Request for Non-Substantive Change to the
Boundary and Annexation Survey
OMB Control No. 0607-0151
U.S. Department of Commerce
U.S. Census Bureau

Purpose

The U.S. Census Bureau conducts the Boundary and Annexation Survey (BAS) annually to collect information about selected legally defined geographic areas. The BAS is used to update information about the legal boundaries and names of all governmental units in the United States. The Census Bureau uses the boundary information collected during the BAS to tabulate data for the decennial and economic censuses, and for annual estimates and surveys such as the American Community Survey (ACS) and the Population Estimates Program (PEP). The BAS is authorized by Section 6 of Title 13 of the United States Code.

The Boundary Validation Program (BVP) is conducted every ten years, and runs in parallel with the 2020 BAS. For the BVP, Tribal Chairs (TCs) and Highest Elected Officials (HEOs) are asked to review and confirm their government's boundary, legal name, and status information. The TC/HEOs are instructed to work with their BAS contact to report any corrections through the 2020 BAS.

The BAS State Certification (BASSC) is an annual program that invites governor-appointed State Certifying Officials (SCOs) to review legal boundary changes submitted to the annual BAS. This program ensures the accuracy and completeness of the boundary information reported to the Census Bureau through the BAS program.

This non-substantive change request is to update the 2020 BAS, BVP, and BASSC materials from the currently approved collection. Refer to Table 1 for a list of the additions and changes made to the materials submitted with this NSC.

Background

The current BAS OMB collection was approved on 10/30/2018 for three years, with an expiration date of 11/30/2021. The Census Bureau has made changes to the BAS, BVP, and BASSC materials to include new programmatic information, minimize duplication of correspondence, and utilize plain language.

This Non-Substantive Change (NSC) is a request for BAS, BVP, and BASSC related materials in the form of respondent guides, quick start guides, and a partnership toolbox overview document. Participants will use these instructions and guidance to review their BAS/BVP/BASSC materials. Refer to Table 2 for a list and brief description of the BAS/BVP materials enclosed with this NSC.

Burden
The burden of the BAS is unchanged by this update.

Attachments

Table 1: BAS/BASSC/BVP Materials Additions and Changes

Changes as part of this NSC	Description
Initial BVP TIGERWeb Quick Start Guide	
New Quick Start Guide for BVP participants	• Guides BVP participants through how to use TIGERweb.
BASSC-4L State Certifying Official (SCO) Letter (CCD States)	
Date changes, minor text changes	• Changed all years from 2018 to 2019. • Changed the due date for SCO files to March 1, 2020. • Removed "the state of" from the first sentence. • Changed "BAS State Certification Respondent Guide" to "BAS Respondent Guide: State Certification document." • Changed "please notify my staff" to "please notify the Census Bureau."
BASSC-4L SCO Letter (MCD States)	
Date changes, minor text changes	• Changed all years from 2018 to 2019. • Changed the due date for SCO files to March 1, 2020. • Removed "the state of" from the first sentence. • Changed "BAS State Certification Respondent Guide" to "BAS Respondent Guide: State Certification document." • Changed "please notify my staff" to "please notify the Census Bureau."
Updated in all BAS documentation	
Additional information added to Key Dates section	• Revised section provides updated verbiage under the Key Dates section that is applicable for only the 2020 BAS cycle. • Removed ACS/PEP and changed to January 1, 2020 instead of January 1; March 1, 2020 instead of March 1; and May 31, 2020 instead of May 31.
Addition of What's New for the 2020 BAS information section	• New section provides information about the 2020 Boundary Validation Program, which is conducted in parallel to the 2020 BAS; 2020 BAS is the final opportunity to provide

