



General Government Division

B-281392

December 17, 1998

The Honorable Dan Miller, Chairman  
The Honorable Carolyn B. Maloney, Ranking Minority Member  
Subcommittee on the Census  
Committee on Government Reform and Oversight  
House of Representatives

Subject: Decennial Census: Information on the Census Bureau's Plan for Conducting the 2000 Census Without Statistical Sampling

This letter responds to your requests that we review the Department of Commerce's Status Report on Planning for a Decennial Census in Year 2000 Without the Use of Scientific Sampling as of April 1998. As agreed with your offices, this letter (1) reviews the Bureau's plans and cost estimates—as contained in its April 1998 report—for preparing a decennial census that does not require the use of sampling and (2) discusses how the Bureau's fiscal year 1999 cost estimates for preparing such a design were developed.

In addition to reviewing the status report, we interviewed officials at the Department of Commerce and the Bureau of the Census who were responsible for drafting the status report, to obtain information on how the proposed components of the plan and corresponding cost estimates were developed. We could not independently verify these estimates because they were based on limited quantitative data. At the request of the Subcommittee, we are continuing to examine the status and content of the Bureau's planning efforts to undertake a census with or without sampling.

On October 27, 1998, we requested official comments on a draft of this letter from the Secretary of Commerce, or his designated representative, by November 10, 1998. None were provided. On November 20, 1998, senior Bureau officials provided us with technical revisions, which we incorporated where appropriate. We did our work in Washington, D.C., and at the Census Bureau's headquarters in Suitland, MD, between June and October 1998 in accordance with generally accepted government auditing standards.

## Results in Brief

The Commerce Department's April 1998 status report presented a preliminary plan—with much work remaining—for doing the 2000 Decennial Census without the use of statistical sampling. Many of the elements of the Census Bureau's current sampling-based design—such as field office infrastructure and staffing, questionnaire development and delivery, special population and area counts, automated data processing, and marketing and local partnerships—could require modification or expansion if a nonsampling census is conducted in 2000. Bureau officials said that the Bureau's efforts to revise its current design to exclude

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sampling procedures required additional research and operational analysis that the Bureau had not previously considered or conducted. The Bureau expects to issue a plan for conducting a census without sampling, an associated master activity schedule, and fiscal year 2000 cost estimates for a nonsampling census by the end of December 1998.

In the Commerce Department's status report, the Census Bureau identified a need for \$312 million in additional fiscal year 1999 funding to prepare for a nonsampling effort. This estimate included cost increases for seven of the eight decennial census program activities in the President's fiscal year 1999 budget, such as \$82 million for field data collection and support systems and \$77 million for data content and products. For the April 1998 status report, senior Bureau officials provided their "best guess judgments," based on prior census experience, of the costs of potential components of a nonsampling plan. These officials said that their estimates were not supported by in-depth quantitative analysis and that, until the design for a nonsampling plan is completed, the Bureau could not estimate precisely what the total cost of such a census would be.

## Background

In November 1997, after negotiations between the administration and Congress over the 1998 Census Bureau appropriation and discussion over the use of sampling in the 2000 Census, the President signed the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act of 1998. The act directed the Bureau to become prepared to implement a 2000 decennial census without using statistical methods. In response, the Bureau began preparing a plan for a nonsampling census, while also continuing the development of its current sampling-based design for 2000. In March 1998, the Chairman of the Subcommittee on Commerce, Justice, State, the Judiciary, and Related Agencies, House Committee on Appropriations, requested that the Department of Commerce provide a status report on the Bureau's plans for a nonsampling census. The Department of Commerce's April 1998 status report was the response to that request.

The extent to which sampling will be used in the 2000 Census has still not been decided. Members of Congress have raised concerns about the Bureau's proposed use of sampling and estimation techniques because of unresolved methodological and legal issues. In August and September 1998, federal courts ruled in two separate cases<sup>1</sup> that the use of sampling in the decennial census for purposes of congressional apportionment is prohibited by the Census Act.<sup>2</sup> The administration is appealing the rulings to the Supreme Court, and oral arguments were held on November 30, 1998.

In October 1998, Congress appropriated to the Department of Commerce \$1.03 billion for fiscal year 1999 decennial-census-related activities. As part of the negotiations over the fiscal year 1999 budget, Congress and the administration agreed that funding will not be available

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<sup>1</sup> U.S. House of Representatives v. U.S. Department of Commerce, 11F. Supp. 2d 76 (D.D.C. 1998) and Glavin v. Clinton, 19F. Supp. 2d 543 (E.D. Va 1998).

<sup>2</sup> 13 USC Section 195.

for the Bureau of the Census or any of the other departments and agencies included in the Commerce, Justice, State, the Judiciary, and Related Agencies appropriations after June 15, 1999, unless additional legislation is enacted by Congress.

