
United States Census 2020

Study Plan Geographic Programs Operational Assessment in 2018

Geographic Programs Integrated Project Team

Draft Pending Final Census Bureau Executive Review and Clearance.

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Table of Contents

I.	Introduction.....	1
II.	Background.....	1
III.	Assumptions.....	4
IV.	Questions To Be Answered.....	4
V.	Methodology.....	6
VI.	Risks/Limitations.....	6
VII.	Measures of Success.....	6
VIII.	Data Requirements.....	7
IX.	Division Responsibilities.....	7
X.	Milestone Schedule.....	8
XI.	Issues That Need to be Resolved.....	11
XII.	Review/Approval Table.....	11
XIII.	Document Revision and Version Control History.....	12
XIV.	Glossary of Acronyms.....	12
XV.	References.....	13

I.

II. Introduction

The Geographic Delineation component of the Geographic Programs Operations determines, delineates, and updates geographic area boundaries serving two purposes during the 2020 Census: data collection and data tabulation. The Census Bureau divides the nation into these geographies to manage 2020 Census field operations and tabulation activities. This study plan documents how early parts of the 2020 Census Geographic Programs Operation will be assessed.

III. Background

The Geographic Programs Operation (GEOP) supports the 2020 Census data collection and tabulation activities within the MAF/TIGER system. The MAF/TIGER system (a compilation of software applications and databases) serves as the national repository for all spatial, geographic, and residential address data needed for Census Bureau survey and census data collection, data tabulation, data dissemination, geocoding services and map production.

The GEOP comprises three major components: Geographic Partnership (GEOP/GP), Geographic Delineations (GEOP/GD), and Geographic Data Processing (GEOP/GDP). This assessment will focus on the design of the GEOP/GD Operational Component for the 2020 Census, which includes two major operational activity areas:

- Collection Geography Delineation – delineation of various geographic levels to support data collection during census activities. These areas include Special Land-Use Areas (SLUs), Basic Collection Units (BCUs), Type of Enumeration Areas (TEAs), and Field Management Areas (FMAs).
- Tabulation Geography Delineation – delineation of various geographic levels to tabulate household statistics based on input from external partnership programs or internally defined tabulation criteria. These areas include tabulation blocks.

a) *Collection Geography Delineation*

Collection geographies are delineated to provide a framework from which data are collected for the 2020 Census as well as other decennial-related tests. Operational subactivities make up collection geography delineation.

Basic Collection Unit (BCU) Delineation: The BCU serves as the smallest unit of collection geography for all 2020 Census listing operations. The BCU replaces both the collection block and assignment area geographies used for the 2010 Census. While the primary purpose of the BCU is to support 2020 Census operations, the BCU can also support other census programs like current survey fieldwork. BCUs are designed to survive beyond the 2020 Census and endure for future decennial censuses. Their delineation is driven by criteria defined by various Census Bureau stakeholders and with batch software designed to

implement the criteria effectively and efficiently. BCUs are interactively reviewed using standard procedures and maintained using business rules and legal value checks.

Special Land-Use (SLU) Area Delineation: A key component of collection geography is the identification of special land use areas. For the 2020 Census, military areas and national parks boundaries will be maintained as BCU boundaries. These boundaries will be updated on a regular basis to reflect the most recent information available. For example, military areas identify restricted areas, within which appropriate permissions may be needed to conduct census activities. The national park boundaries often provide important reference areas that can be used to divide large geographic areas or to indicate where various housing situations can be expected.

Type of Enumeration Area (TEA) Delineation: Every BCU in the U.S. is assigned to one type of enumeration area (TEA). The TEA reflects the predominant methodology used to enumerate the households within the BCU. Similar to 2010, a national batch delineation process assigns a consistent TEA value to each BCU. One component of batch delineation includes utilizing data from the Coding Accuracy Support System (CASS), which processed addresses without Delivery Sequence File (DSF) coverage to determine if any non-DSF records have mailable addresses. The initial 2020 Census TEAs are defined as follows:

- **Self-Response** – the primary response data collection methodology for the 2020 Census. The Census Bureau will mail invitations to participate to all housing units in the Self Response universe. Each invitation has a unique ID associated with the housing unit and will be delivered by US Postal Service (USPS). Households are encouraged to complete their questionnaire on the Internet. Households also have an option to respond by phone or paper. Households who have not responded by a specific date and are not enumerated by administrative records will be included in the Nonresponse Followup operation.
- **Update Enumerate (UE)**¹ – method of data collection whereby enumerators canvass to update addresses and map information while attempting to conduct an interview. If an interview is not completed, an invitation to participate is provided to each household in the form of a notice of visit or a census paper questionnaire with a unique ID. UE is conducted for areas with special enumeration needs and areas that do not receive mail at the address listed on the MAF. Residents who have not completed an interview with an enumerator or responded by phone, paper, or Internet by a certain date will receive a follow-up visit as part of the Nonresponse Followup operation.
- **Remote Alaska (RA)** – method used to enumerate the most sparsely settled and isolated parts of Alaska that require special travel, early enumeration, and other special arrangements. Enumerators update address, map information, and enumerate households simultaneously. The enumeration of group quarters, transitory locations, or any special situations in these areas is also conducted as part of the Remote Alaska operation. The Remote Alaska field operation is similar to the Update Enumerate Census operation.

¹ Some of these areas will be identified as Update Leave in later TEA delineations leading up to the 2020 Census. In the Update Leave operation enumerators will update addresses and leave a packet with each household encouraging internet self-response and includes a paper questionnaire.

- **Military** – identifies areas in military installations that may require special procedures. The enumeration method for households in these areas will be based on administrative records and information provided by the Department of Defense.
- **Island Areas** – method used in American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands. Households in these areas will receive a questionnaire similar to the ACS questionnaire with a few additional questions. During the operation, field enumerators conduct an independent listing of housing units, depict their spatial location on a map, and enumerate the households concurrently.

Field Management Area (FMA) Delineation: This component of collection geography includes delineation of geographic areas other than BCU and TEA, which are necessary to manage and accomplish fieldwork for the 2020 Census. BCUs are the building block of all FMAs. FMAs include regional census center (RCC), area census office (ACO), census field manager zones (CFMs) and census field supervisor areas (CFSs). RCCs and ACOs are the same for all operations while CFMs and CFSs differ based on the operation.

Coding Accuracy Support System (CASS)

Addresses without Delivery Sequence File (DSF) coverage were processed by CASS software run by census staff to determine if any of these non-DSF records have addresses that could be used for mailing. Data from the CASS runs in 2016 and 2017 was considered during TEA delineations in 2016 and 2017.

b) Tabulation Geography Delineation

Tabulation Block Delineation: Tabulation blocks are delineated once a decade. Prototype tabulation blocks are delineated to support the Redistricting Data Program (RDP). Creation of tabulation blocks assists the Census Bureau in complying with requirements of Public Law 94-171 (P.L. 94.171), which outlines the process to gather data from designated government officials and provide the governor and legislature in each state with the data they need to redraw congressional and state legislative districts. Since the inception of tabulation blocks in 1980, in addition to data tabulation, tabulation blocks are used in geocoding of addresses in the MAF, statistical sample design and selection, special tabulations and user-defined geographic areas, and in defining urban and rural areas and ZIP Code Tabulation Areas (ZCTAs).

IV. Assumptions

- Special Land-Use Areas are finalized in the MAF/TIGER system before BCU delineation.
- The BCU delineation will cover the entire country, including the 50 states, District of Columbia, Puerto Rico, and Island Areas.
- BCUs will be used as the basis for assigning work to individuals in the field.
- Delineators will build field management area geographies for managing data collection from whole BCUs.
- BCU delineation will include both batch and interactive processes.
- TEAs will be built using BCU as their base.
- Delineators must create TEAs using whole BCUs. Multiple TEAs cannot exist within a single BCU.
- Delineators will create the TEAs through batch and interactive processes that assign a TEA to all BCUs within the 50 states, District of Columbia, Puerto Rico, and Island Areas.
- Subject matter experts will optimize the TEA design to minimize the costs of conducting the census, while maximizing the opportunity for respondents to receive a direct invitation to participate in the 2020 Census.
- A log of changes made during interactive TEA delineation and the rationale for each change will be maintained.
- The TEAs will be based primarily on mailability, which is determined by data from the DSF and CASS.
- Public lands data will be obtained from federal sources.

V. Questions To Be Answered

The Geographic Programs Assessment will assess early parts of the 2020 Census Collection and Tabulation geography delineations. Data from this report will assess how the entire country is delineated at various geographic levels as we head toward the 2020 Census. This assessment will look at basic collection unit or tabulation block counts, housing unit counts, and land area affected. This assessment will also examine the impact of CASS on the TEA delineation.

The research questions to be answered in the Geographic Programs Assessment are:

Collection Geography

BCU

- How many BCUs were created during the national BCU delineation in 2016? What type of SLUs were held during BCU delineation?
- Describe the changes made to interactively update BCUs. How many BCUs were there at the time of the 2017 TEA delineation? How many BCUs were there at the time of the

final TEA delineation in 2018? How do the BCU counts compare? Can any conclusions be drawn from the results?