Changes as part of this NSC	Description
	updates before the 2020 Census data tabulation, and the development of a BAS Partnership Toolbox for ArcGIS users.
Date changes	• Changed years from 2018 to 2019 and 2019 to 2020 throughout.
Correct video link to website	• Replace the link to videos from https://www.census.gov/programs-surveys/bas/library/videos/bas-intro.html>.to https://www.census.gov/programs-surveys/bas/library/videos.html
Formatted reference links	• Changed all Section references to format as Section #, <Title> - using a comma to separate the paragraph number from the paragraph title.
Updated references for consistency	• Made all instances of ZIP file, zipfile, and ZIP File, BAS ID and BAS entity ID, Census and Census Bureau, and shapefile and shape file consistent across all documents. (Used BASID, ZIP and zip according to images they reference, and Census Bureau.)
Changed Area/Hydrographic Landmark Update Layer references	• Changed from Area/Hydrographic Landmark Update Layer to Area Landmarks/Hydrographic Areas.
2020 Digital BAS Partnership Toolbox	
Throughout the 2020 Digital BAS Partnership Toolbox	• Updated and added new screen shots for 2020.
Boundary and Annexation Survey (BAS) Respondent Guide: Digital	
Figure 2. Overlay of Four Feature Classes	• Changed image to graphically show an overlay of the four different feature classes.
Replaced Info box in Section 5.5.2	• Info box was incorrect, changed to match one for the Boundary and Annexation Survey (BAS) Respondent Guide: GUPS.
Moved Section 5.3.1 Boundary Changes to Legal Entities in Georgia and Indiana	• Added to Section 5.3.2.1 after the Boundary Corrections section.

Changes as part of this NSC	Description
Figure 40. polygons that should be Snapped to Roads or Rivers	• Added new images to Figure 40 to show examples of a before/after of a snapping.
Edit to Section 5.3.1	• Add subsection using the text from Section 4.2 of the Boundary and Annexation Survey (BAS) Respondent Guide: GUPS.
Section 5.3.1	• Add text from Boundary and Annexation Survey (BAS) Respondent Guide: GUPS, Section 2.4.1 under Boundary Changes as 5.3.1.
Appendix B 2020 Digital BAS Example Process 1	• Replace with updated 2020 BAS Partnership Toolbox step-by-step instructions.
Chapter 5, Section 5.3 Boundary Changes	• Added more specifics on how tools are used to make change files (Symmetrical Difference or Union) and when to use them.
Section 5.4 Linear Feature Updates	• Updated this section to match the *Boundary and Annexation Survey (BAS) Respondent Guide: Digital*.
Caption under Figure 10	• Updated this section to match the *Boundary and Annexation Survey (BAS) Respondent Guide: Digital*.
Section 5.7.8 FIPS Codes	• Updated title to include first usage spell out of acronym.
Update references to BAS 19	• Replaced BAS 19 shapefile names with BAS 20 for submissions.
Updated Shapefile Naming Conventions	• Replaced outdated references of PVS_17 and PVS_18 to current PVS_19_v2.
Appendix C 2020 Digital BAS Example Process 2	• Updates throughout to match *Boundary and Annexation Survey (BAS) Respondent Guide: Digital*. • Moved Section C10.5 to after C10.2.
Boundary and Annexation Survey (BAS): Digital Quick Start Guide	
Update step 2 in Initial Steps to add hyperlinks	• Added the URL to the two bullets so if readers could not click and link, they could copy the URL to connect to the documents.
Boundary and Annexation Survey (BAS): GUPS Quick Start Guide.	

Changes as part of this NSC	Description
Update step 2 in Initial Steps to add hyperlinks	• Added the URL to the two bullets so if readers could not click and link, they could copy the URL to connect to the documents.
Second page, Return Updates Using the Secure Web Incoming Module (SWIM)	• Changed formatting from bullets in step 3 to numbers.
Forgot your Password? box	• Changed formatting to match Boundary and Annexation Survey (BAS): Digital Quick Start.
Boundary and Annexation Survey (BAS) Respondent Guide: Paper	
Introduction, Section B, Step 1	• Updated BVP website link.
Throughout the document	• Addressed acronyms that were not spelled out.
Boundary and Annexation Survey (BAS) Tribal Respondent Guide: Digital	
Chapter 3, first paragraph	• Moved below Table 1.
Removed Section 5.4.2	• Removed this section. It was replaced with the wording in the main heading and is now redundant.
Section 2.3 Reviewing Legal Boundaries	• Added Table 1: Available Change Types by Entity Type.
Section 5.5.1 Area Landmark/Hydrographic Area Updates	• Placed **Note** from digital guide for consistency: *Area Landmark/Hydrographic Area Changes May Be Delayed* The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating area landmark and hydrographic area changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.
Section 5.7.6 Compressing the Digital Files	• Removed Step 4.
Appendix B 2020 Digital BAS Example Process 1	• Replace with updated 2020 Digital BAS Partnership Toolbox step-by-step instructions.