## The Bureau has not Completed Its Plans for a Nonsampling Census

The Department of Commerce's April 1998 Status Report on Planning for a Decennial Census in Year 2000 Without the Use of Scientific Sampling presented a preliminary plan by senior Bureau officials for conducting a 2000 Census that does not use sampling. Under a nonsampling design, the Bureau would have to follow-up with more nonresponding households compared to a sampling-based census, as well as use various coverage improvement initiatives in the absence of statistical estimation to ensure an accurate count. As a result, the Bureau expects that a nonsampling census will cost more to conduct in a number of areas. These areas of increased costs will include hiring a larger number of additional census workers, opening a greater number of census offices, expanding marketing and promotional efforts (in an effort to improve mail response and reduce nonresponse workload), and preparing to handle an increased volume of materials in data processing operations. In addition, the Bureau expects that, without an Integrated Coverage Measurement<sup>3</sup> to help determine and improve the quality of the data, additional coverage improvement programs aimed at hard-to-enumerate populations, such as people who do not live in traditional housing units, would have to be pursued.

Bureau officials said that nine elements of the Bureau's sampling-based design could require modification or expansion to take the place of sampling and statistical estimation procedures. The nine elements are local census office infrastructure and staffing; questionnaire development; questionnaire delivery; questionnaire nonresponse follow-up; a count of special populations and areas, including group housing and the homeless; telecommunication support and automated data processing; marketing and local partnerships; coverage edit follow-up<sup>4</sup>; and telephone questionnaire assistance for those filling out questionnaires.

Bureau officials are considering additional elements for inclusion in the nonsampling-based census plan. These elements include the use of administrative records for efforts such as the parolee/probationer coverage improvement program, which is designed to identify this hard-to-reach population; post-census review and recanvassing of census population counts and maps, which is designed to verify accuracy; and a follow-up of all addresses classified during the census as vacant or nonexistent by the Postal Service.

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<sup>3</sup> For the 2000 Census, the Bureau has designed a statistical estimation procedure called Integrated Coverage Measurement that involves taking a separate sample of households after the nonresponse follow-up is completed, to make adjustments to the census counts for coverage purposes.

<sup>4</sup> Coverage edit follow-up is a census data coverage improvement process whereby Bureau staff follow up on incomplete or inconsistent questionnaire responses.

Three elements of the Census Bureau's sampling-based design would not require additional research or modification for a nonsampling census. These elements are creating and updating address lists; maintaining and upgrading the geographic database; and producing and disseminating census products, such as maps and related materials concerning population.

Bureau officials said that efforts to revise its sampling-based design to exclude sampling procedures required additional research and operational analysis that the Census Bureau had not previously considered or conducted, such as questionnaire design improvements and additional coverage options, and that this research is still ongoing. Bureau officials said that the Bureau expects to issue (1) a plan for conducting a census without sampling, (2) an associated master activities schedule, and (3) fiscal year 2000 cost estimates for the plan by the end of December 1998.

## The Bureau Estimated its Plans for a Nonsampling Census Will Cost \$312 Million in Fiscal Year 1999

The President's fiscal year 1999 budget request, which was submitted to Congress in February 1998, contained a request for \$36 million to enable the Census Bureau to maintain the option of preparing for a nonsampling census until Congress and the administration reach a decision on the design of the census. This amount included \$19 million for developmental work, including staff support, additional dress rehearsal evaluations<sup>5</sup> and other special testing activities, and \$17 million for space to open early local census offices. The Department of Commerce's April 1998 status report, which was completed after the President's budget was submitted, detailed the Bureau's plan at that point for conducting a nonsampling census and identified a need for an additional \$276 million in fiscal year 1999 funding to enable the Bureau to prepare for the nonsampling effort. This brings the total funding the Bureau identified as necessary in fiscal year 1999 for a nonsampling design to \$312 million.

This plan and its estimated cost increases include seven of the eight program activities<sup>6</sup> in the President's fiscal year 1999 budget that concern the decennial census:

- program development and management;
- data content and products;
- field data collection and support systems;
- enhancements to address list development procedures;
- automated data processing and telecommunications support;
- testing, evaluations, and the 1998 dress rehearsal for testing census designs; and

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<sup>5</sup> In 1998, the Census Bureau held a dress rehearsal for the 2000 Census to demonstrate and test its design features.

<sup>6</sup> The term "program activity" refers to the listing of projects and activities in the Appendix of the Budget of the United States Government. Program activity structures are intended to provide a meaningful representation of the operations financed by a specific budget account.

- marketing, communications, and partnerships.