TEA

- What criteria was used to define TEAs in each of the batch delineations?
- What were the results of the batch and interactive TEA delineation?
- How many housing units are in each TEA and how has the number changed?
- How often did TEA change pre vs post smoothing in the 2017 delineation?
- How often did TEA change during interactive review? What were the reasons and how many of each reason were there? What guidance was changed based on reviews of the 2017 Interactive TEA delineation?

CASS

- How many records were presented for CASS processing?
 - How many had sufficient address information to attempt processing?
 - How many records had sufficient information to match to a mailable address?
 - What are the reasons addresses did not match?
 - What additional information was provided during CASS processing?
 - What challenges were there in determining the the mailability of Puerto Rico addresses?
- How did the CASS results compare between the 2016 and 2017 batch runs?
- Did CASS impact the TEA delineation by moving more areas into Self Response?
- What were the results of the DSF Research and can the findings be incorporated into the final delineation prior to the 2020 Census?

SLU

- How many updates were made to Military areas based on the administrative data provided by the Department of Defense? How are they characterized (boundary change, remove data, add data, etc.)?
- How many updates were made to National Parks? How are they characterized (boundary change, remove data, add data, etc.)?

FMA

- What criteria was used for the CFM and CFS delineations?
- What were the sizes of the CFM and CFS delineations?

Tabulation Blocks

- How many Tabulation blocks were created in the delineation?
- What did the tabulation block research focus on to reduce the number of small blocks? How effective was the effort?

VI. Methodology

The following data sources will be used to answer the research questions:

1. **BCU data** will determine the characteristics of BCUs at the national and state levels. This analysis will look at the number of BCUs, number of housing units flagged as valid, and any TEA changes that may have occurred. Data from the initial BCU delineation in 2016 will be compared to the final BCU data determined after interactive review in early 2018.
2. **TEA data** from the batch and interactive delineations, with pre-smoothing and post-smoothing TEA assignments, will examine TEA assignments throughout the country. BCUs will be analyzed to see how TEAs were delineated and how often the smoothing process changed the TEA assignment. Housing unit counts by TEA in this assessment will be at the national and state levels. Pre-smoothing and post-smoothing TEA data is currently available.
3. **CASS data** records not on the DSF that were run in 2016 and 2017 to determine the mailability of addresses and TEA data will be examined to see if CASS had any impact on the TEA delineation. This analysis will determine if running records through the CASS in 2018 is warranted. CASS data from the 2016 and 2017 runs are currently available.
4. **SLU data** used to update military and national parks boundaries will be reviewed as well as the process involved to determine effectiveness of the process.
5. **FMA data** for ACOs, CFMs, and CFSs will be used. Due to timing, ACOs data will be provided nationally. CFM and CFS data will be for the 2018 End-to-End test areas.

VII. Risks/Limitations

- Update Leave areas were not identified in the 2016 and 2017 TEA delineations which may result in some confusion when comparing to 2018 data.
- If guidance for the interactive review is not clear enough or guidance is not followed, there may be inconsistent results across the nation.
- Sufficient staffing is needed to complete all aspects of collection geography delineation.
- If the MAF/TIGER System includes spatially inaccurate, duplicated, or missing features unintended blocks will be created or there will be a failure to create intended blocks.

VIII. Measures of Success

- Guidelines for interactive review of BCUs were followed consistently.
- As a result of interactive BCU delineation, all nesting relationships are preserved.
- Changes to the batch TEA criteria minimize the amount of mailable addresses in Update Leave (TEA 6) and nonmailable addresses in Self Response (TEA 1).
- Changes to the batch TEA criteria produce more desirable results for implementation in the field. (Peer review with multiple stakeholders would be in agreement)
- CASS data moved more areas into the Self Response TEA.

- Lessons Learned in the 2016 and 2017 TEA delineations were used to inform the Final TEA Delineation in 2018.
- Authoritative sources were used to update SLUs prior to BCUs being finalized for the 2020 Census.