Changes as part of this NSC	Description
Appendix C 2020 Digital BAS Example Process 2	• Updates throughout to match Boundary and Annexation Survey (BAS) Respondent Guide: Digital. • Moved Section C10.5 to after C10.2.
Chapter 5, Section 5.3 Boundary Changes	• Added more specifics on how tools are used to make change files (Symmetrical Difference or Union) and when to use them.

Changes as part of this NSC	Description
Boundary and Annexation Survey (BAS) Respondent Guide: GUPS	
Throughout	• Replaced all instances of “GU” throughout the document with “government” or “governments.”
Section 2.5 Reviewing Linear Features	• Deleted section, it appears elsewhere in the document.
Table 5: Install the GUPS Application	• Updated images based on newest version of software.
Table 6: Start a New Project Using Shapefiles from the BAS website	• Renumbered Steps 18-23 to correct order. • Updated images to match current software version.
Table 7 through Table 349	• Updated images to match current web pages and software.
Figure 2, Figure 4, Figure 8, Figure 9, Figure 12	• Updated image to match current version of software.
Section 5.5.3.3	• Explanation of expanding layers on the menu updated to match current software.
Updates Appendix E GUPS Tools	• Updated images based on current version of software.
Section 5.5.2 Table of Contents and Map View	• Changed title to Layers Panel and Map View.
Boundary and Annexation Survey (BAS) Respondent Guide: Tribal GUPS	
Introduction, Section A	• Updated text: Title 13, Section 6, United States Code (U.S.C.).
Throughout	• Replaced all instances of “GU” throughout the document with “government” or “governments.”
Section 2.3 Reviewing Legal Boundaries	• Renamed to Tribal Areas that can be submitted through BAS.
2.5 Legal Disputes	• Deleted, it appears in another part of the guide.
Section 3.2 Submitting Files through SWIM	• Defined the acronym SWIM. • Changed “Annual Response Form” to “BAS Annual Response Form.”
Table 5: Install the GUPS Application	• Updated screen shots throughout the table.

Changes as part of this NSC	Description
Section 5.2 import Data from the Census Bureau's BAS Website	• All images updated where needed to match the Tribal BAS Module in the latest version of GUPS.
QGIS Desktop version	• Updated to Section 3.4.
Update websites and references to BAS 19	• Replaced BAS 19 shapefile names with BAS 20 for submissions.
Updated Shapefile Naming Conventions	• Replaced out dated references of PVS 17 and PVS 18 to current PVS 19v2.
Table 10: Menu Tabs and Their Functions	• Updated images to match current version of GUPS.
Section 6.1.3	• Added missing section on how to add a geographic corridor.
Table 43 and Table 44	• Updated images with past years to 2019 or 2020 where appropriate.
Figures 13, 14, 15	• Text corrected to show as part of Figures.
References to Table of contents on the layers Map changed	• Table of Contents changed to Layers Panel.
Table 6: Start a New Project Using Shapefiles from the BAS Website	• Updated references of tools to match what the updated software uses as the name of the tools.

