turner responded by noting that two-thirds of state legislatures had commented already, and that most had stated their opposition to any reduction either in data at the census block group level or in sample size needed to measure smaller racial groups. Minutes of the CAC, April 14-15, 1993, p. 33-36.

²⁴⁰ Minutes of the CAC, April 15-16, 1993, 23, 36, 87-87. Correspondence with Campbell Gibson, September 1, 2011.

mobilized in ways that targeted continuous measurement, posing as the same threat as a postcard census with no substitute to the long form. The aforementioned American Demographics article included CAC member Ed Spar's appeal to small-area data users to write the Census Bureau and Representative Sawyer's census oversight committee about their desire for the federal government to continue delivering small-area data.²⁴¹

Alexander and the other Census Bureau staff working on continuous measurement had speculated from the beginning that users might be wary of moving averages and cumulations. To preclude this wariness, they took steps to familiarize users with the types of estimates the new system would produce. Alexander had stated his fear about public acceptance of the new system when presenting to the Technical Committee in February 1993, and had mentioned his concerns in his previously noted memo on model-based estimates as early as 1988. Participants in the CM-JAD and members of the Continuous Measurement Steering Committee recommended various measures that the Stakeholders Concerns Work Team and others working on continuous measurement could take to reassure data users. Between late 1993 and late 1994, the work teams started the following steps, and the continuous measurement staff ramped up outreach efforts. These included:

- Using statistical formulas to create mockups of data tables to compare the coefficient of variation (CV) between an estimate derived from the 1990 long form, and the same estimate's reliability if it had been created using 60 months of data collected via continuous measurement.²⁴²
- Running an experiment with household survey data from the late 1980s to produce simulated continuous measurement data and comparing it to 1990 Census results.
- Meeting with other statistical agencies and users' groups to demonstrate what the advantages of continuous measurement were for their groups.
- Delivering public data use files by August 1995 that were created from the proposed 1994–1995

²⁴¹ Linda Jacobsen, "Warning: Census Data in Jeopardy," *American Demographics*, June 1993, Vol. 15, Issue 6, pp. 9–10.

²⁴² Cresce, "Final Report of the CM-JAD," and Alexander, "Progress on the Continuous Measurement Prototype," (CM-12), March 3, 1994.

operational test on Random Digit Dialing (RDD) while depending on the availability of funding.²⁴³

- Starting a large RDD survey before full implementation began and sharing the data products from that survey to show the potential of more frequent estimates for areas larger than 500,000 people.²⁴⁴

At Congressional hearings in late 1994, some non-federal users gave the first indication that their concerns had mounted to the level that they sought to persuade the stakeholders with more authority over the Census Bureau, including Congress, the OMB, the GAO, and the CNSTAT, to oppose implementing the proposal. Between August and October 1994, data users (mostly state data center affiliates and metropolitan planners) wrote to Wisconsin Representative Thomas E. Petri voicing their opposition to the Continuous Measurement Proposal, saying that it would deprive them of small-area data. By 1994, Alexander and the staff of the Continuous Measurement Office had clearly developed a prototype that would deliver all the content and data products that had been available from the 1990 decennial long form. The proponents of continuous measurement were not able to conduct wide-scale outreach to state and local government users until 1995, however, and this allowed nonfederal users' distrust of the proposal to grow. By that point the Continuous Measurement Prototypes clearly sought to provide data for census tracts and even census block groups. However, in response to demands to limit the costs of the Continuous Measurement Program, Alexander

²⁴³ Alexander and Wetrogan, "Small Area Estimation With Continuous Measurement," (CM-14), March 22, 1994, p. 12, and memo from Alexander, "Research Tasks for the Continuous Measurement Development Staff," (CM-15), March 9, 1994, p. C-2.

²⁴⁴ Cresce, "Final Report of the CM-JAD," p. 1. In addition to these measures, Susan Miskura, as director of the 2KS, reassured stakeholders in Congressional hearings in May 1993 about high relative errors in estimates for census block groups. She said those relative errors became less of a problem as users had the Census Bureau aggregate data from the census blocks groups to create estimates for larger small areas such as census tracts. Data users might think that the census block-level errors compounded as the data from census blocks were combined. Miskura told them that estimates would be drawn from larger samples for areas such as TAZs, census tracts, and school districts. Miskura, along with a member of the CNSTAT panel, further defended Continuous Measurement at the May 1993 hearing by pointing out that estimates from the decennial long form, in fact, had high standard errors at the census block group and census tract level. The Continuous Measurement Staff would make this point in reports and presentations to data users through the rest of the 1990s. House Subcommittee, Review of Interim Report, May 27, 1993, p. 5 and 71; Cynthia Taeuber, email message to author, October 20, 2011; Alexander, "Plans for Work on the Continuous Measurement Approach to Collecting Census Content," (CM-16), March 31, 1994; and Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, p. 5.

and his staff wanted to remove oversampling of small governmental units by their early 1994 prototype. Opponents among the metropolitan planners argued that far too many of their clients were small governments, the very users for whom the decennial was the only affordable source of data.²⁴⁵ The increase in the projected standard errors of continuous measurement's estimates made its data suspect.

When the Content Work Team produced its comparative data table on hypothetical results, it alerted users and Census Bureau staff to this same issue of the reliability of estimates for the smallest areas. For most areas larger than an average census tract, experts at the Census Bureau reported that the 25 percent increase in standard errors was "no big deal." In practice, the creators of the table wrote, "a co-efficient of variation (CV) of 10 to 50 percent is acceptable . . . [although] one above 50 percent is undesirable." In their table, the 1990 long-form estimate for the number of school-aged children in poverty in the town of Cottage City, MD (pop. 1,236), had a CV of 46 percent. However, the CV for the same estimate created by continuous measurement's 60-month cumulation would have a CV over 100 percent.²⁴⁶

Many data users from small communities spoke as if "data would be lost," but they were really talking in shorthand about the reliability of estimates for the smallest areas, small subgroups, and the most detailed characteristics. Even though the Census Bureau had not stated any plan to publish fewer estimates for small areas and data would still be available to users ordering special tabulations or accumulated results across census blocks, users still worried about the reliability of the estimates, particularly in estimates on income. At that time, 48 percent of the nation's 39,500 governmental units had populations below 1,000. Planners who helped those governments said the 25 percent decrease in the reliability of continuous measurement estimates, as compared with those of long-form estimates, made those continuous measurement estimates too uncertain to use for decision-making. A jurisdiction with an estimated population of under 2,500 having an estimated

mean household income of \$40,000, would have an estimated mean household income anywhere in the range of \$10,000 to \$70,000 when sampling error was considered.²⁴⁷ Representative Petri showed in 1994 how important small communities' concerns were to Congress and how big an impediment the issue of statistical reliability could be to the adoption of continuous measurement when he asked Acting Census Bureau Director Scarr about the issue. Petri prefaced his question to Scarr with a statement that over one-half of the governmental units in his district had populations under 1,000.²⁴⁸

While the proposed Continuous Measurement System had a sizable and increasingly vocal set of critics, it also had won important support outside the agency by 1994; support that helped keep it alive as an ongoing research project even as its possibility to replace the long form in 2000 diminished. At the OMB, Katherine Wallman, the chief statistician of the United States, had become a strong advocate of continuous measurement. Wallman, as co-chair of the Census 2000 Taskforce, had been briefed on the proposals from the outset and continued to be kept up to date as they were developed. She later stated the proposed system showed promise to help her ongoing quest to improve data collection and content items from across the federal statistical system.²⁴⁹ Continuous measurement's planners argued that its estimates would provide important controls for other federal surveys and that they would work with federal agencies and other levels of government to standardize questions and content items collected in surveys and administrative records.

²⁴⁷ These exact examples were brought up by Steve Murdock, the chief demographer for the Texas State Data Center, in 1996 in testimony before the Senate oversight committee. His concerns shed light on users' concerns in 1994-1995. House Committee, "Census 2000 Putting Our Money Where It Counts," February 29, 1996, p. 92.

²⁴⁸ Response to Written Questions Submitted by Hon. Thomas E. Petri to Harry Scarr in United States Congress, House Committee on Post Office and Civil Service, Subcommittee on Census, Statistics, and Postal Personnel. The status of planning for the Census 2000 and the 1995 census test, 103rd Congress, second session, September 27, 1994, p. 72.

²⁴⁹ Larry McGinn, "ACS Chronology," unpublished notes on the history of the ACS, 1999. Deputy Director Scarr gave evidence in 1995 confirming McGinn's statement. Scarr told Census Bureau regional directors that OMB, and Wallman with it, supported the Census Bureau moving forward with continuous measurement. Harry A. Scarr, "Opening Remarks: Regional Directors Meeting," June 12, 1995. For Wallman's work on standardizing federal data collection refer to OMB (Katherine Wallman), "Strengthening The Federal Statistical System," a discussion paper, July 14, 1995, and Katherine K. Wallman, "The Statistical System Under Stress: Framing An Agenda For Success,"

²⁴⁵ Response to Written Questions Submitted by Hon. Thomas E. Petri to Harry Scarr in United States Congress, House Committee on Post Office and Civil Service, Subcommittee on Census, Statistics, and Postal Personnel. The status of planning for the Census 2000 and the 1995 census test, 103rd Congress, second session, September 27, 1994, p. 72.

²⁴⁶ Memo from Alexander, "Further Explorations Raised at CNSTAT," (CM-13), January 31, 1994, Attachment A.

The potential benefits of continuous measurement for surveys conducted for and by other federal agencies won key support for the proposed system from people involved in those surveys. Most notably, in April 1994, Joseph Waksberg, a former Census Bureau employee and a contractor overseeing many federal surveys, extolled the benefits of continuous measurement to these other surveys. He said that continuous measurement had the potential to save survey sponsors' money and to make their estimates more accurate. Waksberg noted that the National Health Interview Survey (NHIS), for instance, often spent more money than it initially budgeted to find and calculate stratifications for samples from racial and ethnic subpopulations because census data were not current and there were high rates of sampling error from other sources (such as the CPS). He said that continuous measurement offered gains in accuracy and cost savings compared with data derived from the household survey and estimations from building permits on which the NHIS had previously relied.²⁵⁰

In May 1994, the Census Bureau announced an action plan to gather feedback from nonfederal data users and in the process educate them about content and continuous measurement. The large-scale effort to solicit data needs from nonfederal data users was developed by the Census Bureau at the request of the OMB. Between November 1994 and March 1995, the Census Bureau sent out close to 70,000 surveys and information packets to data users. The survey briefly describing the proposed system and asked the data users what programs and legal requirements census data fulfilled for them if continuous measurement would meet their needs.²⁵¹ Further, as part of its surveys and in its meetings with state data centers, the Census Bureau asked users to comment on the proposed system with respect to "the availability of more frequent data but of slightly less reliability for small areas."²⁵² The results and impact of that survey and outreach to data users demonstrate the extent to which detailed statistics were used by a range of state and local agencies and community groups.

DECISION TO PURSUE BOTH A LONG FORM AND CONTINUOUS MEASUREMENT IN THE 2000 CENSUS

In the wake of both challenges to and external support for continuous measurement, the Census Bureau, in early 1995, suggested running both the long-form sample survey and continuous measurement in 2000. Throughout 1994, key stakeholders challenged the Census Bureau's argument that continuous measurement could lower the differential undercount and reduce its costs. The challenges eroded the likelihood that the Census Bureau would win backing for plans to use continuous measurement to replace the long form as reducing costs and lowering the differential undercount were two of the major reasons that key members of Congress had supported continuous measurement since 1991. Congress also deemed the two goals the most important ones by which it would judge plans for the 2000 Census.²⁵³

Challenges to Continuous Measurement's Theorized Effect on Coverage Rates

The year 1994 saw members of the CNSTAT Panels and the GAO dispute theories that continuous measurement would help the Census Bureau with coverage. Keith Rust, a CNSTAT Alternative Methods Panel member, made one of the strongest cases in this respect in a paper he delivered at the Joint Statistical Meetings in 1994. In the paper, he argued that even if dropping the long form increased decennial response rates, the increase would not translate into much of a change in coverage. Rust used the Census Bureau's post enumeration research from late 1993 that showed that much of the differential undercount had come from persons uncounted even when other members of their households were enumerated. In addition, Rust said the lower response rate on the 1990 long form had not had much impact on undercoverage because the long form went to a small portion of the households enumerated.²⁵⁴ Ivan Fellegi, then chief statistician of the government of Canada and a member of the CNSTAT Panel on Census Requirements and the discussant at Rust's American

²⁵⁰ Minutes and Report of Committee Recommendations of the Census Advisory Committee of Professional Associations, April 14–15, 1994, p. 20.

²⁵¹ U.S. Census Bureau, Decennial Management Division, "Solicitation of Census 2000 Content Needs From Non-Federal Data Users," November 1995, pp. 2–3, and Minutes and Report of the Committee Recommendations, December 1–2, 1994, p. 9.

²⁵² CAC, April 14–15, Census Bureau Response to Recommendation 15.

²⁵³ Ivan Fellegi, "Discussion of Keith Rust's Paper 'Continuous Measurement Alternatives to Census Data Collection,'" paper presented to the ASA, August 1994, p. 94.

²⁵⁴ Keith Rust, "Continuous Measurement Alternatives to Census Data Collection," 1994 JSM Proceedings, p. 86.

Statistical Association (ASA) presentation, agreed with Rust's conclusions.²⁵⁵

Further dimming the luster of continuous measurement, in his 1994 ASA presentation, Rust also said that he would need more evidence before accepting the theory that continuous measurement would reduce the undercount. Arguing against this, continuous measurement's proponents posited that field staff in a short-form-only census could devote greater effort to reducing the undercount. While applauding the proposed use of continuous measurement to free up resources in the decennial year for efforts to enumerate hard-to-count subgroups, Rust requested more concrete evidence that these activities would work. He said that, even though he found that premise logical and plausible, the methods were untested.²⁵⁶

Those criticisms slowly wore down the sense within the Census Bureau that continuous measurement would help the decennial census tackle the undercount, but first Alexander fought the critics' assumptions. In August 1994, he objected to the CNSTAT's assertion, based on data from the Census Bureau's other intercensal surveys of households, that continuous measurement endeavors would have worse coverage than the decennial long form. Most of the Census Bureau's household surveys were conducted in person at that time, so Alexander pointed how the Continuous Measurement Survey would employ self-enumeration. Moreover, Alexander noted how continuous measurement brought together the best elements of surveys and the decennial census. It would use simplified household rosters similar to those in the decennial census to boost response rates and, like surveys,

would employ controls on estimates to adjust for differential coverage rates between groups.²⁵⁷

In a report in January 1995, Alexander reiterated that a short-form-only census would offset the undercount by a negligible amount at best. He also agreed with Rust's position on coverage improvements by saying that it was probably impossible to verify scientifically if field staff could do a better job counting everyone if they did not have to worry about content.²⁵⁸ Later in 1995, other statisticians from the Census Bureau joined Alexander in bringing up a potential problem for continuous measurement. It would use population estimates derived from the decennial census to adjust the accuracy of continuous measurement's estimates to account for undercoverage of different population groups. Those decennial-based population controls themselves, however, were known to become increasingly inaccurate in the later years of any given decade.²⁵⁹

Prior to the 1995–1996 operational test, staff from the Continuous Measurement Office held out hope that continuous measurement's residence rules would facilitate capturing information on persons often missed within households surveyed.²⁶⁰ Mostly however, backers of continuous measurement shifted away from arguing about the system's benefits in terms of coverage and focused instead on

²⁵⁵ Fellegi, p. 93. More importantly, Rust's arguments circulated far beyond the statistical profession. In 1994, when the Congressional oversight committee asked the GAO to analyze a Census Bureau researcher's calculations on coverage improvements, the GAO affirmed that dropping the long form would likely lead to only a trivial improvement on the undercount. The Census Bureau researcher calculated that the mail return rate on the long form would need to be as low as 40 percent (versus the 1990 long-form mail return rate of 70.4 percent) to have shifted the undercount by 0.5 percent. GAO, "Improving Census Accuracy," GAO/GGD-94-116R, August, 2, 1994, p. 9, and Catherine Keeley, "Could the Census Bureau Reduce the Undercount by Not Using a Long Form?," U.S. Census Bureau memorandum, September 10, 1993.

²⁵⁶ Keith Rust, "Continuous Measurement Alternatives to Census Data Collection," paper presented to the ASA, August 1994, p. 86.

²⁵⁷ Charles H. Alexander, assistant chief for Longitudinal and Expenditure Surveys to Barry Edmonston, study director Panel on Census Requirements in the Year 2000 and Beyond, August 24, 1994, pp. 2–3, and Charles H. Alexander, "A Prototype Continuous Measurement System for the U.S. Census of Population and Housing," (Internal Census Bureau Reports CM-17) U.S. Census Bureau, Washington, DC, May 5, 1994, presented at the Annual Meeting of the Population Association of America, p. 7.

²⁵⁸ Charles H. Alexander, "DRAFT Some Ideas for Integrating the Continuous Measurement System Into The Nation's System of Household Surveys," (Internal Census Bureau Reports CM-19A) draft, U.S. Census Bureau, Washington, DC, January 6, 1995, (title page stated that the paper was "Prepared as a starting point for discussions with sponsors of household surveys"), p. 21.

²⁵⁹ Lynn Weidman, Charles Alexander, Gregg Diffendal, Susan Love, "Estimation Issues for the Continuous Measurement Survey," paper presented at the ASA Meeting, August 1995, p. 5, and Susan Love, Donald Dalzell, and Charles Alexander, "Constructing a Major Survey: Operational Plans and Issues for Continuous Measurement," paper presented at the ASA Meeting, August 1995, p. 9.

²⁶⁰ For details on the operational tests, refer to the section of Chapter 3 titled "1996 Continuous Measurement Test."

its strengths in terms of timely data, frequent data releases, and a flexible data collection system.²⁶¹

Criticisms of Cost Projections for the Continuous Measurement System

While the CNSTAT and the GAO criticized claims that continuous measurement would improve census coverage, they also challenged Census Bureau's claims that the new system would reduce the agency's data collection costs. His presentation of the revised cost estimates to the CNSTAT panels in January 1994 demonstrated Chip Alexander's awareness of these potential conflicts early on. The CNSTAT members quickly pounced on the numbers. They argued that sample sizes used in calculating cost estimates did not match those proposed for the system in the reports they had read. In addition, they challenged the cost savings attributed to getting rid of the oversample of small governmental units (SGUs). Alexander quickly responded that sample sizes had been reduced since the release of the earlier reports to which the CNSTAT members were referring. Alexander said that lower cost estimates were justified based on the smaller sample sizes, along with the research-based revision to assumptions on response rates.²⁶²

As with the issue of coverage, outside criticisms of cost projections caused Alexander and the CMSO to adjust their arguments. Thus, a few months after

²⁶¹ Alexander, "Integrating the Continuous Measurement System Into Household Surveys," (CM-19A), January 6, 1995, p. 21. When the Congressional committee overseeing Census Bureau operations asked Census Bureau Director Martha Farnsworth Riche in October 1995 if dropping the long form would improve mail return rates for the 2000 Census, she repeated the arguments and data cited by the GAO. That is, differences in return rates in 1990 had been too small and the long form went to too small a percentage of the population to make much of a difference. Riche had been confirmed as the new director in October 1994. Martha Farnsworth Riche, "Responses to the Subcommittee's Follow-up Questions On the October 25 1995 Hearing on Plans for 2000 Census," November 30, 1995, in House Subcommittee on National Security, International Affairs, and Criminal Justice of the Committee on Government Reform and Oversight, Oversight of the Census Bureau: Preparations for the Census 2000, 104th Cong., 1st sess., October 25, 1995, p. 90.

²⁶² Memo from Charles H. Alexander, DSMD, to Robert Tortora, associate director SDMS, "Further Exploration of Issues Raised at the CNSTAT Requirements Panel Meeting," (Internal Census Bureau Reports CM-13) U.S. Census Bureau, Washington, DC, January 31, 1994, p. 1. Members of the CNSTAT Requirements Panel continued to hold this belief while drafting the panel's final report. Barry Edmonston, study director, CNSTAT Panel on Census Requirements in the Year 2000 and Beyond, to Art Cresce, on National Research Council letterhead, July 27, 1994.

The GAO in January 1994 made a slightly different point in testimony before the Congressional oversight subcommittee. William Hunt from the GAO pointed out the incongruity of claiming that the Continuous Measurement System would reduce the cost of collecting census data if, as Acting Director Harry Scarr had said, it was merely cost neutral. House Subcommittee, January 21, 1994, p. 47-48.

Hunt's GAO testimony to Congress, Alexander directed the new CMSO to refine the cost model based on new data coming out of Year 2000 R&D experiments.²⁶³ Alexander also began to soften his position that continuous measurement would replace the long form in 2000, arguing instead that the Census Bureau could use "a conditional decision process, i.e. decide to adopt continuous measurement pending the results of further testing."²⁶⁴

In the summer of 1994, the CNSTAT challenged the Census Bureau's estimates on which Scarr relied in making continuous measurement's cost neutrality argument.²⁶⁵ The CNSTAT Alternative Methods Panel conceded that a short-form-only decennial census might reduce some costs as field representatives would not have to follow up with respondents for items left blank or filled in erroneously. However, the panel's September 1994 final report disputed Census Bureau claims of savings from response rates brought by dropping the long form. The panel also claimed that the decennial census benefitted from greater publicity and that the Continuous Measurement Survey might not live up to the response rate assumptions developed from the ALFE test.²⁶⁶ That critique was particularly potent as those projected response rates were crucial in allowing cost estimators to reduce estimates via cutting both the initial sample size required and the amount of nonresponse follow-up work needed by the new system.²⁶⁷

In his previously mentioned ASA paper, Keith Rust, from the Alternative Methods Panel, argued that the Census Bureau would need to decide whether the cost of updating the MAF should be assigned to

²⁶³ Memo from Charles H. Alexander, DSMD, to Lawrence McGinn, Demographic Surveys Division, "Research Tasks for the Continuous Measurement Development Staff (CMDS)" (Internal Census Bureau Reports, CM- 15), U.S. Census Bureau, Washington, DC, March 9, 1994 (this memorandum was included as an attachment in documents presented to the Professional Associations Census Advisory Committee in April 1994, p. c-2).

²⁶⁴ Charles H. Alexander, "Progress on the Continuous Measurement Prototype," (Internal Census Bureau Reports CM- 12), U.S. Census Bureau, Washington, DC, revised March 3, 1994, p. 2.

²⁶⁵ In July 1994, Barry Edmonston initially confronted Alexander, Scarr, and Cresce with a draft of the final report of the CNSTAT Requirements Panel saying that the Continuous Measurement System would cost \$1.1 billion over a decade. Alexander and Cresce corrected Edmonston's use of an obsolete sample size again as they had in January 1994. Charles H. Alexander, assistant chief for Longitudinal and Expenditure Surveys to Barry Edmonston, study director Panel on Census Requirements in the Year 2000 and Beyond, August 24, 1994, pp. 2-3.

²⁶⁶ Refer to section four subsection titled "Budget."

²⁶⁷ Committee on National Statistics (CNSTSAT), National Research Council, Counting People in the Information Age, National Academy Press, Washington, DC, September 1994, p. 190.

continuous measurement.²⁶⁸ The final report of the CNSTAT Requirements Panel made a similar statement to Rust's even while lowering panel members' objection to the estimates based on revised sample sizes. The panel asked about the actual savings from continuous measurement field representatives' corrections to the MAF if savings from an updated MAF were counted among continuous measurement's merits— even though the entire cost of updating were not budgeted to continuous measurement. The report also said that the Census Bureau planned to save money in the decennial census by following up with only a sample of households in the 2000 Census. It argued that reducing costs in this manner would result in a simultaneous reduction in the marginal cost savings of substituting continuous measurement for the long-form survey.²⁶⁹

This criticism of the estimated cost savings from continuous measurement along with data users' advocacy of keeping the long form caused Alexander and the CMSO to once again shift their arguments about the proposal. Earlier in January 1994, Alexander had said he and census planners would meet with data users to get their suggestions regarding the value of oversampling small governmental units.²⁷⁰ Apparently, the data users convinced him the procedure was worthwhile, and as the Census Bureau and APDU processed data from the surveys of nonfederal data users, the CMSO in January 1995 added oversampling of small governmental units back into plans for operational tests of continuous measurement.²⁷¹

In a second shift in his arguments in favor of continuous measurement, Alexander dropped arguments about cost savings. He began saying that accurate cost projections for the new system would have to await further testing and that the primary benefits of continuous measurement remained the increase of data accuracy and the overall improvements it would bring to estimates made from other household surveys.²⁷² Additionally, Alexander cited the importance

²⁶⁸ Rust, "Continuous Measurement Alternatives to Census Data Collection," 1994, p. 85.

²⁶⁹ CNSTAT, "Modernizing the U.S. Census," released November 1994, published 1995, p. 129.

²⁷⁰ Memo from Alexander, "Further Explorations Raised at CNSTAT," (CM-13), January 31, 1994, p. 1.

²⁷¹ Alexander, "Integrating the Continuous Measurement System into Household Surveys," (CM-19), January 6, 1995, p. 18, and Census Bureau, "Solicitation of Census 2000 Content Needs from Non-Federal Data Users: November 1994–March 1995," November 1995.

²⁷² Charles H. Alexander, "Plans for Work on the Continuous Measurement Approach to Collecting Census Content," (Internal Census Bureau Reports CM-16), U.S. Census Bureau, Washington, DC, March 31, 1994, p. 5, and Alexander, "A Prototype Continuous Measurement System," (CM-17), May 5, 1994, p. 6.

data users' placed on the long-form data as opposed to their concerns about the "newness" of continuous measurement.²⁷³

In his January 1995 report in which he substantially fleshed out how continuous measurement might benefit other government surveys, Alexander highlighted the following sources as leading to the active exploration of alternatives:

- Recommendations made by panelists brought together in September and November 1994 by the COMSIS Corporation for the Bureau of Transportation Statistics (BTS) to study the implications of continuous measurement on transportation uses of decennial data.
- The final report of the CNSTAT Census Requirements Panel in November 1994.
- Penn State Statistics Professor Clifford Clogg's²⁷⁴ response at the PAA Meeting to the May 1994 presentations on continuous measurement by Alexander and Larry McGinn, the head of the CMSO.

Basing his remarks on the CMSO's early discussions with users such as the COMSIS Corporation panelists, user reports received by the CNSTAT, and comments from Professor Clogg, Alexander stated his belief that the long-form survey accounted for "a much smaller proportion of total census cost than the visibility and importance of the long-form data may have suggested to some." He continued that, even as the CMSO sought input from the sponsors of household surveys on how to design the Continuous Measurement System, the CMSO would solicit those sponsors' recommendations for alternatives to continuous measurement (Table 2). In that same January 1995 report, Alexander said that this exploration of alternatives might involve some combination of a long form with continuous measurement.²⁷⁵ While the

²⁷³ Alexander, "Integrating the Continuous Measurement System Into Household Surveys," (CM-19), January 6, 1995, p. 21.

²⁷⁴ Clifford C. Clogg, at the time of his comments before the PAA, was also an associate of the Population Research Institute (PRI). Clogg's status as a leading contributor to the field of research in sociological methodologies added to the importance of his criticisms among statisticians, demographers, and sociologists.

²⁷⁵ Alexander and the CMDS may have confused members of Congress, state and local data users, and federal agencies alike in this regard. For the sake of "consistency," they continued to circulate the version of the prototype where it argued that continuous measurement would replace the long form in 2000. Alexander argued that this move allowed all stakeholders to be reviewing and commenting on the same version and left no stakeholders feeling as if they had been left out of discussions. Alexander, "Integrating the Continuous Measurement System Into Household Surveys," (CM-19), January 16, 1995, p. 21.

argument about continuous measurement's ability to reduce costs subsided in the mid-1990s, it would return a few years later when a wider gap in response rates between the long form and the short form in the 2000 Census renewed the plausibility of cost neutrality arguments for the ACS.

Conditional Support From Data Users

By late 1994, the Census Bureau's expanded efforts to meet directly with federal statistical agencies to increase support for the Continuous Measurement Program. When the CNSTAT Alternative Methods Panel released its final report in September 1994, it ratified what the CM-JAD had wanted since June 1993; that is, to jointly explore in depth with data users how they could benefit from continuous measurement. The Alternative Methods Panel's report called on the Census Bureau to collaborate with other federal agencies to research how continuous measurement would affect their work.²⁷⁶ The increased number of people working on the project helped greatly.

When the CMSO launched its outreach to outside stakeholders, Charles Alexander's personality and talents played a role in garnering a more receptive audience for the Continuous Measurement Proposal. When writing and speaking, Alexander had the ability to translate even complex statistical elements of the proposed survey into plain English. Several years later, one unnamed colleague told Alexander's eulogists that Alexander "could always see a hundred different ways to explain a situation."²⁷⁷ Alexander's patience and generosity with his time when he provided those explanations also helped "ensure that those who represent the Census Bureau to Congress and others understood the most important things about the American Community Survey (ACS)."²⁷⁸ Most importantly, "his true genius," wrote one colleague "was his ability to demonstrate how the ACS could be used/moved/changed to accommodate many different data user constituencies."²⁷⁹ The greatest example of his communication skills would probably be the speed with which Alexander took a

²⁷⁶ CNSTAT, "Counting People in the Information Age," September 1994, pp. 183, 186.

²⁷⁷ Alan M. Zaslavsky, "Chip Alexander and the American Community Survey," discussant paper, Proceedings of the 2003 Joint Statistical Meetings Section on Survey Research Methods, p. 4714.

²⁷⁸ Cindy Taeuber and Paula Schneider, "Chip Alexander, A Prince of a Human Being," DSD Newsletter, Internal Census Bureau publication, fall 2002, p. 6.

²⁷⁹ Zaslavsky, p. 4714.

criticism from the CNSTAT and produced a comprehensive report on the ways continuous measurement would be of use to all the other current surveys. Just 3 months after the CNSTAT recommended that exploration, Alexander had written his report and won approval to release it.²⁸⁰

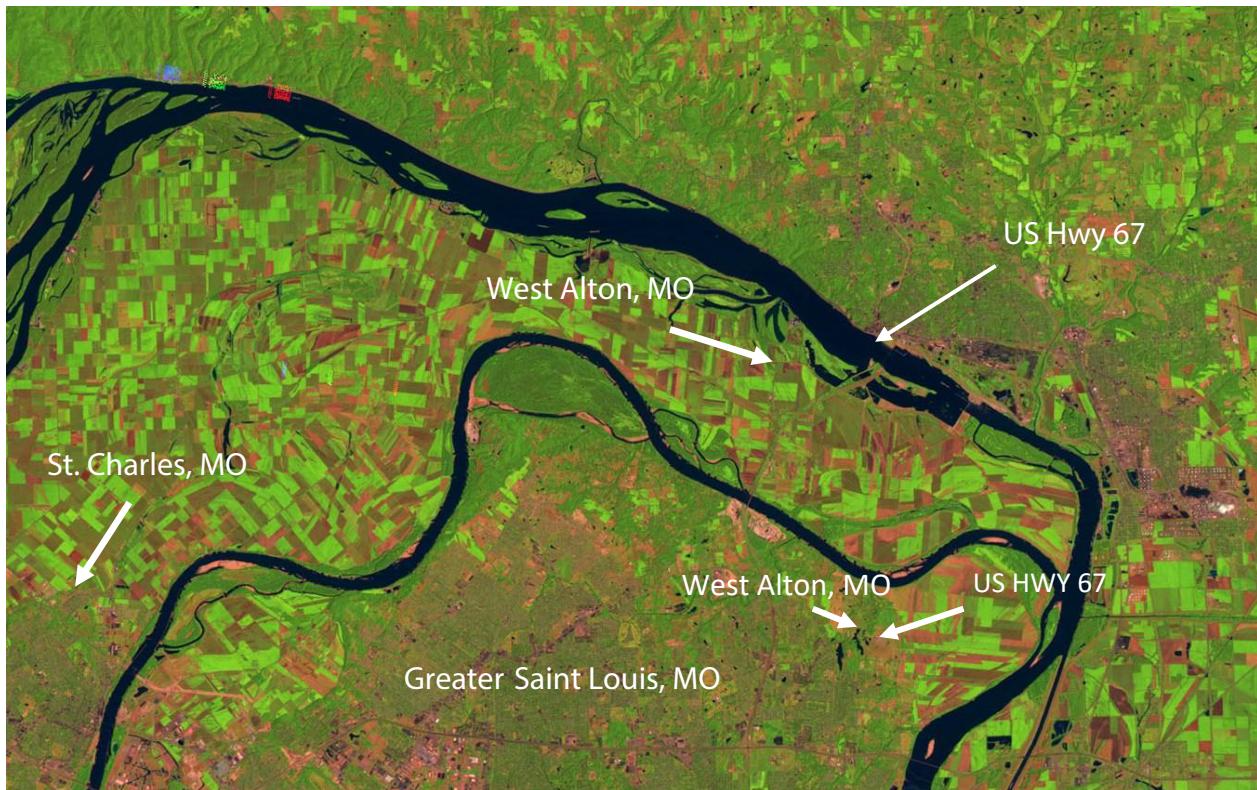
The CMSO began conducting formal consultations with other agencies in mid-1994. As part of these consultations, McGinn and Alexander presented the latest prototype to the COMSIS/BTS panel. They also forwarded many of the research papers on continuous measurement to the panelists.²⁸¹ In November 1994, after deliberating on McGinn and Alexander's presentations, some transportation planners began to support continuous measurement. They argued that updated data would be helpful for planning in areas where a new rail station opened or where flooding had occurred. With that statement it would appear such planners were moved by the potential usefulness of the Continuous Measurement System's up-to-date data in responding to natural disasters such as the 1993 Missouri-Mississippi Floods, to which Alexander and McGinn alluded in speeches. The 1993 flooding throughout the Lower Missouri River Basin had inundated some towns for more than 100 days, dislocated thousands of residents and farms, and severely disrupted highway traffic across the Mississippi River Valley. Alexander wrote in one of the continuous measurement reports in the fall of 1993 that, if the proposed new survey "had been in place in flooded areas of the mid-West prior to the recent floods, it would have been relatively easy to get before-and-after characteristics specific to flooded

²⁸⁰ Alexander had proposed that exploration with survey sponsors as early as March 1994. The speed with which the report was produced, like the speed with which Alexander worked through the process of weeding out alternative designs, is still remarkable. Alexander, "Research Tasks for the Continuous Measurement Development Staff," (CM-15), March 1994.

²⁸¹ Bureau of Transportation Statistics, "Implications of Continuous Measurement for the Uses of Census Data in Transportation Planning," U.S. Department of Transportation, April 1996.

Figure 2.

The Missouri and Mississippi Rivers Within Their Banks: 1991



blocks.”²⁸² (Refer to Figures 2 and 3 for the historic flooding on the Missouri and Mississippi rivers.)

²⁸² Over the next several months, Alexander and Larry McGinn elaborated on the explanation and added other types of disasters. For example, a couple of weeks after the Northridge Earthquake caused \$20 billion in damages and displaced 20,000 people in Southern California, they added that the updated MAF and continuous measurement data would help in quick response surveys in areas with earthquakes. Data from continuous measurement data would serve as the baseline for “a focused local survey to measure needs and rate of recovery for areas affected by natural disasters.” In that same vein, when telling the Association of Public Data Users about continuous measurement, Deputy Director Harry Scarr mentioned the system’s potential in areas struck by a large natural disaster “like the mid-West floods or Hurricane Andrew.” The Bureau of Transportation Statistics report only singled out floods, but McGinn, Alexander, Scarr, and others from the Census Bureau were tying the new program to many natural disasters. Bureau of Transportation Statistics, “Implications of Continuous Measurement for the Uses of Census Data in Transportation Planning,” p. 2; Charles H. Alexander, A Continuous Measurement Alternative for the U.S. Census, (Internal Census Bureau Reports CM-10), U.S. Census Bureau, Washington, DC, October 28, 1993, p. 39; U.S. Geological Survey, “USGS Response to an Urban Earthquake – Northridge ‘94,” 1996, <<https://pubs.usgs.gov/of/1996/ofr-96-0263/>>, accessed October 29, 2011; Alexander, “Progress on the Continuous Measurement Prototype,” (CM-12), March 3, 1994, Attachment E; Alexander, “A Prototype Continuous Measurement System,” (CM-17), May 5, 1994, p. 15; and Harry A. Scarr, “Continuous Measurement,” speech presented to the Association of Public Data Users (APDU), October 16, 1994.

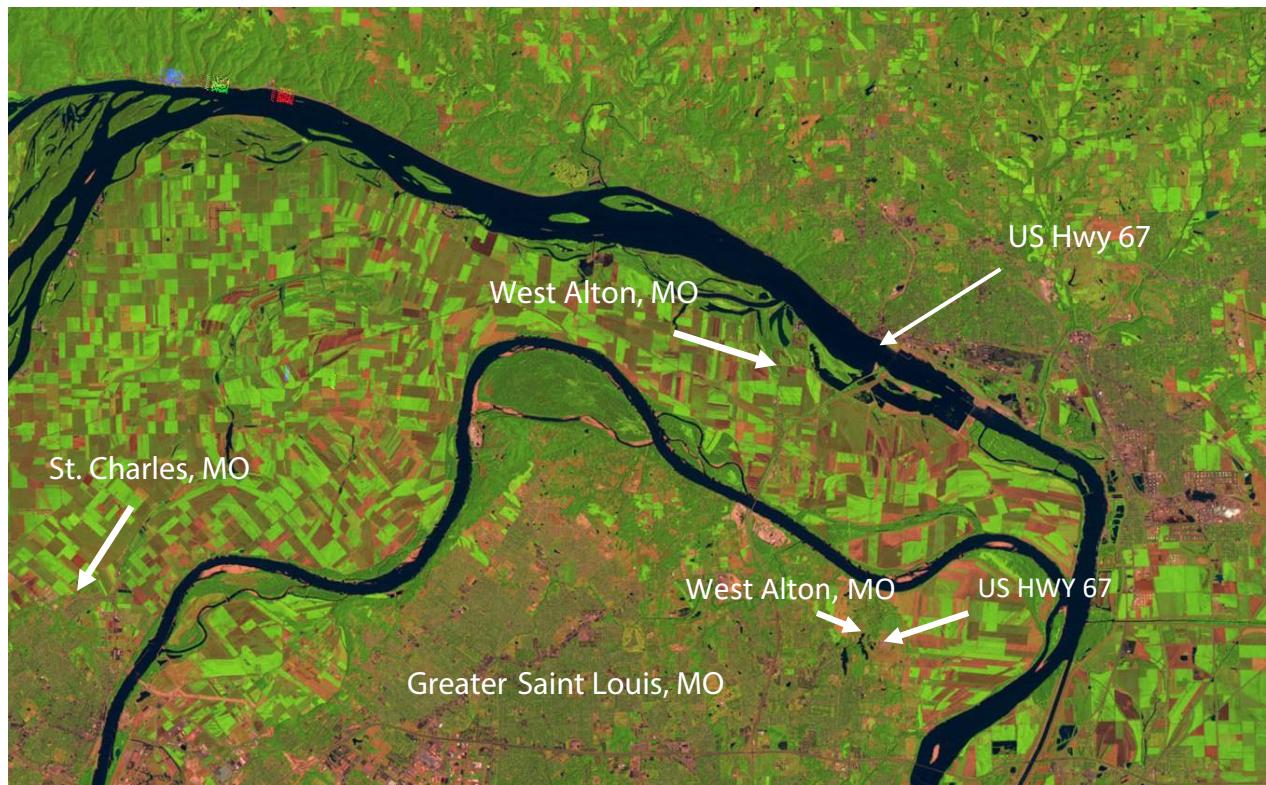
In 1993-1995, Charles Alexander and Larry McGinn told audiences that continuous measurement’s up-to-date data would help measure needs and rates of recovery from natural disasters. These satellite images show some of the scale of disasters to which they referred from that period. The Great Missouri Floods of 1993 closed or washed out bridges on the Missouri River between Kansas City and Saint Charles, MO, affecting hundreds of thousands of commuters.

The United Press described the floods as turning U.S. Highway 67 into “a marina” and threatening construction of the new Clark Bridge over the Mississippi River. In Figure 3, the dark areas represent thousands of acres inundated with the entire town of West Alton surrounded. Areas in bright pink are farmlands scoured bare by flood waters.²⁸³

²⁸³ Lee W. Larson, chief, Hydrologic Research Laboratory, NOAA/National Weather Service, “The Great USA Flood of 1993,” paper presented at the International Association of Hydrological Sciences Conference, Anaheim, California, June 24-28, 1996. And Bill Greenblatt, “The Great Flood of 1993,” United Press International, July 24, 1993.

Figure 3.

Flooding on the Missouri River: 1993



Some members of the COMSIS panel even came to the proposed system's defense when other panelists mentioned complaints about the reduced reliability of estimates from continuous measurement.²⁸⁴ These new continuous measurement supporters asserted that the reduced levels of confidence and increased errors, even those associated with the annual releases of small-area data, would be acceptable for the types of applications transportation planners performed with the data. Both supporters and skeptics of continuous measurement on the COMSIS panels voiced their desire to observe further research on the new system before they would support its replacement of the decennial long form.²⁸⁵ For instance, some transportation planners argued that multiyear estimates would give them a fuzzy snapshot from which they could not develop transportation and antipollution plans.²⁸⁶

²⁸⁴ Refer to section four subsection titled "Census Bureau Involvement of Stakeholders and Their Concerns."

²⁸⁵ Bureau of Transportation Statistics, "Implications of Continuous Measurement for the Uses of Census Data in Transportation Planning," U.S. Department of Transportation, April 1996, p. 2.

²⁸⁶ Government Executive, March 1995.

While Alexander, McGinn, and the CMSO addressed individual agencies and statisticians, Acting Director Scarr informed a broader group of stakeholders that momentum had built behind the proposed Continuous Measurement System. At the APDU meeting in October 1994, Scarr reminded the audience of the long history of efforts to deliver more timely data and Congressional interest in the new system's promise. He addressed the great lengths to which data users extrapolated from decennial data to correct for timeliness. Scarr said that if the Clinton Administration decided to implement continuous measurement in 2000, it would succeed. Most importantly, Scarr declared that the idea of continuous measurement had "already assumed a life of its own" and that "the genie could no longer be put back in the bottle."²⁸⁷

Some data users also began promoting continuous measurement on their own. In the wake of CMSO

²⁸⁷ Harry A. Scarr, "Continuous Measurement," speech presented to the Association of Public Data Users (APDU), October 16, 1994. According to Constance Citro, at that time a senior staff officer at the CNSTAT, audience members interpreted Scarr's speech as saying "the train is leaving the station," that continuous measurement was moving forward if not in 2000 then in 2010.

meetings with transportation planners and other presentations to the U.S. Department of Housing and Urban Development (HUD), the newsletter of the Government Statistics Section of the ASA opened its update on continuous measurement with the advantages of the proposed system. The article read like McGinn's crib notes and listed the system's strengths as bringing higher quality data, delivering data after only a 6-month time lag, and allowing screening to find rare populations. The editors of the Government Statistics Newsletter however repeated the conclusion voiced in the final report of the CNSTAT Census Requirements Panel. The newsletter concluded that the problems on variance in small areas and questions on moving averages' effect on such content items as journey to work and income made many data users prefer to have both, but to have the 2000 long form and then to begin continuous measurement after the census.²⁸⁸

The Census Bureau intensified its outreach efforts to educate users about continuous measurement in 1995. In March 1995, Alexander and McGinn joined new Census Bureau Director Martha Farnsworth Riche and Chief Statistician of the United States Katherine Wallman at the first colloquium of Federal Statistical Technical Experts on Continuous Measurement. Representatives from 15 federal agencies attended as did statisticians from Council of Professional Associations on Federal Statistics (COPAFS), the National Science Foundation, and the state of Maryland. In addition to presenting detailed theoretical and operational aspects of the proposed Continuous Measurement System, McGinn and Alexander shared tables created from the Continuous Measurement System's simulation files with attendees at the colloquium. The CMSO gave its audience in this and later meetings an even greater sense of how the new system might benefit them. It granted data users access to a website from which they could download the simulation files and the results from future operational tests.²⁸⁹ The federal agencies agreed to meet every 4 months on the topic of Continuous Measurement.²⁹⁰

²⁸⁸ "Continuous Measurement," Government Statistics Newsletter, Winter 1995.