The eighth category was census preparation for Puerto Rico, the Virgin Islands, and the Pacific Areas. Bureau officials said that no modifications were necessary to this category for census activities in the Virgin Islands and Pacific Areas because the Bureau's plans for these areas under either a sampling or a nonsampling option would be the same. Bureau officials said that modifications were necessary for census activities in Puerto Rico for a nonsampling option, but that these changes were minor and did not require additional funds beyond what was originally requested in fiscal year 1999.

Table 1 shows the Bureau's estimate of the additional fiscal year 1999 costs—beyond the \$36 million in the President's fiscal year 1999 budget—by program activity, contained in the Commerce Department's status report and associated with preparing for a 2000 Census without sampling.

**Table 1: Estimates of Fiscal Year 1999 Additional Costs for Preparing a Nonsampling 2000 Census Design**  
Dollars in millions

Program activity	Bureau increase (April 1998)
Program development and management	\$24.0
Data content and products	77.0
Field data collection and support systems	82.0
Address list development	10.0
Automated data processing and telecommunications support	18.0
Testing, evaluations, and dress rehearsal	15.0
Marketing, communications, and partnerships	50.0
Puerto Rico, Virgin Islands, and Pacific Areas	0.0
<b>Total</b>	<b>\$276.0</b>

Source: Department of Commerce status report data.

The status report presented senior Census Bureau officials' fiscal year 1999 cost estimates for the program activities associated with preparing for a nonsampling census. According to the senior Bureau officials responsible for drafting the fiscal year 1999 estimates for the preparation of the 2000 Census, these estimates represented their "best guess judgments" of such costs, based on prior census experience. They said that these estimates were not supported by in-depth quantitative analyses because the Bureau had not completed the needed research and operational analysis. Bureau officials told us that, until the design for a nonsampling plan is completed, the Census Bureau could not estimate precisely what the total cost of such a census would be.

A brief discussion of the Bureau's basis for each program activity's increase follows.

### Program Development and Management

The Census Bureau requested an additional \$24 million for this activity. According to Bureau officials, the additional funding would cover \$9 million for Bureau headquarters activities in the direction of overall management, with possible contractor support for Management

Information System enhancements. The officials said that the remaining \$15 million would be held in a contingency fund for unforeseen funding shortfalls.

### Data Content and Products

The Bureau requested an additional \$77 million in this category. During the Bureau's 1998 dress rehearsal, people participating at the test sites for the 2000 Census received a 5-person household questionnaire with a roster that allowed respondents to list up to 12 household members. If respondents listed more than five members on the roster, the Bureau requested them to complete a follow-up questionnaire designed for large households. According to Bureau officials, data from the dress rehearsal test sites suggested that follow-up mail return rates for large households (those containing more than five persons) were lower than expected or error-prone, indicating that if the same procedure is followed for the 2000 Census, a portion of the population may go uncounted. Therefore, the Bureau decided that a six-person household questionnaire might increase coverage. Bureau officials said that a major component of the additional \$77 million was meant to fund the research, design, testing, and printing of a six-person household questionnaire, in addition to the five-person household questionnaire that was already planned.

In September, in an effort to save on printing costs, the Bureau decided that the six-person questionnaire could also be used for a sampling-based design—thereby eliminating the need for printing a five-person questionnaire. While the cost of printing two questionnaires is no longer an issue, the use of a six-person questionnaire has implications for data processing operations, and Bureau officials said that the additional funds requested would still be needed to study these implications and make modifications for a six-person questionnaire.

Other components of the requested increase include the reevaluation of, and potential printing costs associated with, a targeted or blanketed mailing of replacement questionnaires. During the census dress rehearsal, the Bureau reported a 7 percentage point increase in response rates as the result of sending a second questionnaire to all households. This second mailing had been ruled out of the sampling-based census design because of time constraints imposed by aspects of the sampling operation. The additional \$77 million would also fund the development of other forms associated with collecting data during a nonsampling census—for example, special enumerator forms for targeted populations, such as recent immigrants.

### Field Data Collection and Support

The Census Bureau requested an additional \$82 million in this category. According to Bureau officials, \$58 million of this increase would be used to staff and prepare for the early opening of 130 local census offices. Bureau officials said that, under a nonsampling design, the Bureau would work to establish a local community presence earlier, to promote awareness of and participation in the census among respondents and reduce the nonresponse follow-up workload. The officials said that these local census offices would be opened a year earlier than scheduled to begin this work. Bureau officials said that, including the 130 early-opening offices, a total of 520 local census offices would need to be opened if a nonsampling-based

design is implemented for 2000. If a sampling-based design is implemented, the Bureau has planned to open a total of 475 local census offices.

According to Bureau officials, another \$4 million of the \$82 million would be used to explore the expansion of the capabilities of planned telephone assistance centers that were originally designed to accept only incoming calls from individuals seeking help in completing census questionnaires. The increase would be used to study changes that would be needed to augment the capacity and capability of the telephone assistance centers, such as the ability to make outgoing calls to clarify questionnaire responses.