Table 2: BAS/BVP Materials Crosswalk

File Name	Quick Description
Initial BVP TIGERWeb Quick Start Guide	BVP guide used to aid participants This is will aid TCs and HEOs in using the TIGERweb without having to read the whole TIGERweb guide. This document will be placed on the BVP website.
2020 Digital BAS Partnership Toolbox	Step-by-step instructions to using Census Bureau developed tools for facilitating the boundary updating process for ArcGIS users.
2020 Boundary and Annexation Survey (BAS) Respondent Guide: Digital	BAS Respondent Guide with instructions for participating in the 2020 BAS using a Geographic Information System (GIS).
2020 Boundary and Annexation Survey (BAS): Digital Quick Start Guide	A two page document outlining how to download and obtain BAS Materials to digitally review boundaries and use the Secure Web Incoming Module (SWIM) to submit documents.
2020 Boundary and Annexation Survey (BAS): GUPS Quick Start Guide	A two page document outlining how to download, start a new project or update using GUPS and how to use the Secure Web Incoming Module (SWIM) to submit documents.
2020 Boundary and Annexation Survey (BAS) Respondent Guide: Paper	BAS Respondent Guide with instructions on using paper maps to review and update boundaries.
2020 Boundary and Annexation Survey (BAS) Respondent Guide: Tribal Digital	BAS Respondent Guide with instructions for the Federal American Indian Reservations, Federal Off-Reservation Trust Lands, Tribal Subdivisions, and Hawaiian Homelands on participating digitally in the 2020 survey.
2020 Boundary and Annexation Survey (BAS) Respondent Guide: GUPS	BAS respondent guide to assist participants with directions for how to use the digital tools available within the GUPS application, as well as step-by-step instructions for how to carry out specific shapefile updates (e.g., annexations and deannexations, adding and deleting features and landmarks, etc.) digitally. This document also contains instructions for using the Geographic Update Partnership Software (GUPS).
2020 Boundary and Annexation Survey (BAS) Respondent Guide: Tribal GUPS	BAS guide to assist participants in the review and update all legal governments and boundaries within their reservation/trust lands/tribal subdivisions, including the additions and deletions of land area and boundary corrections. This document also contains instructions for using GUPS.

BASSC-4(L)
(09-2018)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Washington, DC 20233-0001

December 2, 2019

<Contact Salutation> <First Name> <Last Name>
<Position>
<Department>
<Address>
<City, State Zip-Zip+4>

Dear «CONTACT_SALUTATION» «LAST_NAME»:

The Governor's office notified the U.S. Census Bureau that you are serving as the State Certifying Official (SCO) for «STATE_NAME». Through this program, the Census Bureau asks you to verify the accuracy of the information received during the 2019 Boundary and Annexation Survey (BAS). The decennial census, Population Estimates Program, and the American Community Survey use the information collected through the BAS to tabulate and report data for communities in your state.

All information and materials for review, including the BAS State Certification listings and the *BAS Respondent Guide: State Certification* document, are located on the BAS State Certification webpage at the following address: <https://www.census.gov/programs-surveys/bas/information/state-certification-program.html>. Select your state name under the Download BAS State Certification Materials section to be directed to a File Transfer Protocol site where you can find the materials for download. We are providing you with the following information from the 2019 BAS:

- List 1- governments that have disincorporated, become inactive, or otherwise ceased to exist;
- List 2- legal boundary changes reported to the 2019 BAS; and
- List 3- names and functional statuses of incorporated places.

A summary of the state laws for reporting legal boundary changes in the state of «STATE_NAME» is attached for your reference. Please notify the Census Bureau if there are errors in the state law summary or if there are any records in the provided data files that are in violation of state or county law. Return the certified listings to the Census Bureau on or before March 1, 2020. Refer to the *BAS Respondent Guide: State Certification* document located on the BAS State Certification webpage at the link above for further information.

If you have any questions or require additional information, please contact the Census Bureau's Geography Division by telephone at 301-763-1099 or by email at <geo.bas@census.gov>.

Sincerely,

Deirdre Dalpiaz Bishop
Chief, Geography Division

Attachment
By email

Attachment: State Law Summary

BASSC-4(L)
(09-2018)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Washington, DC 20233-0001

December 2, 2019

<Contact Salutation> <First Name> <Last Name>
<Position>
<Department>
<Address>
<City, State Zip-Zip+4>

Dear <Contact Salutation> <Last Name>:

The Governor's office notified the U.S. Census Bureau that you are serving as the State Certifying Official (SCO) for <State Name>. Through this program, the Census Bureau asks you to verify the accuracy of the information received during the 2019 Boundary and Annexation Survey (BAS). The decennial census, Population Estimates Program, and the American Community Survey use the information collected through the BAS to tabulate and report data for communities in your state.