²⁸⁹ When Martha Farnsworth Riche was confirmed as director of the Census Bureau in October 1994, Harry Scarr reverted to just serving as deputy director. Charles H. Alexander, Jr., "CMS and the Statistical System," presentation at the "Continuous Measurement: First Colloquium with Federal Statistical Technical Experts," March 14, 1995, Slide 35 and Illustrations A-O.

²⁹⁰ Minutes and Recommendations of the Census Advisory Committee, April 27-28, 1995, p. 34.

Support had increased by April 1995 to the point that members of both the ASA and PAA reported they were having "spirited debates" about the advisability of substituting continuous measurement for the long form in 2000. Speaking for the ASA members of the CAC, Richard Kulka, vice president of the Research Triangle Institute, said many of the ASA's members hoped continuous measurement could be implemented by the end of the decade. They were almost universally supportive of its continuously updated data, and some ASA members strongly favored continuous measurement even if it were implemented at the expense of the long form. Kulka reported, however, that the ASA and the PAA were divided more than he had ever seen them. Many ASA members feared that the series of Continuous Measurement reports from the Census Bureau indicated the agency was moving too quickly into operational plans for the new system without addressing issues, including conceptual issues about cumulated data. This level of debate within the statistical community left the Census Bureau without definitive support to run continuous measurement alone in 2000.²⁹¹

These debates caused the Census Bureau to move closer to the CNSTAT panels' position that it ought to research continuous measurement but not implement it in 2000. In April 1995, the CAC echoed the CNSTAT panels recommending that the Census Bureau continue research on a Continuous Measurement System but that it not replace the long form with that system in 2000. The Census Bureau told the CAC that it was pursuing funding to conduct the long-form survey in 2000 alongside a separate Continuous Measurement Survey as a means of testing continuous measurement's reliability and feasibility.²⁹²

In this response to the CAC, the Census Bureau essentially was committing to running with the COMSIS Panel's recommendations of the previous fall. That COMSIS panel urged the Census Bureau to:

"... undertake a test for the Census 2000 where long-form data are collected nationwide and compared with a parallel collection of continuous

²⁹¹ Minutes and Recommendations of the Census Advisory Committee, April 27-28, 1995, p. 34.

²⁹² Minutes and Recommendations of the Census Advisory Committee, April 27-28, 1995, p. 83-84. It could be that when Riche took over as the new director of the Census Bureau at the end of 1994 that she was already predisposed against replacing the long form in 2000 from her days on the CAC or that her former CAC colleagues convinced her. In any case, her installation as director correlated with the agency changing its wording about Continuous Measurement as a replacement in 2000.

measurement data for a representative sample of geographic areas.”²⁹³

In that recommendation, the COMSIS panel essentially laid out the idea that the Census Bureau implemented in 2000 with the Census 2000 Supplementary Survey.²⁹⁴

While McGinn, Alexander, and other CMSO staff members attempted to convince data users of continuous measurement’s promise of greater access to more data, Census Bureau executives used support from key stakeholders to persuade remaining skeptics within the agency. Deputy Director Harry Scarr made certain to note OMB’s support for continuous measurement as a selling point in speeches in 1995 to Census Bureau regional directors and to state data centers.²⁹⁵ Before Scarr made these speeches, McGinn and his staff had already been holding seminars on continuous measurement with various Census Bureau divisions and circulating the latest plans for the system.²⁹⁶ McGinn and Scarr’s outreach within the Census Bureau can be seen as efforts to settle internal tensions surrounding the proposed program.²⁹⁷

Among data users, the turnaround in Ed Spar’s thinking about continuous measurement speaks to the effectiveness of the CMSO’s outreach efforts. As executive director of the COPAFS, Spar authored a column sent to PAA members in the organization’s quarterly newsletter. In this spring 1995 column, he stated that the adoption of continuous measurement and budget cuts to statistical agencies might lead to loss of data for local decision-making. Spar told readers that it was “imperative that you write to your own representatives, and those who are responsible for oversight and appropriations” to inform them about this potential loss and noted COPAFS’s plans to raise user concerns with the new head of

the subcommittee overseeing Census Bureau operations.²⁹⁸ By fall 1995, CMSO staff had allayed some of Spar’s fears, and he designed the Census Bureau’s marketing plan to educate data users and stakeholders about the proposed system and win their backing for it.²⁹⁹

The Promise of Data for Downsizing Government

The growing number of data user supporters of continuous measurement became something of a bulwark against renewed threats from Congress to cut-back on the content of data collection by the Census Bureau. The new 104th Congress threw the future of both continuous measurement and the long form into doubt in 1995. It moved oversight of the decennial census from the House subcommittee headed by continuous measurement supporter Tom Sawyer to the House Committee on Government Reform and Oversight. Support for continuous measurement from the new committee’s chair was uncertain. More importantly, the new leadership of the appropriations committee demanded to know why the decennial census was collecting information for other federal agencies and businesses without reimbursement. One budget proposal for the Census Bureau limited the agency to what it had spent in 1994.³⁰⁰

Throughout 1995, the new leaders of the appropriations committee handed the Census Bureau another complication. Their March 1995 budget proposal eliminated funding for the long form entirely and left in doubt the possibility of funds for alternative sources of data.³⁰¹ Appropriations committee members reiterated their argument that the long form was too complicated, asked unnecessary questions, and burdened respondents. In addition, they said that the Census Bureau would have to rein in what Congressional aides described as “runaway budgets” for the 2000 Census and make cuts like every other agency to balance the federal budget. They added a new argument that the lower response rate on the long form likely made it cost more than the \$300 million estimated by

²⁹³ Minutes and Report of Committee Recommendations, April 2, 1995, pp. 83–84, and Bureau of Transportation Statistics, “Implications of Continuous Measurement for the Uses of Census Data in Transportation Planning,” U.S. Department of Transportation, April 1996, p. 1.

²⁹⁴ U.S. Census Bureau, *Design and Methodology: American Community Survey*, April 2009, p. 2-2. Also refer to Chapter 4.

²⁹⁵ Harry Scarr, Opening Speech at the Regional Directors Meeting, June 1995.

²⁹⁶ Memo from Lawrence McGinn, chief, Continuous Measurement Design Staff, to those interested in Continuous Measurement, “The Continuous Measurement Project,” October 7, 1994, p. 5.

²⁹⁷ Hints of these tensions had surfaced at the April 1993 CAC meeting where different Census Bureau staff presented conflicting views of the CM System’s ability to deliver small-area data if it had to be cost neutral.

²⁹⁸ Edward J. Spar, executive director Council of Professional Associations on Federal Statistics (COPAFS), “From the Federal Statistical System: The COPAFS Column,” PAA Affairs, Spring 1995.

²⁹⁹ In March 1995, Spar attended the First Colloquium with Federal Statistical Technical Experts; he even gave the introductory remarks. Spar heard McGinn and Alexander detail dozens of ways the Continuous Measurement System would benefit other federal surveys and provide data of use in planning and evaluating state and local programs.

³⁰⁰ L. Nye Stevens, Fundamental Design Decisions Merit Congressional Attention, Testimony, GAO/T-GGD-963, October 25, 1995, p. 24.

³⁰¹ Harry A. Scarr, “Opening remarks,” Regional Directors Meeting, June 12, 1995.

the Census Bureau.³⁰² The eventual funding proposal by the House Appropriations Committee softened these stances but also supported continuous measurement. It recommended a budget line item for continuous measurement in the Census Bureau's budget while also trimming 30 percent from the agency's request for funds to research and develop the 2000 Census.³⁰³

In order to align with the priorities of the new Congress, McGinn and Alexander made reference to how continuous measurement would help further the devolution of power desired by Congressional leadership and by Vice President Albert Gore's reinventing government initiative. When McGinn and Alexander spoke to the colloquium with federal statistical experts on continuous measurement in March 1995, the Administration of President William Clinton actively sought to give cities and states more control over funds spent in enterprise zones. For their part, Congressional Republicans wanted to cede to the states greater authority for programs ranging from crime, poverty, and environmental regulation. McGinn and Alexander noted how continuous measurement would provide consistent measures nationwide by which the federal government could distribute funds equitably among states. Continuous measurement's annually updated data and its ability to add on supplements also held promise for government officials' metrics by which to measure cost effectiveness of state and local government programs.³⁰⁴

Congressional representatives may have been swayed by such arguments, they may have agreed with the House Appropriations Committee's reasoning on reduced burdens and costs, or possibly they agreed

³⁰² Allan Holmes, "Countdown to 2000," *Government Executive*, Vol 27, Issue 3, March 1995. The Census Bureau refined and circulated several estimates for the long form's cost between 1992-1995 perhaps adding to Congressional appropriators' suspicion of the figures. The CNSTAT panel brought up the \$300-500 million figure in 1994 from figures supplied by the Census Bureau but also created its own lower estimates. Census Bureau Director Riche also forwarded to Congress in November 1995 an estimate of \$300 million, the revised estimate Charles Alexander had circulated in reports a few months before. CNSTAT, "Modernizing the U.S. Census," November 1994, p. 125; Alexander, "A Continuous Measurement Alternative," (CM-10), p. 28; Alexander, "Integrating the Continuous Measurement System into Household Surveys," (CM-19), January 6, 1995, p. 21; and Riche, "Responses to the Subcommittee's Follow-up Questions," in House Subcommittee, October 25, 1995, p. 90.

³⁰³ John Hoeffel, "Shrinking the Census," *American Demographics*, October 1995, Vol. 17, Issue 10, pp.32-38.

³⁰⁴ Lawrence McGinn, "The Continuous Measurement System," presentation at the "Continuous Measurement: First Colloquium with Federal Statistical Technical Experts," March 14, 1995, Slide 27, and Charles H. Alexander, Jr., "CMS and the Statistical System," presentation at the "Continuous Measurement: First Colloquium with Federal Statistical Technical Experts," March 14, 1995, Slide 26.

with Representative Sawyer's continued appeals for a system with more timely data than the long form. Whatever their individual reasons, Congress passed the Appropriation Committee's bill without amendment in the summer of 1995. With that bill, they gave some support for the proposed Continuous Measurement System, in that they approved a budget line item for research on continuous measurement. They also voted to give the Census Bureau \$4 million to research and develop the system.³⁰⁵

Census Bureau Director Riche also brought up census data's role in the devolution of power but did so in defending continuing the long form and only testing continuous measurement in 2000. Speaking before Congress in October 1995, she aligned data from the long form with a key goal of the new Congress, the delegation of power from the federal government back to states, counties, and cities. Riche argued that the House's cuts from decennial planning funds would hamper potential improvements in census data and pointed out state and local governments were the heaviest users of that data. Riche added that the decennial census made federal, state, and local government operations less costly given how heavily it was used for planning schools, highways, and other services and facilities. Its information, Riche noted, would be all the more crucial to states trying to implement and monitor programs they took back from the federal government. When Congress asked if continuous measurement or estimates derived only from administrative records might one day be a suitable replacement for the long form, Riche said she agreed with the CNSTAT panels that neither alternative would be ready and fully tested by 2000.³⁰⁶

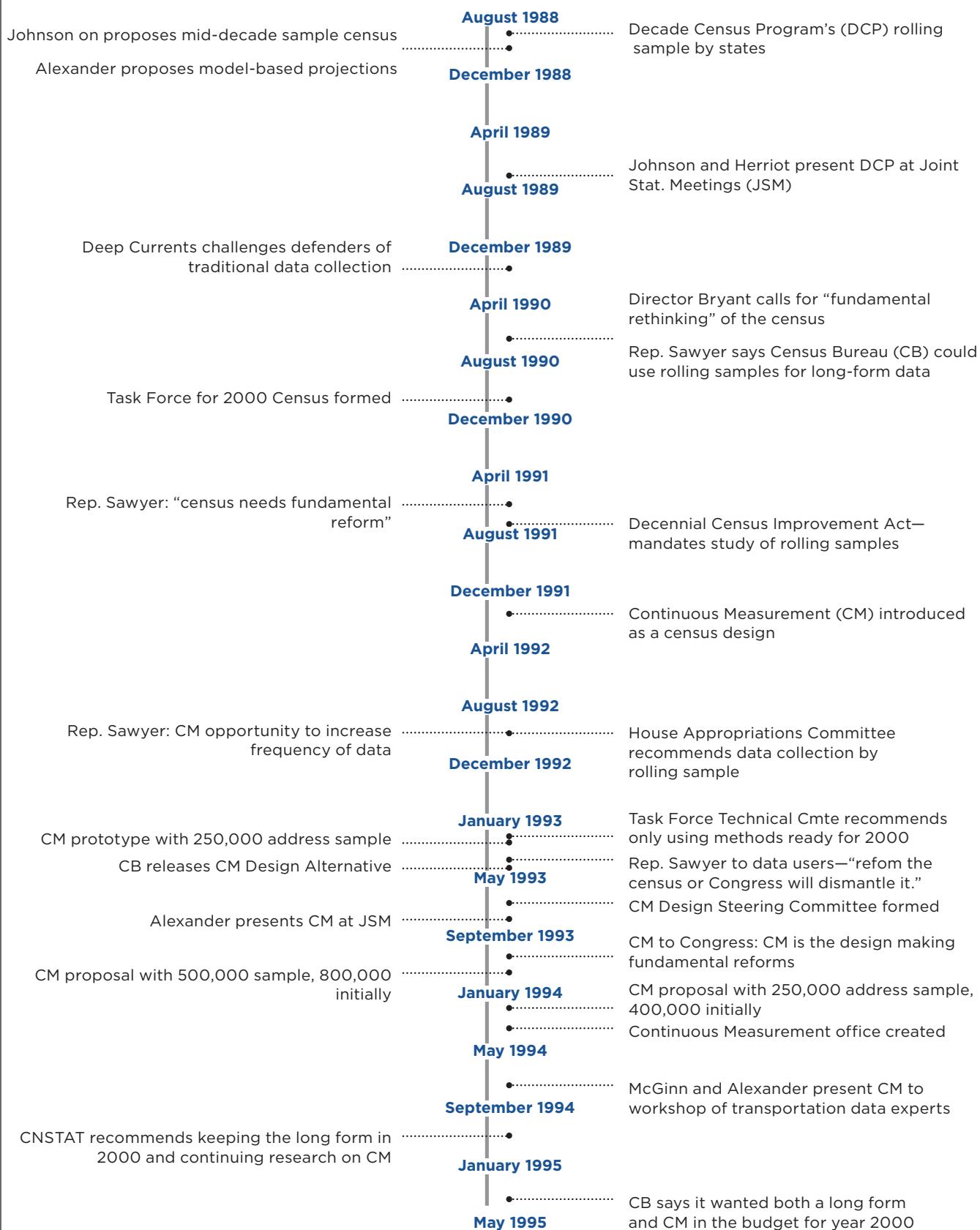
The results of the APDU and Census Bureau surveys of data users' needs helped demonstrate the extent to which detailed statistics were used by a range of state and local agencies and community groups. They also became powerful defenses of continued collection of small-area data when Congressional appropriators threatened to eliminate funding for the long-form sample and possibly provide no funds for replacing it with alternative data collection methods. For example, the APDU report illustrated dozens of uses by local and state government agencies. It also noted how banks used migration data from the

³⁰⁵ House of Representatives, 104th Congress, 1st Session, Report 104-196, July 19, 1995.

³⁰⁶ House Subcommittee, *Oversight of the Census Bureau: Preparations for the Census 2000*, October 25, 1995, pp.77, 74, and 90f.

Figure 4.

Key Events in the Development of the Continuous Measurement Proposals: 1988-1995



long form when determining which branches should extend banking hours and which services branches should offer in their neighborhoods.³⁰⁷

Based on their responses to information from those reports and another from the Census Bureau, it would appear that Congress was moved by them, albeit not entirely in favor of continuous measurement. The Census Bureau sent one report to Congress that went question by question from the long form citing statutory requirements and programs for which data from the questions were required. Congressional mandates for the use of census data made Congress the de facto “number one” user of census data. Representative Karen Thurman brought up that report and said it proved the data’s vital importance in allocating billions of dollars in funds when she told other members of the Congressional oversight committee to fight the House Appropriations Committee’s stance. Thurman argued federal agencies would have to conduct their own surveys to replace the long-form data and that effort would cost twice as much as the long-form survey. Thurman also said she did not believe that a smaller ongoing survey could deliver the data. A few months later and unlike Representative Thurman, Senator Phil Gramm of Texas was, in his words, “not married to the long form” but supported continued collection of its content. He echoed Thurman when he argued that the data had more value than what the long-form survey cost. “We’re talking about pennies which generate data . . . on which trillions of dollars of private investments are made,” Gramm said.³⁰⁸ With that statement, Gramm opened his effort to restore most of the funds cut by the House from the Census Bureau’s budget for research and development and testing for the 2000 Census and continuous measurement.

While a joint conference of the Senate and House restored most of the funding to the Census Bureau for research and development, this agreement did

³⁰⁷ Association of Public Data Users, “APDU Year Census 2000 Content Working Group Final Report on Activities,” April 12, 1995, p. 13. Before the Census Bureau officially published its report on data uses in November 1995, it released videos of focus groups talking about the decennial census, its questionnaires, how the data are used, and whether they understood continuous measurement. It showed that video to stakeholders and gave advance copies of the survey report to members of Congress. “Minutes and Report of the Committee Recommendations,” October 26–27, 1995, p. 13–15.

³⁰⁸ In the same hearing as Rep. Thurman’s defense of the long form, the GAO and the Inspector General’s office brought up the long-form data’s role in state and local activities. House Subcommittee, Oversight of the Census Bureau: Preparations for the Census 2000, October 25, 1995, p. 8, and John Hoeffel, “Shrinking the Census,” *American Demographics*; October 1995, Vol. 17 Issue 10, pp. 32–38.

nothing to lessen the fears of data users about budgets. Stakeholders had Riche’s statements implying that continuous measurement would not be implemented in 2000 because it would not be tested fully by then. Still, they feared Congress would cut the decennial budget for either the long form or continuous measurement. Several stakeholders stated that, under that scenario, their original fear present since 1993 would come true—the Census Bureau would have only enough funds to run a small Continuous Measurement Survey and not be able to deliver small-area data.³⁰⁹ Data users persisted in that fear even as the Census Bureau left mention of continuous measurement out of its “Maize Book,” the official plan for the 2000 Census. These budget uncertainties would take the better part of the next 10 years to resolve.³¹⁰

CONCLUSION

As the Census Bureau ran its first field test of continuous measurement in early 1996, several unresolved questions preoccupied the CMSO. Would results from field tests show that response rates matched assumptions made in the prototypes? Would the Census Bureau, the U.S. Postal Service, and other government agencies be able to build and maintain an address list to improve coverage and bring down costs? Would the Census Bureau’s permanent staff and field offices be able to handle ongoing field operations of the size needed to do 250,000 interviews a month and process the data? Or would the logistics of processing so many forms on a rolling basis across 3,000 counties prove unwieldy as an advisory committee member had forecast?³¹¹ Could the agency conduct the number of phone and computer assisted interviews forecasted? Would data from the test sites prove to be useful and valuable to members of Congress and to their constituents in

³⁰⁹ Minutes and Report of the Committee Recommendations, October 26–27, 1995, p. 13–15, and Barbara Vobejda, “Critics Keeping Tabs on the Census Bureau; Agency Under Congressional Pressure to Be More Accurate With Less Money in 2000 Tally,” The Washington Post, December 5, 1995.

³¹⁰ Census Bureau, “The Plan for Census 2000,” also known as “The Maize Book,” revised and reissued February 28, 1996, and House Subcommittee, “Census 2000: Putting Our Money Where It Counts,” 104th Congress, 1st Sess., February 29, 1996, p. 92.”

³¹¹ Joseph Waksberg in Minutes and Report of Committee Recommendations of Professional Associations,” April 14–15, 1994, pp. 20–21.

whose districts the sites were run?³¹² Would government agencies sponsoring household surveys warm to the Continuous Measurement Survey's more timely data as they learned more about it? Or would they and other data users object to cumulations or census content pushed off the short form? Would it even be feasible to incorporate add-on questionnaires to have the Continuous Measurement Survey help gather some data for other household surveys?³¹³ How closely would costs from the test sites match

³¹² Charles Alexander said that Census Bureau would consult heavily with users on products from even "cumulative estimates simulation projects." And the CNSTAT Panel to Evaluate Alternative Census Methods recommended in its published report and in testimony to Congress that the Census Bureau should "develop a program to inform data users of the simulated data products emerging from their test surveys and get their reactions." Alexander quoted in the Minutes of the CAC, April 14–15, 1994, p.22, and Norman Bradburn, prepared statement before the House Subcommittee on Census Statistics and Postal Personnel, September 24, 1994, p. 28.

³¹³ Waksberg advised in April 1994 that previous attempts to provide model-based estimation for small-area data using data from other surveys had not been successful. Minutes of the CAC, April 14, 1994, p. 21. By 1995, the Alexander and the CM Office no longer thought about adding data from the other surveys and instead looked to add on questionnaires. Charles H. Alexander, "Continuous Measurement and the Statistical System," (CM-20), U.S. Census Bureau, Washington, DC, May 23, 1995, presented at the Annual Labor Market Information Conference in Nashville, TN, p. 2.

the assumptions made in the prototypes? Would Congress weigh favorably the benefits of more timely data against a decade of costs that by some 1995 projections would be about twice as much as that of the decennial long-form survey? Would Congress approve funding for larger operational tests in the late 1990s? As of May 1995, Alexander noted there had been no final decision about proceeding to full-scale implementation of continuous measurement.³¹⁴ Would the Census Bureau's operations be ready, if need be, to launch a fully operational Continuous Measurement Survey as scheduled in 1999 or would research findings or budget cuts delay or shelve even comparative testing of continuous measurement alongside the decennial census? The Census Bureau's efforts to find answers to those questions are the subject of Chapter 3 of this book. The eventual winning of funding and approval for replacing the long form with a Continuous Measurement Survey took almost another decade from the time the CMSO launched its first outreach to data users, and is the subject of Chapter 4 of this book.

³¹⁴ Alexander, "Continuous Measurement and the Statistical System," May 23, 1995, p. 2.

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Chapter 3. From the Drawing Board to Field Testing: 1995-1999

INTRODUCTION

When Martha Farnsworth Riche came to the Census Bureau as its director in 1994, she concluded that Continuous Measurement (CM) “did not have many fans . . . ”¹ Most of the other federal statistical agencies were concerned that the new survey might endanger ongoing surveys that they sponsored. Indeed, one member of the Census Advisory Committee on the Professional Associations thought that “many Federal agencies are afraid of the CM concept . . . ”² While federal data users saw CM as a potentially disruptive force, nonfederal data users were concerned with the higher standard errors associated with CM estimates and with the possibility that the survey might not receive the required funding from Congress. If data users abandoned the census long form for CM and Congress did not fund the survey, they would have no small-area data at all.³

Skepticism about CM was not limited to those outside the Census Bureau. 2000 Census long-form data devotees believed that the Census Bureau should devote scarce research funds to improving the census sample questionnaire, not to developing an entirely new survey. Other skeptics within the agency pointed out the many technical details that would have to be resolved before the Census Bureau could release estimates from the new survey to the public.⁴

In the midst of this ongoing discussion of the merits and risks associated with CM, the Census Bureau decided to move ahead with the newly-dubbed

American Community Survey (ACS).⁵ Senior census officials considered two options:

- Implement the ACS in 2000 and drop the census long form.
- Postpone the elimination of the census long form until 2010, substitute a smaller version of the ACS as part of the 2000 Census research and experimental program, and implement the ACS in the early 2000s.

Initially, Census Bureau leadership appeared to favor the first option. ACS planners devised a rigorous testing regimen for the new survey that would take place between 1996 and 1998.⁶ Successful testing

⁵ There are several versions of how the American Community Survey got its name. One account stressed the role of Preston J. Waite, the chief of the Demographic Statistical Methods Division. In the spring or early summer of 1995, Waite realized that the term “continuous measurement” would mean very little to the public or to members of Congress. Even worse, the survey questionnaire that was about to be sent to the printer had to contain the name of the survey. He convened an ad hoc group of Census Bureau staff and told them to come up with a new name for the survey in 1 hour. After much discussion, the term American Community Survey (ACS) emerged as the consensus choice. Refer to Susan Love and Gregg Diffendal, “The American Community Survey: November/December 1996 Sample Profile.” A second version focused on a high-level meeting led by Martha Riche, the Census Bureau’s director. Congressional staff members informed the external liaison for CM, Cynthia Taeuber, that they believed that no one wanted the government to measure them continuously. These staffers suggested that the survey needed a new name. Taeuber told Riche about the problem. With her interest in marketing, Riche grasped the nature of the complaint and agreed that the name had to be changed. Riche scheduled a meeting of those responsible for ACS policy and budget, including Riche herself, Taeuber, Waite, Charles Alexander, and probably Lawrence McGinn. Initially, Waite and Alexander wanted to retain “continuous measurement,” but they gave way to Riche’s insistence on a new name. The group deliberated and agreed on the “American Community Survey.” Personal communication from Cynthia Taeuber, March 30, 2012. Yet another version came from Lawrence McGinn. He remembered Director Riche returning to Census Bureau headquarters after discussing the new survey at venues around the country. From her discussions, she concluded that the name ought to be changed and that “American” implied national coverage while “community” connected the actual neighborhoods in which people lived. In McGinn’s version, Riche asked her staff to consider “American Community Survey” but neither demanded it be accepted nor indicated much urgency for the decision. These three versions are not necessarily mutually exclusive. Some variation of all three of them may have taken place. Personal communication from Lawrence McGinn, July 11, 2012.

⁶ Charles H. Alexander, “A Prototype Continuous Measurement System for the U.S. Census of Population and Housing,” CM-17, May 5, 1994.

¹ Martha Farnsworth Riche, “Oral History Interview Transcript,” January 28, 1998, p. 12, available at <www.census.gov/history/pdf/Riche_Oral_History.pdf>, accessed October 17, 2012.

² U.S. Census Bureau, “Minutes of the Census Advisory Committee on the Professional Associations,” meeting held on April 27-28, 1995, p. 35.

³ Riche, “Oral History,” p. 12.

⁴ Some of these critics were the same people who had raised questions about Herriot’s earlier proposals, refer to “Report of the Demographic Area Committee to Critique ISAS,” September 2, 1988; interview of Nancy Gordon, retired associate director for Demographic Fields, October 17, 2012.

would mean the introduction of basic survey operations nationwide in fiscal year (FY) 1999 and implementation of the complete CM program in FY 2000. However, as described in Chapter 2, wide-ranging concerns from federal and nonfederal stakeholders and technical issues related to the survey itself blunted this drive for substituting the ACS for the 2000 Census long form.

Instead of implementing the ACS in 2000, Census Bureau executives chose to include the ACS in the 2000 Census as part of the decennial census research and experimental program. The Census Bureau would conduct large-scale testing of the ACS concurrently with the collection of 2000 Census long-form data. This version of the plan called for the Census Bureau to mail questionnaires to 400,000 addresses distributed across all the counties each month from January 1999 until December 2001. Over the course of 3 years, 14.4 million households would receive the ACS. This was a large enough sample to allow for direct comparisons between ACS estimates and 2000 Census long-form data on a tract-by-tract and place-by-place basis. Beginning in 2002, the Census Bureau planned to reduce the sample size to 250,000 housing units per month, or 3 million per year.⁷ Also in 2002, the Census Bureau would produce 1999–2001 cumulated estimates for all tracts and block groups to give local officials an opportunity to observe how the new survey would affect the data for their areas and possibly gain their support. In addition to the ACS, CM included expanding and improving the population estimates program and then incorporating the results into the ACS as population controls. Concurrently, the Census Bureau proposed developing statistical modeling techniques using selected characteristics to produce small-area estimates of income and poverty.⁸

⁷ Lawrence McGinn, "The Continuous Measurement Approach to Collecting Census Content," paper presented at the Census Advisory Committee meeting on October 20, 1994.

⁸ U.S. Census Bureau, "Objectives for the Original and New ACS Proposals," n.d., memorandum from Mimi Born, Lynn Weidman, and Don Fischer to Cindy Taeuber, June 6, 1995, attachments Exhibit 14, "Periodic Censuses and Programs: Program Change Personnel Detail: Continuous Measurement," and "Fiscal Year 1996 Costs for Continuous Measurement." The Estimation of Small Area Income and Poverty program later became the Small Area Income and Poverty Estimates (SAIPE) program.

The Census Bureau's budget request for FY 1996 contained a substantial increase for the CM staff. The proposed \$11 million budget would expand CM personnel from fewer than 20 full-time staff to 84 full-time staff and 106 part-time staff.⁹ The ACS required the larger staff in order to finalize the planning for the 1996 test in six local sites and a national sample, and to collect, process, evaluate the data, and develop the data products.¹⁰

Between mid-1995 and mid-1996, the Census Bureau's position on the testing and implementation of the ACS underwent considerable modification, as both federal and nonfederal data users raised significant concerns. These concerns were that the ACS survey design limitations or unavoidable budget reductions might preclude it from providing the needed small-area estimates.¹¹ The Census Bureau's plan to oversample small governmental units to assure sufficient sample size and reliability of estimates conflicted with efforts to control the cost of continuous measurement. In late October, Census Bureau Director Martha Farnsworth Riche informed the agency's congressional oversight subcommittee that eliminating the 2000 Census sample questionnaire would produce only "limited cost savings." Furthermore, the Census Bureau did not find "any alternative data collection methodologies [that] can provide comparable information for all geographic entities and meet all legislated requirements and other data needs." Whatever research progress the agency might make in the years leading up to the 2000 Census, Director Riche concluded "... neither the Census Bureau nor other experts ... believe anything approaching full substitution will be possible in 2000."¹²

⁹ U.S. Department of Commerce, U.S. Census Bureau, "Budget Estimates Fiscal Year 1996," Exhibits 13 and 14.

¹⁰ Memorandum from Mimi Born, Lynn Weidman, and Don Fischer to Cindy Taeuber, June 6, 1995, attachments Exhibit 14, "Periodic Censuses and Programs: Program Change Personnel Detail: Continuous Measurement," and "Fiscal Year 1996 Costs for Continuous Measurement," and memorandum from Lawrence S. McGinn, chief, Continuous Measurement Staff, to Jay Keller, assistant chief Year 2000 Research and Development Staff, "Funding to Continuous Measurement Staff," May 5, 1994.

¹¹ Refer to Chapter 2 for detailed discussions.

¹² Martha Farnsworth Riche, "Responses to the Subcommittee's Follow-up Questions on the October 25, 1995 Hearing on Plans for Census 2000," in U.S. House of Representatives, Subcommittee on National Security, International Affairs, and Criminal Justice of the Committee on Government Reform and Oversight, "Oversight of the Census Bureau: Preparations for the 2000 Census," Oct. 25, 1995, 104th Cong., 1st Sess., 1995, p. 90. All the quotations in this paragraph come from this source.

The formal announcement of the Census Bureau's plan for the 2000 Census took place on February 28, 1996, at the Department of Commerce in Washington, DC.¹³ That plan contained brief descriptions of the short-form and long-form questionnaires but no mention whatsoever of CM or the ACS.

To replace the original version of the ACS testing and implementation schedule, the CM staff developed a revised ACS proposal ("ACS, Version 2") that accomplished most of the earlier plan's objectives at lower cost, while postponing the beginning of nationwide data collection until 2003, and the release of the full range of data products until 2008.

The revised version had two major components. From 1999 through 2001, the Census Bureau would collect ACS data annually from approximately 240,000 addresses in approximately 40 sites.¹⁴ The selection criteria included: already being an ACS test site, population size, rate of population change between 1990 and 1996, geographic distribution across the country, ease of enumeration, and presence of local experts to help Census Bureau staff analyze and evaluate the estimates. The agency used population size, rate of change between 1990 and 1996, and ease of enumeration components to create 24 strata in the group of test sites.¹⁵ Each of the sites the ACS staff selected contained at least one of the 24 strata. The entire sample included examples of all strata, as well as other desirable characteristics, such as geographic diversity, certain racial or ethnic groups, seasonal populations, and American Indian reservations.¹⁶ Census Bureau statisticians planned to compare the ACS-based estimates from these 40 sites with those calculated for the same sites from the 2000 Census long-form sample, and assess similarities and differences. The agency added a second group of eight test sites, termed "phase-in sites," in order to help

regional office staff obtain data-collection experience prior to national implementation in 2003.¹⁷

The second component of the revised ACS was the national sample. Starting in 2000 and extending through 2002, an annual national sample of 960,000 addresses (divided into 12 monthly samples of 80,000 addresses each) would receive the ACS form in the mail and return it by mail. An ACS interviewer would interview nonrespondents either by telephone or in person. To reduce cost, the agency allowed some clustering in the sample counties.¹⁸ In 2003, they would expand the national sample to the planned 3 million addresses per year and cover all counties in the country in an unclustered design. The revised ACS would replace long-form data collection in the 2010 Census.¹⁹

1996 CONTINUOUS MEASUREMENT TEST

The ACS staff designed the 1996 CM test to assess all components of the survey from data collection and tabulation to the production of data products and teaching data users how to use the data. Two specialized studies preceded the 1996 test: a simulation study of the multiyear data that the new survey would produce, and an evaluation of computer-assisted telephone interviewing (CATI) for collecting long-form type census data.²⁰

The objectives of the 1996 CM test were to:

- Collect census long-form data using a monthly household survey design.
- Produce estimates down to the block level.

¹⁷ The phase-in sites aimed to give all regional offices experience in collecting ACS data in metropolitan settings. These sites were Anchorage, AK; San Diego, CA; Lake County, IN; Baltimore City and County, MD; Suffolk County, NY; Genesee County, MI; Hennepin and Ramsey Counties, MN; and Mecklenburg County, NC.

¹⁸ Cluster sampling is a technique used when researchers can identify relatively heterogeneous groupings with respect to some characteristic(s) in a statistical population. Each cluster should be representative of the entire population. Geographically dispersed populations are often expensive to survey. Sampling clusters rather than individuals often reduces interviewer travel costs.

¹⁹ Memorandum from Preston Jay Waite to Joel L. Morrison, Dwight P. Dean, and John H. Thompson, "American Community Survey Test Sites for FY 1999," July 17, 1997; U.S. Census Bureau, "Objectives for the Original and New ACS Proposals," n.d.; and "The Revised American Community Survey," n.d.

²⁰ Gregg Diffendal and Lynn Weidman, "Simulation of Continuous Measurement for Small Area Estimation," 1995 Annual Meeting of the American Statistical Association, Proceedings, Statistical Research and Methodology Section, pp. 602-07, and Kenneth B. Dawson, Janice A. Sebold, Susan P. Love, and Lynn Weidman, "Collecting Census Long Form Data Over the Telephone: Operational Results of the 1995 Continuous Measurement CATI Test," 1995 Annual Meeting of the American Statistical Association, Proceedings, Statistical Research and Methodology Section, pp. 590-95.

¹³ U.S. Census Bureau, "The Plan for Census 2000," February 28, 1996.

¹⁴ By April 1997, 37 sites were selected to be sampled between 1999 and 2001. Following a significant budget reduction for FY 1999, the number of sites was reduced to 31. For more information, refer to the discussion in this section.

¹⁵ Stratification is the process of dividing a population into relatively homogeneous subgroups, or strata, with regard to one or more characteristics. In this case, ACS statisticians divided cities or counties into strata based on population size, rate of population change between 1990 and 1996, and ease of enumeration.

¹⁶ "Background Information for the February 19, 1997 Meeting of the American Community Survey Product Development Group," and "American Community Survey Product Development Group Summary," February 19, 1997.

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- Evaluate the overall CM system, including three modes of data collection (mailout/mailback, CATI, and computer-assisted personal interviewing [CAPI]), the control system, the data processing system, and the data tabulation system.
 - Evaluate the overall coverage and data quality of CM.
 - Obtain real-time cost and productivity information to create an improved cost model.²¹

The original plan called for tests in six sites representing a broad range of geographic areas: Columbus, Ohio (a large central city in a metropolitan statistical area [MSA]); Rockland County, New York (a metropolitan county that is part of the New York primary MSA); Brevard County, Florida (a single county MSA); Louisa County, Iowa (a rural county that introduced a county-wide address system in the early 1990s); Fulton County, Pennsylvania (a rural county without a county-wide address system); and Multnomah County, Oregon (which included Oregon's largest city, Portland). Using the master address file (MAF) then under construction by the Census Bureau's Geography Division, the ACS team selected a sample of addresses each month from the four urban areas and one of the rural areas (Louisa County, Iowa) in the test. In rural Fulton County, Pennsylvania, the agency planned to select a monthly sample of housing units from an address list constructed by Census Bureau personnel.²²

Reductions in the Census Bureau's FY96 budget forced the agency to cut the number of continuous measurement test sites from six to four. Those retained were Fulton County, Pennsylvania; Rockland County, New York; Brevard County, Florida; and Multnomah County, Oregon.

ACS planners considered several factors in selecting the sites including population size and density, the presence or absence of city-style addressing, geographic balance (which gave agency interviewers across the country experience in collecting data for this survey), current survey workload, and the sites' land area.²³ For the three urban sites (Rockland, Brevard, and Multnomah Counties), the Census Bureau prepared special advance MAF by matching

²¹ U.S. Census Bureau, Continuous Measurement Staff, "Continuous Measurement Matters," April/May 1995, p. 1.

²² Ibid, p. 2; and Federal Register, V. 60, No. 115, June 15, 1995, p. 31447.

²³ City-style addresses refer to those having a street number and street name. Other types of addresses include post office box numbers, rural route numbers, star routes, etc.

each site's 1990 Census Address Control File (ACF) with the U.S. Postal Service's 1995 Delivery Sequence Files (DSFs). The rural site, Fulton County, contained few city-style addresses, so the Census Bureau compiled an address list by listing each housing unit in the county.²⁴

DATA COLLECTION

When fully implemented, the ACS would consist of an annual 3 percent sample of housing units, divided into monthly installments of 250,000 housing units. One year of data was sufficient to produce reliable estimates of population and housing characteristics for geographic entities containing at least 65,000 people. Geographic areas with populations between 20,000 and 64,999 required 3 years of cumulated data to obtain valid estimates. For areas with fewer than 20,000 people, reliable estimates required 5 years of sample data. However, the 1996 ACS test sampled at the particularly high rate of 15 percent in most areas and 30 percent in small governmental units in order to collect enough data in 1 year to allow for comparisons with the long-form data from the 1990 Census. For comparisons of small areas, such as block groups and tracts, ACS researchers had to collect in 1 year the amount of information it would normally take 5 years to collect. This large, single-year sampling operation yielded sufficient data for the ACS staff to compare directly the data collected in 1996 with those from the 1990 Census long form.²⁵

While virtually all Census Bureau surveys taken at this time relied on a combination of telephone interviews and personal visit interviews for data collection, the

²⁴ U.S. Census Bureau, "Operational Overview of the 1996 American Community Survey," pp. 1-2, available at <www.census.gov/history/pdf/operationaloverview1996acs.pdf>, accessed December 2023, and U.S. Census Bureau, "ACS: Accuracy of the Data (1996)," p. 1, available at <www.census.gov/acs/www/html/meth_doc/accuracy/1996/accuracy.htm>, accessed March 20, 2011. Refer also to Charles H. Alexander, Scot Dahl, and Lynn Weidman, "Making Estimates From the American Community Survey," paper presented at the 1997 annual meeting of the American Statistical Association in Anaheim, CA, in Proceedings of the Section on Government Statistics and Section on Social Statistics, Alexandria, VA, American Statistical Association, 1997, pp. 88-97, and Amy Symens Smith, "The American Community Survey and Intercensal Population Estimates: Where Are the Crossroads?," Population Division Technical Working Paper No. 31, December 1998, pp. 3-4.

²⁵ U.S. Census Bureau, "ACS: Accuracy of the Data (1996)," p. 1, available at <www.census.gov/history/pdf/accuracyofdata-acs1996.pdf>, accessed December 2023; Susan Love and Gregg Diffendal, "The 1996 American Community Survey Monthly Response Rates, by Mode," paper presented at the American Community Survey Symposium, U.S. Census Bureau, March 1998, p. 1; and Charles H. Alexander, "Recent Developments in the American Community Survey," paper presented to the Annual Meeting of the American Statistical Association, Dallas, TX, August 1998. For the 1996 ACS, small governmental units were defined as areas with fewer than 1,000 housing units.

ACS adopted the decennial census practice of mailing questionnaires to the in-sample addresses and instructing respondents to complete the forms and return them to the Census Bureau by mail. The mail-out/mailback strategy was the least expensive way of collecting information, and those designing the ACS used it to reduce overall costs. Census Bureau planners anticipated that about half the housing units would respond by mail. Only after the mailout/mailback procedure had run its course would the Census Bureau begin the second and third phases of data collection: CATI and CAPI.²⁶

Mail Data Collection. Research carried out in preparation for the 2000 Census indicated that multiple contacts with respondents increased voluntary cooperation with the census. With this research in mind, the 1996 test in urban areas included up to four contacts with each address in the sample. During the third week of the month prior to the mailing of questionnaires, the Census Bureau sent letters notifying the inhabitants of that month's sample housing units that they had been selected and would soon receive an ACS packet by mail. They received the questionnaire package about one week later. A week after that a reminder card asked all the recipients to complete and return the questionnaire and thanked them if they had already mailed the completed form. Two weeks after that, the Census Bureau sent a second questionnaire package only to those housing units that had not returned a completed form.²⁷

However, since the rural site (Fulton County) contained few city-style addresses and had no plan to implement a county-wide address system, the Census

Bureau compiled a sampling frame²⁸ by sending personnel into the field to locate and list each housing unit in the county and then computerizing the listing. In addition, Census Bureau staff marked the location of each housing unit on a census map (map spotting). Following the creation of an address list and the selection of the sample housing units, Census Bureau employees hand-delivered questionnaire packages to each sample address. People living in Fulton County did not receive advance notification letters, reminder cards, or second questionnaire packages.

The Census Bureau divided the sample addresses in each site into 12 monthly groups, or panels. Questionnaire mailings began in November 1995 and continued through October 1996.²⁹ The 1996 test included only housing units; the Census Bureau did not add group quarters until the 1999 and 2001 tests.³⁰

Computer-Assisted Telephone Interviewing (CATI).

At the beginning of the month following the initial mailing of questionnaires, the Census Bureau followed up with telephone calls to nonresponding addresses. While the 1990 Census made limited

²⁸ In the Census Bureau's population census and survey work, the sampling unit is usually a street address consisting of a street name and address number. The sampling frame is a complete list of all possible sampling units, in this case a list of all street addresses. Researchers select sample units from the sampling frame or address list.