IX. Data Requirements

- Denote the ID for each unique BCU.
- Denote the number of housing units in each BCU.
- Denote the types of SLUs held during the delineation.
- Denote splits or merges made to BCUs during the interactive delineation.
- Denote results of BCU nesting checks.
- Denote when BCUs were delineated.
- Denote criteria used to define TEAs during batch delineation.
- Denote the TEA for each BCU.
- Denote the TEA for each BCU pre-smoothing.
- Denote the TEA for each BCU post-smoothing.
- Denote the TEA for each BCU during the batch delineations.
- Denote the TEA for each BCU during the interactive reviews.
- Denote the reasons for a TEA change during the interactive review.
- Denote records presented for CASS processing.
- Denote the number of records CASS determined had sufficient information to match to a mailable address.
- Denote all data provided by CASS.
- Denote TEAs that were changed based on CASS.
- Denote updates made to Military areas based on administrative data provided by the Department of Defense.
- Denote the types of updates made to Military areas.
- Denote the number of HUs in each FMA geography (ACO, CFM, and CFS).
- Denote the number of tabulation blocks and population data in each one.

X. Division Responsibilities

Decennial Census Management Division (DCMD)

- Project management and issue resolution.

Decennial Statistical Studies Division (DSSD)

- Gather Geographic Programs Assessment requirements.
- Conduct data analysis.
- Provide the Geographic Programs Assessment report.

Geography Division (GEO)

- Implement Collection and Tabulation geography delineations.
- Provide data files.

Field Division (FLD)

- Provide Interactive TEA Reason Codes.
- Provide FMA data.

XI. Milestone Schedule

Below are the standard schedule activities for the development of the study plan and operational assessment report. Regard those highlighted in bold block-face as the key milestone activities. Definitions of acronyms are noted in the glossary section.

Activity ID	Activity Name	Orig Duration	Start	Finish
Geographic Programs Assessment Study Plan				
First Draft				
	Prepare First Draft of Geographic Programs Assessment Study Plan	12 days	06/06/17	06/30/17
	Distribute First Draft of Geographic Programs Assessment Study Plan to the Assessment Sponsoring DCMD ADC and Other Reviewers	5 days	07/06/17	07/06/17
	Incorporate DCMD ADC and Other Comments to Geographic Programs Assessment Study Plan	5 days	07/14/17	07/24/17
Initial Draft				
	Prepare Initial Draft Geographic Programs Assessment Study Plan	5 days	07/24/17	07/27/17
	Distribute Initial Draft Geographic Programs Assessment Study Plan to Evaluations & Experiments Coordination Branch (EXC)	1 day	07/27/17	07/27/17
	EXC Distributes Initial Draft Geographic Programs Assessment Study Plan to the DROM Working Group for Electronic Review	1 day	07/28/17	07/28/17
	Receive Comments from the DROM Working Group on the Initial Draft Geographic Programs Assessment Study Plan	5 days	08/07/17	08/08/17

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Activity ID	Activity Name	Orig Duration	Start	Finish
	Schedule the Geographic Programs Study Plan for the IPT Lead to Meet with the DROM Working Group	1 day	07/06/17	07/06/17
	Discuss DROM Comments on Initial Draft Geographic Programs Assessment Study Plan	1 day	09/12/17	09/12/17
Final Draft				
	Prepare Final Draft of Geographic Programs Assessment Study Plan	15 days	09/13/17	09/29/17
	Distribute Final Draft of Geographic Programs Assessment Study Plan to the DPMO and the EXC	1 day	10/02/17	10/02/17
	Schedule and Discuss Final Draft Geographic Programs Assessment Study Plan with the 2020 PMGB	10 days	10/03/17	10/16/17
	Incorporate 2020 PMGB Comments for Geographic Programs Assessment Study Plan	10 days	10/17/17	10/30/17
	Prepare FINAL Geographic Programs Assessment Study Plan	10 days	10/31/17	11/13/17
	Distribute FINAL Geographic Programs Assessment Study Plan to the EXC	1 day	11/14/17	11/14/17
	EXC Staff Distributes the Geographic Programs Assessment Study Plan and 2020 Memorandum to the DCCO	1 day	11/15/17	11/15/17
	DCCO Staff Process the Draft 2020 Memorandum and the Geographic Programs Assessment Study Plan to Obtain Clearances (DCMD Chief, Assistant Director, and Associate Director)	5 days	11/16/17	11/22/17
	DCCO Staff Formally Release the Geographic Programs Assessment Study Plan in the 2020 Memorandum Series	2 days	11/27/17	11/28/17