All information and materials for review, including the BAS State Certification listings and the *BAS Respondent Guide: State Certification* guide, are located on the BAS State Certification webpage at the following address: <https://www.census.gov/programs-surveys/bas/information/state-certification-program.html>. Select your state name under the Download BAS State Certification Materials section to be directed to a File Transfer Protocol site where you can find the materials for download. We are providing you with the following information from the 2019 BAS:

- List 1- governments that have disincorporated, become inactive, or otherwise ceased to exist;
- List 2- legal boundary changes reported to the 2019 BAS;
- List 3- names and functional statuses of incorporated places; and
- List 4- names and functional statuses of Minor Civil Divisions (MCDs).

A summary of the state laws for reporting legal boundary changes in <State> is attached for your reference. Please notify the Census Bureau if there are errors in the state law summary or if there are any records in the provided data files that are in violation of state or county law. Return the certified listings to the Census Bureau on or before March 1, 2020. Refer to the *BAS Respondent Guide: State Certification* guide located on the BAS State Certification webpage at the link above for further information.

If you have any questions or require additional information, please contact the Census Bureau's Geography Division by telephone at 301-763-1099 or by email at <geo.bas@census.gov>.

Sincerely,

Deirdre Dalpiaz Bishop
Chief, Geography Division

Attachment
By email

Attachment: State Law Summary

Initial Boundary Validation Program (BVP) Quick Guide

Use this Initial BVP Quick Guide to access TIGERweb and review the U.S. Census Bureau's depiction of your government's boundary.

TIGERweb is a web-based system that allows users to visualize the Census Bureau's TIGER (Topologically Integrated Geographic Encoding and Referencing) database, and provides a simple way to view the TIGER data without geographic information system (GIS) software and without downloading data.

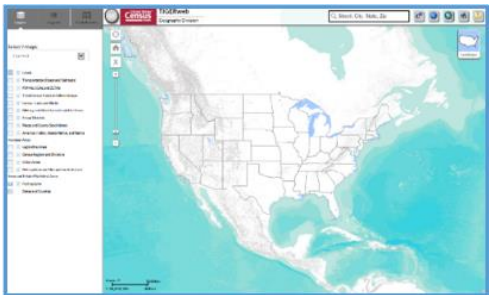
Detailed instructions for using TIGERweb are on the Boundary and Annexation Survey (BAS) website: <https://www2.census.gov/geo/pdfs/partnerships/bas/TIGERwebforBAS.pdf>.

1. **Access the TIGERweb Online Map Viewer at:** <https://tigerweb.geo.census.gov/tigerweb/>
   a. When opening the webpage, you should see a map in the center of the screen and a menu on the left hand side.

2. **Select a data vintage to view from the dropdown.**
   a. On the left hand side of the screen, select the data to view from the "Select Vintage" dropdown.
   b. Choose "**BAS2020**" from the "Select Vintage" dropdown menu.

3. **Turn on the appropriate boundary layer for your government.**
   a. Ensure the "Layers" tab is selected.
   b. Click the empty box next to the layer name of your government type to view the boundary. Layers containing legal boundaries include "American Indian, Alaska Native, and Native Hawaiian Areas", "Places and County Subdivisions", or "States and Counties". There should now be a checkmark in the box.
   c. These layers include the legal boundaries updated during the 2019 BAS.

1

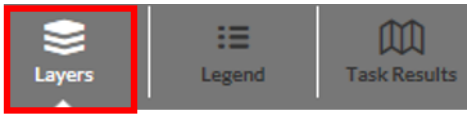


TIGERweb website

2

Vintage dropdown

3a



Layers tab

3b

Layer options

Connect with us
@uscensusbureau

For more information:
2020CENSUS.GOV

Shape your future
START HERE >

United States® Census 2020

4. **Use the Query tool to find your government boundary.**

   a. Select the icon depicting a globe and magnifying glass in the upper right hand corner to open the "Query" tool.

   b. Select the "Attribute" tab.