²⁹ The partial federal government shutdown from December 16, 1995, through January 6, 1996, complicated the 1996 test. The Census Bureau cancelled the January mailing and completed the telephone and personal visit cases for the November and December panels on a delayed schedule. Refer to Alexander, Dahl, and Weidman, "Making Estimates," 1997, p. 89. An earlier federal government shutdown, from November 14, 1995, through November 19, 1995, did not disrupt the data collection effort.

³⁰ The Census Bureau divides living quarters into two groups: housing units and group quarters. A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room occupied or intended for occupancy, in which the residents live separately from any other people in the building and that have direct access from the outside of the building or through a common hall. Group quarters consist of two components: institutional group quarters that provide authorized, supervised care or custody of the inhabitants (such as a correctional institution or a nursing home), while noninstitutional group quarters include such living arrangements as college dormitories, military quarters, and group homes. The 1997 ACS test in Franklin County, Ohio, included a limited test of group quarters procedures. Refer to U.S. Census Bureau, "2000 Census of Population and Housing, Selected Appendixes: 2000," Government Printing Office, Washington, DC, 2003, pp. B-13-14.

²⁶ Susan Love, Donald Dalzell, and Charles Alexander, "Constructing a Major Survey: Operational Plans and Issues for Continuous Measurement," paper presented at the 1995 annual meeting of the American Statistical Association, in *Proceedings of the Survey Research and Methods Section*, Alexandria, VA, American Statistical Association, 1995, pp. 584-85, and Deborah H. Griffin and Preston Jay Waite, "American Community Survey Overview and the Role of External Evaluations," *Population Research and Policy Review*, Vol. 25, No. 3, June 2006, p. 206.

²⁷ Susan Love and Gregg Diffendal, "The 1996 American Community Survey Monthly Response Rates, by Mode," paper presented at the American Community Survey Symposium, U.S. Census Bureau, March 1998, p. 1.

use of telephone follow-ups, surveys in succeeding years made increasing use of centralized CATI. The greatest success had been with recurring surveys, in which an interviewer initially contacted respondents at their addresses, administered the questionnaire, and obtained their permission to conduct subsequent interviews by telephone. For an address-based survey such as the 1996 continuous measurement test, making the initial nonresponse follow-up telephone contact required obtaining accurate telephone numbers for specific housing units without knowing the respondent's surname. Accurate data was critical as incorrect matches could lead to contacting the wrong address, wasting scarce resources, and potentially adding sampling bias if the interviewer conducted the interview anyway.³¹

Earlier testing demonstrated that commercial vendors could provide accurate telephone numbers for about 35 percent of the sample addresses given to them. The 20 to 30 percent of all households in the United States with nonpublished telephone numbers (wide variations existed from state to state) added to the complexity of the endeavor. Limitations on the availability and accuracy of address lists matched with telephone numbers led some census researchers to suspect that, at most, a CATI facility could only reach about 25 percent of the nonresponse universe.

On a positive note, Census Bureau research suggested CATI interviewers might be able to complete interviews with about one-half of the nonresponding units that they could contact. Researchers expected the 1996 continuous measurement test to provide the first assessment of the extent to which the agency could collect census long-form type data during a CATI operation.³²

Computer-Assisted Personal Interviewing (CAPI).

The last phase of data collection, personal interviewing, began 2 months after the initial mailing. The nonresponse universe for personal visit follow-up included all the mail nonresponse follow-up

³¹ Love, Dalzell, and Alexander, "Constructing a Major Survey," 1995, pp. 585-86.

³² Love, Dalzell, and Alexander, "Constructing a Major Survey," 1995, p. 586.

addresses for which the Census Bureau was unable to acquire a telephone number, plus those addresses CATI interviewers were unable to contact via telephone. The latter group contained a diverse group of housing units that the ACS staff expected would be the most difficult to enumerate. ACS staff selected a 1 in 3 subsample of these addresses and sent it to field interviewers. Interviewers located the remaining assigned housing units and attempted to conduct interviews. These lists evolved daily as late mail returns arrived at the census office, thus reducing the workload.³³ The CATI and CAPI phases of data collection each took 1 month.³⁴

Results of the Mailout/Mailback Test. Continuous measurement staff carefully examined the responses of the sample households to the questionnaire mailings because the mail response and mail return rates at the four sites would play a crucial role in the success or failure of the test and, possibly, of the CM concept.

The ACS staff calculated the mail response rate by dividing the number of housing units returning a completed questionnaire plus those giving information to the telephone questionnaire assistance (TQA) unit by the total number of households receiving the questionnaire.³⁵ This rate determined the size of the nonresponse follow-up workload and would continually change as the staff received late returns.³⁶

Table 1 presents the mail response rates for the overall 1996 test and for each of the four sites. Continuous

³³ Late mail returns were completed questionnaires received at the census office after the cut-off date for generating the reminder mail and CATI nonresponse follow-up lists.

³⁴ Love, Dalzell, and Alexander, "Constructing a Major Survey," 1995, p. 587, and Anthony Tersine, "Item Nonresponse: 1996 American Community Survey," paper presented at the American Community Survey Symposium, U.S. Census Bureau, March 1998, p. 1.

³⁵ Telephone questionnaire assistance consisted of a toll-free telephone number where ACS sample respondents could call if they had questions, comments, or complaints. Based in the Census Bureau's Jeffersonville, IN, office, nearly one-half of the calls answered by telephone questionnaire assistance (TQA) operators were complaints. However, these operators also administered the ACS questionnaire over the phone to respondents who were unable or unwilling to complete it themselves. Refer to Love and Diffendal, "The American Community Survey: April 1996 Sample Profile," pp. 6-9.

³⁶ Love and Diffendal, "1996 American Community Survey Monthly Response Rates," p. 2.

Table 1.

Mail Response for the 1996 Continuous Measurement Test

Mailing and response	Total		Rockland		Brevard		Multnomah		Fulton	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total sample ¹	81,719	X	13,622	X	28,544	X	37,742	X	1,811	X
Questionnaires returned from initial mailing (initial mail response rate)	41,707	51.0	6,271	46.0	14,534	50.9	20,011	53.0	891	49.2
Second mailing ²	48,481	X	9,131	X	16,623	X	22,727	X	NA	X
Replacement questionnaires returned (replacement response rate)	8,170	16.9	1,441	15.8	2,735	16.5	3,994	17.6	NA	X
Total mail response ³	49,755	60.9	7,693	56.5	17,244	60.4	23,927	63.4	891	49.2

NA Not available.

X Not applicable.

¹ Total sample is the denominator for the initial and total mail response rates.² Second mailing is the denominator for the replacement response rate.³ Total mail response is less than the sum of initial and replacement response because some households returned both questionnaires.

Source: Susan Love and Gregg Diffendal, "The 1996 American Community Survey Monthly Response Rates, by Mode," Table 1.

measurement researchers were quite pleased with the overall 60.9 percent response rate, which was almost 11 percent more than they had expected.³⁷

Census researchers found that the monthly response rates for Multnomah and Rockland counties were remarkably stable, with the former ranging from about 63 percent to 66 percent and the latter running between 54 percent and 60 percent.³⁸ The Brevard County response rate rose in the autumn and winter, only to decline from April through the summer months. CM researchers attributed much of this pattern to seasonal variations in occupancy rates.³⁹

By contrast, the mail return rate is based on occupied housing units only. For this reason, the staff could not calculate the number until after the census takers had visited each nonresponsive household and determined the actual number of occupied housing units. Since the denominator for mail return rates was smaller than for the mail response rates, ACS experts expected the mail return rates to be higher percentages than the mail response rates, and they were. Mail response rates varied between about 54 percent and 73 percent. Removing vacant and nonexistent units from the sample also revealed that the high public

³⁷ The long-form mail response rate in the 1990 Census was 61.0 percent, nearly identical to the mail response rate for the 1996 ACS test (60.9 percent). Refer to U.S. Census Bureau, 1990 Census of Population and Housing, Part A, 1990 CPH-R-2A, pp. 6-28-29.

³⁸ In Fulton County, monthly response rates (between 45 percent and 55 percent) were lower than in the other counties. This was partly a result of not delivering replacement questionnaires in the county. However, the small sample size in Fulton County also meant that response was highly susceptible to variations in the number of vacant and nonexistent units in the sample from month to month.

³⁹ Love and Diffendal, "1996 American Community Survey Monthly Response Rates," pp. 2-3.

cooperation numbers remained stable during the Continuous Measurement Survey in Brevard County, where the mail return rate hovered around 70 percent throughout the test year.⁴⁰

Respondents sent completed forms to the Census Bureau's National Processing Center (NPC) in Jeffersonville, Indiana, where Census Bureau staff "checked in" the questionnaires and submitted them to a set of reviews, or "edits." The first of these, the "clerical edit," determined if the questionnaire was missing enough information to require a telephone contact. If it was, the NPC clerk sent the questionnaire to a different section of the NPC, where a staff member attempted to contact the respondent by telephone in order to complete the form. The other two edits were termed "coverage edits." One compared the questionnaire entry giving the number of people living at the address with the number of people for whom the questionnaire contained information. The second checked if the number of people listed as living at the address was greater than five as the test questionnaire had room for responses from only five people. For either condition, agency staff tried to contact the household by telephone to resolve discrepancies or fill in missing information. Blank questionnaires automatically received a telephone follow-up.⁴¹

⁴⁰ Love and Diffendal, "1996 American Community Survey Monthly Response Rates," p. 3.

⁴¹ Alexander, Dahl, and Weidman, "Making Estimates," 1997, p. 89, and Charles H. Alexander, "The American Community Survey: Design Issues and Initial Test Results," in Statistics Canada, Proceedings of Symposium 97: New Directions in Censuses and Surveys, Statistics Canada, Ottawa, Canada, 1998, pp. 187-192.

Table 2.

CATI Response for the 1996 Continuous Measurement Test

Mailing and response	Total		Rockland		Brevard		Multnomah	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
CATI universe ¹	18,596	X	3,498	X	6,801	X	8,297	X
Late mail returns removed.....	3,522	18.9	746	21.3	1,098	16.1	1,678	20.2
Ineligible phone numbers	4,787	25.7	696	19.9	1,973	29.0	2,118	25.5
Eligible for telephone interviews ²	10,287	X	2,056	X	3,730	X	4,501	X
Completed interviews.....	6,521	63.4	1,363	66.3	2,252	60.4	2,906	64.6
Refusals.....	1,456	14.2	303	14.7	568	15.2	585	13.0
Other noninterviews	2,310	22.5	390	19.0	910	24.4	1,010	22.4

X Not applicable.

¹ CATI universe is the denominator for late mail returns removed and ineligible phone number rates.² Eligible for telephone interview is the denominator for completed interviews, refusals, and other noninterviews.

Source: Susan Love and Gregg Diffendal, "The 1996 American Community Survey Monthly Response Rates, by Mode," Table 2.

Results of the CATI Test. Census Bureau staff attempted to collect data from addresses that had not responded by mail in the three urban sites. Since Fulton County lacked a city-style address system, it was impossible to make firm matches between telephone numbers and addresses. Approximately 1 month after the initial mailing of questionnaires, Census Bureau staff generated a nonresponse follow-up address list, which they submitted to commercial vendors who were able to supply telephone numbers for about 50 percent of the nonresponding addresses. During the 3.5 weeks of telephone nonresponse follow-up, approximately 19 percent of these households returned completed questionnaires. (Table 2) In addition, staff at the Jeffersonville office regularly removed late mail returns from the telephone follow-up list.⁴²

However, problems persisted as 25 percent of the telephone numbers provided by vendors either did not connect interviewers with the correct addresses or proved to be nonworking numbers. Therefore, about 55 percent of the original CATI workload required personal interviews.

While there was a good deal of variation in the month-to-month response rates by site, the annual total exceeded 60 percent at each site. During the year, CM staff tried several different methods to increase response, including contacting directory assistance to see if it could provide phone numbers for name and address combinations and using a business database to obtain phone numbers for managers of multiunit structures—but to no avail. The CM staff's careful study of CATI telephone records did determine the most successful times of the day and days of the week to conduct interviews and the

subsequent modification of calling times proved quite successful.⁴³

Results of the CAPI Test. Sending field representatives to specific addresses to administer questionnaires was the most expensive mode of data collection. In order to reduce costs, the Census Bureau sent only one-third of the nonresponse cases remaining after the mailing and CATI phases to the field for data collection.⁴⁴ Many of these addresses proved to be vacant, nonexistent, or were those for which the Census Bureau had been unable to obtain telephone numbers. Further, the CAPI sample included many of those who refused to complete the mailed questionnaire or to participate in the CATI data collection effort (Table 3).⁴⁵

Across the four test sites, CAPI began about 2 months after the initial questionnaire mailing. It took 3 to 4 weeks and involved administering automated questionnaires with built-in skip patterns and interviewer checks on respondent answers, similar to the CATI form. Despite the challenges of CAPI data collection, interviewers were able to obtain interviews from respondents at over 94 percent of the occupied housing units.⁴⁶

⁴² Love and Diffendal, "1996 American Community Survey Monthly Response Rates," pp. 4-5.

⁴³ Nonresponse cases also included one-third of a second component. When the Census Bureau could not mail a questionnaire directly to sample housing units because the area lacked a house number/street name addressing system or the post office did not use the system for mail delivery, Census Bureau field staff delivered the questionnaire package directly to the housing unit. If residents of these units did not return a completed questionnaire, they were also included in the CAPI follow-up list. Refer to Love, Dalzell, and Alexander, "Constructing a Major Survey," p. 584.

⁴⁴ Love and Diffendal, "1996 American Community Survey Monthly Response Rates," p. 5.

⁴⁵ Love and Diffendal, "1996 American Community Survey Monthly Response Rates," pp. 5-6.

⁴² Love and Diffendal, "1996 American Community Survey Monthly Response Rates," pp. 3-4.

Table 3.

CAPI Response for the 1996 Continuous Measurement Test

Mailing and response	Total		Rockland		Brevard		Multnomah		Fulton	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
CAPI subsample ¹	8,694	X	1,573	X	3,084	X	3,726	X	311	X
Late mail returns removed.	280	3.2	52	3.3	88	209	123	3.3	17	5.5
Deletes.	666	7.7	151	9.6	218	7.1	271	7.3	26	8.4
Eligible for interview ²	7,748	X	1,370	X	2,778	X	3,332	X	268	X
Interviews	7,291	94.1	1,291	94.2	2,596	93.4	3,145	94.4	259	96.6
Refusals.	336	4.3	40	2.9	148	5.3	145	4.4	3	1.1
Other noninterviews	121	1.6	39	2.8	34	1.2	42	1.3	6	2.2

X Not applicable.

¹ CAPI subsample is the denominator for late mail returns removed and deletes rates.² Eligible for interview is the denominator for interviews, refusals, and other noninterviews rates.

Source: Susan Love and Gregg Diffendal, "The 1996 American Community Survey Monthly Response Rates, by Mode," Table 3.

The CAPI phase of data collection was the primary method the survey used to identify vacant housing units. Almost 21 percent of the units visited during CAPI were vacant. The ACS produced estimates of the number and some of the characteristics of these vacant units in all census geographic entities. As a result, CAPI interviewers remained responsible for collecting basic housing unit information on vacant units from knowledgeable respondents, such as building owners or managers, real estate dealers, or neighbors.⁴⁷

In a survey intended to become nationwide and to rely on monthly field visits covering virtually every county in the country, this was important because the Census Bureau had to be able to predict the size of the work force it would need to collect survey data. Successful management of the survey required that the number of field representatives should be about the same every month.⁴⁸

The survey team anticipated an issue with the residence rules used in the decennial census. Unlike the decennial census, which uses a single reference date (Census Day, April 1 of the census year), the ACS is taken throughout the year. Thus, a residence rule with a fixed reference date is not feasible. Instead, the ACS adopted a "current residence" rule, also known as a 2-month rule. For the 1996 test, the survey parameters defined current residents of the housing unit as those who lived or intended to live at the address for more than 2 consecutive months. The survey did not consider people staying fewer than 2 months and who usually resided at another address as current residents. This rule excluded people in the household who had another, more permanent residence. In order

to minimize the omission of people with no usual residence from household rosters, if a guest had no other address, the survey considered them a resident. In this way, the Census Bureau hoped to reduce the population undercoverage that tended to be higher in household surveys than in censuses.⁴⁹

In order to have a fixed start date for the residence rule, the Census Bureau tied this to the date of initial ACS contact with a household. For the mailing phase, the initial contact date was the date the respondent completed the questionnaire. For the CATI and CAPI phases, the date on which the interviewer contacted a current resident became the initial contact date.⁵⁰

THE 1997 AND 1998 TESTS

In 1997, the Census Bureau continued the operational test in the four sites surveyed in 1996 and added four new sites: Douglas County, Nebraska (including Omaha); Harris and Fort Bend Counties, Texas

⁴⁷ Ibid., p. 6.

⁴⁸ Ibid.

⁴⁹ Residency and residence rules are important and complicated concepts. Love and Diffendal, "1996 American Community Survey Monthly Response Rates," p. 2, summarized the ACS concept of residency as follows: "The ACS adopted a rather unique concept of residency that considers that anyone staying at a sample address for more than 2 months to be a current resident of the unit, and therefore eligible to be interviewed for the survey. This concept of residency is quite different from the usual residence concept used by the decennial census and most other demographic surveys. It changes the definitions of occupied and vacant units, and allows a unit's status to change more often since it is not dictated by occupants' one and only one "usual" residence. Areas where large numbers of people stay for extended periods of time but are not their "usual" residence would be most affected by this new concept. Of the sites in the 1996 test, Brevard was expected to be the one most affected. And it does seem that we are watching the movement of "snowbirds" in and out of the county, the subsequent change in the vacancy rate reflected in the rising and falling of the mail response rates. When units are sitting empty, or are occupied by short term vacationers, fewer questionnaires are returned by mail."

⁵⁰ Love, Dalzell, and Alexander, "Constructing a Major Survey," p. 588.

Table 4.

ACS Test Sites by Year: 1996-1999

Year	Test site
1996	Fulton County, Pennsylvania ¹
1996	Rockland County, New York ¹
1996	Brevard County, Florida ¹
1996	Multnomah County, Oregon ¹
1997	Fulton County, Pennsylvania
1997	Rockland County, New York
1997	Brevard County, Florida
1997	Multnomah County, Oregon
1997	Douglas County, Nebraska ¹
1997	Harris and Fort Bend Counties, Texas ¹
1997	Franklin County, Ohio ¹
1997	Otero County, New Mexico ¹
1998	Fulton County, Pennsylvania
1998	Rockland County, New York
1998	Broward County, Florida ^{1,2}
1998	Multnomah County, Oregon
1998	Kershaw and Richland Counties, South Carolina ¹
1998	Douglas County, Nebraska
1998	Harris and Fort Bend Counties, Texas
1998	Franklin County, Ohio
1998	Otero County, New Mexico
1999	Fulton County, Pennsylvania
1999	Rockland County, New York
1999	Broward County, Florida
1999	Multnomah County, Oregon
1999	Bronx County, New York ¹
1999	Lake County, Illinois ¹
1999	San Francisco County, California ¹
1999	Pima County, Arizona ¹
1999	Jefferson County, Alaska ¹
1999	Tulare County, California ¹
1999	Upson County, Georgia ¹
1999	Black Hawk County, Iowa ¹
1999	Miami County, Indiana ¹
1999	DeSoto Parish, Louisiana ¹
1999	Calvert County, Maryland ¹
1999	Hampden County, Massachusetts ¹
1999	Douglas County, Nebraska
1999	Harris and Fort Bend Counties, Texas
1999	Franklin County, Ohio
1999	Otero County, New Mexico
1999	Madison County, Mississippi ¹
1999	Iron, Reynolds, and Washington Counties, Missouri ¹
1999	Flat Head and Lake Counties, Montana ¹
1999	Schuylkill County, Pennsylvania ¹
1999	Sevier County, Tennessee ¹
1999	Starr County, Texas ¹
1999	Zapata County, Texas ¹
1999	Petersburg City, Virginia ¹
1999	Yakima County, Washington ¹
1999	Ohio County, West Virginia ¹
1999	Oneida and Vilas Counties, Wisconsin ¹

¹ Site's first year in the test.² Broward County replaced Brevard County.

Source: U.S. Census Bureau.

(including Houston⁵¹); Franklin County, Ohio; and Otero County, New Mexico. (Table 4) The selection criteria were similar to those used for the 1996 ACS test: population size and density, city-style addressing, geographic distribution in relation to the agency's 12 regional offices, current survey workload, and land area. Another criterion was to identify active data users who could partner with the agency in evaluating and improving the ACS program.

By adding Houston, Texas, the ACS tackled its first large city. At the time, Houston was a rapidly growing, diverse city with a 1990 population of over 1.6 million (20 percent African American and 20 percent Hispanic). ACS staff viewed Houston as a prime example of the type of respondent reception the ACS would experience in large metropolitan areas.

Of the four new sites, only Otero County, New Mexico, contained substantial rural territory. In addition to having to create a current address list for the rural part of Otero County, ACS staff had to develop procedures for collecting information on the county's Mescalero Apache American Indian reservation and to maintain the exact boundary between the rural part of Otero County and the city of Alamagordo.⁵²

The survey had one additional test site (Franklin County, Ohio, including the city of Columbus) slated for inclusion in 1996 but cut it for budgetary reasons. However, during the 1997 test, Franklin County served as the first site in which ACS researchers collected information from group quarters residents. Traditionally, group quarters (e.g., prisons and jails, nursing homes, college dormitories, military facilities, and group homes) posed data collection challenges during decennial censuses because of their diversity and the difficulty in identifying and interviewing their residents.⁵³

Continuation of the test in the 1996 sites allowed for the production of estimates of year-to-year changes. Except for Brevard County, Florida,⁵⁴ the ACS sampled the sites surveyed in 1997 again in 1998, with the

⁵¹ A small section of Houston falls outside of Fort Bend and Harris Counties and was not included in the 1997 test.

⁵² Susan Love and Gregg Diffendal, "The American Community Survey: July 1996 Sample Profile," pp. 5-6.

⁵³ Susan Love and Gregg Diffendal, "The American Community Survey: July 1996 Sample Profile," p. 5. "Minutes of the CMO [Continuous Measurement Office] Staff Meeting," November 14, 1996, p. 1. The 1997 and 1998 inclusion of group quarters was on an "offline" basis as an experiment or informal test.

⁵⁴ The Census Bureau dropped Brevard County from the test because of the resistance of some residents' to the personal nature of some of the questions and the opposition of the county's congressman, David Weldon.

addition of Broward County, Florida, and two South Carolina counties (Kershaw and Richland). The latter two allowed statisticians to compare estimates from the ACS to the findings of the 1998 Census dress rehearsal, which took place in the same counties.

The 1997 and 1998 tests sampled housing units in most sites at 3 percent annually, using a MAF constructed by merging the 1990 Census address control file (ACF) and the 1995 USPS Delivery Sequence File (DSF, 1997) or the 1997 DSF (1998). The survey team increased the sample size to 9 percent in governmental units containing fewer than 1,000 housing units to assure sufficient sample size to produce reliable estimates.⁵⁵

The 1997 and 1998 tests revealed a number of important findings. The biggest was finding that the mail response rate in the large, demographically diverse Houston, Texas, site was notably lower (between 44 percent and 46 percent) than that in most other sites (between 54 percent and 65 percent). Although residents in Houston received advance notice of the incoming questionnaire and replacement questionnaires, the response rate most closely resembled rural Fulton County, Pennsylvania, where residents did not receive an advance notice or a replacement mailing.⁵⁶ However, this was not completely unexpected as mail response in large cities tends to be lower than in other types of sites for several reasons including: a substantial proportion of multiunit dwellings, subpopulations that do not want to interact with government personnel or agencies, significant parts of the population with unusual housing arrangements, and a large number of non-English-speaking residents. As seen in the 1995 and 1996 tests, Brevard County's mail response rate continued to fluctuate with the migration of "snowbirds" from northern states to Florida for the winter and back to the northern states during the warmer months. This same pattern appeared in the late spring in Columbus, Ohio, where

the decline in the mail response rate coincided with the end of the semester at Ohio State University.⁵⁷

PREPARING FOR THE 1999–2002 ACS TEST

In the fall of 1998, the Census Bureau again had to modify its plans for the 1999 test due to a budget reduction from the requested \$38.8 million to \$20 million. Before the budget cut, the plan envisioned:

- Increasing the number of comparison test sites from 9 in 1998 to 37 in 1999 with an additional 8 phase-in sites.⁵⁸ As previously noted, the ACS staff planned for the test sites to provide estimates for small areas such as census tracts. ACS statisticians intended to divide the annual 240,000 housing unit sample among the 45 comparison and phase-in sites, with each site sampled at a 3 percent level. Testing was to cover the sites for 3 years, between 1999 and 2001.⁵⁹ For example, Houston, Texas, contained approximately 782,000 housing units in 2000. An annual 3 percent sample would amount to 23,460 housing units. Over the course of the 3-year testing period, the cumulative sample for Houston would come to 70,380 households. This size sample would provide reliable estimates that statisticians could compare with similar estimates from the 2000 Census sample for each of Houston's census tracts.
- Implementing a national sample of 960,000 housing units annually beginning in 2000 and ending in 2002. The ACS national sample would permit comparisons of characteristics from the 2000 Census sample for states, large cities, and large substate areas but would not produce any small-area data.
- Postponing the full implementation of the ACS from 2002 to 2003 and releasing the first 5-year estimates (2003–2007) in 2008.⁶⁰

⁵⁵ U.S. Census Bureau, "ACS: Accuracy of the Data (1997)," p. 1, available at <www.census.gov/history/pdf/accuracyofdata-acs1997.pdf>, accessed December 2023, and U.S. Census Bureau, "ACS: Accuracy of the Data (1998)," p. 1, available at <www.census.gov/history/pdf/accuracyofdata-acs1998.pdf>, accessed December 2023.

⁵⁶ Susan Love and Gregg Diffendal, "The American Community Survey: November/December 1996 Sample Profile," Table 1; Susan Love and Gregg Diffendal, "The American Community Survey: January/February 1997 Sample Review," Table 1; Susan Love and Gregg Diffendal, "The American Community Survey: March/April 1997 Sample Review," Table 1; Susan Love and Gregg Diffendal, "The American Community Survey: May/June 1997 Sample Review," Table 1; and Gregg Diffendal, "The American Community Survey: July/August 1997 Sample Review," Table 1.

⁵⁷ Susan Love and Gregg Diffendal, "The American Community Survey: May/June 1997 Sample Review," Table 1.

⁵⁸ The purpose of phase-in sites was to provide Census Bureau regional offices that did not contain ACS comparison sites with opportunities to train staff in ACS data collection techniques prior to national implementation in 2003. Adding the 8 phase-in sites to the 37 comparison sites produced a planned total of 45 sites in 1999.

⁵⁹ Memorandum from Preston J. Waite to John H. Thompson, Dwight P. Dean, and Joel L. Morrison, "American Community Survey Test Sites for FY 1999," June 17, 1997, and U.S. Census Bureau, "Objectives for the Original and New ACS Proposals," n.d.

⁶⁰ U.S. Census Bureau, "Objectives for the Original and New ACS Proposals," n.d.

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- Eliminating the long form from the 2010 Census.⁶¹

The budget reduction resulted in significant changes including, the cancellation of all the large urban phase-in sites, and a reduction in the sample sizes in all sites. Even these measures were not sufficient to keep the project within the new budget, so the staff reviewed the original site selection process to gauge which sites overlapped with others in terms of general demographic characteristics, such as population size, population changes between 1990 and 1996, and ease of enumeration. Based on this evaluation, the ACS staff decided to eliminate six sites from the test, thereby reducing the overall number of sites to 31. For each dropped site, the group concluded there were “other sites that could ... meet the most critical characteristics and help us more to determine long-range costs.”⁶²

The Census Bureau’s House Appropriations subcommittee questioned the agency about the ACS’s long-term budget implications. The Census Bureau’s initial response noted that it based cost estimates on the 1990 Census and the 1996–1998 test sites. In a later, more complete response, the ACS staff prepared a report that incorporated the need for cost model information from as large and diverse a group of test sites as possible. These sites could provide cost information on the follow-up operation in cities (including areas where many households contained no English readers) and in rural areas where long distances between houses impacted the productivity of field representatives. In addition to estimating these costs, other cost components, such as the cost of following up via telephone and personal visit after differing mail response rates, also needed to be assessed.⁶³

The mailout of nearly 14,000 advance letters to the sample households in the 31 ACS test sites began in late December 1998; a few days later, the households received their questionnaires. In early February 1999, CATI began calling those addresses that had not returned completed questionnaires to the Census Bureau. The following month ACS field representatives began knocking on the doors of the 1 in 3 housing units that had not responded to the mail or

⁶¹ U.S. Census Bureau, “CM Activities That Will Permit the Long Form to be Eliminated in 2010,” n.d.

⁶² Email from Cindy Taeuber to Stanley J. Rolark, Renee Jefferson-Copeland, and others, “ACS—Response to SDC Questions,” December 11, 1998. The following six sites were dropped from the 1999 ACS Test: Boulder County, Colorado; Monroe County, Pennsylvania; Richland County, South Carolina; Kershaw County, South Carolina; Arlington County, Virginia; Chatham County, North Carolina; and Berkeley County, West Virginia.

⁶³ Ibid.

telephone inquiries.⁶⁴ Data collection and processing activities were similar to those used in earlier ACS tests.

In late December 1999, the project’s scope expanded from the 31 test sites to include the 1,203 counties that made up the national decennial census test. The monthly mailout increased to more than 74,000 addresses, including both the comparison sites and the national sample.⁶⁵ During this expansion, the Census Bureau weighed whether they could effectively administer the ACS during the 2000 Census. In the end, while the agency discovered some bottlenecks (such as too few employees in the telephone questionnaire assistance and data keying operations), for the most part, the two operations did not interfere with one another.⁶⁶

DATA CAPTURE AND DATA PROCESSING

The ACS 2009 and 2014 publications Design and Methodology describes the details of the data capture and data processing operations.⁶⁷ Salient components of the process include:

- **Check-in.** This was the process of laser scanning and recording the unique barcode on each envelope containing a completed ACS questionnaire. Respondents who replied by mail sent the completed questionnaires to the Census Bureau’s NPC in Jeffersonville, Indiana, where they were checked in. Completed questionnaires also arrived at check-in by way of the TQA procedure. Each questionnaire contained a toll-free telephone number that respondents could call with questions about the ACS or to answer the questionnaire. Trained TQA interviewers conducted the ACS interview, completed a paper questionnaire on the respondent’s behalf, and submitted the completed form for check-in.⁶⁸

⁶⁴ U.S. Census Bureau, “Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey: July 2001,” p. 16.

⁶⁵ U.S. Census Bureau, “Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey: July 2001” Report 1, “Demonstrating Operational Feasibility,” especially Appendix 2, “Workloads and Timing.” The comparison sites were the 31 test sites in which the Census Bureau collected ACS data between 1999 and 2001 and census long-form data in 2000 in order to compare the two datasets.

⁶⁶ Ibid., pp. 16–20.

⁶⁷ U.S. Census Bureau, *Design and Methodology: American Community Survey, ACS-DM1*, April 2009. The Census Bureau released an updated version (Version 2.0) in January 2014.

⁶⁸ U.S. Census Bureau, “American Community Survey Operations Plan, Release 1: March 2003,” pp. 2122. When completing a questionnaire on a respondent’s behalf, the TQA interviewer asked for the barcode on the questionnaire to verify against the MAF.

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- **Data capture.** NPC staff bundled checked-in questionnaires into batches of 50 and sent them to the keying unit where clerks at desktop workstations entered the information on the questionnaires into the data capture file. NPC sent these files to Census Bureau headquarters each night.⁶⁹ A key-from-image system replaced this method in 2007.⁷⁰
 - **Telephone Edit Follow-Up.** After keying the questionnaire information, clerks reviewed the resulting data for content completeness and coverage to determine if the household required a telephone follow-up.⁷¹ When a questionnaire failed either of these reviews, NPC clerks contacted the respondent's address by telephone and attempted to complete the missing data and resolve any errors.⁷² Approximately one-third of all mail returns required follow-up. As improving data quality was one of the main goals of ACS operations, these follow-ups helped reduce nonsampling errors. In 1999, the Census Bureau automated the content and coverage components by substituting a computer algorithm for the clerical review and added an automated quality control routine. NPC staff continued contacting respondents by telephone to complete the questionnaires.⁷³
 - **Coding.** A number of questions on the ACS questionnaire, including those on race, Hispanic origin, place of birth, ancestry, migration, language, place of work, and industry and occupation allowed respondents to enter their own answers. The Census Bureau had to code these responses for the purpose of tabulation. Coding took place both at headquarters and the NPC.
 - The largest group of variables was race, Hispanic origin, ancestry, and language. Computer programs accomplished the first stage of coding. Keyers entered the responses as written on the questionnaires. Then the computer matched the values of the variables with automated lists of the most common responses for race categories, ancestries, and languages, and substituted the appropriate numerical code for the value. For example, the computer compared the response to the language question with an automated list of 380 language categories and assigned the appropriate numeric code. When the automated system was unable to assign a code to a particular entry, ACS staff referred the case to clerical coding for resolution. This operation took place at headquarters.
 - The second group of variables was geographical: place of birth, migration, and place of work. Geocoding (the assigning of standardized codes to geographic data) had two components: an automated component that took place at Census Bureau headquarters and a clerical component at NPC that handled the residual cases that could not be coded automatically.
 - The last type of coding focused on industry and occupation. This remained a clerical process and took place at NPC.⁷⁴
 - **Editing and Imputation.** Editing is subjecting data to a series of logical steps designed by subject-matter experts (SMEs) to identify missing, inconsistent, or implausible responses. For example, SMEs might use other information on the questionnaire to fill in missing information such as inferring marital status from a person's age or relationship to head of household. Imputation is the insertion of one or more estimated answers into a field of a data record that previously contained no data or had inconsistent or implausible data. For instance, if the ages of the individuals in a household were missing from a questionnaire but the completed form included all the other information requested, the missing ages could be "borrowed" from another nearby

⁶⁹ U.S. Census Bureau, "American Community Survey Operations Plan, Release 1: March 2003," p. 22.

⁷⁰ Stephanie Baumgardner, "An Evaluation of the Transition to the iCADE Data Capture System—Overview Report," ACS 12-RER-25, July 31, 2012.

⁷¹ The questionnaire allows for maximum of five respondents. Households with more than five residents require telephone follow-ups to complete the questionnaire.

⁷² Charles H. Alexander, "The American Community Survey: Design Issues and Initial Test Results," paper presented to the XIV Annual International Symposium on Methodology Issues, in Hull, Quebec, November 5–7, 1997, pp. 2–3, and Charles H. Alexander, Scot Dahl, and Lynn Weidman, "Making Estimates From the American Community Survey," paper presented at the 1997 annual meeting of the American Statistical Association in Anaheim, California, in Proceedings of the Section on Government Statistics and Section on Social Statistics, American Statistical Association, Alexandria, Virginia, 1997, pp. 88–97.

⁷³ Lynn Weidman and Charles H. Alexander, "Estimation for the American Community Survey: Ongoing Work, Planned Work, and Issues," paper presented at the Census Advisory Committee of Professional Associations, October 21–22, 1999, p. 5, and U.S. Census Bureau, "American Community Survey Operations Plan, Release 1: March 2003," pp. 23–24.

⁷⁴ U.S. Census Bureau, "American Community Survey Operations Plan, Release 1: March 2003," p. 28.

household that exhibited similar characteristics.⁷⁵ For the ACS, both editing and imputation were automated procedures. Computer programmers translated the specifications provided by population and housing experts into code that instructed computers to execute the required processing steps. ACS statisticians designed edit and imputation procedures to identify and resolve a variety of data issues ranging from the simple (inserting values when such variables as age or sex were missing) to the complex (the edit for housing value involved a joint examination of reported housing value, property taxes, and other variables). The justification for editing and imputing values for missing or incorrect responses was both statistical and practical. Well-designed edits and imputations can reduce the error of the estimates by eliminating erroneous responses and can increase data-user convenience as missing or implausible data combinations can complicate the analysis of public-use microdata and summary cross-tabulations.⁷⁶

- **Weighting.** In most household surveys, weighting refers to a series of mathematical adjustments used to bring the characteristics of a survey sample more into agreement with those of the full population by compensating for differences in sampling rates across areas, differences between the full sample and the interviewed sample, and differences between the sample and independent estimates of basic demographic characteristics.⁷⁷ For the ACS, the Census Bureau used its annual population estimates and housing-unit estimates as the independent estimates. Using this, ACS statisticians assigned separate weights to each person and each housing unit in the sample. Workers used the person weights to calculate the estimates of the number of individuals with various characteristics (e.g., race, sex, age). They used housing unit weights to estimate the number of housing units and households. ACS researchers realized that the use of separate weights for persons and households would result in inconsistencies between some

estimates produced using person weights and related estimates using housing unit weights, largely due to within-household undercoverage. The goal of weighting is to correct for underrepresented groups of individuals or housing units in the sample, not for reporting errors.⁷⁸ Chapter 5 discusses some of the research used to resolve inconsistencies.⁷⁹

- **Tabulation.** Tabulation refers to the aggregation and display of data in formats useful to data users. As a wide variety of individuals and institutions use census data, it is imperative that it meets the legislative, legal, and programming needs of all levels of government, businesses, nonprofit organizations, and individuals. The staff also designed the ACS data products to resemble closely those from the decennial census long form, which it replaced.⁸⁰ Some data users devoted substantial resources to designing computer programs that incorporated long-form census data for particular uses. By designing ACS tables to resemble those derived from the census long form, the ACS staff tried to minimize the disruption of switching to ACS data products.

DATA PRODUCTS

Data products from the new survey would “at first glance [be] the same as the information provided by the 1990 long form.”⁸¹ However, the Census Bureau could only update the long-form data during a decennial census. The virtue of the new ACS survey was its ability “to update regularly the information about communities that the U.S. census has traditionally produced once a decade.”⁸²

⁷⁵ U.S. Census Bureau, *American Community Survey Design and Methodology*, January 2014, pp. 95–96; Alexander, Dahl, and Weidman, “Making Estimates,” p. 90; and U.S. Census Bureau, “American Community Survey Operations Plan, Release 1: March 2003,” pp. 28–29.

⁷⁶ Alexander, Dahl, and Weidman, “Making Estimates,” pp. 90–91.
⁷⁷ U.S. Census Bureau, *American Community Survey Design and Methodology*, Version 2.0, January 2014, and Alexander, Dahl, and Weidman, “Making Estimates,” p. 90.

⁷⁸ U.S. Census Bureau, “American Community Survey Operations Plan, Release 1: March 2003,” pp. 29–30.

⁷⁹ Charles H. Alexander, “Technical Concerns From Data Users About the American Community Survey,” draft report dated May 8, 1996, p. 5.

⁸⁰ In this sense, the term communities referred to both geographic areas (counties, cities, towns, census tracts, block groups, etc.) and demographic groups (racial or ethnic groups, occupational groups, age cohorts, etc.).

The Census Bureau designed the ACS to produce the full range of characteristics for both small and large geographic areas and demographic groups—income, poverty, educational attainment, journey to work, etc.—in addition to the basic age, race, sex, and marital status information found on the census short form.⁸³ In July 1997, the agency began releasing the final data from the 1996 test. The Census Bureau issued the data products in electronic format that users could print on demand.⁸⁴

ACS staff based the design and content of prototype ACS data products on the specifications for Summary Tape File 3 (STF3) that contained long-form estimates from the 1990 Census. STF3 contained a group of detailed tables and four profiles that summarized estimates for social characteristics, economic characteristics (divided into two tables), and housing characteristics.⁸⁵ As preparation for the 2000 Census intensified, ACS planners understood that ACS data products would have to be similar to those data users expected from the long form. The 2000 Census Summary File 3 (SF3) became the basis for the 1999 ACS test and the Census 2000 Supplementary Survey (C2SS) data products that would allow data users to compare ACS and 2000 Census estimates. SF3 contained an expanded set of data products including new race iterated detailed tables and a collection of geographic comparison tables. The Census Bureau released each ACS estimate with its associated 90 percent confidence interval to help data users assess ACS data quality.⁸⁶

One of the major attractions of the ACS was that it could produce new data each year. For all states and communities that had at least 65,000 residents, the ACS would release single-year estimates of demographic, housing, social, and economic characteristics. For geographic areas with smaller populations, the ACS sampled too few households to provide reliable single-year estimates. However, for the first set of data, the agency could pool together multiple years of data to create reliable 3-year

⁸³ Alexander, "Technical Concerns," p. 2.

⁸⁴ Love and Diffendal, "The American Community, Sample Review," July/August 1997, p. 1. A preliminary version of the data had been released several months earlier to give data users an opportunity to familiarize themselves with the information and begin using it. Refer to Love and Diffendal, "The American Survey, Sample Review," March/April 1997, pp. 5-9.

⁸⁵ Deborah H. Griffin, "Development of American Community Survey Data Products," (draft), January 25, 2012, pp. 2-3.

⁸⁶ Ibid. Cynthia Taeuber, "American Community Survey Update and Demonstration of the 1997 CD-ROM," paper presented at the Census Advisory Committee of Professional Associations meeting, April 22-23, 1999. Beginning in 2005, margins of error replaced confidence intervals.

(20,000-65,000 residents) and 5-year (less than 20,000 residents) estimates. After the release of the first set of multiyear data, ACS could then release subsequent multiyear estimates annually by dropping the earliest year of cumulated data and adding the most recent year.

During the early years of ACS development, survey researchers did not place much emphasis on the "periodic" nature of ACS estimates. Early explanations of using multiyear ACS data often included references to conceiving of period estimates as approximating the middle year of the 3- or 5-year data-collection period. One of the leading spokesmen for the ACS, Charles Alexander, realized that it was important to alert data users to some of the conceptual issues associated with using multiyear data.⁸⁷ In 1996, he wrote that, "A three or five year average is best interpreted as an estimate pertaining to the characteristics of the area as of the middle year of the three or five year period. Thus, the 2000-2004 average should be seen as an estimate centered on 2002."⁸⁸ He continued, "If the area is stable over the five years, or if the area is changing at a steady rate (even if the change is rapid), the average will approximate the characteristics of the area in the middle year, and will be a useful number to use to describe that year."⁸⁹ However, "If the area's values fluctuate up and down during the 5-year period, for example, if there is a 1-year "blip" or if the numbers "bounce around," then no one of the years is adequate as a general description of the area to be used several years later. In this case, the 2000-2004 average should be interpreted as a general description of the area for the period of time around 2002, not fully reflecting any unusual events in that middle year."⁹⁰ This kind of interpretation of ACS multiyear averages remained common for several years.⁹¹ The question

⁸⁷ Charles Alexander was assistant division chief of the Demographic Statistical Methods Division.

⁸⁸ Alexander, "Technical Concerns," p. 6.

⁸⁹ Ibid.

⁹⁰ Ibid.