Bureau officials said that another \$20 million would be used to award a recruitment advertising contract made necessary by the expected increase in staffing for a nonsampling census. Bureau officials said that they consulted several advertising firms, which all recommended that the recruitment advertising be conducted separately from the core census promotional advertising for 2000. Bureau officials said that an estimated 50-percent increase in staffing would be needed if a nonsampling-based census design is implemented, because they estimated a 50-percent increase in nonresponse workload under such a design. To reach this estimate, they assumed, for example, if a mail response rate of 70 percent was achieved, a remaining 20 percent of households would be enumerated through actual household follow-up under the Bureau's sampling-based design, and the last 10 percent would be sampled. However, under a nonsampling-based design, the last 10 percent would not be sampled. Therefore, staff would need to conduct actual follow-up of an additional 10 percent of households, thereby increasing by half the originally planned nonresponse workload.

### Address List Development

While the basic creation of the address list would be done the same way under either the sampling or nonsampling design, as part of its nonsampling plan, the Bureau requested an additional \$10 million in this category to further explore and refine the use of federal administrative records databases to identify missing addresses in its master address list. Bureau officials said that the use of databases from the Internal Revenue Service and of commercial national telephone directories to locate missing addresses from the Bureau's geographic-based address files proved promising in the census dress rehearsal. Bureau officials further said that the Bureau planned to continue testing other federal databases for this purpose as well, such as databases from the Department of Housing and Urban Development, including those of the Federal Housing Administration.

### Automated Data Processing and Telecommunications Support

The Census Bureau requested an additional \$18 million for this program activity. Bureau officials said that, of this increase, \$12 million was needed to modify its data processing systems. A by-product of this modification was to be the ability to provide additional tabulations necessary for analyzing dress rehearsal data for both sampling and nonsampling censuses. However, Bureau officials did not provide specific details on the additional dress rehearsal tabulations that would be necessary to plan for a nonsampling census. These officials said that this increase was a rough estimate and perhaps greater than would ultimately be needed. They also said that the remaining \$6 million of the increase would be

used to modify the scanning equipment that the Bureau plans to use to capture the data from the new six-person household questionnaire, assuming it is used in the final design. According to Bureau officials, the company responsible for designing and building the scanning equipment guaranteed to incorporate all modifications submitted by July 1, 1998, as part of its signed contract with the Bureau. However, the officials said that, under the terms of the contract, any modifications submitted after this date would be done at a premium.

### Testing, Evaluations, and Dress Rehearsal

The Census Bureau requested an increase of \$15 million to be used for additional evaluations of the census dress rehearsal results, such as research to determine the appropriate geographic level at which to search for duplicate questionnaires. Bureau officials stressed that this \$15 million figure was a rough estimate. They said that other small-scale tests would be required if a nonsampling-based design was implemented, because it was already too late to test additional coverage improvement activities in the census dress rehearsal. These officials said that follow-up questionnaires for large households had not been adequately researched, and that such a questionnaire would become more important in a nonsampling-based census design because of the high percentage of children undercounted in these households.

### Marketing, Communications, and Partnership

The Bureau requested an increase of \$50 million to be used to hire additional specialists for promoting the 2000 Census in local communities and to expand the current paid promotional advertising budget. The officials said that the number of specialists might eventually need to be doubled from the original estimate of 320 full-time-equivalent positions if the Bureau implemented a nonsampling-based design.<sup>7</sup>

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We are sending copies of this letter to the Chairman and Ranking Minority Member of the Senate Committee on Governmental Affairs; the Chairman and Ranking Minority Member of the Subcommittee on Commerce, Justice, State, the Judiciary, and Related Agencies, House Committee on Appropriations; the Chairman and Ranking Minority Member of the Subcommittee on Commerce, Justice, State, the Judiciary, and Related Agencies, Senate Committee on Appropriations; the Secretary of Commerce; and the Director of the Bureau of the Census. Copies will be made available to others on request.

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<sup>7</sup> A full-time-equivalent position consists of one or more employed individuals who collectively complete 2,080 work hours in a given year. Therefore, both one full-time employee and two half-time employees equal one full-time-equivalent position.



Please contact me on (202) 512-8676 if you have any questions. Other major contributors to this letter were Robert N. Goldenkoff, Assistant Director, and Victoria E. Miller, Senior Evaluator.

A handwritten signature in black ink, appearing to read "J. Christopher Mihm". The signature is written in a cursive style with a large, stylized initial "J" and a long, sweeping underline.

J. Christopher Mihm  
Associate Director, Federal Management  
and Workforce Issues



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