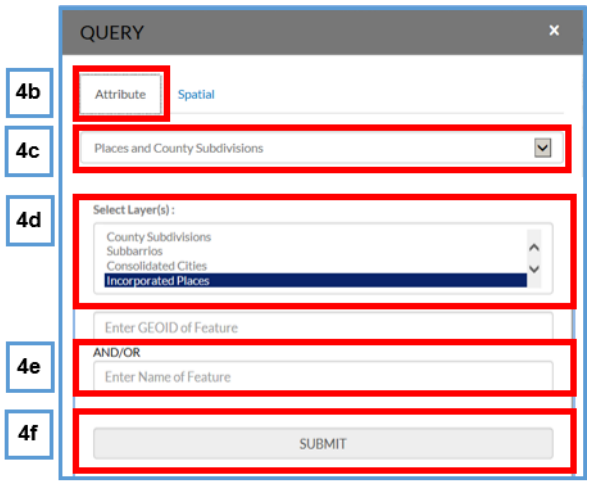
   c. Under the "Select Map" option, choose "American Indian, Alaska Native, and Native Hawaiian Areas", "Places and County Subdivisions" or "States and Counties".

   d. Under the "Select Layers" option, choose the type of government you represent to review.

   e. Enter the name of your government in the "Enter Name of Feature" box.

   f. Click "Submit".

Select Query Tool



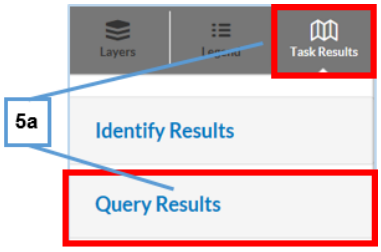
Query Tool Options

5. **Zoom to government and view boundary.**

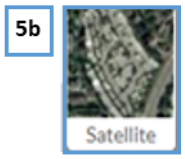
   a. Go to the "Task Results" tab on the upper right of the page and select the "Query Results". Select the name of your government to zoom to the boundary.

   b. Zoom and pan around the boundary to review by left clicking and moving the mouse.

   c. Change the map background to show terrain, landmass, or satellite imagery by clicking the background icon in the upper right of the map.



Query results



Map background options

Please work with your BAS contact to submit boundary updates by March 01, 2020 if you determine that the boundary for your government is incorrect.

For more information on Initial BVP, please visit the BVP website at <https://www.census.gov/programs-surveys/bas/information/bvp.html>, or contact the Census Bureau by email at <geo.bas@census.gov>, or by phone at 1-800-972-5651.

Connect with us
@uscensusbureau

For more information:
2020CENSUS.GOV

Shape your future
START HERE >

United States® Census 2020

2020 DIGITAL BAS PARTNERSHIP TOOLBOX

The 2020 Digital BAS Partnership Toolbox provides step-by-step instructions to facilitate the updating process. For best results, use the toolbox in ArcGIS 10.0 and higher.

1 How to Use the BAS Partnership Toolbox

In an effort to ease the burden of creating BAS updates, a toolbox was developed for ArcGIS. This toolbox simplifies the updating process by automating the downloading of data, creating changes, removing slivers, formatting and checking attribution, and preparing/exporting files for submission. Before running these tools, users will need the following:

- The BAS Partnership Toolbox, which can be downloaded at: <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html>.
- The BAS ID for the government being processed. This can be found on the BAS Annual Response email or online at: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.
- A shapefile or feature class showing the legal boundary of the government.
  - Data in this layer should have data including the name of the government being processed formatted to agree with the Census Bureau's naming convention for the same government as found in the NAME field or the NAMELSAD field for Minor Civil Division (MCD) and American Indian / Alaska Native / Native Hawaiian (AIANNH).
- The 2020 BAS Partnership Shapefiles located at: <https://www.census.gov/geographies/mapping-files/2019/geo/bas/2019-bas-shapefiles.html>.

2 Toolbox Tools Setup

These Toolbox tools were designed primarily for use in ArcCatalog though they run in ArcMap as well. The instructions for most steps are assuming use in ArcCatalog.