⁹¹ In addition to "Technical Concerns," refer to Charles H. Alexander, "Impact of Multiyear Averaging of Data From the American Community Survey," in American Statistical Association Proceedings of the Survey Research Methods Section, American Statistical Association, Alexandria, VA, 1996, pp. 644-649; Charles H. Alexander, "Recent Developments in the American Community Survey," in American Statistical Association Proceedings of the Survey Research Methods Section, American Statistical Association, Alexandria, VA, 1998, pp. 92-100; Charles H. Alexander, "A Discussion of the Quality of Estimates From the American Community Survey for Small Population Groups," draft paper dated July 17, 2002; and the version of this paper edited by Alfredo Navarro and presented at the 2003 Joint Statistical Meetings, Section on Survey Research Methods, in JSM Procedures, American Statistical Association, Alexandria, VA, 2003, pp. 363-371.

of how to interpret ACS multiyear averages was an important one for data users. ACS staff devoted more than a decade to conceptualizing the Census Bureau's position and explaining its ramifications to different groups of data users.

The basic data products from the first ACS test consisted of tables containing the estimated number of people in each race, age group, and sex, other tables displaying combinations of variables such as race by sex, race by age group, mean and median income by race, age group, sex, and many more.⁹² Additionally, the ACS also produced "profiles" (summary statistics and derived measures) for the main geographic entities in the survey. Taken together, the base tables and profiles comprised the major aggregated data products from the first continuous measurement test.⁹³

ACS researchers patterned the second type of data product, public use microdata samples (PUMS), after the 5 percent PUMS file from the 1990 Census. These PUMS are a set of raw data about individuals or housing units that allows users to create custom tables not available in the ACS data products.⁹⁴ These PUMS records do not contain any information that can identify a specific housing unit, group quarter, or person. Instead, the files only identify region, division, state, and public use microdata areas (PUMAs).⁹⁵

In addition to printed products and CD-ROMs, the ACS also disseminated estimates via the newly-created American FactFinder.⁹⁶ This is the internet-based information system launched in March 1999 that made Census Bureau demographic, economic, and geographic data available to agency personnel and the public. The ACS data products were among the first uploaded into the system.⁹⁷

⁹² Mary Ellen Davis and Charles H. Alexander, Jr., "The American Community Survey: The Census Bureau's Plan to Provide Timely 21st Century Data," Missouri Library World, Spring, 1997, and Griffin and Waite, "American Community Survey Overview," p. 218.

⁹³ Griffin and Waite, "American Community Survey Overview," p. 218.

⁹⁴ Davis and Alexander, "Timely 21st Century Data," p. 1.

⁹⁵ PUMAs are nonoverlapping areas that partition each state into areas containing about 100,000 residents. They are the most detailed geographic areas identified in the ACS PUMS files. For more information, refer to U.S. Census Bureau, "Brief History of Public Use Microdata Areas (PUMAs)," n.d., available at <https://www2.census.gov/geo/pdfs/reference/puma/puma_history.pdf>.

⁹⁶ The Census Bureau retired American FactFinder on March 31, 2020. For more information, refer to the press release at <<https://www.census.gov/newsroom/press-releases/2020/american-factfinder-retiring.html>>.

⁹⁷ Titan Systems Corporation, "American FactFinder System Requirements Study," Census 2000 Evaluation R.3.b, June 6, 2002, pp. iii-iv.

CONCERNS OF DATA USERS

As the Census Bureau considered implementing the ACS in the 2000 Census, the agency also had to confront skepticism and resistance to change among at least some key groups of data users. The Census Bureau's director at the time, Martha Farnsworth Riche, summarized the issue this way: "The American Community Survey did not have many fans when I came here. It was seen as a threat by most of the other statistical agencies, in that it would conflict with data they produced."⁹⁸

Even before the Census Bureau began collecting any ACS data or released any related data products, some federal agencies were aware of the Census Bureau's interest in this methodology through papers given by Charles Alexander and others at professional conferences and meetings.⁹⁹ In 1994, the Bureau of Transportation Statistics (BTS) sponsored a study on the "Implications of Continuous Measurement for the Uses of Census Data in Transportation Planning."¹⁰⁰ This study found that, over the previous 30 years, state and regional transportation planning agencies had become increasingly dependent on census data for a wide variety of purposes, such as: benchmarking their own surveys, monitoring trends in travel behavior, modeling travel patterns, estimating future land-use patterns, implementing federal laws (e.g., the Civil Rights Act of 1964 and the Americans with Disabilities Act), and monitoring the enforcement of federal transportation and environmental regulations.¹⁰¹ The members of the transportation planning panel which prepared the analysis acknowledged the "excellent partnership" that existed "between the Census Bureau and the transportation community." However, the authors cautioned that before they could fully embrace the use of continuous measurement, the Census Bureau would have to assure them that it had fully addressed "issues of timeliness, currency of data, program flexibility, cost, and impacts on small-area data." Any radical change, such as eliminating the census long form, "must be viewed objectively, studied systematically, and

⁹⁸ Oral History Interview, January 28, 1998, p. 12.

⁹⁹ Charles "Chip" Alexander was assistant division chief of the Demographic Statistical Methods Division until his accidental death in 2002.

¹⁰⁰ U.S. Department of Transportation, Bureau of Transportation Statistics, "Implications of Continuous Measurement for the Uses of Census Data in Transportation Planning, Government Printing Office," Washington, DC, 1996.

¹⁰¹ "Implications of Continuous Measurement," pp. 5, 8-9.

implemented in such a fashion as to minimize risks to stakeholders.”¹⁰²

The BTS was not the only group of data users to urge the Census Bureau to proceed with caution and not to implement continuous measurement before thorough and rigorous testing. In the wake of actual and perceived missteps in the 1990 Census, the Census Bureau hired the National Academy of Sciences (NAS) to create two study panels to advise the agency on its planning and testing for the 2000 Census. Both panels praised the agency for its efforts to “reengineer” the decennial census, and each noted that continuous measurement needed more testing and evaluation before it could successfully replace the long-form questionnaire in the 2000 Census. Writing in late 1994, one panel concluded that “the current program of research and development for continuous measurement is moving much too quickly into an operational phase when key issues about the concept remain to be addressed.” Panel members expressed concern about costs, data quality, user needs, and relationship to ongoing surveys. In the panel’s view, the Census Bureau’s focus on,

“ . . . a series of operational tests that rapidly increase in scope and cost, leading up to a final decision at the end of 1997 on whether to drop the census long form from the 2000 Census and replace it with continuous measurement . . . is much too ambitious in our view, given all of the questions that need to be answered . . . ”¹⁰³

In the mid-1990s, members of the Census Bureau’s Advisory Committee of the Professional Associations echoed the misgivings of the NAS panels, particularly “the feasibility or desirability of substituting a CM system for the traditional census long-form questionnaire for the 2000 Census.” Committee member Richard Kulka of the American Statistical Association stated that calling Census Bureau proposals to replace the census long form with continuous measurement controversial “would be somewhat of an understatement.” According to Kulka, the wider statistical and demographic communities had not reached anything like consensus on this issue.¹⁰⁴

Between the early and late 1990s, continuous measurement went from one of many programs the Census Bureau was investigating and evaluating to one of the highest priorities on its agenda. However, by late 1995, Census Bureau executives decided that they lacked the time and resources to test and evaluate an ACS prototype before using it to replace the sample questionnaire in the 2000 Census. Additionally, the Census Bureau had yet to convince key data-user groups within the federal statistical community of the efficacy of the ACS and the benefits of the data. A number of data users were relieved after the Census Bureau postponed full implementation until after the 2000 Census. They believed that continuing to test the ACS and compare its results to the 2000 Census long-form data provided better opportunities to evaluate ACS data quality and to examine similarities and differences between the two data sets on both national and local geographic levels.

Users of small-area data were particularly concerned that ACS data products would not provide the same level of detail with similar quality as the long-form data. They had seen their hopes dashed in the 1960s and 1970s, when the Census Bureau shelved proposals for a mid-decade census that included tract-level data in favor of data-collection programs that provided useable data for urban and metropolitan areas but little tract or rural data (Chapter 1). The Herriot and Johnson proposals from the late 1980s promised to provide tract-level data for at least 1 year for each state during the decade between censuses but offered a more expansive set of data for larger cities and metropolitan areas (Chapters 1 and 2). Rural and small-area data users feared a possible loss of long-form census data altogether coupled with uncertain funding of the ACS. With no long form, if the ACS lost funding, these users ran the risk of having no data at all.

While fears of inadequate funding continued through the end of the 1990s and beyond, small-area data users also were concerned about the quality and reliability of ACS estimates for rural areas. Responding to this concern, the Census Bureau hired Westat, a research company, to convene a conference of knowledgeable academics, state government officials, and representatives of professional associations.

DATA USER CONFERENCES

The conference took place on May 14 and 15, 1998. Attendees included Census Bureau staff members,

¹⁰² “Implications of Continuous Measurement,” p. 19.

¹⁰³ Barry Edmonston and Charles Schultze (eds.), *Modernizing the U.S. Census*, Washington, DC, National Academy Press, 1995, pp. 124–25.

¹⁰⁴ U.S. Census Bureau, “Minutes of the Census Advisory Committee of the Professional Associations,” held at the Census Bureau on April 27–28, 1995, pp. 33–34.

representatives of other federal government agencies, and individuals representing minority concerns. Its primary purpose was to discuss the data uses and policy implications of ACS data for rural areas, ACS survey design and its capacity to meet user needs for small geographic areas and populations, potential design options, and to provide a forum for experts to express their views.¹⁰⁵

The group concluded that the ACS planning process had been open, extensive, and responsive to data user needs. In particular, “they saw no evidence of an antirural bias in the design of the ACS.”¹⁰⁶ While conference participants supported the ACS in general, their recommendations included a number of improvements:

- Ensure that the master address file accounted for the large number of post office boxes, rural route numbers, and general delivery addresses in rural communities.¹⁰⁷
- Recognize the importance of, and be highly responsive to, its user community by providing data users with training materials and presentations, survey objectives and uses, and encouraging the use of data averaged over time.
- Become sensitive to the “political” implications of the ACS stemming from the likely use of the data for fund allocation and program planning and be prepared to strongly support the survey’s methodology and the quality of its products.
- Present ACS respondents with multilingual response options including questionnaires in several languages and telephone and personal visit follow-up interviewers who could interact with respondents in their own languages.
- Establish an ACS advisory group similar to the decennial census advisory committee that could assist the Census Bureau in dealing with the many technical issues that remained, offer advice on prioritization of research projects, and lend credence to the ACS’s data collection methodology and the quality of its data products.¹⁰⁸

About 4 months after the rural areas conference, the National Academy of Sciences organized a workshop

¹⁰⁵ Graham Kalton, Daniel B. Levine, Joseph Waksberg, and John Helmick, “The American Community Survey: The Quality of Rural Data: Report of a Conference,” June 29, 1998, p. 2.

¹⁰⁶ “Quality of Rural Data,” pp. 2–3 and 5.

¹⁰⁷ “Quality of Rural Data,” p. 20.

¹⁰⁸ “Quality of Rural Data,” p. 20.

to consider the benefits and challenges of replacing the census long form with the ACS. Held on September 13, 1998, this gathering brought together academic and policy experts, government officials, experienced data users, and Census Bureau staff to discuss the Census Bureau’s efforts to develop a research agenda on methodological issues relating to the ACS. The Committee on National Statistics, a component of the NAS, organized the workshop, managed the preparation of background papers by statisticians and experienced data users, and prepared the summary for publication.¹⁰⁹

The workshop addressed six methodological issues:

- Combining information across geographical areas.
- Combining information across time.
- Using ACS estimates as inputs to funding allocation formulas.
- Applying weights to account for nonresponse and undercoverage.
- Considering issues relating to sample and questionnaire design.
- Analyzing the effects of switching from census long-form estimates to ACS estimates on various long-form applications.¹¹⁰

The Census Bureau did not ask the panel for formal recommendations, but members did offer suggestions on the need for further research. As more ACS data became available over time, the Census Bureau could try and assess alternative approaches to the issues raised above against each other and against the upcoming 2000 Census. Some of this research and its results are described in Chapters 4 and 5.

PROMOTING THE ACS

Promoting the ACS is an ongoing process involving at least two distinct target audiences. The first consists of survey respondents who fall into the ACS sample in any given month. The Census Bureau addressed this group with a series of mailing packages that stressed the mandatory nature of the survey and encouraged respondents to participate voluntarily by completing the questionnaire and returning it to the Census

¹⁰⁹ National Research Council, Committee on National Statistics, “The American Community Survey: Summary of a Workshop,” National Academy Press, Washington, DC, 2001.

¹¹⁰ “American Community Survey Workshop,” p. 5.

Bureau. The second audience consists of data users ranging from the inexperienced to the statistically sophisticated. For this group the promotional material emphasized the value, timeliness, and quality of the data. During the testing phase, the ACS produced promotional handouts, brochures, and presentations and a limited number of printed and electronic data products, together with training in their use.

In 1996, the first year of ACS testing there was “little in the way of public complaint to the Bureau” about the test in three of the four sites.¹¹¹ Brevard County, Florida, was the exception. In June 1996, Census Bureau officials instructed CATI and CAPI interviewers to respond to objections by informing householders to direct their complaints to their congressional representatives.¹¹² The bulk of the complaints seem to have involved either the “personal nature of the questions or the legal requirement to participate in the survey.”¹¹³ Responding to the objections of some of his constituents, Representative David Weldon, representing the 15th Congressional District of Florida (which included southern Brevard County), looked into the possibility of making response to the ACS test voluntary.¹¹⁴ Since the ACS remained a mandatory survey, Representative Weldon’s initiative did not pan out. However, this issue continues to reemerge periodically during normal consideration of the Census Bureau’s budget.

Over the next several months, letters of complaint from ACS test respondents in Brevard County continued to arrive at the Census Bureau via Representative Weldon’s office. Responding to Congressional correspondence took a substantial amount of staff time and involved senior staff as well.¹¹⁵ ACS staff leader, Lawrence McGinn, met with the Census Bureau’s chief of Congressional Affairs to try to “resolve the problem of [Rep.] Weldon’s office telling ACS respondents they don’t have to cooperate on the survey.”¹¹⁶

¹¹¹ U.S. General Accounting Office, “The American Community Survey: Accuracy and Timeliness Issues,” GAO-02-956R, September 30, 2002, p. 23.

¹¹² U.S. Census Bureau, Continuous Measurement Office, “Minutes of the CMO Staff Meeting,” June 13, 1996, p. 1.

¹¹³ “Accuracy and Timeliness Issues,” p. 23.

¹¹⁴ “Minutes, CMO Staff Meeting,” June 13, 1996, p. 1. At the next CMO staff meeting, an ACS staffer mentioned that one of Congressman Weldon’s staff members was telling respondents that they did not have to answer the test questions. Refer to “Minutes, CMO Staff Meeting,” June 20, 1996, p. 1.

¹¹⁵ “Minutes, CMO Staff Meeting,” September 5, 1996, p. 1. The CMO minutes noted that dropping Brevard County from the 1997 test had been discussed at a recent associate directors’ meeting.

¹¹⁶ “Minutes, CMO Staff Meeting,” September 26, 1996, p.1.

About 6 months later, the chief of the Demographic Statistical Methods Division, Preston J. Waite, met with Representative Weldon to discuss the test. Weldon was not a user of census data but was impressed with the 1990 Census data that Waite showed him. However, Weldon remained concerned about his constituents’ complaints and was “not happy with the ACS.” Census Bureau officials were aware that they would have to decide whether to keep the test in Brevard County or move it further south to Broward County.¹¹⁷ By the summer of 1997, the ACS staff decided to drop Brevard County at the end of February 1998.¹¹⁸ They confirmed this decision in November 1997 and notified Brevard County officials in early January 1998 that the ACS test would end in their county the following month.¹¹⁹

Concerns about respondent privacy, government snooping, and mandatory response surfaced sporadically in connection with the census long form and the ACS. Census Bureau interviewers were often successful in obtaining responses after they explained the purpose of the ACS and the uses to which public and private organizations made of the data.

As she was leaving the Census Bureau in January 1998, Director Martha Riche emphasized that, “The most important program we are marketing right now is the American Community Survey.” Director Riche also realized that a successful ACS “will create a large annual constituency as opposed to a large once-a-decade constituency . . .” Winning the support of other government agencies was high on her to-do list. She recognized that successful testing and implementation of this survey would require substantial funding from Congress and vocal support from Census Bureau stakeholders. In her oral history interview, she noted that ACS planners and researchers invited “representatives from other government agencies . . . to work with us so they would get what they needed . . .” She concluded that, “as a result [of the Census Bureau’s outreach] the statistical community is pretty committed to this survey.” Outreach to local communities by participating in “town meetings around the country” was also high on her agenda. She believed that the ACS “was a winner because people understand its benefits right away.” Her efforts to reach out to public and private sector data users were motivated in part by the knowledge

¹¹⁷ “Minutes, CMO Staff Meeting,” April 10, 1997, p.1.

¹¹⁸ “Minutes, CMO Staff Meeting,” August 28, 1997, p.1.

¹¹⁹ “Minutes, CMO Staff Meeting,” November 20, 1997, p.1, and “Minutes, CMO Staff Meeting,” January 8, 1998, p.1.

that stakeholders feared that a loss of funding might imperil both ACS and the census long form, leaving them without any census-type small-area data.¹²⁰

Much of the available documentation of the Census Bureau's promotional program for the early years of the ACS consists of draft marketing plans, accounts of or plans for promotional activities in specific test sites, and presentations at professional meetings, government agencies, and advisory committees. The extent to which ACS promotional plans were discussed and approved at the highest levels of the Census Bureau's chain of command remains unclear. One ACS staff member recalled that Director "Barbara Bryant generally knew what we were doing, but we were not particularly on her radar since things seemed to be going okay."¹²¹ Director Martha Riche had a marketing background and was more interested in the plans for the ACS. ACS senior staff had "lots of informal conversations" with Director Riche about promoting the ACS, "most of which were undocumented."¹²²

In mid-1994, a small group of Census Bureau employees, under the direction of Cynthia Taeuber, began putting together the components of the ACS marketing plan.¹²³ Taeuber's team worked closely with the Census Bureau's State Data Centers to develop examples of ways local governments and private companies could use ACS data at the community level. Examples included selecting the most appropriate locations for schools in growing areas and responding to chamber of commerce complaints of outdated census information interfering with banks' efforts to locate new branches and automated teller machines. Taeuber wove these local references into ACS presentations she and her staff gave at community meetings to encourage response to ACS tests and to counter local resistance. For example, working with the Nebraska State Data Center and members of Senator Robert Kerrey's (NE-D) staff, Taeuber's group explained why respondents should complete the ACS questionnaires. Kerrey's staff then explained

¹²⁰ U.S. Census Bureau, oral history interview with Martha Farnsworth Riche, conducted on January 28, 1998, pp. 12-13, available at <www.census.gov/history/pdf/Riche_Oral_History.pdf>, accessed July 25, 2011.

¹²¹ Personal email from Cynthia (Taeuber) McIlwain, dated July 2, 2016. Barbara Bryant served as director of the Census Bureau from 1989 to 1993.

¹²² Ibid. Cynthia Taeuber headed the marketing effort for the ACS from 1994 through 2004. She kept notes of many of the meetings and decisions in her green notebooks, which she "carried everywhere." I have not been able to locate those notebooks.

¹²³ Cynthia Taeuber was senior program advisor to the deputy director.

to him the benefits Nebraska could obtain using ACS data. Kerrey became one early supporter of the ACS. Together with members of the Congressional Affairs Office, Taeuber's staff arranged meetings with important congressional staffers to have subject-matter experts explain the benefits of ACS data for programs they were already supporting. With the assistance of the Public Affairs Office, Taeuber reached out to print and electronic journalists as ACS stakeholders themselves but also as intermediaries to convey local stories to political actors and their staffs.¹²⁴

The earliest extant marketing plan was the product of a meeting in the spring of 1995 between the chief of the Census Bureau's Marketing Services Office, John Kavaliunas, and a long-serving member of the Census Bureau's advisory committee from the American Marketing Association, Edward Spar.¹²⁵ This plan consisted of eight components:

1. A rudimentary segmentation of data users.
2. Creation of a marketing office within the ACS office.
3. Development of a user-friendly set of data products.
4. Risk minimization.
5. Partnerships with public and private data users and vendors. Data product pricing.
6. Partnerships with data vendors and development of training classes taught by Census Bureau staff.
7. Implementation schedule with annual goals extending from 1995 through 2000.

They fleshed out each component with further detail to give the reader a sense of how it would work. For example, the plan divided data users into three groups (congress and federal agencies, state and local governments, and university researchers and private business) and briefly described how each might use ACS data. The new marketing office would then develop a potential customer list and form groups from the list in order to understand customer response to the survey and to the types of data products it could produce. Creating ongoing groups of data users to test and report on product usability would also facilitate interaction between ACS staff and customers. The marketing office would also construct a customer information system to track

¹²⁴ Personal email from Cynthia (Taeuber) McIlwain, dated July 2, 2016.

¹²⁵ "Marketing Plan for Continuous Measurement (CM)," n.d., Spring 1995, and personal notes from a discussion with Edward Spar, April 26, 2010.

outreach efforts and follow up customer requests. The office would be responsible for creating a series of clearly understandable promotional materials for data users with different levels of statistical sophistication. Another element of the marketing plan involved minimizing risk by developing and reviewing risk management plans, conducting market research throughout the survey and product development process, and maintaining strong communications with such major stakeholders as congress, federal statistical agencies, and state and local governments. Some federal agencies might conclude that implementation of the ACS could imperil the existence of the special-purpose surveys they sponsored; to minimize this possibility, the marketing plan urged the Census Bureau to organize a special outreach effort to the federal statistical community, and the research community more broadly, to reassure them and to initiate ongoing partnerships.

A revised version of this plan, dated June 1995, reorganized and expanded existing components of the earlier plan and added a few new components, such as expanded customer segmentation, identification of emerging markets and creating demand, enhanced products and services, and budget.¹²⁶

Largely because of budget constraints, implementation of the marketing program took substantially longer than the ACS staff anticipated. To be sure, Census Bureau personnel had been giving presentations on continuous measurement and the ACS for several years. Beginning in December 1992, Charles Alexander wrote a series of papers describing components of the ACS and the research that would undergird the program. The goal of the first ten of these papers was to convince Census Bureau senior staff of the feasibility and viability of the ACS concept.¹²⁷ In August 1993, Alexander presented an overview of the research supporting an ACS alternative to the census long form at the annual meeting of the American Statistical Association. From then on, Census Bureau staff prepared a growing number of papers and presentations on the theory, methodology, planning, and testing of data collection and tabulation and product preparation. They presented this research to meetings of professional associations, congressional staff, federal agencies, public and

¹²⁶ U.S. Census Bureau, "Marketing Plan for Continuous Measurement, June 12, 1995.

¹²⁷ These papers were part of the Continuous Measurement Series, Nos. 1-20. Alexander wrote the first ten between December 1992 and October 1993.

private statisticians and demographers, and members of the Census Bureau's advisory committees. This kind of outreach was quite different from that needed to persuade the American people to complete and return ACS questionnaires.

Outreach efforts to state, county, and municipal officials proceeded along the path that Taeuber pioneered. For example, in the spring of 1995, headquarters staff and employees of the Seattle Regional Office set up a federal-state partnership in Multnomah County, Oregon, to utilize a state data file similar to that needed in the 1996 CM test. By coordinating the efforts of headquarters staff, regional office geographic staff, and the Oregon Metropolitan Planning Office, the Census Bureau prevented the duplication of expensive work and assured that they could complete geographic preparation for the 1996 ACS test on time.¹²⁸

When the ACS data collection test began in the fall of 1995, the ACS had no formal outreach staff. Taeuber's team was an informal grouping. As a result, the Census Bureau initially relied on a combination of pamphlets, brochures, and community presentations together with press releases and free media to publicize the new survey.¹²⁹ In fact, the agency did not hire the first formal outreach staff member until late 1996.¹³⁰ In early 1997, the Marketing Services Office assigned several of its staff members to work on promotional brochures, single page fact sheets, and other materials.¹³¹

By January 1997, the Census Bureau prepared schedules for annual ACS presentations, which they updated as needed. In late February, the tentative schedule contained 17 meetings with professional associations; congressional and federal agency staff; census advisory committees; state data center representatives; the mayor of Houston, TX; community

¹²⁸ Memorandum from Martha Farnsworth Riche, director, to Larry McGinn (CM Staff), Linda Franz (Geography Division), Brian Monaghan (Field Division), and Wendy Holly and Rick Campbell (Seattle Regional Office), "Good Work for Oregon," May 25, 1995.

¹²⁹ U.S. General Accounting Office, "The American Community Survey: Accuracy and Timeliness Issues," GAO-02-956R, Sept. 30, 2002, p.24.

¹³⁰ U.S. Census Bureau, Continuous Measurement Office, "Minutes of the CMO Staff Meeting," Jan. 9, 1997, p. 1. The minutes state that Cynthia Taeuber was recently assigned as a special assistant to Preston Jay Waite ("Jay"), chief of the Demographic Statistical Methods Division, "to handle the publicity and outreach for the ACS."

¹³¹ U.S. Census Bureau, "Minutes of the Census Advisory Committee of the Professional Associations," October 23, "Quality of Rural Data," pp. 20-24, 1997, and email from Cheryl V. Chambers, chief, Communications Management and Support Branch, American Community Survey Office, July 26, 2011.

groups; and an ACS product development group.¹³² ACS staff also organized workshops in the test site cities to teach local elected officials, planners, and local government agency employees how to use ACS data.¹³³ Workshops ranged from single presentations on the development and future of the ACS, a comparison of the ACS and 2000 Census questionnaires, to lengthy discussions of data tables and PUMS files and demonstrations of their uses.¹³⁴

Once the Census Bureau identified the counties to be included in the 1999 ACS test, the ACS staff expanded its outreach efforts. By late winter of 1997, with the representative and senators from each of the test sites, ACS staff began a campaign to educate them about the benefits of participating. The staff arranged meetings with national, state, and local officials to explain when and where the test would take place; what information the survey would collect and how the Census Bureau would protect the confidentiality of the information; and the various uses for resulting statistics such as for planning and evaluation studies, grant applications, and promotion. ACS staff also identified at least one experienced data user at each site to participate with Census Bureau statisticians and demographers in the evaluation of the test data.¹³⁵

As the Census Bureau developed and refined marketing and promotional plans for the ACS, it solicited feedback from respondents, data users, community leaders, and other stakeholders. On several occasions, members of the Census Bureau's advisory committees heard presentations on the status of ACS promotion and offered suggestions. They also provided

¹³² Thanos Theodoropoulos, "Tentative Schedule of ACS External Activities," February 25, 1997.

¹³³ U.S. General Accounting Office, "The American Community Survey: Accuracy and Timeliness Issues," GAO-02-956R, Sept. 30, 2002, p.24.

¹³⁴ Lawrence S. McGinn, "The Revised American Community Survey," PowerPoint presentation given at the ACS Product Development Group Meeting on February 19, 1997; Charles H. Alexander, "Comparison of the ACS to the 2000 Long Form," PowerPoint presentation given at the ACS Product Development Group Meeting on February 19, 1997; and Preston J. Waite, "The American Community Survey: 1997 and Beyond," PowerPoint presentation given at the 2000 Census Advisory Committee Meeting in March 1997.

¹³⁵ Tom Coughlin to Cindy Taeuber, "C[ontinuous] M[easurement] Sites, FY 1999, Sorted by State/County," February 27, 1997; U.S. Census Bureau, "1999 Counties for ACS-2, Sites Are Subject to Funding Levels," March 3, 1997; and Cindy Taeuber, "Uses of American Community Survey Data by Local and State Governments and Special Population Groups," March 6, 1997.

a sounding board for the agency to test elements of promotional campaigns before a receptive audience.

At the October 1997 advisory committee meeting, the Census Bureau presented its plans. Preston J. Waite, the senior manager responsible for getting the ACS off the ground, emphasized that congressional and budgetary constraints made it impossible to assume the continued funding of new projects such as the ACS. As he pointed out, "Marketing these programs, increasing public awareness, and developing a constituency of users were essential to the survey's long-term future."¹³⁶

Two years later, in October 1999, ACS representatives revisited the 1997 fall meeting of the advisory committee of professional associations to describe a revised version of the marketing plan. The version considered at the 1999 advisory committee meeting consisted of three chronological phases. The already completed phase 1 covered the years 1996 through 1998 and focused on identifying decision makers' needs, the types of ACS data products that could provide for those needs, and raising decision makers' awareness of the survey. The second phase extended from 1999 through 2002. In addition to expanding awareness of the ACS, the plan sought to build support for the survey by increasing the usefulness of ACS data products, developing applications for public and private sector use, and beefing up the education and training programs. The last phase of the marketing plan covered 2003 through 2010 and further emphasized the importance of training decisionmakers on the uses of ACS data, particularly through the use of annually updated information to analyze demographic and economic trends, and the application of statistical modeling and geographic information systems to get the most out of the newly available data.¹³⁷

One element common to all three phases of the plan was ensuring sufficient funding to test aspects of the survey or to implement it nationwide. Members of the advisory committees made useful suggestions, such

¹³⁶ U.S. Census Bureau, "Minutes of the Census Advisory Committee of the Professional Associations," October 23-24, 1997, p. 42.

¹³⁷ Colleen D. Flannery, "Strategic Marketing for the American Community Survey: Are We on the Right Track?," presented at the Census Advisory Committee of Professional Associations, October 21-22, 1999.

as the need to market the survey's data products to the widest possible audience, to specify the steps to be taken in each phase to achieve widespread acceptance and use of the ACS, and to revise the plan to include measurable outcomes within specified time frames in order to assess the success or failure of the plan.¹³⁸

¹³⁸ U.S. Census Bureau, "Minutes of the Census Advisory Committee of the Professional Associations," October 21–22, 1999, pp. 16–18.

The marketing effort for the ACS developed significantly between 1995 and 1999. However, inadequate funding hampered its implementation for at least part of this time. It was not until after 2000 that senior Census Bureau staff agreed that the ACS needed a more effective marketing program and took the steps necessary to bring it about.

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Chapter 4. Research, Evaluation, and Outreach (2001–2004)

INTRODUCTION

For nearly 140 years, the Census Bureau sought to provide communities with data more frequently than once every 10 years. Previous attempts to deliver data on an annual basis had resulted in data only for the nation as a whole, large states, and large metropolitan areas. Further, repeated attempts to win approval and funding for a mid-decade census fell flat when the projected costs proved too high.

In the late 1990s, the Census Bureau explored the possibility of providing timely data nationwide by replacing the decennial census long form survey with a monthly survey called the American Community Survey (ACS). In 2000, to test proposed methods for the survey, the Census Bureau conducted the Census 2000 Supplementary Survey (C2SS) nationwide and in several counties already included in the ACS. Statistical analyses of data from the C2SS and ACS tests demonstrated that the ACS was an acceptable substitute for the long form in terms of statistical reliability and data quality. When a number of data users began praising the quality of the estimates released from the test survey, the list of stakeholders announcing their support for the ACS also increased. The users praise for the quality of ACS estimates tempered the criticism of their lower statistical reliability in comparison to the long form.

As part of their broad program of outreach for the ACS program, the Census Bureau communicated with every member of Congress and provided them information about the survey and, through informal visits with congressional staff and presentations to groups of congressional staff representing different interests, showed them the value of up-to-date data for their districts. Just like the public at-large, representatives and senators learned of the detailed yearly data that would be available to them if they approved and funded the nationwide implementation of the ACS. Congress did just that by 2004 and the Census Bureau expanded the ACS to its full sample size.

CENSUS 2000 SUPPLEMENTARY SURVEY DEMONSTRATES OPERATIONAL FEASIBILITY AND SURVEY QUALITY

Background

In order to test whether it was possible to implement the ACS nationwide concurrent with collecting data through the decennial census, the Census Bureau conducted the C2SS. This test survey greatly expanded on previous Bureau experiments evaluating data collection and data processing methods proposed for the ACS. Since 1995, the Census Bureau had tested the ACS' mixed mode method of gathering data with mailed surveys, computer-assisted telephone interviews (CATI), and computer-assisted personal interviews (CAPI) in select counties across the country. By 1998, the Census Bureau expanded its testing to 36 counties and the results were promising.¹ The remaining question was whether the Census Bureau could mail out enough forms, field enough interviewers, and process a large number of responses on a sustained, year-to-year basis to provide the timely data promised by the ACS.

In 2000, the Census Bureau greatly expanded the scope of its testing by moving ACS operations into 1,239 counties selected to create a nationally representative sample of 866,000 housing units.² The resulting C2SS included the 36 counties tested since 1998 and 1,203 counties new to the survey, thereby making it the largest household survey ever

¹CATI and CAPI were conducting only with a subset of nonrespondents. Refer to Chapter 3 for more information on the C2SS.

²U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 1: Demonstrating Operational Feasibility," July 2001, pp. 3, 14, and U.S. Census Bureau, *Design and Methodology: American Community Survey*, April 2009, pp. 2–3.

conducted by the Census Bureau (Chapter 3).³ The C2SS used the mixed-mode survey methods used in previous ACS tests: initial data collection via mailed questionnaires (the “mailout/mailback” operation) and follow up with a subset of nonresponding households using telephone and in-person interviews. Each month, the Census Bureau drew an independent sample and then collected data for that sample over the course of 3 months. At the end of 1 year of C2SS operations, the Census Bureau completed the C2SS on time and under budget despite the five-fold increase in sample size over 1999.⁴

Operational Feasibility

The operational results of the C2SS demonstrated that the Census Bureau could effectively implement the ACS nationwide. The survey had obtained acceptable mail response and mailable address rates.⁵ Census Bureau employees conducted telephone interviews on schedule and successfully reduced the workload for in-person follow-up visits. Further, employees also completed personal visit interviews on schedule and achieved a high rate of response. In fact, the C2SS total survey response rate (for all modes) was 96.5 percent and survey response rates

³ U.S. Census Bureau, Report 1, p. 3, and Nancy M. Gordon, U.S. Census Bureau, “Census 2000 Supplementary Survey: An Operational Feasibility Test,” July 2001, slide 3, accessed January 24, 2013, at <www.census.gov/acs/www/library/by_year/2001/>. To create a nationwide sample representative of most aspects of the American populace, the Census Bureau created primary sampling units (PSUs) out of selected counties, county equivalents (such as independent cities in Virginia), and portions of counties with large populations or covering large geographic areas. For more information about the process by which PSUs were created, refer to U.S. Census Bureau, Accuracy of the Data, available at <https://www2.census.gov/programs-surveys/acs/tech_docs/accuracy/accuracy00_C2SS.pdf>, accessed December 30, 2012.

⁴ U.S. Census Bureau, Report 1, p. 16. Further, part of the C2SS was conducted at the same time as the 2000 Census. Thus, for the first few months of the C2SS, decennial operations preoccupied many of the Census Bureau’s most experienced field managers and lured away many potential interviewers. However, initial backlogs in data processing and handling forms in those first few months proved manageable as the Census Bureau adjusted staffing levels and cleared the backlogs.

⁵ In addition to the mail response rate, another measure of the effectiveness of the mailout/mailback method is the mailable address rate. Similar to the mail response scenario, a low rate of mailable (or complete) addresses would increase the costs of the survey because it would increase the number of addresses requiring personal interviews. By the end of the first year of operations, the mailable address rate for the sample addresses in the combined C2SS and 2000 comparison counties was relatively high at 95.5 percent. In other words, 95.5 percent of the addresses in the sample were deemed complete and, thus, mailable. For the ACS, the Census Bureau defined complete addresses as having either the house number, street name, and ZIP Code or a complete rural route, box number, and ZIP Code. It considered Post Office boxes and other rural style addresses incomplete. U.S. Census Bureau, Report 1, p. 17.

were high across the nation in the test site counties.⁶ The components of the total survey response rate are the mail response rate and the CATI and CAPI response rates:

- **Mail Response Rate.** The C2SS met the goal of achieving a mail response rate of over 50 percent: the mail response rate was 51.9 percent.⁷ This was important for two reasons. First, in order to match the census long form in terms of statistical reliability, the ACS would have to sample an estimated 3 million households a year.⁸ Second, for Congress to approve and fund the ACS, the Census Bureau had to demonstrate that it could deliver data in a cost effective manner and stay within budget. Therefore, the bulk of responses needed to come from mailout/mailback rather than the more costly telephonic or in-person interviews.⁹ For this reason, the ACS would only conduct follow-up interviews of a subsample of households that did not respond by mail. Thus,

⁶ The total survey response rate is the ratio of completed interviews to the sample cases that were eligible to be interviewed. If survey response rates are low or are lower in certain areas or for certain population groups, the data may not provide an accurate picture of the entire population. Of all 1,239 counties included in the survey, Bronx County, New York, had the lowest total survey response rate lower at 91 percent. All other counties had a total response rate of 95 percent or more. U.S. Census Bureau, Report 1, pp. 14-19 and 23.

⁷ The mail response rate is the ratio of all completed mail returns relative to the mailout universe. In comparison, the Census Bureau’s 2001 estimates for initial mail response rate for the 2000 Census long form was 53.9 percent. U.S. Census Bureau, “Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 2: Demonstrating Survey Quality,” May 2002, pp. 10, 16, and U.S. Census Bureau, “Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 6: The 2001–2002 Operational Feasibility Report of the American Community Survey,” May 2004, p. 5.

⁸ Data users and stakeholders demanded data similar in statistical reliability to the long-form census data that the ACS sought to replace. It was not enough for the survey to deliver new data on the nation as a whole every year, it had to deliver data for characteristics of subpopulations even in small areas. For certain small population groups, data users had deemed information critical to the operation of Congressionally mandated programs, including the percentage of children in poverty in neighborhoods and the location of concentrations of senior citizens with disabilities. As mentioned in earlier chapters of this history, statisticians projected that the 3 million households sample size would increase standard errors by about 25 percent over the decennial long form for estimates of characteristics of populations shared by 10 percent of the population of an average sized census tract.

⁹ Deborah H. Griffin and Preston Jay Waite, “American Community Survey Overview and the Role of External Evaluations,” *Population Research and Policy Review*, vol. 25, 2006, p. 212. To assess costs and sample size, the initial prototype for what became the ACS predicted that the ACS would have a 50 percent mail response rate and an overall survey response rate of 93.4 percent. Charles H. Alexander, “A Prototype Design for Continuous Measurement,” Internal Census Bureau Reports CM-7, 1993, pp. 4-5.

- a high mail response rate became all the more important.¹⁰
- **CATI response rates.** The C2SS test demonstrated that the Census Bureau could successfully conduct telephone and in-person interviews for a nationwide ACS. The Census Bureau was able to complete CATI on schedule, which reduced the workload for personal visit follow-ups by 57.3 percent.¹¹
 - **CAPI response rates.** The Census Bureau followed up with CAPI of a subsample of households to which the Census Bureau could not mail its questionnaires and from households that had not responded to the mail survey or follow-up telephone calls. The Census Bureau also completed the CAPI operation on schedule and with a 91.9 percent response rate. Only 3.8 percent of respondents refused to participate.¹²
- The C2SS also provided insight into operational aspects needing improvement. Overall, while workload projections were accurate and increased staffing and workloads were manageable, the Census Bureau identified some staffing deficiencies and higher-than-anticipated workloads, specifically during the timeframe when data processing overlapped with 2000 Census operations.¹³ For example, the Telephone Questionnaire Assistance (TQA) workload was higher than expected for the first 4 months of 2000 due to an increased number of calls related to the census. The staffing shortfall for TQA in turn affected the Edit Follow-up Operation.¹⁴ The Census Bureau addressed such issues as it continued to test the operational feasibility of the ACS in 2001 and 2002.¹⁵
- ### Survey Quality
- In addition to the success of each mode of data collection, the C2SS test showed that the Census Bureau had nonresponse errors under control. Nonresponse error is a major source of nonsampling error and affects how well estimates from a survey capture characteristics of the total population. One of the main types of nonresponse is unit nonresponse, where a survey fails to obtain data from a unit in the survey (such as a person or household) because interviewers failed to contact residents, members of the household refused to participate, or some other factor. The C2SS response rates served as a good proxy measure for nonresponse error and revealed that the Census Bureau had maintained the earlier high levels of total survey response for the 1995–1999 tests as operations moved nationwide.¹⁶
- In terms of nonresponse error across racial and ethnic groups, the C2SS test performed well, but found that nonresponse rates were not distributed evenly among the various groups. Census Bureau researchers compared C2SS response rates in census tracts where 75 percent or more of the population reported one ethnic or racial category. Survey response rates were significantly lower in tracts where the Black population predominated and in tracts where a large proportion of the American Indian and Alaska Native population resided than in tracts with a high concentration of the White population (Table 1).¹⁷ While the total survey response rates were high across all
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- ¹⁰ For example, a lower than expected number of mail respondents would mean that either: (1) the Census Bureau would have to shift its resources in order to interview more households by phone or in person, thus increasing cost; or (2) it would have to publish estimates derived from a smaller-than-planned number of respondents, resulting in lower reliability than projected. U.S. Census Bureau, Report 1, p. 17.
- ¹¹ The Census Bureau accomplished that despite the increased workload that resulted from the much larger sample size. As the sample expanded from 26 to 1,239 counties, the CATI operation grew from follow-up of about 3,500 cases per month to 19,000 case per month in 2000. To accommodate the increased workload, the Census Bureau increased the number of call centers from one to three and the number of interviewers from 39 to 181. U.S. Census Bureau, Report 1, pp. 20–22. In comparison to 2000, the CATI response rate was higher in 2001 (65 percent) and 2002 (63.5 percent). U.S. Census Bureau, Report 6, p. 12.
- ¹² U.S. Census Bureau, Report 6, p. 16. The remaining 4.3 percent did not respond for reasons such as: no one at home, respondent temporarily absent, and language barriers.
- ¹³ U.S. Census Bureau, Report 1, pp. 15–16.
- ¹⁴ TQA provides information and assistance to individuals who call a toll-free number provided on Census Bureau questionnaires. In 2000, TQA staff provided information on both the C2SS and the 2000 Census. In addition, TQA staff also were responsible for the edit follow-up operation. Edit follow-up is an automated coverage and content edit designed to identify missing or inconsistent responses. Records that fail the edit follow-up operation (in other words, records that have missing or inconsistent responses) require telephone follow-up. The increased workload for the C2SS caused backlogs in data entry early in 2000, which was resolved later in the year after decennial operations ended. U.S. Census Bureau, Report 1, pp. 18–19.
- ¹⁵ Refer to the section of this report titled, “Continued Operational Quality and Improvements in the ACS: 2001–2002.”
- ¹⁶ U.S. Census Bureau, Report 2, p. 15, and U.S. Census Bureau, Report 1, p. 23.
- ¹⁷ U.S. Census Bureau, Report 2, pp. 15 and 17.

Table 1.
Survey Response Rates by Racial and Ethnic Groups

Group ¹	Total weighted survey response rate
White	95.9
Black.....	*92.4
American Indian and Alaska Native.....	*89.1
Asian	95.2
Hispanic.....	95.8

* Significantly different from White at the 90 percent confidence level.

¹ Racial/ethnic group comprises at least 75 percent of the population.

Source: U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey," Report 2: *Demonstrating Survey Quality*, May 2002, p. 17.

groups, the Census Bureau concluded that it needed to make improvements and continue monitoring response rates of racial and ethnic groups.¹⁸

DATA QUALITY AND COMPARABILITY AMONG C2SS, ACS MULTIYEAR AVERAGES: 1999–2001, 2000 CENSUS LONG-FORM DATA

In addition to evaluating the operational feasibility of ACS data collection methods and measures of survey quality, the Census Bureau evaluated the quality of the data produced from the ACS and the C2SS. The Census Bureau also knew that stakeholders would gain further confidence in the new survey if outside researchers reviewed its data and methods for strengths, weaknesses, and areas for improvement. Thus, in spring 2003 the Census Bureau contracted with four researchers to compare ACS 3-year average data (for 1999–2001) to the 2000 Census long form across a spectrum of social and demographic characteristics for the total population, subpopulations,

and small areas.¹⁹ Specifically, researchers looked at both data quality (as measured by nonsampling and sampling errors), as well as data comparability.²⁰ The analyses by the Census Bureau and outside researchers generally confirmed that the ACS could produce more timely estimates of comparable or better data quality than those produced by the decennial long form.