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Geographic Programs Assessment Report				
First Draft of Assessment Report				
	Receive, Verify, and Validate Geographic Programs Assessment Data			
	Examine Results and Conduct Analysis			
	Prepare First Draft of Geographic Programs Assessment Report	15 days	11/01/18	11/23/18
	Distribute First Draft of Geographic Programs Assessment Report to the Assessment Sponsoring DCMD ADC and Other Reviewers	1 day	11/26/18	11/26/18
	Incorporate DCMD ADC and Other Comments Geographic Programs Assessment Report	5 days	11/27/18	12/03/18
Initial Draft of Assessment Report				
	Prepare Initial Draft Geographic Programs Assessment Report	10 days	12/04/18	12/17/18
	Distribute Initial Draft Geographic Programs Assessment Report to Evaluations & Experiments Coordination Br. (EXC)	1 day	12/18/18	12/18/18
	EXC Distributes Initial Draft Geographic Programs Assessment Report to the DROM Working Group for Electronic Review	1 day	12/18/18	12/18/18
	Receive Comments from the DROM Working Group on the Initial Draft Geographic Programs Assessment Report	10 days	12/19/18	01/03/19
	Schedule the Geographic Programs Report for the IPT Lead to Meet with the DROM Working Group			
	Discuss DROM Comments on Initial Draft Geographic Programs Assessment Report	11 days	01/04/19	01/18/19
Final Draft of Assessment Report				
	Prepare Final Draft of Geographic Programs Assessment Report	25 days	01/22/19	02/26/19
	Distribute Final Draft of Geographic Programs Assessment Report to the DPMO and the EXC	1 day	02/27/19	02/27/19
	Schedule and Discuss Final Draft Geographic Programs Assessment Report with the 2020 PMGB	10 days	02/28/19	03/13/19
	Incorporate 2020 PMGB Comments for Geographic Programs Assessment Report	10 days	03/14/19	03/27/19

Pre-decisional Document: Geographic Program Assessment Study Plan Version 0.2

Final Assessment Report				
	Prepare FINAL Geographic Programs Assessment Report	15 days	03/28/19	04/17/19
	Deliver FINAL Geographic Programs Assessment Report to the EXC	1 day		04/17/19
	EXC Staff Distribute the FINAL Geographic Programs Report and 2020 Memorandum to the DCCO			
	DCCO Staff Process the Draft 2020 Memorandum and the FINAL Geographic Programs Report to Obtain Clearances (DCMD Chief, Assistant Director, and Associate Director)			
	DCCO Staff Formally Release the FINAL Geographic Programs Report in the 2020 Memorandum Series			
	EXC Staff Capture Recommendations of the FINAL Geographic Programs Report in the Census Knowledge Management SharePoint Application			

XII. Issues That Need to be Resolved

None at this time.

XIII. Review/Approval Table

Role	Electronic Signature	Date
Fact Checker or independent verifier		
Author's Division Chief (or designee)		
DCMD ADC		
DROM DCMD co-executive sponsor (or designee)		
DROM DSSD co-executive sponsor (or designee)		
Associate Director for R&M (or designee)		
Associate Director for Decennial Census Programs (or designee) and 2020 PMGB		

XIV. Document Revision and Version Control History

VERSION/EDITOR	DATE	REVISION DESCRIPTION	EAE IPT CHAIR APPROVAL
v. 0.1/Earl Letourneau	06/29/2017	First Draft	
v. 0.2/Earl Letourneau	09/12/2017	Initial Draft	
v. 0.3/Earl Letourneau	09/25/2017	Final Draft	

XV. Glossary of Acronyms

Acronym	Definition
ACO	Area Census Office
ADC	Assistant Division Chief
BCU	Basic Collection Unit
CASS	Coding Accuracy Support System
CFM	Census Field Manager or Census Field Management Area
CFS	Census Field Supervisor
DCMD	Decennial Census Management Division
DROM	Decennial Research Objectives and Methods Working Group
DSF	Delivery Sequence File
DSSD	Decennial Statistical Studies Division
EXC	Evaluations & Experiments Coordination Branch
FMA	Field Management Area
GARP	Geographic Areas Reconciliation Project
GEO	Geography Division
GEOP	Geographic Programs Operation
GEOP/GD	Geographic Delineations
GEOP/GDP	Geographic Data Processing
GEOP/GP	Geographic Partnership
IPT	Integrated Project Team
MAF	Master Address File
MAF/TIGER	Master Address File/Topologically Integrated Geographic Encoding and Referencing
PMGB	Portfolio Management Governance Board
RA	Remote Alaska
RCC	Regional Census Center
RDP	Redistricting Data Program
SLU	Special Land-Use Area
TEA	Type of Enumeration Area
TIGER	Topologically Integrated Geographic Encoding and Referencing
UE	Update Enumerate
USPS	United States Postal Service
ZCTA	ZIP Code Tabulation Areas

XVI. References

Decennial Census Management Division (2016), “2020 Census Detailed Operational Plan for Geographic Programs Operations”, U.S. Census Bureau