Nonsampling Errors

Self-Response Rates

Survey responses generally are more complete and, thus, of higher quality when mailed in by the respondent than when survey interviewers personally interview the respondents and record their answers.²¹ However, the various reviews of ACS data noted that the level of self-response (response through the mail) was higher for the 2000 Census long form than for the ACS. The Census Bureau noted that this was likely due to the high visibility and extensive advertising

¹⁹ Griffin and Waite, "American Community Survey Overview and the Role of External Evaluations," 2006, p. 210, and Robert Scardamalia, "The American Community Survey: General Commentary on the Findings From External Evaluations," *Population Research & Policy Review*, 2006, vol. 25, p. 294. Refer to Linda Gage, California Department of Finance, "Comparison of Census 2000 and American Community Survey 1999–2001 Estimates: San Francisco and Tulare Counties, California," 2004, accessed on January 29, 2013, at <www.census.gov/acs/www/Downloads/library/2004/2004_Gage_01.pdf>; George C. Hough, Jr., and David A. Swanson, "The 1999–2001 American Community Survey and the 2000 Census Data Quality and Data Comparisons: Multnomah County, Oregon," March 9, 2004, accessed on January 30, 2013, at <www.census.gov/content/dam/Census/library/working-papers/2004/acs/2004_Salvo_01.pdf>; Joseph Salvo, Peter Lobo, and Timothy Calabrese, New York City Department of City Planning, "Small Area Data Quality: A Comparison of Estimates, 2000 Census and the 1999–2001 ACS Bronx, New York Test Site," March 5, 2004, accessed on January 29, 2013, at <www.census.gov/content/dam/Census/library/working-papers/2004/acs/2004_VanAuken_01.pdf>, and Paul M. Van Auken, Roger B. Hammer, Paul R. Voss, and Daniel L. Veroff, University of Wisconsin-Madison, "American Community Survey and Census Comparison Final Analytic Report: Vilas and Oneida Counties, Wisconsin, Flathead and Lake Counties, Montana," March 5, 2004, accessed on January 29, 2013, at <www.census.gov/content/dam/Census/library/working-papers/2004/acs/2004_VanAuken_01.pdf>.

²⁰ Sampling error refers to the variability that occurs by chance because a sample was surveyed rather than the entire population. Nonsampling error includes all other errors that occur in surveys, including nonresponse (missing or incomplete information), coverage (missing or duplicate responses from individuals), measurement (data collection), and processing errors. U.S. Census Bureau, Report 2, pp. 6–7.

²¹ Gage, "Comparison of Census 2000 and American Community Survey 1999–2001 Estimates," p. 7.

¹⁸ For example, in 2002 it began studying the possibility of oversampling (increasing the sample size) in areas with low response rates. It also mailed reminder cards and replacement questionnaires in those tracts and made telephone assistance available in English and in Spanish. The Census Bureau also initiated studies of refusals, noncontacts, and other noninterviews. U.S. Census Bureau, Report 2, p. 18.

campaign of the decennial census.²² The combined self-response rate for the 35 counties included in the 2000 ACS test was 55.3 percent, compared to the 2000 Census long-form self-response rate of 68.1 percent.²³ As discussed below, both Census Bureau researchers and external evaluators said that other indicators of data quality offset the ACS' lower self-response rates.

Nonresponse Rates

Overall, the ACS had lower housing unit and occupied housing unit nonresponse rates than the census long form, which indicates a higher response rate during nonresponse follow-up operations for the ACS compared to the 2000 Census.²⁴ This is due to the fact that the ACS, with a significantly smaller sample than a complete count, necessarily had a more rigorous follow-up operation than the decennial census. Further, the ACS employs a staff of permanent professional interviewers while the census uses temporary census takers. The difference in nonresponse rates may result in larger nonresponse errors in the census long form data than in the ACS.²⁵

On average across the ACS test site counties, the occupied housing unit nonresponse rate for the 2000 Census sample was 3.5 percentage points larger than

²² U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 7: Comparing Quality Measures: The American Community Survey's Three-Year Averages and Census 2000's Long Form Sample Estimates," June 2004, p. vi. In addition, the 2000 Census included questionnaires in languages other than English, designed to increase self-response rates in areas with high concentrations of households with limited English proficiency. In contrast, the ACS used only English questionnaires in 2000, although it later added questionnaires in other languages. *Ibid.*, p. 44.

²³ The average difference between the two rates (12.8 percentage points) is statistically significant. The margin of error for the self-response rates was 3.6 percent at the 90 percent confidence interval. U.S. Census Bureau, Report 7, pp. 7, 14.

²⁴ Unit nonresponse is the failure to obtain the minimum required information from an eligible person in the sample (in a housing unit or group quarters), for reasons such as respondent unable or unwilling to participate, interviewer unable to locate address or respondent, etc. The occupied unit nonresponse rate is a measure of the percentage of occupied housing units for which there was not enough information obtained for an interview. For the ACS, researchers subtract response rates from 100 percent to measure unit nonresponse. The Census Bureau calculated these two rates for the following reasons: (1) to measure how successful the ACS and the 2000 Census were in obtaining interviews and enumerations, and (2) to get an indication of the levels of potential nonresponse error in the estimates from the two surveys. *Ibid.*, pp. 17, 21.

²⁵ *Ibid.*, p. vi, and U.S. Census Bureau, "American Community Survey: Response Rates - Definitions," accessed on January 30, 2013, at <www.census.gov/programs-surveys/acs/methodology/sample-size-and-data-quality/response-rates-definitions.html>.

the ACS 3-year average rate (8.7 percent and 5.2 percent, respectively).²⁶ In some of the areas examined by outside researchers, the differences were even larger. For instance, in Tulare County, California, the census occupied housing unit nonresponse rate was 10.1 percent compared to the ACS rate of 3.9 percent.²⁷ In addition, evidence suggested that the ACS outperformed the census long form across small areas. The ACS occupied housing unit nonresponse rate for Bronx, New York, was 11 percent, compared to 21 percent for the 2000 Census long form. Overall, the 2000 Census had higher unit nonresponse rates than did the ACS in 77 of the 88 neighborhoods in the Bronx.²⁸

Sample Completeness

Sample completeness is a measure of how well a sample represents the total population. When the ratio of people with certain characteristics in the survey are different from those in the census count, estimates of characteristics can be affected. For the studies discussed in this section, the sample completeness ratio was calculated by dividing the ACS weighted population estimates (or the 2000 Census long-form sample estimates) by the 2000 Census population count, and multiplying by 100. The closer the ratio is to 100, the closer the survey sample represents the total population.²⁹

²⁶ U.S. Census Bureau, Report 7, pp. 20–21. The Census Bureau collected ACS 3-year average estimates between 1999 and 2001 in 36 counties across the United States. The Census Bureau selected these counties to represent different types of geographic areas, including large cities and medium and rural counties. To simulate the sampling error for the planned 5-year data, a greater percentage of the individuals living in these counties were included in each year's sample than was planned for when the fully-implemented ACS. *Ibid.*, p. v.

²⁷ Gage, "Comparison of Census 2000 and American Community Survey 1999–2001 Estimates," p. 9.

²⁸ Salvo, Lobo, and Calabrese, "Small Area Data Quality," pp. 7–8.

²⁹ *Ibid.*, p. 6. Starsinic and Albright developed the sample completeness ratio to capture error due to both coverage and nonresponse. They compared the 2000 C2SS and 1990 Census long-form sample completeness ratios and found the C2SS ratio of 90.2 to be significantly different (at the 90 percent confident level) from the 1990 Census long-form sample completeness ratio of 89.7. Differences between the survey estimates and the population count can be due to unit nonresponse, survey undercoverage (the extent to which the sampling frame contains fewer people than the sampled population), and differences in the frame used for sample selection. Michael Starsinic and Keith Albright, U.S. Census Bureau, "Coverage and Completeness in the Census 2000 Supplementary Survey," *Proceedings of the Survey Research Methods Section, American Statistical Association*, 2002, pp. 3346–3347, accessed on January 29, 2013, at <www.asasrms.org/Proceedings/y2002f.html>, and U.S. Census Bureau, Report 2, pp. 22–23.

Table 2.

**Comparison of Sample Completeness Ratios:
C2SS and 1990 Census Long Form**

Group	C2SS	1990 long form
Total population	90.2	*89.7
White	93.5	*91.2
Black	85.1	*80.7
American Indian and Alaska Native	88.1	91.4
Asian	89.2	89.4
Native Hawaiian and Other Pacific Islander	88.2	87.2
Hispanic (any race)	88.1	*84.5

* Sample completeness ratios of the two samples are statistically significant at the 90 percent confidence level.

Source: Michael Starsinic and Keith Albright, U.S. Census Bureau, "Coverage and Completeness in the Census 2000 Supplementary Survey," Proceedings of the Survey Research Methods Section, American Statistical Association, 2002, p. 3347, accessed on January 29, 2013, at <www.census.gov/library/working-papers/2002/acs/2002_Starsinic_01.html>.

The Census Bureau's comparisons of sample completeness rates between the ACS 3-year averages and the 2000 Census sample estimates found that the ACS represented housing units better than the census long-form sample. The ACS housing unit sample completeness ratio of 92.9 was 2.6 points higher than the census long-form ratio of 90.3. The surveys represented the population equally as well; the household population sample completeness rates of 90.4 for the ACS and 91.1 for the census long form were not statistically different.³⁰

Outside research also demonstrated that the ACS 3-year data matched or exceeded the ability of census long form to represent the true population. For instance, in the Bronx, New York, the ACS had a population sample completeness ratio of 83.0 whereas the 2000 Census long form had a ratio of 80.0. In both Multnomah County, Oregon, and San Francisco County, California, there was no significant difference between the ACS ratio and the long-form

ratio (88.0).³¹ In Multnomah County, the ACS ratio was 93.9, compared to the long-form ratio of 94.4. However, one study noted that completeness ratios for the individual years of ACS test site surveys were inconsistent, first rising and then falling (78.0, 88.0, and 85.0, respectively for 1999 through 2001). That study concluded that the Census Bureau needed to evaluate whether this effect was the result of the implementation of new controls for population estimates or changes in how they created the estimates from year to year.³²

Although the 2004 studies did not address sample completeness by subgroups of the population, an earlier study by the Census Bureau found that the C2SS sample completeness ratios for most racial groups compared favorably to those from the 1990 Census long-form ratios (Table 2).³³ These findings had important implications for the survey's ability produce accurate estimates on characteristics for racial and ethnic groups. These sample completeness ratios close to 100.0 gave the best assurance that the sample was representative of the groups.³⁴

³¹ Salvo, Lobo, and Calabrese, "Small Area Data Quality," p. 25; Hough and Swanson, "The 1999-2001 American Community Survey and the 2000 Census Data Quality and Data Comparisons," p. 3; and Gage, "Comparison of Census 2000 and American Community Survey 1999-2001 Estimates," p. 9. In general, these studies indicated that the ACS housing unit sample completeness ratios for various areas were consistent with those of the 2000 Census long-form survey. These findings agree with earlier comparisons of the C2SS and the 1990 long-form estimates that demonstrated that the C2SS had sample completeness ratios across geographic areas as good as those for the long-form survey it sought to replace. For 15 states, there was no statistical difference in this measure for the C2SS and the long form. For small states, the 1990 long form had better sample completeness ratios. For states with large populations, the C2SS outperformed the 1990 Census long-form survey. Starsinic and Albright, "Coverage and Completeness in the Census 2000 Supplementary Survey," p. 5.

³² Salvo, Lobo, and Calabrese, "Small Area Data Quality," p. 25.

³³ U.S. Census Bureau, Report 2, pp. 22-25; Starsinic and Albright, "Coverage and Completeness in the Census 2000 Supplementary Survey," p. 3347.

³⁴ U.S. Census Bureau, Report 2, p. 22. For example, if a disproportionate share of Asian American women with less than a high school education were left out of the sample, either by missing addresses or failing to respond, the C2SS could report incorrectly on the educational attainment of Asian American women. That is, it would overestimate the educational attainment of the Asian American population, as well as for the total population. The Census Bureau's analysis of the C2SS results in terms of sample completeness concluded that it was hard to measure whether people in the C2SS's sample differed in characteristics from those not sampled since survey data for these people are, by definition, not available.

³⁰ U.S. Census Bureau, Report 7, p. 39.

Item Nonresponse

In addition to having sample completeness ratios that met or exceeded expectations, the ACS test surveys compared favorably to, and, in many ways, performed better than the 2000 Census in terms of item nonresponse. Item nonresponse occurs when a respondent fails to provide complete and usable information for all required items, such as when a person accidentally overlooks a question, refuses to answer it, or provides an invalid answer. High item nonresponse can adversely impact the final estimates of a survey. One way of minimizing the impact of item nonresponse error is through imputation. Thus, the Census Bureau uses imputation rates as a measure of item nonresponse.³⁵

Census Bureau studies in 2001 and 2002 showed that at the national level, the C2SS had significantly lower data allocation rates than the 2000 Census long form for most items, including gender, age, race, and Hispanic origin.³⁶ Subsequent studies of the ACS 3-year average data also showed that the ACS had lower item allocation rates than the census long form. For example, for person-level (as opposed to household-level) questions, the ACS 3-year average data had an item allocation rate of 6.5 percent, compared to 11.2 percent for the 2000 Census long form.³⁷ In addition, in a study of data for the Bronx, New York,

³⁵ Imputation is the process used to resolve the problems of missing, invalid, or inconsistent responses identified during editing; Census Bureau employees change responses or missing values on the person's record to ensure a plausible, internally consistent record. Imputation is done through allocation (using answers from other people in the household or people believed to have similar characteristics) or assignment (using information from the household to assign a value for a missing item such as using first name to determine a person's sex). The imputation rate is the ratio of the number of eligible people that had a value imputed for an item to the number of people eligible to have responded to that item. U.S. Census Bureau, Report 2, pp. 19–20, 42–43.

³⁶ For example, the Census Bureau imputed the race of 3.9 percent of the eligible population from the 2000 Census but only had to impute the race of 2.4 percent of the people in the C2SS. Imputation rates for gender were 1.0 percent for the 2000 Census and 0.5 percent for the C2SS. U.S. Census Bureau, Report 2, p. 20. In 2002, the Government Accountability Office (GAO) examined the Census Bureau's early reports on data allocation rates and relayed the findings to Congress. GAO noted that because of the sample size, the accuracy of the ACS would be less than that of the census long form, however, nonresponse errors were somewhat smaller for the ACS. GAO, "The American Community Survey: Accuracy and Timeliness Issues," GAO-02-956R, Sept. 30, 2002, pp. 3, 9, and 10.

³⁷ The Census Bureau then averaged item allocation rates across the 36 counties included in the ACS 3-year averages. U.S. Census Bureau, Report 7, pp. 28–30.

the difference between the 3-year averages and the long-form data were striking. For questions such as weeks worked last year, industry, occupation, and employment status, allocation rates were at least 10 percentage points higher in the 2000 Census than in the ACS.³⁸

The lower item allocation for the ACS indicated that its estimates were less prone to nonresponse errors than estimates from the census long form.³⁹ Several factors affected this, such as the use of a permanent, professional interviewing staff and computer-assisted interviewing instruments.⁴⁰ Further, the ongoing nature of the ACS appeared to contribute to its lower nonresponse rates, although the Census Bureau concluded that it needed further research to explore this finding.⁴¹

Sampling Errors

Because the Census Bureau expected the ACS to produce statistically reliable estimates for small population groups and small areas, a key indicator of the suitability of the ACS as a replacement for the census long form was the sampling error of its small area estimates. A sampling error is the variability that occurs when asking a portion, rather than the entire population. Generally, the larger the sample, the smaller the sampling error. The Census Bureau calculated that the sampling error of the ACS would be one-third higher than that of the long form because of its smaller sample size and use of subsampling for personal interviews of nonrespondents (rather than personally interviewing all nonrespondents as did the census).⁴²

³⁸ Salvo, Lobo, and Calabrese, "Small Area Data Quality," p. 7.

³⁹ U.S. Census Bureau, Report 7, p. vi.

⁴⁰ In comparison, nonresponse follow-up interviewers for the 2000 Census were relatively inexperienced temporary workers. In fact, in 2000, pressure to complete the count ended up depriving the 2000 Census long form of resources to conduct follow-up with households that failed to answer certain questions. Further, the workforce of predominantly temporary census takers did not like to ask the income question and several other "difficult" questions. U.S. Census Bureau, Report 7, p. 31; U.S. Census Bureau, Report 1, p. 10; and Paula Schneider, interview with author, October 27, 2011.

⁴¹ U.S. Census Bureau, Report 7, p. 41.

⁴² U.S. Census Bureau, Report 2, pp. 27–29, and Michael Starsinic, U.S. Census Bureau, "American Community Survey: Improving Reliability for Small Area Estimates," Proceedings of the Survey Research Methods Section, American Statistical Association, 2005, pp. 3592, 3594, accessed on January 29, 2013, at <www.asasrms.org/Proceedings/y2005/files/JSM2005-000427.pdf>.

Overall, the Census Bureau met the target levels of sampling error for single-year ACS estimates. However, differences in mail response indicated that sampling error was higher for some groups than for others.⁴³ In response, the Census Bureau created plans to boost subsampling in areas where mail response rates were low. It also explored measures to make it easier for households with limited English proficiency to respond to the survey.⁴⁴ However, when outside researchers analyzed the ACS 3-year average data, they found the tract-level sampling errors to be higher than expected. For example, a study of four counties (two in Montana and two in Wisconsin) found sampling errors for census tract-level estimates in three of the counties were much higher than the Census Bureau had predicted. Although county-level sampling errors were roughly 33 percent higher than those for the 2000 Census long form, as expected, many tract-level sampling errors were 50 to 150 percent higher. The Census Bureau's further investigation found that, unlike the 2000 Census that increased sampling rates based on occupancy to yield more useful data, the ACS failed to oversample minor civil divisions in Wisconsin. This oversampling in the census resulted in a smaller than normal sampling error. The Census Bureau determined that correcting for the absence of oversampling might diminish the differences between the long form and the ACS in this area, and the changes were made in 2002 and 2005 that made both sets of data more comparable.⁴⁵

Data Comparability

In addition to comparing measures of data quality between the ACS and the census long form, researchers compared the statistics produced by the two surveys to determine if they were comparable. In 2002, GAO identified key survey items where the difference

⁴³ U.S. Census Bureau, Report 2, pp. 27-28. The C2SS did not provide sufficient information to serve as a test of a fully implemented ACS on this facet of data quality. Its sample size was a fraction of what the ACS would have on full implementation. In addition, the C2SS did not sample all counties, so it did not produce state estimates. Therefore, the Census Bureau did not evaluate results as if they were a measure of what the ACS would produce eventually. *Ibid.*, p. 27.

⁴⁴ U.S. Census Bureau, Report 2, pp. 28-29, and Charles H. Alexander (ed. by Alfredo Navarro), "The Quality of Estimates From the American Community Survey for Small Population Groups," *Proceedings of the Section on Survey Research Methods*, American Statistical Association, 2003, p. 366, accessed on January 29, 2013, at <www.asasrms.org/Proceedings/y2003/Files/JSM2003-000180.pdf>.

⁴⁵ Van Auken, et al., "American Community Survey and Census Comparison Final Analytic Report," pp. 40-48, and Starsinic, "American Community Survey: Improving Reliability for Small Area Estimates," 2005, pp. 3595-3596.

between the national-level estimates from the 2000 Census and the C2SS were greater than 10 percent, such as housing units lacking complete plumbing and self-employed workers. GAO also found several state-level estimates that differed by more than 10 percent between the two surveys, such as workers commuting by public transportation, households with income of \$200,000 or more, and measures of the number of individuals and children living in poverty.⁴⁶ The Census Bureau pointed out that GAO evaluated estimates from only 1 year and that 5-year ACS estimates would be more accurate than decennial long-form estimates because they would more closely reflect an area's current conditions than decennial census estimates.⁴⁷

Subsequent studies provided more evidence of the accuracy and quality of ACS estimates. The Census Bureau found poverty measures in the 2000 Census and the C2SS to be relatively consistent, at 12.4 percent and 12.2 percent, respectively. The Current Population Survey (CPS) measure of poverty was comparable at 11.9 percent. Because the Census Bureau conducts the CPS specifically to provide official government estimates of employment, unemployment, and poverty, statisticians consider this survey as the benchmark against which to compare other estimates, so the similar results point to the accuracy of the ACS data.⁴⁸

Researchers at the New York City Department of City Planning determined that the differences between estimates for the Bronx were not large enough to affect the planning of public programs. They compared 235 data topics from the ACS 3-year estimates and the 2000 Census long form for the Bronx's 88 neighborhoods and found 190 statistically similar data topics in the surveys. One exception was the number of persons with disabilities in several neighborhoods, which could have implications on public transportation planning, however Census Bureau researchers attributed this outlier to increased explanations from more rigorous follow-up operations of

⁴⁶ GAO noted that the differences did not appear to have been caused by the C2SS' exclusion of people living in group quarters or by seasonal fluctuations in the population and incomes. GAO, "The American Community Survey: Accuracy and Timeliness Issues," p. 11. GAO acknowledged that complete information was not available to fully evaluate data quality and also noted that more information was needed to meet federal agencies' needs regarding the use of ACS data. *Ibid.*, pp. 9-15.

⁴⁷ *Ibid.*, p. 31.

⁴⁸ Paula Schneider, U.S. Census Bureau, "Content and Data Quality in Census 2000," *Census 2000 Testing, Experimentation, and Evaluation Program*, Topic Report Series, No. 12, TR-12, March 2004, p. 21.

the ACS.⁴⁹ Furthermore, for some data items with statistically significant differences between the ACS and the 2000 Census, the ACS estimate was closer to the value indicated by administrative records. For example, ACS estimates on fuel used for home heating were much closer than the census estimates to comparable estimates from local utilities and New York City's Housing and Vacancy Survey. The ACS data on the number of employed persons was also more consistent with state data and data from the Bureau of Economic Analysis than were census counts. Overall, these researchers concluded that the ACS was an acceptable substitute for the census long form from a content standpoint.⁵⁰

The study of ACS results for Tulare County, California, mirrored the findings from the Bronx. Overall, 80 percent of the data topics examined were statistically comparable between the ACS 3-year averages and the 2000 Census. Where there were differences, the researcher noted that the ACS data was still "useful and usable" and that the ACS might have captured other phenomena.⁵¹ For example, lower median income values reported in the ACS, as compared to the long form, may have reflected the timing of the data collection. The ACS collected data throughout the year while the census long form used April 1 as its reference date. In Tulare County, California, the long form reported a median income of \$33,983, compared to the ACS estimate of \$31,467. According to the author, the difference was "theoretically consistent" with an annual income figure that would include seasonal workers who have lower earnings.⁵²

Estimates for 63 percent of the 364 variables tested for Multnomah County, Oregon, were not statistically different between the ACS 3-year data and the 2000 Census long-form data. Several variables with statistically significant differences reflected trends in the local area that the 2000 Census long form missed. For example, the higher levels of educational attainment reported by the ACS were consistent with migration patterns into Portland and Multnomah County. The authors suggested that other differences

⁴⁹ The authors determined an item was similar across the two surveys if differences between their estimates were statistically significant in less than one-fifth of the Bronx's 88 neighborhoods. Salvo, Lobo, and Calabrese, "Small Area Data Quality," pp. 9, 21-22.

⁵⁰ According to the authors, the 2000 Census recorded that employment had declined by 3 percent from 1990 to 2000, even though New York City was booming economically. Salvo, Lobo, and Calabrese, "Small Area Data Quality," pp. 20-22.

⁵¹ Gage, "Comparison of Census 2000 and American Community Survey 1999-2001 Estimates," p. 4.

⁵² Ibid., pp. 4, 6.

in the estimates from the two surveys might be the result of differences in the wording and placement of questions on the two survey forms.⁵³

The Census Bureau's comparison of estimates from ACS 3-year data and the 2000 Census found that at the county level, most of the estimates were not significantly different. Some small (less than 1 percentage point) county-level differences reflected the larger sample sizes in the largest counties. Other small but statistically significant differences were in the age, relationship, and household income variables. Other county-level differences were due to differences in questionnaire wording or survey operations between the two surveys (including editing procedures, weighting, and the use of computer-assisted interviewing for ACS nonresponse follow-up), such as with the race, disability, and school enrollment questions. Finally, the Census Bureau noted that some differences were difficult to detect at the tract-level because of the small sample sizes and larger variances. The researchers suggested that national-level comparisons between ACS and 2000 Census estimates might verify whether these differences exist at the national level or whether some of these differences are particular to the counties chosen for the study.⁵⁴

In 2004, the Census Bureau released four reports comparing estimates from the C2SS to the 2000 Census for demographic, economic, social, and housing characteristics.⁵⁵ The Census Bureau undertook these comparisons for two reasons: (1) to demonstrate that the ACS was a sound replacement for the long form with respect to quality, and (2) to determine how ACS data may differ from decennial census data. Thus, when Census Bureau researchers found

⁵³ Hough and Swanson, "The 1999-2001 American Community Survey and the 2000 Census Data Quality and Data Comparisons," pp. 24, 31.

⁵⁴ U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 8: Comparison of the American Community Survey Three-Year Averages and the Census Sample for a Sample of Counties and Tracts," June 2004, pp. xvii-xviii, 60.

⁵⁵ U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 4: Comparing General Demographic and Housing Characteristics With Census 2000," May 2004; U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 5: Comparing Economic Characteristics With Census 2000," May 2004; U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 9: Comparing Social Characteristics With Census 2000," June 2004; and U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 10: Comparing Selected Physical and Financial Characteristics of Housing With the Census 2000," July 2004.

Table 3.
Comparison of C2SS and 2000 Census Race Question

(In percent)

Race alone or in combination	C2SS	2000 Census	Difference
White	79.4	77.3	*2.1
Black or African American.....	12.2	12.7	*-0.5
American Indian and Alaska Native..	1.7	1.5	*0.3
Asian	4.2	4.3	0.0
Native Hawaiian and Other Pacific Islander.....	0.3	0.3	0.0
Some Other Race	4.5	6.6	*-2.1

* Difference is statistically significant.

Source: U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 4: Comparing General Demographic and Housing Characteristics with Census 2000," May 2004, pp. 1-2.

significant differences, they explored the reasons, sought supporting evidence to determine if the ACS estimate was sound, and suggested improvements when necessary. These reports also served as a starting point for understanding the differences between the two surveys to help data users make the transition from the decennial census long-form estimates to the ACS.⁵⁶

For example, differences in the race estimates between the 2000 Census and the C2SS were statistically significant. A larger proportion of people reported White as their race and fewer people reported "Some Other Race" in the C2SS than in the 2000 Census (Table 3). There were only minor differences in wording and formatting between the two surveys. However, one reason for the difference in estimates may be in how interviewers deal with responses to the race question during nonresponse follow-up. Previous Census Bureau research had shown that the biggest differences in reporting of race occur in data collected by interviewers. Further, a more detailed comparison of C2SS and 2000 Census responses revealed that the 2000 Census had a higher proportion of the Hispanic population reporting Some Other Race when an interviewer collected their data. A separate study found that C2SS interviewers who did not also work on the 2000 Census were more likely to prompt for another answer if a Hispanic respondent provided "Hispanic" as a response to the race question. Thus, the Census Bureau concluded that differences in interviewing techniques likely led to the higher proportion of

"White" responses and a lower proportion of "Some Other Race" responses in the C2SS.⁵⁷

Conclusion: ACS Would Be a Reasonable Replacement of the Long Form

The overall conclusion of these and other studies was that the Census Bureau should move forward with its plans to replace the decennial census long-form sample with the ACS in 2010. The Census Bureau argued that the quality measures and timeliness of the ACS data compared to the long form suggested that the ACS was superior to the traditional method of conducting the census with a long-form sample.⁵⁸ When implemented fully, the ACS would improve overall survey quality compared with census long-form sample. Although the Census Bureau expected increases in sampling error (due to the smaller sample size), it believed that the ACS would improve the timeliness of the data and reduce nonsampling error.⁵⁹ The Census Bureau noted:

"The basic premise of the ACS rolling sample is that this relatively moderate increase in the sampling error for one part of a decade is a reasonable tradeoff so as to profit from the ability to update the 5-year average every year and thereby gain a picture of the direction of change and relative differences among groups and areas. If the size and characteristics of the population change, such as from 400 to 480, the 5-year average gives a more accurate picture of current conditions than the out-of-date long-form statistics . . . The updated ACS estimates would give a more accurate reflection of current conditions."⁶⁰

⁵⁷ U.S. Census Bureau, Report 4, pp. 32-39. Also refer to Theresa Leslie, David Raglin, and Laurie Schwede, U.S. Census Bureau, "Understanding the Effects of Interview Behavior on the Collection of Race Data," 2002, accessed February 6, 2013, at <www.census.gov/acs/www/Downloads/library/2002/2002_Leslie_01.pdf>; Claudette E. Bennett and Deborah H. Griffin, U.S. Census Bureau, "Race and Hispanic Origin Data: A Comparison of Results From Census 2000 Supplementary Survey and Census 2000," 2002, accessed February 6, 2013, at <www.census.gov/content/dam/Census/library/working-papers/2002/acs/2002_Bennett_01.pdf>, and Laurie Schwede, Therese F. Leslie, and Deborah H. Griffin, U.S. Census Bureau, "Interviewers' Reported Behaviors in Collecting Race and Hispanic Origin Data," 2002, accessed February 6, 2013, at <www.census.gov/acs/www/Downloads/library/2002/2002_Schwede_01.pdf>.

⁵⁸ U.S. Census Bureau, Report 7, p. 41, and U.S. Census Bureau, American Community Survey Operations Plan, Release 1, March 2003, p. 48.

⁵⁹ Griffin and Waite, "American Community Survey Overview and the Role of External Evaluations," p. 209.

⁶⁰ Alexander, "The Quality of Estimates from the American Community Survey for Small Population Groups," p. 365.

⁵⁶ U.S. Census Bureau, Report 4, pp. 1-2.

The outside researchers with whom the Census Bureau contracted to compare the 2000 Census and ACS 3-year estimates generally agreed with the findings of the agency. One study concluded, “The ACS promises to hold great potential for data users. Rather than waiting for 10 years for refreshed data from each decennial census, local data can be made available each year.”⁶¹ Another noted, “The ACS clearly has the potential to not only be an adequate replacement of the long form, but in fact, to be an improvement.”⁶² However, the researchers also identified issues of concern and made recommendations for further research. These included:

Self-response rates. The lower mail response rates of the ACS in comparison to the 2000 Census long form was a cause for concern. Strong nonresponse follow-up operations are more expensive and may not be as accurate as self-response. Further, if mail return rates did not improve, some areas could have insufficient data to generate reliable estimates at the tract level.⁶³

Sample size. Given the relatively smaller sample size of the ACS, any reduction in sample size would pose a severe threat to the quality of the survey’s estimates.⁶⁴

Need for training. Given data users’ heavy use of and dependence on the decennial long form data, it was crucial that the Census Bureau work closely with data users to determine appropriate uses of the data and provide training on how to properly interpret the data. In addition, data users needed training on how to use multiyear averaged data and data for small jurisdictions.⁶⁵

Finally, researchers emphasized the importance of adequate funding, noting that continuous and

sufficient funding was crucial to the success of the ACS.⁶⁶ As one researcher noted, “Continuous measurement assumes continuous funding . . . Sufficient funding for implementing the 2010 ACS plan must be ensured for a longer time horizon than the annual federal budget process now allocates . . . Only with this guaranteed financial support can the ACS plan provide results that are more timely and accurate [than the long form].”⁶⁷

CONTINUED OPERATIONAL QUALITY AND IMPROVEMENTS IN THE ACS: 2001–2002

In 2001 and 2002, the Census Bureau continued to test the feasibility of the ACS. The Census Bureau conducted the Supplementary Survey as a nationwide test of ACS methods, as it had during the 2000 Census (refer to the previous section), and continued to test the ACS in 31 test sites (Chapter 3). The sample size for the combined Supplementary Surveys and the 31 ACS test sites was 890,000 housing units in 2001 and about 820,000 in 2002. While the Supplementary Surveys used ACS methods, the sample design did not reflect the ACS sample design for full implementation because the surveys were designed to provide data for states and large entities of 250,000 or more, not to provide data on small areas.⁶⁸

An assessment of the 2001–2002 ACS tests indicated that the survey continued to be operationally feasible and was ready for full implementation. Overall, the assessment found that during the tests the Census Bureau continued to conduct basic operations on schedule and workload projections were close to actual workloads, which allowed the Census Bureau to predict staffing needs.⁶⁹ In addition, response rates for the three data collection modes—mail, CATI, and

⁶¹ Hough and Swanson, “The 1999–2001 American Community Survey and the 2000 Census Data Quality Comparisons,” p. 31.

⁶² Van Auken et al., “American Community Survey and Census Comparison Final Analytical Report,” p. 63.

⁶³ Salvo, Lobo, and Calabrese, “Small Area Data Quality,” p. 22, and Van Auken, et al., “American Community Survey and Census Comparison Final Analytical Report,” p. 63.

⁶⁴ Salvo, Lobo, and Calabrese, “Small Area Data Quality,” p. 22.

⁶⁵ Scardamalia, “The American Community Survey: General Commentary on the Findings From External Evaluations,” p. 301; Salvo, Lobo, and Calabrese, “Small Area Data Quality,” p. 22; Gage, “Comparison of Census 2000 and American Community Survey 1999–2001 Estimates,” p. 16; and Hough and Swanson, “The 1999–2001 American Community Survey and the 2000 Census Data Quality Comparisons,” p. 32.

⁶⁶ Scardamalia, “The American Community Survey: General Commentary on the Findings From External Evaluations,” p. 301; Gage, “Comparison of Census 2000 and American Community Survey 1999–2001 Estimates,” p. 16; Hough and Swanson, “The 1999–2001 American Community Survey and the 2000 Census Data Quality Comparisons,” p. 32; and Van Auken, et al., “American Community Survey and Census Comparison Final Analytical Report,” p. 63.

⁶⁷ Hough and Swanson, “The 1999–2001 American Community Survey and the 2000 Census Data Quality Comparisons,” p. 32.

⁶⁸ U.S. Census Bureau, “American Community Survey Operations Plan,” release 1, March 2003, p. 12. Between 1999 and 2001, most of the 31 ACS test sites were sampled at an annual rate of 5 percent (Houston, Texas, was sampled at 1 percent and a few other counties were sampled at 3 percent). In February 2002, the sampling rate in all counties was reduced to 2.5 percent, except for Houston which remained at 1 percent.

⁶⁹ U.S. Census Bureau, Report 6, May 2004, pp. iv, 22–23.

Table 4.

ACS Workloads and Response Rates: 2000-2002

Survey component	2000	2001	2002
Total response rate (percent)	95.1	96.7	97.7
Mailout			
Workload.....	850,242	817,469	706,171
Response rate (percent)	51.9	50.7	51.5
CATI			
Workload.....	227,790	252,578	228,867
Response rate (percent)	57.3	65.0	63.5
CAPI			
Workload.....	143,834	136,211	106,546
Response rate (percent)	92.4	94.5	95.4

Source: U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 6: The 2001-2002 Operational Feasibility Report," May 2004, pp. 5, 12, 16, 20.

CAPI—stayed steady or improved (Table 4). Low survey nonresponse rates helped assure data users that the potential for nonresponse bias was minimal.⁷⁰

Generally, the Census Bureau conducted ACS operations on or ahead of schedule in 2001 and 2002, demonstrating that: (1) the program was feasible on a larger scale level, (2) procedures to address processing error were effective, and (3) the ACS could deliver high-quality survey data.⁷¹ For example:

Questionnaire Keying. In 2001 and 2002 the Census Bureau met its production goal of keying questionnaires within 2 weeks of receipt for 90 percent of questionnaires mailed back by respondents. By meeting this goal, the proportion of ACS cases sent to telephone interviewers remained stable and the workload was predictable for planning purposes. In addition, the keying error rate was very low at about 0.05 percent of keyed fields.⁷²

Edit Follow-up. The proportion of cases requiring Edit Followup remained stable at one-third of the mail response universe while the percentage of cases sent to Edit Followup that were not contacted dropped from 30 percent in 2000 to 4 percent in 2002. Improvements in the Edit Followup software program and staffing changes also contributed to an increase in response rates for Edit Followup. Compared to the 48.4 percent response rate in 2000, the response rates for Edit Followup were 74.3 and 83.5 percent in 2001 and 2002, respectively.⁷³

Telephone Questionnaire Assistance (TQA). Staffing changes for TQA helped eliminate problems with the Edit Followup operation, as mentioned above. By 2002, 33 people from a combination of CATI and Edit Followup staff were handling TQA calls during peak hours and fewer than half that number worked during nonpeak hours.⁷⁴ In addition, the Census Bureau began to develop an interactive voice response (IVR) system for TQA to assist with call volume.⁷⁵

⁷⁰ Ibid., p. 21. The CATI response rate was 65 percent in 2001, but dropped in the second half of 2002 when thousands of telephone numbers became available from the 2000 Census. This increased both the proportion of the total sample that makes up the CATI workload and the number of successful interviews but decreased the response rate because many of the 2000 Census phone numbers turned out to be for the wrong person (for reasons such as a change in service or the respondent having moved). In addition, the respondent refusal rate for CAPI decreased from 3.8 percent to 2.5 percent during the same time period. U.S. Census Bureau, Report 6, pp. 12, 16-17, 20-21. Refer to the discussion in the previous section regarding nonresponse bias.

⁷¹ U.S. Census Bureau, Report 6, May 2004, p. 3.

⁷² U.S. Census Bureau, Report 6, pp. v, 6. Keying is the process of capturing responses from of mailed-in forms and producing a data file. In order to ensure subsequent operations and processing activities are conducted on schedule, the Census Bureau set a goal of completing keying within 2 weeks of receipt. The Census Bureau experienced some delays at the end of 2002 as the ACS was transitioning between two versions of the questionnaire, requiring modifications to the Edit Followup software.

⁷³ U.S. Census Bureau, Report 6, pp. 8-9. Edit Followup involves an automated program checking the data for completeness and consistency after the NPC receives and keys questionnaires. If critical items are left blank or the person count does not match the number of persons listed, a telephone interviewer contacts the respondent to obtain the required information. In 2000, heavy Telephone Questionnaire Assistance (TQA) workload hampered the effectiveness of Edit Followup because TQA operators also conducted Edit Followup interviews.

⁷⁴ In 2000, 15 operators handled all of the TQA calls as well as working on Edit Followup. In the latter part of 2000, Field Division (FLD) changed its procedures and CATI interviewers began to handle a portion of the TQA calls. In 2001 and 2002, FLD increased the number of staff answering TQA calls during peak calling hours (in the evening). U.S. Census Bureau, Report 6, p. 8.

⁷⁵ U.S. Census Bureau, Report 6, p. 7. IVR is an automated telephone call-in system whereby callers can find answers to common questions by selecting from options on a menu. Information available via IVR included the explanations of the purpose of the ACS, the confidentiality of responses, and the reason for and uses of questions including income, race, and ancestry.

INCORPORATION OF ACS INTO 2010 CENSUS PLANNING

From the earliest stages, planners made the ACS an integral part of the plan for the 2010 Census.⁷⁶ The Census Bureau determined that repeating the 2000 Census design in 2010 would be “an unwise strategy and . . . a recipe for failure.”⁷⁷ Although the Census Bureau considered the 2000 Census a success, both operationally and in terms of coverage, the success of the 2000 Census resulted primarily from a large infusion of funds in the last couple of years of the census lifecycle and the acceptance of a high-risk strategy to develop systems and procedures. The 2010 Census likely would face its own challenges, such as scarce resources, new technology, and increased privacy concerns. After studying those challenges, the Census Bureau concluded, “the challenges of exponential demographic and technological change preclude repeating Census 2000 in 2010 . . . we are addressing the challenges by taking advantage of multiple opportunities and by adopting a bold and innovative strategy for reengineering 2010.”⁷⁸

Thus, the Census Bureau identified three components that were crucial to its reengineering strategy: (1) modernizing and improving the Census Bureau’s address list and geographic databases, (2) taking a short-form census, and (3) supplying long-form-type data on a continuous basis through the ACS.⁷⁹ The Census Bureau emphasized how the three components of the reengineered census are interrelated:

“Both the [Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER)] modernization and the ACS implementation are integral to a successful 2010 census design . . . To take advantage of a fully implemented ACS, the Census Bureau requires a complete and accurate MAF/TIGER. An accurate MAF/TIGER helps ensure

⁷⁶ Refer to Chapter 2 of the 2010 Census History for more details on the planning process for the 2010 Census.

⁷⁷ Preston Jay Waite, Sally Obenski, and Lisa E. Buckley, “2010 Census Planning: The Strategy,” paper presented at the Joint Statistical Meetings, Atlanta, GA, August 2001, accessed on September 24, 2013, at <www.census.gov/history/pdf/2010Planning-thestrategy.pdf>.

⁷⁸ Ruth Ann Killion, Sally M. Obenski, and Lisa Buckley, “2010 Census Planning: Demographic and Technological Change Escalating Complexity,” paper presented at the Joint Statistical Meetings, Atlanta, GA, August 2001, accessed on September 24, 2013, at <www.census.gov/history/pdf/2010planning-demographicalandtechnical.pdf>.

⁷⁹ Susan M. Miskura, chief, Decennial Management Division, U.S. Census Bureau, to Preston Jay Waite, assistant director for Decennial Census, re: 2010 Census Planning, FY2001–FY2003, Decennial Directorate 2010 Census Planning Memorandum Series, no. 1, October 25, 2000, and Waite, Obenski, and Buckley, “2010 Census Planning: The Strategy.”

that the data collected by the ACS correctly reflect the population and housing characteristics for small geographic areas and groups. On the other hand, a complete and accurate MAF/TIGER depends on the implementation of the ACS. The ongoing presence of ACS staff enables the timely update of the address list, including the identification of new construction and newly converted group quarters.”⁸⁰

The goals for the reengineered 2010 Census were to increase the relevancy and timeliness of long-form data, reduce operational risk, improve coverage accuracy, and contain costs. The Census Bureau had determined that in order to successfully fulfill its mission of collecting and disseminating demographic data, it had to simplify its decennial census operations. This could be achieved by removing the resource-intensive long-form data collection and the compilation of address information from the 2010 Census design and, instead, conducting these activities throughout the decade. This involved continuously updating the address list, modernizing the MAF/TIGER system, and conducting the ongoing ACS.⁸¹

The ACS offered to improve the 2010 Census by reducing costs (such as for printing and TQA), improving response rates (thus reducing the nonresponse follow-up workload), and assisting in the ongoing update of the address list. It also would provide an opportunity to test improvements in decennial census methods. The Census Bureau noted that the ACS more accurately reflected the rapid demographic changes occurring in the United States which “had outpaced the usefulness of the decennial long form,” in light of the need for current data.⁸² Further, in the increasingly information-based economy, government agencies, private businesses, and nonprofit organizations needed current and reliable data for planning purposes. Finally, full implementation of the ACS would support 2010 planning and improve the decennial design in several ways, including:⁸³

- Creating opportunities to innovate and streamline in ways and on a scale not possible when long-form data collection was included.

⁸⁰ Waite, et al., “2010 Census Planning: The Strategy.”

⁸¹ U.S. Census Bureau, Reengineering the Decennial Census: The Baseline Design for 2010, version 1.5, May 2003, attachment to 2010 Census Planning Memoranda Series, no. 14, June 3, 2003, pp. 2–3, and Waite, et al., “2010 Census Planning: The Strategy.”

⁸² Waite, et al., “2010 Census Planning: The Strategy.”

⁸³ Waite, et al., “2010 Census Planning: The Strategy.”

- Allowing decennial census planners to focus on the basics—determining the best methods to accurately count the nation's population.
- Providing current profiles of the population in order to determine how to best approach each geographic area.
- Facilitating 2010 Census enumeration activities by maintaining a continuous presence and relationships in local areas.
- Allowing for the testing of new technologies to make data collection and processing more efficient and cost effective.

In June 2001, the Census Bureau developed the preliminary cost estimates for the 2010 Census, noting that the ACS, MAF/TIGER modernization, and the short-form-only census were highly integrated, complementary activities and that “one [would] not work to its full potential without the others.”⁸⁴ The Census Bureau’s preliminary estimates suggested that implementing all three components would result in a net savings of \$445 million compared to the cost of repeating the design of the 2000 Census. In particular, implementing the ACS would enable the Census Bureau to implement a short-form-only census in 2010, which would reduce the costs associated with scanning mail responses and the costs of Nonresponse Followup (NRFU) operations.⁸⁵

Subsequent delays in the implementation of the full national sample of the ACS resulted in lowering the life cycle cost estimate of the 2010 Census but also delayed the first release of tract-level ACS data from 2008 to 2010.⁸⁶

DELAYS IN IMPLEMENTATION

In order to move traditional long-form data collection to continuous data collection and ensure a smooth transition for data users, the Census Bureau originally

⁸⁴ U.S. Census Bureau, “Potential Life Cycle Savings for the 2010 Census,” June 2001, p. 1.

⁸⁵ U.S. Census Bureau, “Potential Life Cycle Savings for the 2010 Census,” June 2001, p. 1-2, 6. For example, the Census Bureau originally planned to conduct NRFU with handheld computers (HHCs) that would include the short-form questionnaires, enabling census takers to collect short-form data more quickly and with less paper than in 2000. The electronic data entry would have resulted in additional savings by requiring less keying of data from paper forms at the data capture centers. Ultimately, however, the Census Bureau did not implement the use of HHCs for the 2010 Census. Refer to Chapter 3 of the 2010 Census History for more details on the issues surrounding the use of HHCs.

⁸⁶ U.S. Census Bureau, Estimated Life Cycle Costs for the Reengineered 2010 Census of Population and Housing, June 2003, p. 4.

planned to implement the ACS nationwide in 2003 with an annual sample of 3 million households.⁸⁷ Collection of full production data from 2003 to 2007 would have made the ACS 5-year cumulative estimates available in 2008, 4 years earlier than if the 2010 Census included a long-form questionnaire.⁸⁸ However, budget restrictions and the resulting lag in survey design and testing delayed full implementation until January 2005 for housing units and January 2006 for group quarters.

Testing Voluntary Response

Background

In July 2000, the Subcommittee on the Census of the House Committee on Government Reform held its first hearing on the ACS. One focus of the hearing was whether the ACS should be mandatory or voluntary. Subcommittee Chairman Representative Daniel L. Miller noted stated that Congress could not “give its full blessing to the American Community Survey” until that and other issues were addressed.⁸⁹ At the hearing, Census Bureau Director Kenneth Prewitt noted that a mandatory ACS would not only be less costly than a voluntary ACS, but that “by saying it is mandatory, what we really are saying is that the federal government takes this seriously.”⁹⁰ The following year, at its second hearing on the ACS, the House Subcommittee

⁸⁷ U.S. Census Bureau, “Potential Life Cycle Savings for the 2010 Census,” June 2001, p. 1.

⁸⁸ Given the sample size for the ACS, the Census Bureau had determined it would be able to publish reliable annual ACS data only for states and cities, counties, and metropolitan areas with a population of more than 65,000. Data averaged over 3 years would provide reliable estimates for areas with a population between 20,000 and 65,000, and 5-year averages would be available for all geographic areas down to the tract level. U.S. Census Bureau, American Community Survey Operations Plan, release 1, March 2003, p. 7, and Robert P. Parker, chief statistician, GAO, to Dave Weldon, M.D., chairman, and Dan Miller, vice-chairman, House Subcommittee on Civil Service, Census, and Agency Organization, Committee on Government Reform, re: The American Community Survey: Accuracy and Timeliness Issues, GAO-02-956R, September 30, 2002, p. 5.

⁸⁹ Rep. Miller (R-FL) identified five questions to be discussed at the hearing: (1) is the ACS cost efficient, (2) should it be mandatory or voluntary, (3) are rural areas getting quality and timely data, (4) will the ACS be implemented in an accurate, efficient, and consistent manner, and (5) does the ACS address the privacy concerns of the American people? Miller stated, “Not until these questions and their components are answered satisfactorily can Congress give its full blessing to the American Community Survey.” The American Community Survey—A Replacement for the Census Long Form? Hearing before the Subcommittee on the Census of the House Committee on Government Reform, 106th Cong., 2nd Sess., July 20, 2000, serial no. 106-246, p. 2 (statement of Rep. Dan Miller).

⁹⁰ “The American Community Survey—A Replacement for the Census Long Form?” p. 39 (statement of Kenneth Prewitt). Prewitt also noted that making the ACS voluntary would have implications for other government surveys stating that the ACS is “the platform against which all of the other surveys create their statistical controls.” So if it is weakened by low response rates or item nonresponse, all of the other surveys will be weakened. Ibid., p. 40.

on the Census again asked about the implications of a voluntary ACS. The Census Bureau's Acting Director William G. Barron, Jr., stated, "if it is not mandatory the response rates will go down and costs would go up and accuracy would deteriorate . . . Our concern is maintaining response and maintaining the ability to provide accurate data."⁹¹

Representative Miller brought up the issue again at the February 2002 appropriations hearing for the Department of Commerce, asking if the department had received a legal opinion on whether there was a legal requirement to make the ACS a mandatory survey. Commerce Secretary Donald L. Evans responded that he had not received a legal opinion on the mandatory nature of the survey, but that much of the information collected by the ACS was required by various statutes. Miller concluded, "I think the question we want to explore further is the question of whether it is mandatory, or even necessary for technical reasons."⁹²

At the request of Representative Robert L. Barr, vice chairman of the House Committee on Government Reform, the GAO reviewed the legal basis for conducting the ACS and concluded in its April 2002 response that the Census Bureau had authority under Title 13 of the U.S. Code to conduct the ACS as a mandatory survey.⁹³ In a separate report, GAO noted that the Census Bureau had based its decision to conduct the ACS as a mandatory survey on earlier studies finding that response rates for mandatory surveys were higher than those of voluntary

surveys.⁹⁴ After review, GAO agreed that voluntary nationwide surveys had lower response rates than the ACS conducted in 1996 (for which implementation took place in a few areas designated as test sites) and the C2SS. GAO noted, however, that "because there has been no testing of response rates for a voluntary mail survey of households of the size and scope of the ACS," it was not known if a voluntary survey could obtain the same response rate as a mandatory survey given sufficient funding. Thus, GAO asked the Census Bureau to estimate the additional costs of conducting a voluntary ACS. The Census Bureau estimated that it would cost an additional \$20 to \$35 million per year to conduct the ACS as a voluntary survey and achieve the same overall response rate as a mandatory ACS.⁹⁵

Nonetheless, in September 2002 Representative David J. Weldon, concerned with privacy issues, requested a formal test of the ACS as a voluntary, rather than mandatory, survey.⁹⁶ According to a letter from Representative Weldon, the Census Bureau would need to know the results of that experiment before it could project the costs of the new survey and request the necessary funding. The minutes of the ACS team leaders meeting in October 2002 noted, "No decision on future funding of the ACS will be made until the voluntary vs. mandatory results can be evaluated."⁹⁷ In making appropriations for FY 2003, the House of Representatives noted that there was insufficient information to determine the benefits of a mandatory ACS (as specified in the Census Bureau's budget request) compared to a voluntary ACS. Thus, in February 2003, Congress appropriated

⁹¹ The Census Bureau's Proposed American Community Survey [ACS], Hearing before the Subcommittee on the Census of the House Committee on Government Reform, 107th Cong., 1st Sess., June 13, 2001, serial no. 107-9, p. 35 (statement of William G. Barron, Jr.).

⁹² Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations for 2003, hearings before a House Subcommittee of the Committee on Appropriations, 107th Cong., 2nd Sess., February 27, 2002 (statements of Rep. Miller and Secretary Evans), accessed on September 24, 2013, at <www.gpo.gov/fdsys/pkg/CHRG-107hhrg81888/html/CHRG-107hhrg81888.htm>.

⁹³ Anthony H. Gamboa, general counsel, U.S. General Accounting Office, to Honorable Bob Barr, vice chairman, House Committee on Government Reform, April 4, 2002, B-289852, p. 5, and Panel on Research on Future Census Methods, Committee on National Statistics, Planning the 2010 Census, second interim report, The National Academies Press, Washington, DC, 2003, pp. 94–95. According to the Panel on Research on Future Census records, "The distinction between voluntary and mandatory is a significant one because it is believed that the "required by law" verbiage on census forms plays a role in raising response rates." *Ibid.*, p. 95.

⁹⁴ The Census Bureau had conducted an experiment as part of the 1990 Census that showed that a voluntary survey had lower response than a mandatory survey, by about 9 percentage points. Similarly, the Census Bureau's analysis of mandatory and voluntary response to the 1989 Survey of Pollution Abatement Costs and Expenditures showed a 20 percent difference in response between the voluntary and mandatory versions. Robert P. Parker, chief statistician, GAO, to Dave Weldon, M.D., Chairman, and Dan Miller, Vice-Chairman, House Subcommittee on Civil Service, Census, and Agency Organization, Committee on Government Reform, re: The American Community Survey: Accuracy and Timeliness Issues, GAO-02-956R, September 30, 2002, pp. 19–20.

⁹⁵ Parker to Weldon and Miller, GAO-02-956R, p. 19.

⁹⁶ David Weldon and Daniel Miller, House Committee on Government Reform, to Honorable Frank Wolf, chairman, House Committee on Commerce, Justice, and State Appropriations, September 18, 2002, cited in U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey; Report 3: Testing the Use of Voluntary Methods," December 2003, p. 1.

⁹⁷ U.S. Census Bureau, American Community Survey Office, Minutes of Team Leaders' Meeting, October 8, 2002.

Table 5.

Messages Used in American Community Survey Mail Materials

Material	2002 Mandatory Survey	2003 Standard Voluntary Survey	2003 Direct Voluntary Survey
Envelope	YOUR RESPONSE IS REQUIRED BY LAW	YOUR RESPONSE IS IMPORTANT TO YOUR COMMUNITY	YOUR RESPONSE IS IMPORTANT TO YOUR COMMUNITY
Enclosed letter	Please take about 40 minutes of your time to assist your community greatly by completing and mailing back your copy of the American Community Survey, as required by law. We are conducting this survey under the authority of Title 13, United States Code, sections 141-193, and 221. Title 13 also imposes penalties for not responding to the American Community Survey.	The U.S. Census Bureau chose your address, not you personally, as part of a randomly selected sample. The Census Bureau is required by U.S. law to keep your answers confidential. Your participation in the survey is important; however, you may decline to answer any or all questions. The enclosed brochure answers frequently asked questions about the survey.	The U.S. Census Bureau chose your address, not you personally, as part of a randomly selected sample. The Census Bureau is required by U.S. law to keep your answers confidential. The enclosed brochure answers frequently asked questions about the survey.
Enclosed brochure	(No mention of the mandatory nature of the survey in the brochure.)	Your participation in this voluntary survey is very important to your country and to your community. You may decline to answer any or all questions.	Your participation in this voluntary survey is very important to your country and to your community. You may decline to answer any or all questions.

Source: U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey; Report 11: Testing Voluntary Methods – Additional Results," December 2004, Appendix A.

\$1 million to the Census Bureau "to test the response rates of both a voluntary and a mandatory survey."⁹⁸

2003 ACS Voluntary Test

Between March and April 2003, the Census Bureau tested the effects of a voluntary ACS on mail response rates and associated follow-up costs. Messages on the envelopes, letters accompanying the survey, and brochures enclosed with the form explained that the survey was either mandatory or voluntary, with two types of voluntary survey design (refer to Table 5 for variations in wording for the

comparison samples.)⁹⁹ For the purposes of determining the impact of making the ACS voluntary, the Census Bureau compared data from the 2003 ACS Voluntary Test to ACS data from the mandatory test in March and April 2002.

⁹⁸ U.S. House of Representatives, "Making Further Continuing Appropriations for the Fiscal Year 2003, and For Other Purposes," Conference Report to Accompany H.J. Res. 2, Report 108-10, 108th Cong., 1st Sess., February 13, 2003, p. 689.

⁹⁹ The 2003 ACS sample included 12 monthly samples of about 70,000 addresses. Thus, the ACS Voluntary Test universe was comprised of the 140,000 sample cases for March and April 2003. Seventy-five percent of the sample addresses received experimental mail treatments that included materials explaining the survey was voluntary. There were two voluntary mail treatments used. The "Standard Voluntary" treatment used a standard survey approach to explain the voluntary nature of the survey; the "Direct Voluntary" approach more directly explained that the survey was voluntary. For the comparison group, the Census Bureau used the "Current Mandatory" approach, which used the standard wording to indicate that the survey was mandatory. The Census Bureau also tested revised materials stating the survey was mandatory that it had developed to be more user-friendly. In addition, the Census Bureau conducted all follow-up operations by telephone and personal visits using voluntary methods, regardless of the mail treatment. U.S. Census Bureau, Report 3, pp. 2-4. In a subsequent analysis of the data, the Census Bureau compared variations in the wording of both the voluntary and mandatory samples. Making the voluntary forms more user friendly had only a small effect on offsetting the decrease in mail participation. U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey: Report 11: Testing Voluntary Methods - Additional Results, December 2004," pp. v, 2, 8.

Table 6.

Cooperation Rates by Mode, Survey Interview Rates, and Weighted Survey Response Rates: Mandatory vs. Voluntary Survey

(In percent)

Mode	2002 mandatory survey	2003 standard voluntary survey	Difference
Mail cooperation rate	59.5	38.8	-20.7
Telephone cooperation rate	80.7	66.5	-14.2
Personal visit cooperation rate.....	95.6	89.0	-6.7
Survey interview rate	71.8	60.2	-11.6
Weighted survey response rate	97.6	93.4	-4.2

Note: Refer to the footnotes in the text for definitions of the rates.

Source: U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey; Report 3: Testing the Use of Voluntary Methods," December 2003, pp. 6-8, 12-14.

Table 7.

Interview Mode Distribution: Mandatory vs. Voluntary Survey

(In percent)

Mode	2002 mandatory survey	2003 standard voluntary survey	Difference
Total.....	100.0	38.8	-20.7
Mail.....	58.9	40.5	-18.4
Telephone	9.5	15.1	5.6
Personal visit	31.6	44.3	12.7

Note: Totals do not equal 100 percent due to rounding. Interview mode distributions were based on the final weighted estimate of occupied units and indicate the proportion of the data that were collected by mail, telephone, and personal visit. The distributions were weighted to reflect the probabilities of selection and the subsampling factors and do not summarize the percent of actual interviews collected by each mode.

Source: U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey; Report 3: Testing the Use of Voluntary Methods," December 2003, pp. 6-8, and Ibid., p. 8.

The results of the test revealed that both voluntary survey designs had lower cooperation rates¹⁰⁰ for all modes of data collection than the mandatory survey (Table 6), with the Standard Voluntary Survey receiving more responses than the Direct Voluntary survey by a few percentage points. For example, the mail cooperation rate for the voluntary survey was more than 20 percentage points less than that for the mandatory survey.¹⁰¹ The decrease in cooperation rates across mailout, phone and in-person interviews resulted in a 11.6 percent drop in the survey interview rate and a 4.2 percent drop in the weighted survey

response rate.¹⁰² In addition, the change to a voluntary survey shifted respondents from mail participation to participating by telephone or personal visit follow-up (Table 7).

Analyses of the test results demonstrated that declining cooperation and shifts in response mode would have consequences for both cost and reliability. First, personal interview follow-up activities are about 10 times more expensive than mail and telephone data collection activities. Thus, the more cases requiring personal interviews, the higher the survey costs.¹⁰³

Second, the reliability of the data depends on the participation of a sufficient percentage of the initial

¹⁰⁰ The cooperation rate is the proportion of all cases interviewed out of all eligible units ever contacted. Thus, the denominator for the mail cooperation rate is all occupied units included in the mailout. The denominators for the telephone and personal visit cooperation rates include all occupied units contacted during follow up. U.S. Census Bureau, Report 3, Appendix 2.

¹⁰¹ Since the 2003 test included a control group that received a mandatory ACS, Census Bureau staff also compared the cooperation rates for that group to the group that received the 2003 voluntary survey. The results were similar: the mail cooperation rate for the mandatory ACS was 57.3 percent, compared to 38.8 percent for the voluntary group. U.S. Census Bureau, Report 3, pp. 6-7.

¹⁰² U.S. Census Bureau, Report 3, pp. v-vi, 12-14. The survey interview rate is the ratio of the final number of completed interviews from all three modes of data collection (mail, telephone, and personal visit follow-up) to the initial sample. The weighted survey response rate is the number of total interviews from all three modes of data collection divided by the sum of the number of interviews and the number of noninterviews (refusals, break-offs, noncontacts, and other noninterviews). Only eligible sample housing units are included in the denominator of this rate. The weighted survey response rate is higher than the survey interview rate because only eligible cases in the final sample, after subsampling, are included in the denominator of the weighted survey response rate.

¹⁰³ U.S. Census Bureau, Report 3, p. v.

Table 8.

American Community Survey Budget Requests and Appropriations: Fiscal Year 2001 Through Fiscal Year 2008

(In millions of dollars)

Fiscal year	Requested	Appropriated	Difference
2001 ¹	25.0	22.0	-3.0
2002 ¹	27.0	27.0	0.0
2003	123.9	57.1	-66.8
2004	64.8	64.8	0.0
2005	165.6	146.0	-19.6
2006	169.4	167.8	-1.6
2007	179.8	176.4	-3.4
2008	187.2	187.2	0.0

¹ Amounts for fiscal years 2001 and 2002 are for the continuous measurement program, which included the American Community Survey.

Source: Office of Management and Budget, "Budget of the United States Government, FY 2001-2011," accessed on September 24, 2013, at <www.govinfo.gov/app/collection/budget>; Office of Management and Budget, "Statistical Programs of the United States Government, FY 2005-2010," accessed on September 24, 2013, at <https://obamawhitehouse.archives.gov/omb/regulatory_affairs/reports_previous_yrs/>; "Making Further Continuing Appropriations for the Fiscal Year 2003, and For Other Purposes," Conference Report to Accompany H.J. Res. 2, H. Rep. 108-10, 108th Cong., 1st Sess., February 12, 2003, pp. 688-689; House Committee on Appropriations, report to accompany H.R. 2799 (Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Bill, Fiscal Year 2004), H. Rep. 108-221, 108th Cong., 1st Sess., July 21, 2003, p. 77; and "Making Appropriations for Agriculture, Rural Development, Food and Drug Administration, and Related Agencies for the Fiscal Year Ending September 30, 2004, and For Other Purposes," Conference Report to Accompany H.R. 2673, H. Rep. 108-401, 108th Cong., 1st Sess., Nov. 25, pp. 65-66.

sample.¹⁰⁴ Any drop in cooperation by mail and telephone has a critical impact on the reliability of the estimates. The major impact is a loss in the total number of interviews conducted which means each interview has to be weighted higher.¹⁰⁵ As shown in Table 2, even after mail and telephone attempts, 44.3 percent of the voluntary cases remained nonrespondents, compared to 31.6 percent under mandatory methods. Thus, an additional 12.7 percent of personal visit cases carried higher sampling weights in the voluntary survey.¹⁰⁶

The study estimated that if the Census Bureau implemented a voluntary ACS, it would need to increase the initial sample size from 3 million to 3.7 million in order to maintain the same level of reliability as the mandatory design. Furthermore, the workload for telephone follow-up would increase by over 40 percent and the workload for personal visit follow-up would increase by over 60 percent. Thus, the study concluded that conducting a voluntary ACS would require at least an additional \$59.2 million per year.¹⁰⁷

¹⁰⁴ Ibid. To maintain an acceptable level of reliability, 70 percent of the initial sample of 3 million must be interviewed to produce reliable estimates.

¹⁰⁵ Because of the two-phase design of the ACS, only a subsample of nonrespondents (after mail and telephone attempts) are eligible for a personal visit follow-up. In the 2003 ACS Voluntary Test, a greater number of cases remained after mail and telephone interview attempts, so a larger proportion of cases were subsampled and, thus, carried larger sampling weights. Thus, the reliability of ACS estimates would suffer if the survey were conducted using voluntary methods without an increase in the sample size. Ibid., pp. 12-13.

¹⁰⁶ Ibid., pp. 9-10.

¹⁰⁷ Ibid., p. 17. Also, refer to Jennifer D. Williams, Congressional Research Service, "The American Community Survey: Development, Implementation, and Issues for Congress," June 17, 2013.

Appropriations for the ACS

The Census Bureau had planned to implement the ACS in fiscal year 2003. Full implementation would expand the sample to 3 million and include every county and municipio in the United States and Puerto Rico. However, budget restrictions and Congress' request that the Census Bureau study the impact of making the survey voluntary, pushed full implementation to January 2005 for housing units and January 2006 for group quarters.

Fiscal Year 2001-2002. In fiscal years 2001 and 2002, the president's budget request for the CM program, which included the ACS, was approximately \$25 million. The budget requests noted that "The CM program will make the Census Bureau the premier source for current population and housing data needed for both near and long-term economic development."¹⁰⁸ Funding during these years somewhat mirrored the budget requests, signifying congressional approval for the program (Table 8).

Fiscal Years 2003-2004. The February 2003 conference report accompanying the House appropriations

¹⁰⁸ The Continuous Measurement program also included the Small Area Income and Poverty Estimates program. Office of Management and Budget (OMB), Budget of the United States Government, FY 2001, "Analytical Perspectives," p. 206, accessed on September 24, 2013, at <www.whitehouse.gov/omb/budget/analytical-perspectives/>, and OMB, Budget of the United States Government, FY 2002, "Analytical Perspectives," p. 208, accessed on September 24, 2013, at <www.gpo.gov/fdsys/browse/collectiontab.action>. In preparation for full implementation of the ACS, the Census Bureau placed the American Community Survey Office under the direction of the associate director for the Decennial Census in 2003. U.S. Census Bureau, *Design and Methodology: American Community Survey, ACS-DM1*, April 2009, p. 2-4.

bill noted that although the administration had requested funding of \$123.9 million for the ACS, the House recommended \$57.1 million plus an additional \$1 million to test the response rates of both a mandatory and a voluntary ACS.^{109, 110}

In May 2003, the House Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census held a hearing on the ACS. In his opening remarks, subcommittee chairman Representative Adam H. Putnam noted several obstacles to Congress making a decision on fully funding the ACS. Putnam stated that the Census Bureau needed to “demonstrate to both the authorizers and appropriators that fully funding the ACS will eliminate duplicative survey[s] at the Census Bureau” and, thus, save taxpayers money.¹¹¹ Citing privacy concerns, Putnam added that the Census Bureau “should seriously explore new and innovative ways to solicit voluntary cooperation from the residents of the Nation.”¹¹² Putnam also voiced concern that declining response rates to surveys in general could have implications for future costs of the ACS. Census Bureau Director Louis Kincannon assured the congressman that the Census Bureau expected to keep costs under control “and to use every device and every technique at our hands to try to keep that response rate up.”¹¹³

The administration’s budget request for FY 2004 included \$64.8 million for the ACS, an increase of \$7.7 million over the FY 2003 appropriation (though just over \$59 million less than the FY 2003 request). That amount would permit the full implementation of the ACS to occur in the fourth quarter of FY 2004.¹¹⁴ In

¹⁰⁹ “Making Further Continuing Appropriations for the Fiscal Year 2003, and For Other Purposes,” Conference Report to Accompany H.J. Res. 2, H. Rep. 108-10, 108th Cong., 1st Sess., February 12, 2003, pp. 688-689. Refer to the section on the 2003 ACS Voluntary Test.

¹¹⁰ Panel on Research on Future Census Methods, Committee on National Statistics, Planning the 2010 Census, second interim report, The National Academies Press, Washington, DC, 2003, p. 80.

¹¹¹ “The American Community Survey: The Challenges of Eliminating the Long Form From the 2010 Census,” hearing before the House Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census of the Comm. on Government Reform, 108th Cong., 1st Sess., February 12, 2003, serial no. 108-97, May 13, 2003, p. 2 (statement of Rep. Putnam).

¹¹² The American Community Survey: The Challenges of Eliminating the Long Form From the 2010 Census, p. 2 (statement of Rep. Putnam).

¹¹³ The American Community Survey: The Challenges of Eliminating the Long Form From the 2010 Census, p. 27 (statement of Charles Louis Kincannon). Kincannon also discussed the \$123.9 million budget request for the ACS when Putnam asked him how much the ACS would cost every year until 2010. *Ibid.*, p. 30.

¹¹⁴ Carol M. Van Horn, assistant director for the American Community Survey and decennial census, to Lawrence S. McGinn, chief, American Community Survey Office, re: “Survey and Operational Design for Taking the American Community Survey (ACS) to Full Implementation,” ACS Decision Memorandum No. 03-04, October 22, 2003.

October 2003, the House Appropriations Committee voiced its support for the ACS, stating it supported “the Administration’s efforts to collect long-form data on an on-going basis rather than waiting for once-a-decade decennial long form data.”¹¹⁵ Thus, the committee recommended that Congress approve the requested amount of \$64.8 million. The Consolidated Appropriations Act of 2004, signed into law on January 23, 2004, authorized \$64.8 million for the ACS for FY 2004.¹¹⁶

FY 2005. The Administration’s budget request for FY 2005, submitted in early 2004, included \$165.6 million for full implementation of the ACS.¹¹⁷ Overall, the Bush Administration requested a budget increase of nearly \$220 million over FY 2004 for the Census Bureau.¹¹⁸ However, in March 2004 members of the Senate Appropriations Committee questioned the need for increased funding so far in advance of the census. For example, Senator Ernest F. Hollings questioned “ramping up [spending] 7 to 6 years ahead of time for the 2010 Census” at a time when the Commerce Department suggested cutting \$67 million from a federal program that supported businesses creating manufacturing jobs.¹¹⁹ Other senators asked why the Commerce Department was cutting funding for programs to monitor and study climate change.

¹¹⁵ U.S. House of Representatives, Committee on Appropriations, report to accompany H.R. 2799 (Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Bill, Fiscal Year 2004), H. Rep. 108-221, 108th Cong., 1st Sess., July 21, 2003, p. 77.

¹¹⁶ House Comm. on Appropriations, report to accompany H.R. 2799, p. 77; Consolidated Appropriations Act of 2004, Pub. L. No. 108-199, January 23, 2004. Overall, however, the Census Bureau’s total FY 2004 appropriation was \$53.2 million below the President’s request. Office of Management and Budget, Statistical Programs of the United States Government, FY 2005, p. 8, accessed on September 24, 2013, at <www.whitehouse.gov/omb/regulatory_affairs/reports_previous_yrs>.

¹¹⁷ Office of Management and Budget, Statistical Programs of the United States Government, FY 2005, p. 12, accessed on September 24, 2013, at <<https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/05statprog.pdf>> and Office of Management and Budget, Analytical Perspectives, Budget of the United States Government, Fiscal Year 2005, p. 45, accessed on September 24, 2013, at <www.govinfo.gov/content/pkg/BUDGET-2005-PER/pdf/BUDGET-2005-PER.pdf>.

¹¹⁸ Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations for Fiscal Year 2005, hearing before the Senate Subcommittee of the Committee on Appropriations, March 2, 2004, p. 6 (prepared statement of Secretary Donald L. Evans).

¹¹⁹ Senate Appropriations Hearing, March 2, 2004, p. 26 (statement of Sen. Hollings). Hollings did not ask a direct question concerning the cut of \$67 million from the Manufacturing Extension Partnership. However, when previously asked about the budget cuts for the program, Evans stated that “this was one of those tough choices” that had to be made in light of reduced appropriations in FY 2004. Senate appropriations hearing, March 2, 2004, p. 21 (statement of Donald L. Evans).

In questions for the Department submitted subsequent to the hearing, Appropriations Subcommittee Chair Senator Judd A. Gregg asked for an explanation of the “extraordinary” increase in the Department’s budget request for the Census Bureau.¹²⁰ In his written response, Secretary Evans stated that the funding increase would enable the Census Bureau to implement the ACS in every county in the United States and Puerto Rico, including expanding the sample to 250,000 addresses per month. The additional funds would also pay for MAF/TIGER enhancements, and the 2005 Census Test, among other planning, testing, and development activities for the 2010 Census.¹²¹

Later that year, the National Research Council panel designated to review the early planning process for the 2010 Census stated that it “encourage[d] full congressional funding of the ACS and are heartened that the funds for launch of the full-scale ACS in late fiscal 2004 have been approved.”¹²² The panel continued,

“It is essential, however, that Congress recognize that funding of the ACS is a long-term commitment. The benefits of the ACS will be jeopardized if the survey program is faced with oscillating budget commitments. Cuts in funding (and with them reductions in sample size) will impair the overall quality of the survey, with the most pronounced impact on the ability to produce estimates for small geographic areas and population groups.”¹²³

In the July 2004 House report accompanying the FY 2005 appropriations bill, the Committee on Appropriations again voiced its support of an ongoing ACS to replace decennial long-form data. However, the committee did not recommend funding the full budget request for the ACS, “due to the belief that this function may be postponed for an additional year without increasing the risk to the

overall planning process.”¹²⁴ Thus, the Consolidated Appropriations Act of 2005 authorized the House-recommended amount of \$146 million for the ACS, nearly \$20 million less than requested.¹²⁵

Full Implementation of the ACS

Despite budget limitations, the Census Bureau fully implemented the ACS in 2005. With this, the ACS expanded from the 1,240 counties in the C2SS and ACS test sites to all 3,141 counties in the United States, all 78 municipios in Puerto Rico, and the District of Columbia. In addition, the annual ACS sample increased from 800,000 to 3 million addresses.¹²⁶ Table 9 depicts the impact on workloads as the ACS transitioned from its demonstration phase (between 2000 and 2004) and full implementation.

LANGUAGE RESEARCH AND THE SPANISH LANGUAGE QUESTIONNAIRE

In 2002–2003, ACS staff conducted research on the quality of data from households with limited English proficiency, including assessments to learn how Spanish speakers interpreted survey questions and whether they understood the questions and key terms as intended. Furthermore, the Census Bureau conducted focus groups to examine methods used by interviewers to conduct interviews with persons of limited English proficiency, and to determine if there were inconsistencies in the ways field interviewers handled such interviews.¹²⁷ This research was part of a larger effort throughout the Census Bureau to develop a plan for language assistance to ensure high quality data from non-English-speaking households.¹²⁸

¹²⁴ U.S. House of Representatives, Committee on Appropriations, report to accompany H.R. 4754 (Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Bill, Fiscal Year 2005), H. Rep. 108-576, 108th Cong., 2nd Sess., July 1, 2004, p. 68.

¹²⁵ Consolidated Appropriations Act of 2005, Pub. L. No. 108-447, December 8, 2004.

¹²⁶ U.S. Census Bureau, *Design and Methodology: American Community Survey, ACS-DMI*, April 2009, p. 2-4.

¹²⁷ Pamela McGovern, Deborah Griffin, and Larry McGinn, “Language Action Plan for the American Community Survey,” presentation to the Decennial Census Advisory Committee, May 8–9, 2003, pp. 2–3.

¹²⁸ The plan consisted of four interrelated components: (1) translation guidelines, (2) pretesting standards, (3) qualitative and quantitative research, and (4) sociolinguistic research on language use. Lorena Carrasco, “The American Community Survey (ACS) en Español: Using Cognitive Interviews to Test the Functional Equivalence of Questionnaire Translations,” 2003, accessed at <www.census.gov/content/dam/Census/library/working-papers/2003/adrm/ssm2003-17.pdf>.

¹²⁰ Senate appropriations hearing, March 2, 2004, p. 33 (questions submitted by Sen. Gregg).

¹²¹ Senate appropriations hearing, March 2, 2004, pp. 33–34 (written response of Donald L. Evans).

¹²² Panel on Research on Future Census Methods, Committee on National Statistics, *Reengineering the 2010 Census: Risks and Challenges*, The National Academies Press, Washington, DC, 2004, p. 125.

¹²³ Panel on Research on Future Census Methods, *Reengineering the 2010 Census*, p. 127.

Table 9.

Comparison of American Community Survey Demonstration Phase and Full Implementation

Comparison category	Demonstration phase (2000 to 2004)	Full implementation (beginning in 2005)
Areas covered ^{1, 2}	1,240	3,219
Sample size (number of addresses)	800,000	3,000,000
Surveys mailed out monthly	67,000	250,000
Monthly telephone nonresponse follow-up calls	25,000	85,000
Monthly nonresponse follow-up personal visits (number of addresses)	40,000	11,000
Field representatives	1,200	3,500

¹ The demonstration phase included the 1,240 counties in the Census 2000 Supplementary Survey and American Community Survey test sites; full implementation included all 3,141 counties in the states (including the District of Columbia) and all 78 municipios in Puerto Rico.

² In the demonstration phase, the number of counties increased from 1,239 to 1,240 with the creation of the City and County of Broomfield, CO, in 2001 from Adams, Boulder, Jefferson, and Weld Counties. City and County of Broomfield, "Constitutional Amendment," accessed at <www.broomfield.org/index.aspx?NID=1635>.

Source: U.S. Census Bureau, *Design and Methodology: American Community Survey*, ACS-DM1, April 2009, p. 2-4.

According to data from the Census 2000 Supplementary Survey (C2SS), an estimated 3.8 million households were "linguistically isolated" (no household member aged 14 or over reported speaking English "very well"). Of these households, 2.3 (60 percent) spoke Spanish only.¹²⁹ A review of the distribution of responses across the three modes of data collection in the C2SS further revealed that linguistically isolated Spanish-speaking households had the lowest percentage of households response by mail (26.3 percent, compared to 62.7 percent of English-speaking households) and the highest percentage of interviews interviewed by CAPI (62.8 percent for linguistically isolated Spanish-speaking households and 28.7 percent for English-speaking households).¹³⁰

Quantitative Quality Assessments

To assess the quality of data from households with limited English proficiency, researchers compared item nonresponse for households that speak English only, households that speak a language other than English (but have someone over the age of 14 who

is proficient in English), and linguistically isolated households.¹³¹

Using combined data from both the C2SS and the 2001 Supplementary Survey (O1SS), researchers calculated two allocation rates: one across all housing items and one across all population items. The results showed that after combining all interview modes, allocation rates for linguistically isolated households were only slightly higher than the overall allocation rates for households speaking English only. Although the mail allocation rates for Spanish-speaking households were significantly higher than households speaking English only, Spanish-speaking households interviewed by CAPI had significantly lower allocation rates than English-only households. In fact, some items have more complete data from CATI and CAPI than from mailed-back forms. The researchers concluded that they needed to conduct additional research in order to identify other dimensions that might have an impact on data quality, such

¹²⁹ Pamela McGovern and Deborah Griffin, "Quality Assessment of Data Collected From Non-English Speaking Households in the American Community Survey," presentation to the Census Advisory Committee on the African American Population, the American Indian and Alaska Native Populations, the Asian Population, the Hispanic Population, and the Native Hawaiian and Other Pacific Islander Populations, May 5-7, 2003, pp. 4-5.

¹³⁰ McGovern and Griffin, "Quality Assessment of Data Collected From Non-English Speaking Households in the American Community Survey," pp. 3-5.

¹³¹ Item nonresponse is one measure of data quality. It occurs when a respondent fails to provide complete and usable information for required questions, such as when a person accidentally overlooks a question, refuses to answer it, or provides an invalid answer. Item nonresponse can be measured using item allocation rates, which quantify how frequently allocation was the source of data in the production of a specific tabulation. The Census Bureau handles missing or inconsistent data with imputation. There are two primary imputation methods: assignment and allocation. Assignment involves looking at other data provided by the respondent or other people in the same household to fill in missing responses. For example, if information on the respondent's sex is missing but the person reported giving birth to children in the past 12 months for a subsequent question, the response of "female" is assigned to the question of the respondent's sex. Allocation involves supplying missing or inconsistent data from households or people in the sample with characteristics similar to the respondent. For example, some questions, such as whether a person has served in the military, are more accurate when provided from another person with similar characteristics. U.S. Census Bureau, *American Community Survey: Design and Methodology*, 2013, p. 133, and McGovern and Griffin, "Quality Assessment of Data Collected From Non-English Speaking Households in the American Community Survey," p. 3.

¹²⁹ Pamela McGovern and Deborah Griffin, "Quality Assessment of Data Collected From Non-English Speaking Households in the American Community Survey," presentation to the Census Advisory Committee on the African American Population, the American Indian and Alaska Native Populations, the Asian Population, the Hispanic Population, and the Native Hawaiian and Other Pacific Islander Populations, May 5-7, 2003, pp. 4-5.

¹³⁰ McGovern and Griffin, "Quality Assessment of Data Collected From Non-English Speaking Households in the American Community Survey," pp. 3-5.

as the extent to which linguistically isolated respondents understand the survey questions and the type of training provided for conducting interviews with non-English-speaking households.¹³²

Subsequent research using the 2003 ACS data analyzed noninterview rates due to language barriers. The data showed that at the national and state levels, language noninterview rates were very low. In other words, language barriers did not lead to incomplete interviews. At the county-level, only 6 of the 1,240 counties in the 2003 ACS had language-related noninterview rates greater than 0.4 percent and only two of those had language noninterview rates above 1.0 percent.¹³³ The researchers concluded that due to the efforts of bilingual staff the ACS is successful in obtaining complete data from respondents, regardless of language spoken.¹³⁴

Qualitative Quality Assessments

The Census Bureau also conducted cognitive testing and focus groups to assess data quality. Using cognitive interviews, researchers tested the functional equivalence of Spanish questionnaire translations. They sought to determine how respondents interpreted Spanish translations of key questions and terms and whether those interpretations were consistent with the English questionnaire. This research identified several linguistic and design issues that the Census Bureau must take into account when

translating questionnaires, such as terms that have no equivalent in another language.¹³⁵

The researcher noted that the Census Bureau does not routinely pretest translated questionnaires because of factors such as financial constraints and lack of qualified bilingual personnel, noting, “Perhaps the greatest challenge to managing bilingual survey instruments is the absence of bilingual survey specialists who can review questionnaire translations from a survey methodology perspective.”¹³⁶ However, she concluded, “Without systematic testing, there is no empirical basis for evaluating the efficacy of a questionnaire translation as a measurement instrument.”¹³⁷ Thus, she recommended that survey specialists routinely test questionnaire translations regardless of the process, techniques, and quality assurance steps that translators may have used to produce the final translated questionnaire.

Ongoing Language-Related Research and Activities

The Census Bureau continues to research the quality of data obtained from non-English speakers. For example, in early 2002, the Census Bureau conducted approximately 20 focus groups with ACS field interviewers to examine the methods they used to conduct interviews with persons of limited English proficiency. In addition, in 2003, the Census Bureau convened a panel of experts from government, academia, and the private sector to address the merits and drawbacks of generally accepted translation methods. The panel recommended routinely pretesting translated instruments. These research efforts led to the development of the Census Bureau’s guidelines for translating data collection instruments and supporting materials.¹³⁸

¹³² McGovern and Griffin, “Quality Assessment of Data Collected From Non-English Speaking Households in the American Community Survey,” pp. 4–6.

¹³³ Danville County, VA, and Jasper County, SC, had noninterview rates of 2.7 and 2.4 percent, respectively. Deborah Griffin and Joan Broadwater, “American Community Survey Noninterview Rates Due to Language Barriers,” presentation at the Meetings of the Census Advisory Committee on the African American Population, the American Indian and Alaska Native Populations, the Asian Population, the Hispanic Population, and the Native Hawaiian and Other Pacific Islander Populations, April 25–27, 2005.

¹³⁴ Griffin and Broadwater, “American Community Survey Noninterview Rates Due to Language Barriers,” p. 2; Pamela D. McGovern, “A Quality Assessment of Data Collected in the American Community Survey (ACS) From Households With Low English Proficiency,” U.S. Census Bureau Survey Methodology Study Series #2004-01; and U.S. Census Bureau, *Design and Methodology: American Community Survey, ACS-DM1*, April 2009, p. 9–3.

¹³⁵ For example, the ACS Spanish language questionnaire uses the term “hijos de crianza” to refer to foster children. However, the word, *crianza*, stems from the verb *criar* meaning “to raise,” so most respondents interpreted the term as any child the respondent is raising. Those who correctly interpreted the term were familiar with the U.S. foster system and used the term “foster” when referring to the program, as in “el niño foster” (“foster child”). The researcher concluded, “The presence of borrowing in this case suggests trying to find a name in Spanish for a U.S. institution such as the foster program might create more methodological harm than remedy.” Carrasco, “The American Community Survey (ACS) en Español,” p. 16.

¹³⁶ Carrasco, “The American Community Survey (ACS) en Español,” pp. 1, 19.

¹³⁷ Carrasco, “The American Community Survey (ACS) en Español,” p. 19.

¹³⁸ Pamela McGovern, Deborah Griffin, and Larry McGinn, “Language Action Plan for the American Community Survey,” presentation to the Decennial Census Advisory Committee, May 8–9, 2003, pp. 3–4, and U.S. Census Bureau, Census Bureau Guideline: Language Translation of Data Collection Instruments and Supporting Materials, April 5, 2004. The guideline pertains to all Census Bureau surveys, including the American Community Survey.

American Community Survey staff continue to monitor nonresponse due to language barriers. Evaluations have shown that the ACS continues to have low levels of noninterviews caused by the interviewer's inability to speak the respondent's language. This is due to the special efforts interviewers use to identify and hire interpreters and other means to conduct interviews. The Census Bureau has plans for future research to develop and test additional language assistance materials for the mail mode.¹³⁹

OUTREACH, PROMOTION, AND UNDERSTANDING ACS DATA

In a hearing on the American Community Survey in July 2000, Census Bureau Director Ken Prewitt noted the importance of outreach for the ACS program:

"The Census Bureau will need to establish strong, ongoing relationships with a large number of key stakeholders. . . . We will want to maintain the community partnership program, which has proven to be very effective in the early ACS test sites—as it has been for Census 2000. More specifically, there can be no successful ACS unless local and regional governments are on board. We are confident that they will be. And we will want a working relationship with the private sector so that any number of reciprocal benefits can be realized, especially with the survey and data dissemination industries. Finally, the Census Bureau will design its advisory committee structure that has served it so well in Census 2000 in order to draw upon wide-ranging expertise in the conduct of the ACS."¹⁴⁰

¹³⁹ U.S. Census Bureau, *Design and Methodology: American Community Survey*, ACS-DM1, April 2009, p. 9-3. For example, in a continued effort to ensure high-quality data from the increasingly multilingual and multiethnic universe of respondents, the ACS language team to the initiative to develop translations of ACS supporting documents into multiple languages including Spanish, Chinese, Korean, Russian, Vietnamese, Arabic, French, Polish, Portuguese, and Haitian-Creole. In addition, contractors assisted the Census Bureau in conducting cognitive testing of the translated materials beginning in 2008. RTI International, Cognitive Testing of ACS CAPI Materials in Multiple Languages, contract no. 50-YABC-2-66053 TO 11, November 26, 2008; RTI International, Cognitive Testing of ACS Supporting Materials in Multiple Languages, contract no. YA132309CG0014, July 28, 2010; and RTI International, Translation Review and Cognitive Testing of ACS Language Assistance Guides in Multiple Languages, final report, March 2012.

¹⁴⁰ The Census Bureau's Proposed American Community Survey (ACS), hearing before the Subcommittee on the Census of the House Committee on Government Reform, 107th Cong., 1st Sess., June 13, 2001, serial no. 107-9, pp. 50 (statement of Linda Gage, State of California), 65 (prepared statement of Donald J. Hernandez, Population Association of America).

In a subsequent hearing in June 2001, data users provided feedback on various aspects of the ACS. In addition to concerns about sample size and data precision, data users expressed hope that the ACS would provide data that was more current than decennial census long-form data. Several speakers urged the Census Bureau to continue to seek input from outside experts.¹⁴¹

The Census Bureau's early outreach activities for the ACS included data workshops, town hall meetings, media contacts, meetings of local and national organizations, and congressional briefings. In addition, Census Bureau leaders discussed the importance of the ACS at numerous meetings.¹⁴² For example:

- In December 2001, the Census Bureau's Congressional Affairs Office partnered with the House Subcommittee on the Census to sponsor an informational fair about the ACS. The event was attended by more than 60 Congressional staff members and four members of Congress. The fair featured demonstrations of how the data are being used and how Congressional staff could access ACS data on the Internet.¹⁴³
- In the spring of 2003, the Census Bureau held the first meeting of the ACS Federal Agency Information Program. The purpose of this and subsequent meetings was to provide federal agencies with a customized approach to getting help with the transition from long-form data to the ACS.¹⁴⁴

¹⁴¹ "The American Community Survey—A Replacement for the Census Long Form?" Hearing before the Subcommittee on the Census of the House Committee on Government Reform, 106th Cong., 2nd Sess., July 20, 2000, serial no. 106-246, p. 35 (prepared statement of Kenneth Prewitt).

¹⁴² Robert P. Parker, chief statistician, GAO, to Dave Weldon, M.D., chairman, and Dan Miller, vice-chairman, House Subcommittee on Civil Service, Census, and Agency Organization, Committee on Government Reform, re: "The American Community Survey: Accuracy and Timeliness Issues," GAO-02-956R, September 30, 2002, p. 5; William G. Barron, Jr., U.S. Census Bureau, Talking Points for ACS Outreach Meeting at the Department of Commerce, December 17, 2001.

¹⁴³ American Community Survey Office, Minutes of the CMO Staff Meeting, December 6, 2001; Timothy C. Jones, "The ACS Capital Hill Fair," DSD Newsletter, U.S. Census Bureau, Winter 2001-2002, p. 8.

¹⁴⁴ The Census Bureau created a team in response to GAO's recommendation that the Census Bureau needed to be more effective in conducting outreach to federal agencies concerning the ACS. American Community Survey Office, Minutes of the CMO Staff Meeting, April 3, 2003; National Association of State Workforce Agencies, "ACS Formally Launched Federal Agency Information Program," July 30, 2003.

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- In mid-2004, the Census Bureau held three regional outreach meetings (in Dallas, Texas; Grand Rapids, Michigan; and Seattle, Washington) that were attended by more than 200 individuals representing data users, academicians, the media, and local governments.¹⁴⁵

Outreach efforts resulted in public endorsements from more than 40 public and private organizations, including the U.S. Conference of Mayors, the Rural Policy Research Institute, the National Council of Black Mayors, and the National Congress of American Indians.¹⁴⁶ Several organizations passed resolutions, wrote letters, or pledged support for the ACS in other ways. For example, in 2001, a group of organizations prepared a joint letter to Rep. Frank Wolf, chairman of the House Subcommittee on Commerce, Justice, and State, the Judiciary and Related Agencies, urging Congress to fund the ACS to provide sufficient funding for the survey. Organizations that signed the letter included: the American-Arab Anti-Discrimination Committee, American Sociological Association, American Statistical Association, Association of Public Data Users, Target Corporation, Housing Assistance Council, and National Association of Latino Elected & Appointed Officials Educational Fund.¹⁴⁷

Another important component of the Census Bureau's outreach efforts was the solicitation of input from data users and external analyses of the ACS data. In 2004, the Census Bureau released datasets containing data from the 1999–2001 ACS test sites

¹⁴⁵ U.S. Census Bureau, *Design and Methodology: American Community Survey, ACS-DM1*, April 2009, p. 2-6.

¹⁴⁶ Robert R. Weathers II, Cornell University, "A Guide to Disability Statistics From the American Community Survey," May 2005, p. 15; U.S. Census Bureau, "Notes From the American Community Survey – August 2002," Directions Magazine, August 10, 2002, accessed on September 24, 2013, at <www.directionsmag.com/features/notes-from-the-american-community-survey-august-2002/129715>; The National Congress of American Indians, Resolution #FTL-04-417, "Support for the American Community Survey," October 2004; and The United States Conference of Mayors, resolution no. 56, "Support the American Community Survey," June 2002, accessed on September 24, 2013, at <www.usmayors.org/the-conference/resolutions/?category=c1507&meeting=70th%20Annual%20Meeting>.

¹⁴⁷ American Statistical Association et al., to Hon. Frank Wolf, chairman, Subcommittee on Commerce, Justice, and State, the Judiciary, and Related Agencies, re: Sign-on Letter on the American Community Survey, November 20, 2001, accessed on September 24, 2013, at <www.amstat.org/asa/files/pdfs/POL-Sign-onLetter.pdf>.

and the 2000 Census long form. The datasets compared estimates of demographic, social, economic, and housing characteristics from the two samples.¹⁴⁸ Prior to releasing the data, the Census Bureau contracted with local experts to conduct analyses with the data to assess the ability of the ACS to serve as a reasonable replacement for census long form data. These researchers also provided feedback on various aspects of the survey and stressed the importance of collaboration with and training for data users as well as publicity for the survey (Table 10).¹⁴⁹ Similarly, the National Academy of Sciences' Panel on Research on Future Census Methods noted the need for the Census Bureau to inform data users and stakeholders about the unique features of the ACS, such as how to understand and work with moving average-based estimates.¹⁵⁰

Further, data users have participated in the design of ACS data products. For example, in May 2004, the Census Bureau solicited input from the public concerning the design of future ACS data products. Users provided a variety of comments, prompting the Census Bureau's redesign of its proposed set of products. With ongoing public feedback, the Census Bureau planned to continue to make improvements to its data products as more estimates were available.¹⁵¹

¹⁴⁸ The Census Bureau conducted research comparing these data down to the tract level and examining various indicators of nonsampling error at the tract level. U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey: Report 7, Comparing Quality Measures: The American Community Survey's Three-Year Averages and Census 2000's Long Form Sample Estimates," June 2004, and U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey: Report 8, Comparison of the American Community Survey Three-Year Averages and the Census Sample for a Sample of Counties and Tracts," June 2004.

¹⁴⁹ Deborah H. Griffin and Preston Jay Waite, "American Community Survey Overview and the Role of External Evaluations," *Population Research & Policy Review*, vol. 25, 2006, p. 221, and Robert Scardamalia, "The American Community Survey: General Commentary on the Findings From External Evaluations," *Population Research & Policy Review*, vol. 25, 2006, p. 293.

¹⁵⁰ Daniel L. Cork, Michael L. Cohen, and Benjamin F. King, eds., "Planning the 2010 Census: Second Interim Report," Washington, DC, National Academies Press, 2003, pp. 99–100, and GAO, "American Community Survey: Key Unresolved Issues," GAO-05-82, October 2004, pp. 21–22.

¹⁵¹ U.S. Census Bureau, "American Community Survey Data Products," notice and request for comments, Federal Register, vol. 69, no. 94, May 14, 2004, p. 26806; Griffin and Waite, p. 220.

Table 10.

Data User Recommendations: 2004

Author(s)	Location for Which Data Analyzed	Selected Findings/Recommendations
Gage	San Francisco and Tulare Counties, CA	<ul style="list-style-type: none"> In many cases where statistical tests identified significant differences between the ACS and census data, the ACS data generally appeared useful and usable. Data users should learn to use and provide the standard errors supplied with the ACS data and check quality measures. Compare ACS and census data to administrative records that you may have available.
Hough and Swanson	Multnomah County, OR	<ul style="list-style-type: none"> The quality of the ACS data are as good as, or better than, data from the decennial census, with the exception of self-response. However, ACS data collection procedures combined with a more permanent, better-trained field staff eventually produce samples with less nonresponse than the decennial census. Knowledge of the local area provides insight into significant statistical differences between the ACS and census samples. Additional resources will need to be devoted to develop training materials that provide guidance to data users.
Salvo, Lobo, and Calabrese	Bronx, NY	<ul style="list-style-type: none"> For most data items, the ACS is a suitable replacement for the census long-form sample. For four data items with meaningful differences between ACS and census estimates, researchers used administrative data to determine that the ACS was closer to the administrative data. Concluded that users of local area data must work with the Census Bureau to determine how best to use ACS data.
Van Auken, Hammer, Voss, and Veroff	Vilas and Oneida Counties, WI; and Flathead and Lake Counties, MT	<ul style="list-style-type: none"> The ACS has the potential to not only be an adequate replacement for the long form, but an improvement. With the appropriate levels of funding and publicity, the ACS will match or exceed the performance of the long form with regard to data quality.

Sources: Linda Gage, California Department of Finance, Demographic Research Unit, "Comparison of Census 2000 and American Community Survey 1999-2001 Estimates: San Francisco and Tulare Counties, California;" George C. Hough, Jr., Portland State University, and David A. Swanson, University of Mississippi, "The 1999-2001 American Community Survey and the 2000 Census Data Quality and Data Comparisons: Multnomah County, Oregon," March 9, 2004; Joseph Salvo, Peter Lobo, and Timothy Calabrese, New York City Department of City Planning, Population Division, "Small Area Data Quality: A Comparison of Estimates, 2000 Census and the 1999-2001 ACS, Bronx, New York Test Site," March 5, 2004; and Paul M. Van Auken, Roger B. Hammer, Paul R. Voss, and Daniel L. Veroff, University of Wisconsin-Madison, "American Community Survey and Census Comparison Final Analytical Report: Vilas and Oneida Counties, Wisconsin; Flathead and Lake Counties, Montana," March 5, 2004. All papers are available at <www.census.gov/programs-surveys/acs/library.html>, accessed September 24, 2013.

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Chapter 5. Nationwide Implementation: 2005–2010

INTRODUCTION

After more than a decade of imagining, planning, testing, and evaluating, the Census Bureau mailed the first set of American Community Survey (ACS) questionnaires during the week of January 10, 2005, to the 250,000 addresses selected for the sample.¹ Originally planned for full national implementation in fiscal year (FY) 2003, the lack of Congressional funding forced the Census Bureau to delay 2 additional years.

For several years, ACS planners had stressed that the sooner Congress fully funded the ACS, the sooner data users would gain annual access to long-form type data for cities and towns with populations of 65,000 or more. Census Bureau officials also emphasized that it would be necessary to launch the survey in FY 2005 to be able to produce tract-level data in time for those data to be released in the same time frame as the release of 2010 short-form census data.² Finally, Congress approved sufficient funding for the ACS FY 2005 budget. At this time, the House Appropriations Committee declared that it “strongly support[ed] the Administration’s efforts to collect long-form data on an ongoing basis rather than waiting for once-a-decade decennial long-form data.”³

Despite this sign of support, the committee refused to fund data collection from group quarters (GQs) since “this function may be postponed for an additional year without increasing the risk to the overall

planning process.”⁴ The decision created a challenge for ACS statisticians, who had to figure out how to compensate for the lack of a year’s worth of data on GQs.⁵

Funding for the ACS the first decade was uneven. It rose slowly in the early years, doubling between 2002 and 2004, increased dramatically in 2005, saw a significant increase in 2006, then grew slowly again for the remainder of the decade. The first funding jump in 2003 is misleading, as funding simply transitioned from the 2000 Census to the ACS program, while the significant increase in FY 2005 corresponded with nationwide implementation. The increase of FY 2006 stemmed from the addition of GQs and, to a lesser extent, the 2006 ACS Content Test.

It is important to remember that the ACS was not an isolated survey but an integral component of the design for the 2010 Census. Preparation for the 2010 Census was predicated on a tightly integrated program with the fully implemented ACS, which eliminated the need for a long-form questionnaire in the 2010 Census and allowed census planners and enumerators to focus on short-form data collection and ensure a complete and accurate count. Thus, the plan for the 2010 Census envisioned that the ACS would be fully funded and implemented in time to coordinate the release of population counts from the census with the detailed social, economic, and demographic data from the ACS. Without the ACS, the Census Bureau would have to reconceptualize the entire 2010 Census.

¹ U.S. Census Bureau, “America’s Changing, and So Is the Census: National Mailing of New American Community Survey Marks Historic Shift for Census Bureau,” January 10, 2005.

² Department of Commerce, U.S. Census Bureau, “Budget Estimates, Fiscal Year 2004 Congressional Submission,” pp. 156–157, and Department of Commerce, U.S. Census Bureau, “Budget Estimates, Fiscal Year 2005 Congressional Submission,” p. 192.

³ U.S. House of Representatives, Committee on Appropriations, “Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Bill, Fiscal Year 2005,” Report 108-576, 108th Congress, 2d Session, p. 68.

⁴ U.S. House of Representatives, Committee on Appropriations, “Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Bill, Fiscal Year 2005,” Report 108-576, 108th Congress, 2d Session, p. 68.

⁵ The solution the statisticians proposed turned out not to be very complicated after all. They assigned weights to the GQ population in a way that allowed 4 years of actual data to represent 5 years of data.

Table 1.

Congressionally Authorized Obligations for the American Community (ACS) Survey by Year

(In millions of current dollars¹)

ACS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Obligation ...	23.6	29.0	56.8	64.1	144.1	167.8	176.4	187.2	197.0	200.5

¹ Current dollars is a term describing income in the year in which a person, household, or family receives it. For example, the income someone received in 1989 unadjusted for inflation is in current dollars. More information is available at <www.census.gov/topics/income-poverty/income/guidance/current-vs-constant-dollars.html>.

Source: U.S. Census Bureau.

In addition to the difficulties over funding, some members of Congress expressed concern about the intrusiveness of some of the questions on the ACS questionnaire. As early as 1996, one congressman told his constituents they did not have to cooperate with the ACS test then taking place and looked into the possibility of making response to the ACS voluntary.⁶ A congressional inquiry into the advisability of making response to the ACS voluntary arose in 2002. In March of that year, the House of Representatives subcommittee that oversaw the activities of the Census Bureau asked about the cost implications of changing the ACS from a mandatory to a voluntary survey. Six months later, the General Accounting Office (GAO) reported that a voluntary survey would probably cost between \$20 and \$35 million more per year than the mandatory version due to lower mail response rates and higher telephone and personal visit follow-up costs.⁷

Separately from the GAO, and in response to a request from the same House oversight subcommittee, the Census Bureau tested the effects of a voluntary ACS on mail response rates and associated follow-up costs between March and June of 2003. In this test, the mail response rate in the voluntary survey declined by over 20 percentage points in comparison to mail response in the same months of the 2002 ACS test in which response was mandatory. To achieve the same level of data reliability as the mandatory survey would require increasing the sample size of the voluntary ACS by about 700,000 addresses annually at an estimated cost of \$59.2 million.⁸

In addition, with the voluntary survey, a larger proportion of the responses would come from face-to-face interviews conducted by nonresponse follow-up interviewers. The report concluded that, “the nonrespondents after mail and telephone attempts are subsampled for personal visit follow-up.

⁶ Refer to Chapter 3, the section dealing with the transfer of the ACS test site from Broward County, Florida, to Brevard County, Florida. The congressman was David Weldon (R-FL).

⁷ The GAO's report relied on Census Bureau estimates of the additional costs involved in shifting from a mandatory to a voluntary survey. Robert Parker to Representatives Dave Weldon (R-FL) and Dan Miller (R-FL), “The American Community Survey: Accuracy and Timeliness Issues,” September 30, 2002, pp. 19–20. Parker was the GAO's chief statistician. The Census Bureau's estimate of the additional cost of conducting the ACS as a voluntary survey appeared on page 3 of “Comments on the General Accounting Office Draft Report,” attached to Parker's letter report to Weldon and Miller as page 33.

⁸ U.S. Census Bureau, “Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 3: Testing the Use of Voluntary Methods,” December 2003, pp. 5–9, 16–17.

It is for these very reasons that a large drop in the portion of the sample that is interviewed by mail or telephone follow-up results in a concurrent drop in reliability and an increase in costs.” Therefore, the sample would have to greatly increase, at a large cost, to maintain the quality of the data.⁹

Following the GAO and Census Bureau reports on the increased cost and reduced reliability that would result from making response to the ACS voluntary, the impetus behind this effort died down. A GAO report from 2004 on “Key Unresolved Issues” in the ACS did not single out the voluntary versus mandatory nature of the survey as one of those key issues.¹⁰

PREPARATIONS

Outreach to Data User Communities

In order to support federal agencies, which extensively used decennial products, and had special requirements for some data, the Census Bureau instituted the Federal Agency Information Program (FAIP) in the spring of 2003, with the first meeting taking place on June 26, 2003. The FAIP sought to identify long-form-to-ACS transition issues, provide assistance and resources, and find new ways for government agencies and all stakeholders to benefit from ACS data.¹¹ The Census Bureau worked with the Department of Housing and Urban Development prior to the FAIP in 2003, while the Department of Transportation, the U.S. Postal Service, the Equal Employment Opportunity Commission, the Department of Veteran Affairs, the Department of Education, and the Department of Labor participated in FAIP in 2004. The Department of the Interior,

⁹ U.S. Census Bureau, “Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey, Report 3: Testing the Use of Voluntary Methods,” December 2003, pp. 11–13, 16–17.

¹⁰ U.S. Government Accountability Office, “American Community Survey: Key Unresolved Issues,” GAO-05-82, October 2004. However, congressional concern about the alleged intrusiveness of the questions on the ACS and the mandatory nature of the survey did not disappear completely. Five years later, a bill making response to the ACS voluntary was introduced in the House of Representatives. The bill garnered 35 cosponsors but died in committee. Similar bills were introduced in the House of Representatives in 2011 (H.R. 931) and 2013 (H.R. 1078) and in the Senate in 2012 (S. 3079) and 2013 (S. 530). The 2011 and 2012 bills died in committee, but the identically worded H.R. 1078 and S. 530 remained active in committee at the time of this writing (May 2013). A much more sweeping bill, the “Census Reform Act of 2013” (H.R. 1638), would eliminate the ACS altogether, plus all other Census Bureau surveys, the economic census, and the Census of Governments. U.S. Congress, House, “To Make Participation in the American Community Survey Voluntary,” HR 3131, 111th Cong., 1st sess., July 8, 2009.

¹¹ U.S. Census Bureau, *Design and Methodology: American Community Survey*, May 2006, p. 14–19 to 14–20.

the Department of Homeland Security and an inter-agency group measuring English proficiency joined the program in 2005.

In addition to the American Community Survey Office (ACSO), several other areas within the Census Bureau also focused on outreach to data users.¹² The staff of the assistant director for the Customer Liaison and Marketing Services Office (CLMSO)¹³ offered standard and specialized training for the wide variety of audiences, including workshops, brochures and flyers, electronic communications, exhibit booths, and query responses. It also helped coordinate with State Data Centers, Census Information Centers, and the Federal-State Cooperative Program for Population Estimates as key communicators to support the ACS. The Public Information Office (PIO) coordinated media outreach activities, organized and conducted news conferences and special appearances, and developed targeted material, like drop-in articles, for the news media.¹⁴ PIO also developed webinars to train journalists on how to access and use ACS data. The Field Division's Partnership and Data Services staff and Information Services staff conducted workshops, attended meetings, and developed and distributed ACS support materials¹⁵ such as the 2005 guidebook *Using Data From the 2005 American Community Survey*, the online "Guide to the ACS Data Products," and the ACS Data User Training guide presentations.

In addition to training and conferences, the Census Bureau developed several tools to reach data users.¹⁶ The ACS Alert, a periodic newsletter disseminated through email to some 5,000 stakeholders, provided updated information on ACS products, research, and activities. In 2008, a Census Bureau study found that

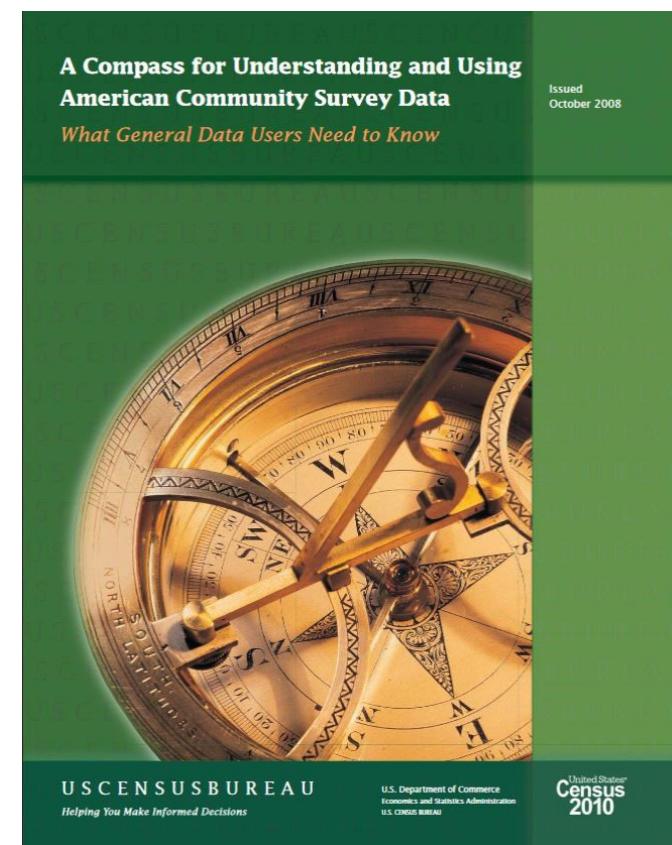
¹² U.S. Census Bureau, *American Community Survey Communications Plan*, February 2005.

¹³ At this time the office was known as the Marketing, Services and Customer Liaison Offices.

¹⁴ The Census Advisory Committee of Professional Associations and the American Marketing Association helped develop a media outreach plan specifically for the ACS, and the changing nature of media markets with increased reliance on the internet, in 2006. Kenneth C. Meyer, "Outreach to Reporters and Journalists: What Do They Need?" October 27, 2006.

¹⁵ *Design and Methodology*, 2006, pp. 14–18.

¹⁶ A typical example of the type of workshop and training conducted by the Census Bureau is the Population Association of America's April 2009 training session, which included presentations on ACS fundamentals, dealing with low reliability estimates, choosing which multiyear estimates to use, comparisons in MYEs, introduction to ACS PUMS files, and demographic research using ACS data. Another typical example of outreach involved publishing within the journals of organizations like the PAA, and The Population Reference Bureau (2005, vol 60., no. 3) reviewed by personnel in the ACSO (Cindy Taeuber, Terri Ann Lowenthal, Ken Bryson, David Swanson).



51.5 percent of email addresses were undeliverable, pointing to the need for continuous maintenance, and the ACS Alert was eventually discontinued.¹⁷ ACS program communications staff also created Congressional Tool Kits in 2004 in conjunction with the Congressional Affairs Office, and distributed them to every member of Congress. The toolkits contained binders with ACS data specific to each member's district or state, a description of ACS operations, justification for each question, and other pertinent information. Another product, the ACS Handbook series, started in 2004 with an issue targeted towards state and local policymakers, while later issues addressed specific data user groups, such as lawmakers, businesses, the media, and specific populations such as American Indians and Alaska Natives, with how ACS data could be used by them specifically. These handbooks evolved into the ACS Compass Series brand in 2008.¹⁸ In subsequent years, products have been updated to reflect changing needs, updated tables, and multiyear estimates.

¹⁷ Lynn Weidmann and Kathleen T. Ashenfelter, Project Report: "Investigation of User Preferences for Measures of Sampling Error to be Displayed on American Community Survey Data Products and Modification of Definitions of these Measures," U.S. Census Bureau, Statistics Research Division, September 3, 2009.

¹⁸ Available at <www.census.gov/programs-surveys/acs/guidance/handbooks.html>.

Data User Input

In 2007, the Committee on National Statistics (CNSTAT) issued a report, “Using the American Community Survey: Benefits and Challenges” based on several conferences and discussions held since 2005. Statisticians, academics, and local planners compiled the final report, which reflected the impact of the ACS on a wide variety of stakeholders and data users. Some of the benefits identified in the report included timeliness of data, frequency of updating, improved data quality, and continued consistency with the long form for most items. The panel also made several recommendations for improvements, including refining sampling, collection, currency and accuracy, updating the Master Address File (MAF), and securing funding.¹⁹

In late 2008 and early 2009, ACS program and CLSMO, in conjunction with regional offices and the State Data Center Network, conducted seven outreach sessions with data users across the country at the behest of Census Bureau Director Steven Murdock. Sessions uncovered data users’ unfamiliarity with ACS data products and their unpreparedness to transition from long-form data. Attendees

¹⁹ Recommendations for improving sampling and data collection included an accurate and updated MAF, increasing the sample size and improving accuracy in small areas, researching and refining data collection methods (CATI, CAPI, mail), researching and refining the residency rule compared to the decennial census, increased attention to group quarters collection, concerns over the importance of data versus confidentiality protections, changing cell-collapsing rules for tables, the effects of inflation adjustment on multiyear estimates (MYEs), and increasing timeliness and quality of data product reviews. Recommendations for improving MYE weighting included researching ways to deliver higher quality 1-year estimates, comparing post-census housing unit estimates with the MAF and improving both, improving population controls, and finding a better way to discern change between overlapping 3- and 5-year estimates. Other recommendations included more consistent ACS-specific funding, better outreach and a dedicated data user support staff, increasing understanding of quality measures, better explanation of sampling error, creating a comprehensive quality profile, more experimental methods panel testing, and more overall experimental improvement and testing. Constance F. Citro and Graham Kalton, eds, *Using the American Community Survey: Benefits and Challenges*, The National Academies Press, 2007.

overwhelmingly approved of the timeliness of ACS data, but needed education in understanding how ACS data interacted with other census data products and residency rules. Data users expressed concerns with sample size and increased error, as well as places with fluctuating seasonal or incident-related populations.

SAMPLING FRAME AND SAMPLE SELECTION

Master Address File (MAF) and the Community Address Update Survey (CAUS)

The 2005 ACS sampling frame was comprised of extracts from the Census Bureau’s MAF, which contained both housing units and group quarters.²⁰ In addition to the ACS, the Census Bureau uses the MAF for several surveys, including the decennial census and continuously updates it through processes such as the Delivery Sequence File (DSF) collaboration with the U.S. Postal Service, regional MAFGOR (Master Address File Geocoding Office Resolution) clerical work, and Demographic Area Address Listing (DAAL) operations. Field representatives also update the MAF during nonresponse follow-up operations for the ACS.

However, of the approximately 8.2 million blocks nationwide, there were more than 750,000 blocks where DSF updates were not able to provide adequate coverage, particularly in predominantly rural areas with nonconventional addresses such as Alaska and rural Maine. In order to address this shortfall, the Census Bureau designed the CAUS specifically for the ACS. Implemented in September 2003, CAUS was an automated field data collection operation that provided a rural counterpart to the update of city-style addresses received from the DSF. It focused on census blocks with high concentrations of non-city-style

²⁰ For more on the formation and updating of the MAF, refer to Chapter 4 of this study, or Chapter 8 of the 2010 History.

Table 2.

Sample Frame and Actual Interviews for the American Community Survey by Year

Year	Housing units		Group quarters	
	Initial addresses selected	Final interviews	Initial sample selected	Final actual interviews
2010	2,899,676	1,917,799	197,045	144,948
2009	2,897,256	1,917,748	198,808	146,716
2008	2,894,711	1,931,955	186,862	145,974
2007	2,886,453	1,937,659	187,012	142,468
2006	2,885,384	1,968,362	189,641	145,311
2005	2,922,656	1,924,527	X	X

X Not applicable.

Source: U.S. Census Bureau.

addresses and suspected growth and used a model-based method to glean information from previous field data collection efforts and administrative records. The model indicated where CAUS work was needed and selected blocks for additional listing operations. Out of the 8.2 million blocks nationwide, 750,000 were identified for CAUS, and traveled by field representatives based on the model rank and whether it was operationally and financially feasible.²¹

CAUS improved coverage of the ACS in several ways. It added addresses that existed, but did not appear, in the DSF and non-city-style addresses in the DSF that did not appear on the MAF. Additionally, CAUS added addresses in the DSF that also appeared in the MAF but were erroneously excluded from the ACS frame as well as deleted addresses that appeared in the MAF but were erroneously included in the ACS frame. The Census Bureau suspended the CAUS program from October 2007 to March 2010 for the 2010 Census Address Canvassing and field follow-up activities, which would have essentially required the same work to be completed twice.²² The ACS program, which transferred labor from CAUS to the 2010 MAF update, then received addresses from the updated 2010 MAF for the May 2010 ACS sampling frames.²³

Housing Units

The 2005 sample consisted of two parts, referred to as the main and supplemental samples. In August and September 2004, the ACS program extracted the main sample from the MAF. The sample of approximately 3 million housing units selected during main phase sampling comprised the majority of the total ACS sample, and the number of addresses selected were evenly allocated to each of the 12 monthly panels for the sample year. At the same time, the ACS program selected a sample of approximately 36,000 housing units for the Puerto Rico Community Survey (PRCS), the name used for the ACS in Puerto Rico. Then in January and February 2005, a further sample of new addresses, proportional to the desired sampling rate, that had been added to the MAF since the September sample was selected for the supplemental

²¹ Results from a 2005 study indicated this method was more effective than a random sampling, and that subsequent DAAL work was conducted based on budget and operational considerations. *Design and Methodology*, May 2006, p. 3-5.

²² U.S. Census Bureau, *Design and Methodology: American Community Survey*, April 2009, p. 3-4, and June 2013, p. 3-4.

²³ Griffin, Deborah, "Comparing 2010 American Community Survey 1-Year Estimates of Occupancy Status, Vacancy Status, and Household Size With the 2010 Census - Preliminary Results," December 20, 2011, p. 8.

phase.²⁴ The addresses from the supplemental phase were allocated to the last nine monthly panels of the year (April through December). Each sample was further divided into five sampling rate categories to ensure diverse populations and geographies received equally reliable estimates. This meant smaller populations received higher sampling rates than larger populations.²⁵

The sample selections for both the main and supplemental samples each had two stages. The first divided the entire MAF into five equal parts, with each part assigned to a year, so that no household would receive the ACS more than once every 5 years. The second stage calculated the sample sizes needed to provide equal reliability of final data for all population sizes. The initial sample for both main and supplemental samples was then created by pulling the required ratio of sample size for each population size from the 20 percent of the total MAF assigned to that year.²⁶ This phase also created a subsample for geographic areas that had traditionally lower response rates. The subsample underwent the final interview and steps in nonresponse follow-up, known as the computer-assisted personal interview (CAPI), and an increased subsample was generated.²⁷

²⁴ To account for completeness, filtering rules are applied and occasionally altered, such as including units under construction, and units that are not geocoded. U.S. Census Bureau, *Design and Methodology: American Community Survey*, April 2009, p 3-7.

²⁵ *Design and Methodology*, May 2006, p. 4-2.

²⁶ The first phase consisted of splitting the entire main or supplemental frame into five subframes, each one including approximately 20 percent of the addresses from the frame. Addresses in the five sampling rate categories were distributed evenly in these subsamples, which ensured individual estimate variances did not differ too much year to year. One of these 20 percent samples was selected for 2005, and the others were assigned to the years 2006-2009, with the 2005 subsample being assigned for resurveying in 2010. This means each address was only eligible to be selected in sample for the ACS once every 5 years, minimizing respondent burden. In 2006, only the addresses new to the MAF since the previous years' supplemental sample are used in the first phase for the main sample, while the supplemental sample was replaced with the additions to the MAF since the new main sample had been divided. Establishing the sampling rate categories for the second phase of sample selection involved calculating the potential samples needed to provide equal reliability for all sizes of population, and then refining those initial overall sample rates. Final overall sampling rates further refined the initial overall sample rates by predicted response rate prior to CAPI. If the tract had not previously been counted in previous ACS tests, ACS staff created projections based on information from the 2000 Census. These projections showed the response rate required for equal reliability for different population sizes for both 60 percent and 75 percent response rates. The second phase of sample selection finished when the first phase 20 percent subphase sample assigned to 2005 was mined using the required sampling rates. *Design and Methodology: American Community Survey*, 2006, pp. 4-1 to 4-7.

²⁷ CAPI is discussed in greater detail in the Modifications section of this chapter.

Group Quarters

In 2005, the ACS program selected the first full-scale sample of GQ facilities and people independently within each state, as well as the District of Columbia and Puerto Rico, for use in 2006. Approximately 2.5 percent of the expected number of residents in GQ facilities were included in both the ACS and the Puerto Rico Community Survey (PRCS).²⁸ Unlike the housing units (HUs), there was only a main sample and no supplemental sample, as any new group homes would not appear in the MAF updates. Due to safety concerns and operational feasibility, certain GQs included in the 2000 Census were not used in ACS operations. These included domestic violence shelters, soup kitchens, mobile food vans, targeted nonshelter outdoor locations, commercial maritime vessel crews, natural disaster shelters, and makeshift encampments.

Small GQs (under 15 people), and those closed on Census Day (e.g., seasonal shelters) made up one sampling strata, while large GQs (over 15 people) comprised the other. The small GQ sample followed a similar stage structure as the HU sample, and was divided into five frames of 20 percent each, with each frame assigned to a year from 2006 to 2010. The second stage reduced the 20 percent GQ samples further to a 1 in 8 sample in order to achieve the target sampling rate of 2.5 percent. Wherever GQs were found in this strata with populations that exceeded 15 people, that location was further subsampled to a count of 10 people in order to create manageable workloads for field representatives (FR). FRs obtained information from the administrative contact for the GQs, and used that information to select the final sample of persons at the facility. The FRs collected individual's information using paper questionnaires, in addition to a card booklet comprising of six cards with the GQ questions and frequently asked questions and other important facts.²⁹

Large GQ samples were similarly divided into two phases and focused on groups of 10 people within each larger facility, however they could also be enumerated year after year, as they were not assigned to

²⁸ The full GQ population is approximately 8 million, with 25 percent in college level student housing, 23 percent in nursing facilities, and 19 percent in correctional facilities. Paul R. Voss, *Panel on Statistical Methods for Measuring the Group Quarters Population in the ACS*, APDU 2010 Annual Conference, September 21, 2010.

²⁹ *Design and Methodology*, 2006, p. C-33.

20 percent groups.³⁰ In the first phase, the samples were sorted by GQ type and geographical order and a systematical sample of 1 in 40 groups was selected.³¹ A field representative then visited the GQ, often after preliminary collaboration with those running or supervising the facility, and used an automated listing instrument to select the 10 people, or more depending on the size of the facility, to be interviewed. In facilities where field representatives interviewed multiple groups, the groups received assignments to different sample months whenever possible. One exception was federal correctional facilities, which were all assigned to September.³²

One initial issue with the GQ sampling frame, as well as the weighting design, was that it was formatted for state-level statistics, while GQ data also needed to work with substate estimates for the total population. This resulted in an increased variance for substate estimates, particularly at the 1-year estimates level. The fact that GQs often concentrated people with similar demographic qualities (e.g., college campuses) skewed these substate estimates. Additionally, the ACS GQ sampling frame only received occasional updates due to the fact that it was created from the 2000 Census Special Place/GQ files, which was then merged with the MAF, as opposed to MAF update operations which focused on updating HUs.³³

Data Collection and Processing

The basic data collection methodology remained a three-stage process, as had been envisioned since the early days of continuous measurement. For mailable cases, stage one consisted of a series of mail contacts with each housing unit in the sample. Included in the

³⁰ A GQ with 350 people would have 35 groups. Based on the first phase of large GQ measurement, this means that with a 1 in 40 sample rate, this large facility may not be represented at all, whereas facilities with between 400 and 800 people (40 to 80 groups) will have at least one group selected. *Design and Methodology*, 2006, p. 4-10.

³¹ In 2008 the GQ sampling stratum increased to more than 1 in 40 for some states.

³² *Design and Methodology*, 2006, p. 4-10.

³³ Beaghen, Michael and Sharon Stern, *Usability of the ACS Estimates of the Group Quarters Population for Substate Geographies*, Section on Survey Research Methods—JSM 2009, 2009. Lessons learned during the first years of GQ testing included how to overcome gatekeepers and setbacks, to use agreements tailored to different facility types, and that outreach materials increased respondent's understanding of ACS needs and requirements. Another major investment that paid off was the automated resident improvement instrument. Susan Schechter, "Overview of the American Community Survey and the Group Quarters Operation," presentation, March 29, 2010. With the 2010 Census, the GQ address list was once again completely updated due to decennial operations. 2012 ACS Research and Evaluation Report Memorandum Series #ACS12-RER-17, "ACS/Census Group Quarters Match," March 28, 2012.

series were a notification letter, the ACS questionnaire, a reminder card, and a second questionnaire, as needed. For cases of nonresponse, the household received a phone call from one of the Census Bureau's three call centers, which would then conduct a computer-assisted telephone interview (CATI). A subsample of the remaining nonresponding housing unit addresses were selected for a computer-assisted personal interview (CAPI) from an ACS interviewer. Unavailable addresses were sampled at a rate of 2-in-3 and sent to CAPI along with the remaining nonresponding housing unit addresses.

There was a significant change in the design of the personal visit follow-up stage of the process, which involved a shift from visiting a random subsample of one-third of the nonresponding housing units for all areas to a more complex approach.³⁴ Both ACS statisticians and outside scholars recognized that areas with low mail and telephone response rates would have a larger percentage of cases requiring personal visits, and that this would result in larger variance estimates for these areas. In an attempt to resolve this issue, the ACS staff investigated methods of oversampling low response rate areas to improve the comparability of sample variances across areas.³⁵ The revised design for mailable addresses used sampling rates of 1-in-2, 2-in-5, or 1-in-3 depending on the historical completion rate of interviews at the census-tract level.³⁶

The ACS personnel had also made a number of relatively minor changes to survey data collection and processing operations since the early testing days. But the first major upgrade was the introduction of the Integrated Computer-Assisted Data Entry (iCADE) data capture system in 2007 to replace the original data capture system which was a key-from-paper (KFP) system in which clerks entered

³⁴ Actually two subsamples comprised the early version of this follow-up operation. The first was a two-thirds subsample of addresses that were ineligible for both mailout and CATI, usually because the addresses were incomplete. The other subsample was the roughly one-third of housing units that had failed to respond to either the mailout of the ACS questionnaire or to the attempted CATI interview. Refer to U.S. Census Bureau, "Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey: July 2001; Report 1, Demonstrating Operational Feasibility," p. 22.

³⁵ Refer to, for example, Anthony Tersine and Mark Asiala, "Alternative Oversampling Options for Low Mail Response Areas in the American Community Survey," paper presented at the Joint Statistical Meetings, August 2002, p. 1, and Daniel L. Cork, Michael L. Cohen, and Benjamin F. King (eds.), *Reengineering the 2010 Census: Risks and Challenges*, National Academy of Sciences, Washington, DC, 2004, p. 107.

³⁶ U.S. Census Bureau, "Accuracy of the Data (2006)," 2007, pp. 5-6.

respondent information from paper questionnaires. iCADE was a key-from-image (KFI) system in which clerical staff keyed respondent data from scanned images of the questionnaire. The ACS staff adopted iCADE for two reasons:

- The KFP system was becoming obsolete and could not be fully supported.
- ACS clerical staff found that it could not keep up with the volume of work required by the KFP system, which resulted in significant backlogs in the questionnaire keying process.

In addition to the improvements noted above, iCADE was expected to reduce data capture expenses through the reduction in tracking, handling, and keying respondent questionnaires on a daily basis.³⁷

Unfortunately, after the Census 2000 Supplementary Survey (C2SS)³⁸ was well underway, ACS researchers became aware of "an issue of considerable concern about the ACS estimates" that would take some time to resolve.³⁹ These ACS research staff members were referring to the disturbing fact that "some significant data inconsistencies" characterized ACS data prior to 2006.⁴⁰ The most significant inconsistency was the difference between the estimated number of households and the estimated number of householders for the same geographic areas. Researchers expected to find a one-to-one relationship, with each household having one householder (also known as Person 1, that is the first respondent on the ACS questionnaire).

In 2005 the ACS estimate for the number of householders in the United States was 114.8 million, but the

³⁷ Stephanie Baumgardner, "An Evaluation of the Transition to the iCADE Data Capture System—Overview Report," 2012 American Community Survey Research and Evaluation Report Memorandum Series ACS12-RER-25, July 31, 2012, available at <www.census.gov/content/dam/Census/library/working-papers/2012/acs/2012_Baumgardner_01.pdf>, accessed on January 22, 2013, and Stephanie Studds, "iCADE, the Data Capture System of the U.S. Census Bureau," in Proceedings of Statistics Canada Symposium 2008: Data Collection: Challenges, Achievements and New Directions, 2009, available at <www.statcan.gc.ca/pub/11-522-x/2008000/article/10969-eng.pdf>, accessed on January 22, 2013.

³⁸ Refer to "Chapter 4, Research, Evaluation, and Outreach (2001-2006)," for a description of the Census 2000 Supplementary Survey and its pivotal role in persuading skeptics of the feasibility of replacing the census long form with the ACS as a source for accurate, reliable data on the characteristics of the U.S. population.

³⁹ Keith A. Albright, Alfredo Navarro, and Mark Asiala, "An Alternative to the Principal Person Method for Weighting in the American Community Survey," paper presented at the 2004 annual meeting of the American Statistical Association, in Toronto, Canada, p. 3241. Accessed at <www.asasrms.org/Proceedings/y2004/files/Jsm2004-000411.pdf> on January 22, 2013.

⁴⁰ Mark E. Asiala, "Weighting and Estimation Research Methodology and Results From the American Community Survey Family Equalization Project," in Proceedings of the 2007 Federal Committee on Statistical Methodology Research Conference, p. 1, accessed at <https://nces.ed.gov/fcsm/pdf/2007fcsm_Asiala-IV-C.pdf> on January 22, 2013.

estimated number of households in the United States was only 111 million. A similar one-to-one relationship should have existed between the number of spouses in households and the number of married-couple households. However, the 2005 ACS estimated that there were 57.1 million spouses and 55.2 million married-couple households. These variations did not appear in the unweighted data, leading ACS researchers to conclude that their weighting methodology must have been responsible for the observed differences in the estimates.⁴¹

The ACS staff tried several approaches to remedy this situation. The ACS used two weights to estimate the characteristics of housing units and their occupants. The housing-unit weight was used for estimating housing, household, and family characteristics, while the person weight was used for estimating person characteristics including householder characteristics. Prior to 2006, while the calculation of the housing unit weights made use of the person weights, there was little effort made to ensure consistency between them. This led to the inconsistencies noted above. In 2002, a working group created to resolve this issue recommended using the person weight of the householder to tabulate estimates for households instead of using the housing-unit weight. This modification produced consistency between estimates of householders and households but in the process, introduced new problems by creating an inequality between the estimated number of households and occupied housing units. By definition, the number of households and the number of occupied housing units should have been the same, but this was not the case. After further consideration, the ACS temporarily abandoned attempts to resolve the inconsistencies in the estimates and returned to using the housing-unit weight to estimate the number of households.⁴²

With data inconsistencies remaining, ACS staff made a second attempt to resolve the issue by adapting the weighting methodology employed in the New York City Housing Vacancy Survey. This methodology required the final person weight of the householder and the spouse to equal the housing-unit weight. In the New York City survey, the person post-stratification adjustment to the independent

population controls was defined in such a way that the adjustment factor of the householder and spouse were set to "1." The remaining sample population had to account for all the difference between the precontrolled estimates and the population controls.

This approach resulted in data consistencies at one level but it increased variances in a number of estimates. In some cases, it also produced negative weights that could be handled only by the increased collapsing of post-stratification cells, which, in turn, led to greater bias in the estimates as the controls were applied to broader cells. In the end, ACS staff felt that the New York City Housing Vacancy Survey worked because its primary focus was on housing unit characteristics while the ACS produced estimates pertaining to both housing units and the people living in them. As a result, the methodology that worked in one New York City survey focused on housing units was not appropriate for a national survey dealing with a broader range of data.⁴³

ACS weighting experts tried again later in the decade. They modified their goal from obtaining numerical equality between variables that should have equal values to reducing the extent of the inconsistencies at the weighting-level area, which for the ACS was either a county or a group of counties. In 2007, ACS researchers modified the weighting methodology in another attempt to reduce these differences. They replaced a single-step process which produced person weights in 2005 and earlier data with a multistage, "three-dimensional" process that involved changes to person weighting, housing-unit weighting, and the estimation procedure. The modified process was referred to as "family equalization."⁴⁴

These modifications resulted in dramatic reductions in the difference between the estimated number of spouses and the estimated number of married couple households. The anomalies associated with the earlier weighting methodology notably decreased. These reductions occurred in the single year data for 2006 and 2007, as well as in the 3-year data for 2005–2007. In addition, the decreases were present at all geographic levels, not just at the weighting area (county or groups of counties) level, suggesting that the beneficial effects of the new weighting procedure filtered down to lower levels of geography.

⁴¹ Mark E. Asiala, "Evaluating Use of Family Equalization for American Community Survey Weighting Methodology," 2011 American Community Survey Research and Evaluation Report, ACS11-RER-06, September 11, 2011, available at <www.census.gov/content/dam/Census/library/working-papers/2011/acs/2011_Aisia_01.pdf>, accessed January 24, 2013.

⁴² Asiala, "Weighting and Estimation Research," p. 2.

⁴³ Asiala, "Weighting and Estimation Research," p. 2.

⁴⁴ Asiala, "Weighting and Estimation Research," pp. 3–8, and Asiala, "Evaluating Use of Family Equalization."

Researchers found a similar reduction in the differences between the estimated number of unmarried partners and the estimated number of unmarried partner households.⁴⁵

In 2009, a new research effort began to address data user concern regarding ACS population estimates for subcounty areas. The primary source of this concern was the difference between ACS population estimates and the population estimates from the Population Estimates Program (PEP) for incorporated places and minor civil divisions (MCD). Significant changes to the weighting methodology improved estimates of subcounty areas, starting with ACS data products including the year 2009. The ACS estimates of the total population of incorporated places and MCDs included adjustments so that they were closer to PEP estimates. The new subcounty controls were in addition to the county-level controls of population by demographic group that had always been a part of ACS methodology.

Some consequences of implementing subcounty controls are that the 2009 ACS, 1-year estimates of totals and characteristics of population and housing units for subcounty areas are not directly comparable to estimates from the 2008 ACS or from earlier ACS releases. Similarly, the 2007–2009 ACS, 3-year estimates of totals and characteristics of population and housing units for subcounty areas are not directly comparable to those from either the 2006–2008 ACS or the 2005–2007 ACS. Observed differences between the ACS data products which include the year 2009 and earlier ACS estimates may reflect this change in methodology and may not reflect real changes in the population. In addition to changes seen at the subcounty level, some counties will show modestly different year-to-year distributions of nondemographic characteristics. Further, it must be noted that a small number of incorporated places and MCDs may have large differences in total population between the PEP and ACS despite the subcounty controls.⁴⁶

When the Unexpected Happens—the 2005 Gulf Coast Hurricanes

On August 29, 2005, Hurricane Katrina, carrying winds in excess of 140 miles per hour, smashed

ashore in the New Orleans and Mississippi Gulf Coast areas, causing massive devastation and flooding.⁴⁷ Less than 1 month later, Hurricane Rita made landfall near the Texas-Louisiana border. Although much less destructive than Katrina, Rita also left a trail of wreckage in the Texas/Louisiana border region.⁴⁸

Together, the two storms destroyed thousands of buildings between Mobile, Alabama, and the Texas/Louisiana border and were responsible for large-scale population displacement from the cities and towns along their paths. The fledgling ACS provided the Census Bureau with an opportunity to estimate the effects the hurricanes had on the populations and the housing stock of the affected area. While the ACS was intended as a survey that would produce data on an annual or multiyear basis, one of the early considerations was releasing data on a subannual basis (Chapter 2). The Census Bureau agreed to prepare two subannual Gulf Coast Area Special Products, one covering the first 8 months of 2005 (January through August) and the other comprising the last 4 months of 2005. The geographic area to be included in these reports consisted of Alabama, Louisiana, Mississippi, and Texas.⁴⁹ In the aftermath of the hurricanes, the Federal Emergency Management Agency (FEMA) designated 117 counties in these states as “disaster counties,” which meant that they were eligible to receive federal disaster assistance (i.e., “Individual and Public Assistance” or IPA). In order to differentiate the population of disaster areas from the rest of the state’s population, the Census Bureau subdivided each state into “FEMA-designated IPA counties” and the balance of the state.⁵⁰

Hurricanes Katrina and Rita caused several temporary modifications in the normal ACS data collection procedures. The ACS planning for operation during natural disasters initially required that ACS field representatives “apply their discretion for entering areas where they do not feel safe and to avoid getting in

⁴⁷ National Oceanic and Atmospheric Administration, National Climatic Data Center, “Hurricane Katrina: A Climatological Perspective,” Technical Report 2005-01, pp. 1–3.

⁴⁸ National Oceanic and Atmospheric Administration, National Climatic Data Center, “Hurricane Rita.”

⁴⁹ Kin Koerber, “Migration Patterns and Mover Characteristics From the 2005 ACS Gulf Coast Area Special Products,” unpublished paper presented at the Southern Demographic Association Conference, Durham, NC, November 2–4, 2006, p. 2.

⁵⁰ U.S. Census Bureau, “2005 ACS Special Product for the Gulf Coast Area; Quality Measures,” June 5, 2006, p. 1, accessed at <https://www2.census.gov/acs/2005_Gulf_Coast_Area_Data_Profiles/Quality%20Measure%206-5%2010AM.doc> on November 27, 2012.

the way of relief efforts.”⁵¹ In September 2005, the ACS did not mail replacement questionnaire packages to sample members living in the most heavily impacted areas, and in October, mailing pieces were delayed or not sent at all. The staff resumed the standard mailing procedure in November. In the same vein, ACS staff postponed CATI or did not call at all. Normal CATI operations began in late October. For the most part, ACS managers cancelled the last stage of data collection, CAPI for September. Interviewing resumed in October and November as areas became more accessible.⁵²

Limitations of the Data—2005 Gulf Coast Hurricanes

The uniqueness of the situation led to the implementation of several procedures and produced data comparable to previously released ACS data products. The January–August and September–December period estimates were annualized so they would represent 12-month (i.e., annual) time periods.⁵³

The Census Bureau stressed that these were not official estimates of the population size in a particular geographic area but were estimates of the characteristics of the population and the housing units in which they lived. The Census Bureau stated that under normal circumstances, ACS estimates would be adjusted (“controlled”) to reflect the independent population and housing-unit estimates produced by the Census Bureau’s population estimates program. Population and housing unit estimates were constructed on an annual basis and should not be applied to subannual data.⁵⁴ Splitting the annual sample into two parts (the January–August and September–December periods) reduced each part of the sample size. As a result,

⁵¹ U.S. Census Bureau, “Minutes of the ACSO Staff Meeting,” September 12, 2005, p. 1.

⁵² U.S. Census Bureau, “2005 ACS Special Product for the Gulf Coast Area: Accuracy of the Data,” May 30, 2006, pp. 2–3, accessed at <https://www2.census.gov/acs/2005_Gulf_Coast_Area_Data_Profiles/GulfCoastMethodology.pdf> on November 20, 2012.

⁵³ The January–August period covered two-thirds of the year, while the September–December period covered one-third of the year. Annualizing the data involved multiplying the weights of the period estimates by the reciprocal of the period’s fraction of the year. The January–August period included 8 months or two-thirds of the year, so the weights of the estimates for this period were multiplied by the reciprocal of two-thirds, which was three-halves or 1.5. The September–December period was 4 months or one-third of the year, and the weights of the estimates for this period were multiplied by the reciprocal of one-third, or 3.

⁵⁴ U.S. Census Bureau, “2005 American Community Survey Special Product for the Gulf Coast Area: Questions and Answers,” May 31, 2006, p. 1, accessed at <https://www2.census.gov/acs/2005_Gulf_Coast_Area_Data_Profiles/GulfCoastQandA.pdf> on November 20, 2012. U.S. Census Bureau, “User Notes on Statistical Significance: 2005 ACS Special Product for the Gulf Coast Area,” accessed at <https://www2.census.gov/acs/2005_Gulf_Coast_Area_Data_Profiles/GulfCoastUserNotes.pdf> on November 20, 2012.

the sampling error for estimates calculated for each period was generally larger than the sampling error for corresponding estimates in the full-year 2005 ACS estimates.⁵⁵

In addition to publishing such quality measures as sample size, survey response rates and item allocations rates for both sets of period estimates, the ACS staff developed a new quality measure called the “out-of-scope rate.” Out-of-scope addresses included those in buildings that had been demolished, condemned, or were otherwise unfit for human habitation, nonexistent addresses, commercial addresses, and group quarters. Out-of-scope addresses were deleted from the ACS estimation process.

The ACS analysts expected that the September–December 2005 out-of-scope rates for areas damaged by at least one of the hurricanes would be higher than the January–August 2005 rates. Table 3 shows that this expectation was correct, particularly for Louisiana.⁵⁶

What the Data Revealed—2005 Gulf Coast Hurricanes

While the Census Bureau indicated that agencies should use the ACS mainly for demographic characteristics, its population estimates program produced special estimates of the household population in a number of the areas affected by Hurricanes Katrina and Rita. Table 4 shows that New Orleans lost more than half its population between July 2005 and January 2006. Over the same time period, St. Bernard Parish lost over 90 percent of its population. Another substantial population exodus occurred in the Gulfport-Biloxi-Pascagoula Mississippi area. The area in and around Houston, Texas, which grew by nearly 100,000, appears to have received the largest single influx of refugees. A smaller, but still significant, increase took place in the Baton Rouge, Louisiana, metropolitan area.⁵⁷

Significantly, some of the characteristics of residents who remained in the New Orleans Metropolitan Statistical Area (MSA) differed from those who

⁵⁵ U.S. Census Bureau, “2005 ACS Special Product for the Gulf Coast Area: Accuracy of the Data,” May 30, 2006, p. 3, accessed at <https://www2.census.gov/acs/2005_Gulf_Coast_Area_Data_Profiles/GulfCoastMethodology.pdf> on November 20, 2012.

⁵⁶ U.S. Census Bureau, “2005 ACS Special Product for the Gulf Coast Area: Accuracy of the Data,” May 30, 2006, pp. 1–4, accessed at <https://www2.census.gov/acs/2005_Gulf_Coast_Area_Data_Profiles/GulfCoastMethodology.pdf> on November 20, 2012.

⁵⁷ This description of population changes following the 2005 hurricanes is based on information presented by Koerber, “Migration Patterns and Mover Characteristics,” pp. 1–10 and Table 2.

Table 3.
Out-of-Scope Rates

State	Substate area	January-August 2005 out-of- scope rate (percent)	September-December 2005 out-of- scope rate (percent)
Alabama	State total	7.0	7.6
Alabama	FEMA IPA area	8.0	8.4
Alabama	Balance of state	6.8	7.4
Louisiana	State total	6.0	12.2
Louisiana	FEMA IPA area	5.8	14.0
Louisiana	Balance of state	6.4	7.1
Mississippi	State total	8.9	11.4
Mississippi	FEMA IPA area	9.8	12.9
Mississippi	Balance of state	7.0	8.4
Texas	State total	5.5	6.0
Texas	FEMA IPA area	4.1	5.3
Texas	Balance of state	6.0	6.2

Source: U.S. Census Bureau, "2005 ACS Special Product for the Gulf Coast Area; Quality Measures," June 5, 2006, p. 4.

Table 4.
Estimated Population of Counties/Parishes in Selected Areas Within the FEMA Designated Area

State	County	Household Population Estimate, July 1, 2005	Household Population Estimate, January 1, 2006
Baton Rouge metro area	X	705,897	732,624
Louisiana	Ascension	89,855	94,126
Louisiana	East Baton Rouge	396,735	413,700
Louisiana	East Feliciana	18,237	18,503
Louisiana	Iberville	29,107	29,729
Louisiana	Livingston	108,622	111,863
Louisiana	Pointe Coupee	22,040	22,649
Louisiana	St. Helena	10,187	10,920
Louisiana	West Baton Rouge	21,064	20,836
Louisiana	West Feliciana	10,050	10,296
New Orleans metro area	X	1,292,774	914,745
Louisiana	Jefferson	448,578	411,305
Louisiana	Orleans	437,186	158,353
Louisiana	Plaquemines	28,282	20,164
Louisiana	St. Bernard	64,576	3,361
Louisiana	St. Charles	50,203	52,269
Louisiana	St. John the Baptist	45,950	48,642
Louisiana	St. Tammany	217,999	220,651
Gulfport-Biloxi-Pascagoula metro area	X	367,019	317,257
Mississippi	Hancock	46,240	35,129
Mississippi	Harrison	186,530	155,817
Mississippi	Jackson	134,249	126,311
Houston metro area	X	5,021,470	5,151,290
Texas	Brazoria	267,376	273,012
Texas	Fort Bend	457,225	472,635
Texas	Galveston	273,162	277,885
Texas	Harris	3,647,656	3,740,480
Texas	Montgomery	376,051	387,278

X Not applicable.

Source: U.S. Census Bureau.

moved. The ACS data revealed that those who remained in New Orleans following the hurricanes were older with a median age of 42.2, while the median age for those who moved outside the MSA was 29.5. The data also found that people living in owner-occupied housing units were more likely to remain than renters. Before Katrina, 68.2 percent of the population of New Orleans over the age of 1 year lived in owner-occupied housing units. After the hurricane, that increased to 78.3 percent.

Those who remained in the New Orleans MSA following Katrina were also more likely to be unemployed or not in the labor force than those who moved outside the MSA. Before Katrina, 41.0 percent of the population 16 years of age or older were unemployed or not

in the labor force. Following Katrina, that percentage rose to 47.8.

The racial composition of the New Orleans MSA changed significantly following Hurricane Katrina. Before the hurricane, 54.6 percent of the population consisted of non-Hispanic Whites 1 year of age and older. Six months later, 66.8 percent of the population 1 year of age and older was non-Hispanic White. The number of African Americans 1 year of age and older made up 35.7 percent of the population. After the hurricane, this decreased to 21.5 percent. Of those who left the New Orleans MSA following the hurricane, 32.1 percent were non-Hispanic White and 59.3 percent were African American.

The ACS data, combined with estimated population counts, provided the kind of information neighborhood leaders, county and city managers, and other local officials needed to begin to assess the magnitude of the disaster and to plan the steps that they needed to take to move forward. They needed the estimates of the age and sex distribution of those who remained to plan for schools, roads, senior centers, soup kitchens, and other public services. They also needed the estimates of the number and characteristics of those who remained and who departed to apply for federal and state aid. This proved that the ACS could provide some of the data needed for communities to recover from natural disasters.

DATA USERS AND USES

In addition to the Annual Population Estimates required from the Census Bureau according to Title 13, newly available ACS data became fundamental to the allocations, data needs, and functioning of several federal agencies. Heading into the first 1-year data release in 2005, the Census Bureau focused on outreach to federal data users, both as one of the largest stakeholders and as a source of funding.⁵⁸ The integration of ACS data into 184 federal programs influenced the distribution of 29 percent of all federal assistance, or \$416 billion, by the time of the release of the first multiyear estimates in 2008.⁵⁹

Transportation and housing were two sectors of federal funding that saw early extensive utilization of ACS data. The U.S. Department of Housing and Urban Development first implemented ACS data in 2005,

⁵⁸ ACS Communications Plan, February 2005.

⁵⁹ For FY 2008. Reamer, Andrew D., *Surveying for Dollars: The role of the American Community Survey in the Geographic Distribution of Federal Funds*, Brookings Institute Metropolitan Policy Program, July 2010.

for their estimates of next year's baseline rents, and in 2006 for Community Development Block Grants.⁶⁰ Other agencies heavily reliant on ACS data for creating datasets included the Bureau of Economic Analysis (BEA), and their total and per capita personal income and Regional Price Parities data, and the Bureau of Labor Statistics, and their employment projections and Standard Occupational Classification system.⁶¹

The ability of ACS data to provide annual estimates at state and local levels also appealed to state and local officials. Out of the \$416 billion allocated based on ACS data in 2008, \$360.9 million went to the states, although much of this also passed on to counties and other local areas. The largest portion of this consisted of \$261.1 billion in Medicaid. In order to help states deal with these significant allocations in the face of changing data sources, the Census Bureau hosted a conference focused on those data users in May 2005. The Census Bureau also transitioned to ACS data in the influential Census Transportation Planning Package. In addition, a 2007 report issued by the National Research Council's Transportation Research Board supported Census Bureau guidelines that, starting with the collection of GQ data in 2006, ACS data could be used for areas with populations greater than 65,000, and in 2008, with the release of 3-year data, for areas with populations greater than 20,000.⁶²

In addition to the inherent benefits of Census Bureau data to all levels of government, private users also benefitted from newer and more timely data. The media were prolific and visible users of ACS data, which helped illustrate several economic and

⁶⁰ "Rental Housing: HUD Can Improve Its Process for Estimating Fair Market Rents," GAO-05-342, March 31, 2005, House Report 109-365, 109th U.S. Congress, 2nd Session, January 31, 2006; "Using the ACS," p. 89.

⁶¹ A proposed plan to use ACS data for the 2008 Office of Management and Budget delineation of Core Based Statistical Areas (CBSAs), did not pan out due to the delayed 5-year estimates, however OMB incorporated ACS data in the 2013 delineation, and became another major federal data user. Office of Management and Budget, "Recommendations From the Metropolitan and Micropolitan Statistical Area Standards Review Committee to the Office of Management and Budget Concerning Changes to the 2000 Standards for Defining Metropolitan and Micropolitan Statistical Areas; Notice," Federal Register, vol. 74, no. 28, p. 7174. Reamer, Andrew, "American Community Survey: Uses and Users," The George Washington Institute of Public Policy, December 11, 2012.

⁶² *Using the American Community Survey*, p. 118. The National Cooperative Highway Research Program consisted of several of the top stakeholders in the federal, state, local, and private level, as well as the full support of the Federal Highway Administration and several other federal agencies. *NCHRP Report 588: A Guidebook for Using American Community Survey Data for Transportation Planning, Using the ACS*, Transportation Research Board, 2007.

demographic points. Releases of ACS data also led news cycles when the information illustrated either significant changes in social and economic fields. Retail businesses, like many other users who relied on decennial data, switched to ACS data to help place new stores and determine services. Nonprofit and advocacy groups made the same transition from decennial to ACS data when determining their outreach and fundraising goals.⁶³

MODIFICATIONS

Adding, Modifying, and Deleting Questions

From 2005 to 2010, national implementation and changing data user needs resulted in several modifications in the questionnaire, methodology, and data products. These changes mainly came about for two reasons: survey improvement and governmental need. Examples of survey improvement include changes to the CAPI, modifications to the questionnaire to facilitate data capture, and changes in sample size. Survey improvements also included the 2006 Content Test, which tested modifications to existing questions and potential additions. Governmental need for new or changed content included the needs of Congress, governmental agencies, and the recommendations of the ACS Content Council.

The content for the ACS closely mirrored the 2000 Census long form and remained the same from 2003–2007, with 25 housing and 42 population questions. On implementation in 2006, the GQ questionnaire kept all of the population questions except relationship to head of household, and only asked about food stamp benefits under housing.⁶⁴ In 2006, the Office of Management and Budget, Congress, and the Census Bureau came to an agreement that helped facilitate content determinations in regard to frequency of data collection, level of geography compared to need, and other sources of data. The OMB Interagency Committee, co-chaired by the Census Bureau, obtained input from all federal agencies, and, in 2006, guidelines required requesting agencies to assist in the development and submission of draft questions as well as cover the cost, although different

arrangements on cost sharing developed throughout the next 4 years.⁶⁵

Planning for the 2006 Content Test began in 2004, and aimed to provide results in time to modify the 2008 ACS Questionnaire. There had always been a content test for the decennial census, and one was done before the 2010 Census for their items. The 2006 ACS Content Test filled that role for the ACS. The Interagency Committee solicited advice on format and content requirements from other agencies in order to determine the topics to be tested in the Content Test. Most topics on the test were to test modified wording and format of existing question, but there were several new topics tested. Once the topics were determined, cognitive testing was done to develop the best version of the questions to test. The 2006 ACS Content Test consisted of a “control” treatment and a “test” treatment. For existing topics where we were testing modified wording, the control treatment used the current version and the test treatment used the best version coming out of cognitive testing. For new topics, there were two versions tested, one in each treatment. The test used similar data collection methods as the regular 2006 ACS, however for operational reasons it excluded a toll-free support number and did not undergo the CATI phase. Like other content tests at the Census Bureau, it included a content reinterview, done on the telephone, to measure response variance, gross difference rates, and net difference rates.⁶⁶ The 2006 ACS Content Test also excluded GQs, the Failed Edit Follow-Up, and only tested the continental United States. In order to gauge the impact of the changes, results from the content test were not edited or imputed using the complex ACS weighting procedure. The results of the 2006 Content Test were reflected in the changes made to the survey in 2008, adding three new topics (health insurance, service-connected disability, and marital history) and modifying questions for many others.⁶⁷

In 2007, the Census Bureau conducted the 2007 ACS Grid-Sequential Test in order to gauge the impact of changing from a grid to sequential layout for the basic demographic questions on the

⁶³ For a comprehensive list of examples, refer to Andrew Reamer, “American Community Survey: Uses and Users,” George Washington University Institute of Public Policy, 2012.

⁶⁴ *Design and Methodology: American Community Survey, 2006*, p. 5–3. Despite using the same questionnaire, some people in certain GQs were not asked certain questions, and were considered out of the universe for certain GQ types.

⁶⁵ *Design and Methodology: American Community Survey, 2006*, p. 5–7, and *Design and Methodology: American Community Survey, 2009*, p. 5–5.

⁶⁶ *Design and Methodology: American Community Survey, 2009*, p. 5–5, and U.S. Census Bureau, *New and Modified Content on the 2008 ACS Questionnaire: Results of Testing Prior to Implementation, 2008*.

⁶⁷ Results from the content test are available at <www.census.gov/programs-surveys/acs/methodology/content-test.2007.html>.

Table 5.

2003-2007 ACS Topics Listed by Type of Characteristic and Question Number

Housing	Population
Household size H1 Units in Structure H2 Year Structure Built H3 Year Householder Moved Into Unit H4 Acreage H5 Agricultural Sales H6 Business on Property H7 Rooms H8 Bedrooms H9 Plumbing Facilities H10 Kitchen Facilities H11 Telephone Service Available H12 Vehicles Available H13 House Heating Fuel H14 Cost of Utilities H15 Food Stamp Benefit H16 Condominium Status and Fee H17 Tenure H18 Monthly Rent H19 Value of Property H20 Real Estate Taxes H21 Insurance for Fire, Hazard, and Flood H22 Mortgage Status, Payment, Real Estate Taxes H23 Second or Junior Mortgage Payment or Home Equity Loan H24 Mobile Home Costs H25 Seasonal Residence	Name P1 Sex P2 Age and Date of Birth P3 Relationship to Householder P4 Marital Status P5 Hispanic Origin P6 Race P7 Place of Birth P8 Citizenship P9 Year of Entry P10 Type of School and School Enrollment P11 Educational Attainment P12 Ancestry P13 Language Spoken at Home, Ability to Speak English P14 Residence 1 Year Ago (Migration) P15 Disability: Sensory, Physical P16 Disability: Mental, Self-care P17 Disability: Going out Alone, Ability to Work P18 Fertility P19 Grandparents as Caregivers P20 Veteran Status P21 Period of Military Service P22 Years of Military Service P23 Worked Last Week P24 Place of Work P25 Means of Transportation P26 Private Vehicle Occupancy P27 Time Leaving Home to Go to Work P28 Travel Time to Work P29 Layoff, Temporarily Absent, Informed of Recall or Return Date P30 Looking for Work P31 Available to Work P32 When Last Worked P33 Weeks Worked P34 Usual Hours Worked Per Week P35 Class of Worker P36 Employer P37 Type or Kind of Business P38 Industry P39 Occupation P40 Primary Job Activity P41 Income in the Past 12 Months (by type of income) P42 Total Income

Source: U.S. Census Bureau, *Design and Methodology: American Community Survey*, 2009, p. 5-3.

paper questionnaire in an effort to better align with the 2010 Decennial Census format. The 2007 Grid-Sequential Test was a mailout test only. And like the 2006 Content Test, excluded GQs, the Failed Edit Follow-Up, tested only within the continental United States, and omitted, edited, or imputed data and did not include the complex ACS weighting procedure.⁶⁸

Congressional need played an important role in the formation of questionnaire content, which was reflected in the 2006 Content Test and in subsequent testing and changes to the questionnaire. Congress

recognized that the true usefulness of 2010 multiyear data would come with the release of the 2005-2009 5-year data in 2010, and based most requirements on the future release of 5-year data products.⁶⁹ The Children's Health Insurance Program Reauthorization Act of 2007 required the Secretary of Commerce to

⁶⁸ Congressional need was also influenced by the lack of long-form data to update spending guidelines in 2010. As demonstrated by the Fannie Lou Hamer, Rosa Parks, and Coretta Scott King Voting Rights Act Reauthorization and Amendments Act of 2006, Public Law 109-246 (redistricting). Also, some people within the Census Bureau considered the 2008-2012 MYE as the true replacement for 2010 data, being centered on the census year and released around the same time as long-form data was previously released, however data users quickly showed their preference for 2006-2010 data based on 2010 population controls.

⁶⁹ New and Modified Content on the 2008 ACS Questionnaire: Results of Testing Prior to Implementation, 2008, pp. 2-3.

include health insurance questions for children.⁷⁰ The Broadband Data Improvement Act of 2007 required the ACS questionnaire to ask about computer and internet use.⁷¹

Census Bureau coordination with the OMB to provide data for federal agencies guided several changes or additions to the ACS questionnaire content. In 2003, the Department of Veterans Affairs, OMB, and the Census Bureau worked towards addressing stakeholder concerns, and led to the addition of a service-connected disability question on the 2006 Content Test and the subsequently revised 2008 questionnaire.⁷² Questions regarding marital history and health insurance information requested by the Department of Health and Human Services underwent testing in the 2006 Content Test and saw implementation in 2008.⁷³ Another small change was the removal of the part of the question on food stamps that asked about total value, reducing nonresponse

⁷⁰ Available at <www.congress.gov/bill/110th-congress/house-bill/3963>, and in 2009 <www.congress.gov/bill/111th-congress/house-bill/2>.

⁷¹ Available at <www.congress.gov/bill/110th-congress/senate-bill/1492>.

⁷² Veterans Affairs required a measurement of six levels of service-related disability based on the percentage of disability as assigned by the department. In order to address these needs, and those of other data-users, OMB convened the ACS Subcommittee on Disability Measurement in 2003, and asked the National Center for Health Statistics (NCHS) to take the lead in assessing the adequacy of the census disability questions. The results of the NCHS's ACS Disability Working Group informed the questions regarding the topic on the 2006 Content Test, and led to the addition of a two-parted question, question 27 a/b, on the 2008 Questionnaire, with results found capable of producing useful results. Kristen Miller and Theresa J. DeMaio, National Center for Health Statistics, Study Series; Survey Methodology #2006-6, "Report of Cognitive Research on Proposed American Community Survey Disability Questions," August 28, 2006; Matthew Brault, Sharon Stern, and David Raglin, U.S. Census Bureau, "Evaluation Report Covering Disability," 2006 ACS Content Test Report P.4, January 3, 2007; Sarah Luckett Clark and David A Raglin, U.S. Census Bureau, "Evaluation Report Covering Service-Connected Disability," 2006 ACS Content Test Report P.5.c, January 5, 2007; Kelly Ann Holder, "Evaluation of New Content on the 2008 American Community Survey: Service-Connected Disability Status and Ratings: August 2009," and Matthew W. Brault, U.S. Census Bureau, "Review of Changes to the Measurement of Disability in the 2008 American Community Survey," September 22, 2009.

⁷³ Marital history was required by the discontinuation of the DHHS's own marriage and divorce survey, and the desire to use the ACS as the new source of primary data. The 2006 Content Test showed several problems with the question, however responses were still adequate for use by the DHHS. Martin O'Connell, Gretchen Gooding, and Leah Ericson, U.S. Census Bureau, "Evaluation Report Covering Marital History," 2006 ACS Content Test Report, P. 9, January 3, 2007, pp. iii, 21-22; Joanne Pascale, "American Community Survey Cognitive Testing of Health Insurance Questions," March 25, 2005; Chuck Nelson and Leah Ericson, U.S. Census Bureau, "Evaluation Report Covering Health Insurance," 2006 ACS Content Test Report, P. 8, January 3, 2007; Joanna Turner, Michel Boudreaux and Victoria Lynch, "A Preliminary Evaluation of Health Insurance Coverage in the 2008 American Community Survey," September 22, 2009.

and response discrepancies.⁷⁴ The National Science Foundation, in order to support the National Survey of College Graduates, requested that the Interagency Council research adding a question for field of degree for college graduates, which underwent testing in 2007, and implementation in January 2009.⁷⁵

CHANGING PROCEDURES

iCADE

In 2007, the ACS transitioned from a key-from-paper (KFP) data input method to a key-from-image (KFI) method, utilizing the Census Bureau's iCADE hardware and software. A live test, conducted in January 2007, double-keyed a small sample of stateside English ACS forms using both KFP and KFI. For all programs that moved from KFP to iCADE in 2008, the Census Bureau experienced budgetary savings of 60 percent, with error rates of less than 1 percent, marking a successful transition.⁷⁶

As part of the transition to iCADE, the questionnaire also underwent significant revisions. In 2005, tests on the effects of a KFI questionnaire, designed primarily by the iCADE team who focused on machine readability over respondent effect, showed that several areas, mainly Hispanic origin, marital status, sex, and race saw a significant increase in nonresponse with the new form. The new KFI design decreased the ease of navigation for respondents, and census officials decided to delay the full scale implementation of iCADE for the ACS. The changes applied from this testing led to the redesigned form used for full implementation in 2007, and helped address the increase in nonresponse rates for all problem areas except sex.⁷⁷ Further testing and research helped modify the questionnaire from a grid/matrix design to a sequential design in 2008, which helped further reduce both unit and item nonresponse rates.⁷⁸

⁷⁴ John J. Hisnanick, Tracy Loveless, and John Chestnut, 2006 ACS Content Test Report H.6, "Evaluation Report Covering Receipt of Food Stamps," 2006 ACS Content Test Report H.6, January 3, 2007.

⁷⁵ David Raglin, Mary Frances Zelenak, Mary C. Davis, and Jennifer Tancreto, U.S. Census Bureau, "Testing a New Field of Degree Question for the American Community Survey," 2007 ACS Content Test Report, May 2008.

⁷⁶ ACS KFI Requirements Processing Team Meeting Notes, December 11, 2006, and January 7, 2008, and Stephanie Studds, "iCADE The Data Capture System of the U.S. Census Bureau," 2009.

⁷⁷ Deborah H. Griffin and Sandra L. Clark, *Respondent Effects Associated With Questionnaires Designed to Accommodate Survey Processing*, American Community Survey Research and Evaluation Program, September 15, 2009.

⁷⁸ John Chestnut, "Effects of Using a Grid Versus a Sequential Form on the ACS Basic Demographic Data," 2008 American Community Survey Grid-Sequential Test, March 6, 2008.

Modifying CAPI

One issue identified by concerned Census Bureau officials revolved around the low response rate during the last phase of data collection: CAPI. Starting in 2005, the Census Bureau instituted a modified CAPI process designed to increase responses among traditionally hard-to-reach populations, including Hispanics and racial minorities. In order to get more data for hard-to-reach populations to improve their estimates, census tracts with low cooperation rates were sampled for CAPI at higher rates, while maintaining cost neutrality. In sampling strata defined by large tracts and whose cooperation rate was equal to or greater than 60 percent, the sampling rate was multiplied by 0.92 (reduced by 8 percent). This reduction in sample for these strata provided the cost savings necessary to offset the increases in cost for the CAPI operation where the CAPI sampling rates were increased.⁷⁹

Other changes, enacted in 2008, also focused on updating the CAPI process. One change focused on reducing resources spent on vacant structures through better training of FRs. Another change assigned the status of head of household to the first named person over 15 if one was not already identified. This latter change helped identify same-sex couples that had otherwise not been counted as such.⁸⁰

CRITICS AND RESPONSES

In addition to friction over funding and continued worry over response rates and effects of the ACS on reducing costs for 2010, Congress provided input on the continuation and inclusion of several categories. Some Congressional efforts, like the Census Oversight Efficiency and Management Reform Act of 2010, foreshadowed changes the Census Bureau would later make, like increased opportunities for online response. The perceived intrusive nature of the ACS also led to some high profile attacks by individual legislators. A bill introduced in July 2009 aimed to make the majority of the ACS voluntary on the grounds that the ACS asked overly intrusive questions, some of which could be construed as offensive, and that despite the beneficial intentions of the ACS to provide data, it also constituted an overreach by the government beyond the decennial mandate of the Constitution. The bill did not proceed after being

referred to the Subcommittee on Information Policy, Census, and National Archives.⁸¹ Another bill introduced in April 2010 that would also make the majority of the ACS voluntary, however, it also did not proceed out of the subcommittee.⁸²

Several private individuals, organizations and internet communities agreed that the ACS went too far. Privacy advocates, like the Electronic Privacy Information Center and the American Civil Liberties Union voiced concerns about the privacy of citizens and the potential for data abuse. Fringe websites across the political spectrum decried the perceived invasive and threatening nature of the detailed survey that warned legal action for nonresponse.⁸³ In addition to the regular collection of letters to the editor that accompanies most survey or decennial census activities, some syndicated columnists also came out against the ACS, however coverage in traditional media sources usually included a balanced discussion as opposed to outright attacks.⁸⁴

Among data uses, the two interrelated areas of criticism were related to standard error and sample size adjustments. In 2006, data users voiced concerns about sample size regarding accuracy of the data for uses in transportation planning, worrying that the smaller sample size might mask changes and reduce confidence in the data.⁸⁵ A Census Bureau report later showed that while the sample size had stayed the same, the number of addresses in the country had continued to increase. Thus, the sampling rate had effectively decreased from 2.26 percent in 2005 to 2.12 percent in 2009. Based on the 2009 sample frame, this yielded an approximately 11 percent sample for the 2005–2009 time period. In comparison, the long-form sample was based upon an overall fixed target sampling rate of approximately 17 percent, leading to increased sample sizes with each subsequent census.⁸⁶ The need for an increase

⁷⁹ Ted Poe, "American Community Survey-Too Much Governmental Intrusion," *Congressional Record*, July 15, 2009, 111th Congress, 1st Session, Vol. 155, No. 106; Poe, Ted. H.R. 3131, "To Make Participation in the American Community Survey Voluntary, Except With Respect to Certain Basic Questions," 111th Congress.

⁸⁰ Todd Akin, H.R.5046, "Census Clarification and Privacy Act," 111th Congress.

⁸¹ Examples include, but are not limited to, postings on the blogs Mental Militia, Truth is Treason, and Daily Kos.

⁸² For examples, refer to the 2005 syndicated column in Texas newspapers (The McAllen Monitor, Sep 25 and The Odessa American, 27 Sep), Debra Saunders June 8, 2009 syndicated column, or Walter E. Williams' February 19, 2010, syndicated column, which represent just a minor portion of editorial criticisms.

⁸³ Ronald Eash, "Impacts of Sample Sizes in the American Community Survey."

⁸⁴ Steven Heftner, "American Community Survey Sample Size Research," U.S. Census Bureau, 2010.

⁷⁹ MEMO-ACS-DOC 2, 2005.

⁸⁰ *Design and Methodology: American Community Survey*, 2009, pp. 4–6 and 7–6.

in sample size would be one issue the Census Bureau worked to address in 2011, following updates from the 2010 Census.

In 2008, the Census Bureau responded to the concerns of the Census Advisory Committee of Professional Associations with a report examining the effects of population controls based on various benchmarks, such as the 1990 and 2000 Censuses. The report found that due to underrepresented populations receiving better coverage in the 2000 Census, there were noticeable discrepancies in estimates using the different baselines for ACS controls.⁸⁷ Following the 2010 Census, the ACS program in conjunction with the Population Estimates Program produced a note describing the differences between population controls based on the 2000 Census and the 2010 Census as well as the implication when comparing the 2009 ACS products to the 2010 ACS products. Multiyear estimates that crossed this threshold used a combination of population estimates that were either fully based on the 2010 Census or made use of both the 2000 and 2010 Censuses. The methodology effectively addressed the discrepancies inherent when switching baselines for the ACS controls.⁸⁸

Unlike decennial long-form data, ACS data provided a selection of choices, and matching the right multi-year estimates (MYE) data with the data need proved challenging to some data users. Additionally, whereas long-form decennial data had a single point in time reference, April 1 of the census year, ACS data underwent monthly surveying, which meant even 1-year data led to misunderstandings and complications for data users when trying to match ACS data to a single point in time. Despite the fact that the total 5-year sample size did not equal the sample size of the 2000 Census long-form data, the Census Bureau reasoned that the quality and timeliness of the data more than made up for the sample size deficiencies.⁸⁹

The Census Bureau released an accompanying report to the first multiyear estimates in 2008 in order to preempt concerns data users would have finding and using ACS data correctly. The report suggested there

⁸⁷ Victoria Velkoff, "The Use of Population Estimates as Controls to the American Community Survey: An Evaluation," American Community Survey Research and Evaluation Program, U.S. Census Bureau, April 11, 2008.

⁸⁸ U.S. Census Bureau, "American Community Survey Research Note: Change in Population Controls," September 22, 2011.

⁸⁹ Michael Beaghan and Lynn Weidman, "Statistical Issues of Interpretation of the American Community Survey's One-, Three-, and Five-Year Period Estimates," 2008 American Community Survey Research Memorandum Series, U.S. Census Bureau, October 2008, pp. 5-6.

were several key concepts that users should understand when using the data, including that the MYE represented period estimates, and not an estimate of the center month or year, and that a relationship existed between the precision of different MYEs. Additionally, small subpopulations could have large standard errors even in large geographies. It also emphasized the importance of controls and the trade-off between currency and precision of estimates. The authors also outlined when to use 1-year estimates, versus when to use MYEs, and noted that as users began using MYEs they expected the discussion around MYEs to evolve and many of the issues to resolve themselves.⁹⁰

FULFILLMENT AND IMPROVEMENT

The release of 5-year data products in 2010 represented the first complete life cycle of the ACS. The ACS data release closely coincided with the 2010 Census data release, which led to a slight reduction of focus and some confusion as data users had to identify and choose between two data sources. The initial ACS data release of about 1,000 tables for nearly 700,000 different geographic areas took place on December 14, 2010, with a later release schedule for other data products based on 5-year data, like American-Indian and Alaska Natives and other specific small population data.

Prior to the release of 5-year data products, the Census Bureau solicited advice for proposed products through the Federal Register on March 6, 2009, and received 26 responses from federal and local governments, commercial organizations, statistical and policy groups, and individual citizens.⁹¹ Some federal agencies, like the BEA, approved of the changes and noted how the new timeliness of data would improve services and product quality. Several of the commercial, policy, and private organizations expressed their pleasure with the timeliness of the data, but worried over representation of smaller areas and populations, and how the data would be presented through data files and American FactFinder.⁹² The vast majority of negative responses came from transportation agencies, including the Department of Transportation and dozens of local, state, and

⁹⁰ Beaghan, 2008, pp. 7, 46, 50.

⁹¹ The Census Bureau asked commenters to focus on four subjects: block group level geography, types of data products, restrictions required for disclosure avoidance or statistical reliability, and frequency of data release. Federal Register, March 6, 2009.

⁹² American FactFinder was the Census Bureau's proprietary online data dissemination tool designed to provide data based on subject in addition to individual reports.

regional transportation boards, as well as the Association of Metropolitan Planning Organizations and the American Association of State Highway and Transportation Officials. Transportation and metropolitan planners worried that the disclosure avoidance techniques used in small areas and at the block-group level reduced the quality of data tables compared to long-form data for transportation, land use, and neighborhood planning, and in some cases, data users worried about effects of the data on measuring climate change and social factors.⁹³ An interdivisional group at the Census Bureau weighed user feedback, along with concerns about meeting

user expectations and releasing survey estimates with known reliability shortcomings.⁹⁴

In the decade bookended by the release of the first 5-year data products and the start of the 2020 Census, the ACS would face several changes and challenges. Some, such as increases in sample size, voluntary response, and funding issues, would echo previously voiced issues, others represented new challenges, like updates to statistic and survey methodology, oversight and review, and unique potentials of the ACS like subannual data, data products, and data confidentiality. Throughout all of this the ACS would continue to demonstrate its value and evolve as one of the country's preeminent surveys and source of data products.

⁹³ There are several dozen responses, but some of the more illustrative examples include the AMPO response of April 20, 2009, the ASHTO response of April 14, 2009, the USDOT response of April 17, 2009.

⁹⁴ Decisions resulting from this process included that only a subset of the 1- and 3-year detailed tables would be published for the 5-year products and to only produce one version (collapsed or not collapsed) of any Detailed Table. Additionally, the Census Bureau decided to exclude the selected population profiles, for specific groups like American Indians and Alaska Natives, from the 5-year data product line as it was believed that the more complete SF4 and AIAN SF-like products should be produced from the 5-year files every 5 years. Deborah Griffin, "Development of American Community Survey Data Products," 2012.