1. Unzip the **Digital BAS Partnership Tools.zip** to the C: drive or other preferred working folder. The folder location does not matter as long as it can be accessed from ArcCatalog. Inside there will be a folder called DBAS, containing all the files to work with for a government. Open ArcCatalog and connect to the DBAS folder. When expanded, the following should be visible:

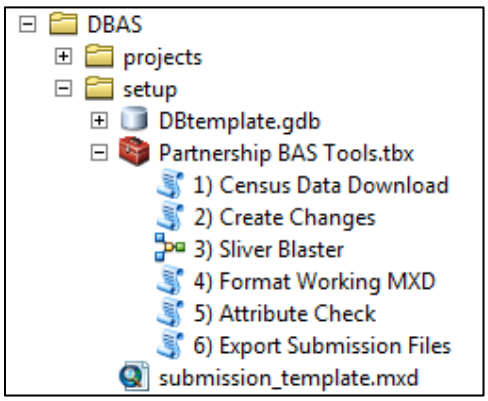


Figure 1. Partnership BAS Tools Menu

Note: To connect to a folder in ArcCatalog, click on the Connect to Folder button on the Standard Toolbar, find the DBAS folder, and then click OK.

3 Census Data Download Tool

The Census Data Download tool will gather all the partnership shapefile data needed to create changes from the Census Bureau website. If the data is on a Census Bureau provided disc, this tool will also work but only if the data is loaded to the computer before running the tool. This tool can also use the ZIP files downloaded from the 2020 BAS Partnership Shapefiles site: <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> and outlined in **Chapter 3** of the *Boundary and Annexation Survey (BAS) Respondent Guide: Digital*. Please follow the steps below to run the Census Data Download tool.

1. Expand the **DBAS folder** and the **setup subfolder**. In the setup folder, find the **Partnership Toolbox**. Expand the toolbox and double click on the **1) Census Data Download** tool.

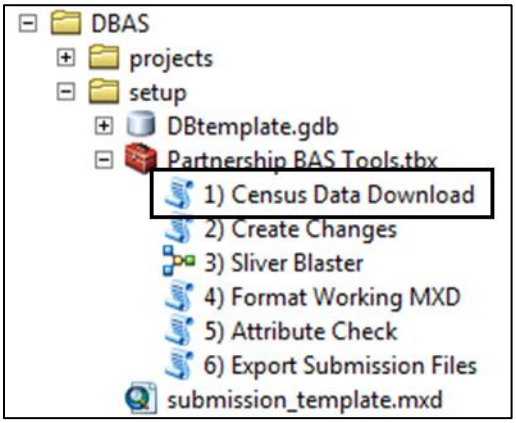


Figure 2. Partnership BAS Tools Menu with Census Data Download Selected

2. There are two ways to use this tool: one that downloads the data from the Census Bureau for the user and one that takes in a folder with the Census Bureau data already downloaded.
   - Enter the 11-digit BAS ID in the **User's BAS ID** field.
   - Select Yes or No under the **Use Data Downloader?** field. If you select No, you must enter a path to the already downloaded partnership shapefiles in the next field.
   - Navigate or drag the folder into **Path to ZIP files** field. Make sure the folder only contains the Census Bureau ZIP files to ensure there are no future data issues.

This example shows how a user would complete the fields to have data downloaded for them.

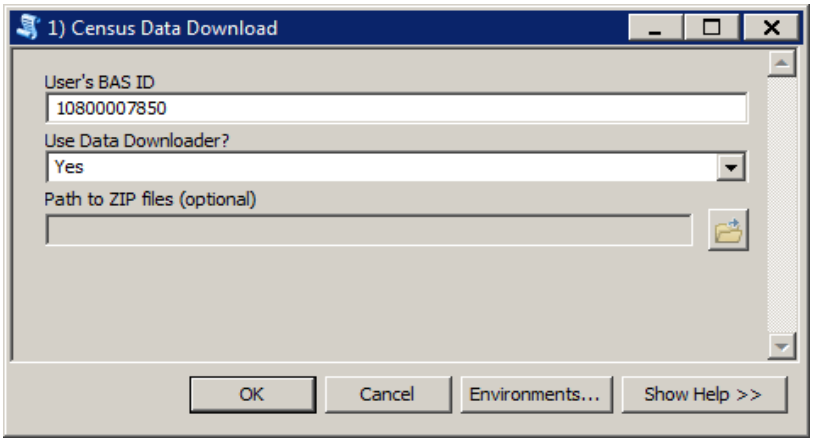


Figure 3. The Census Data Download Window with 'Yes' in the Use Data Downloader Field

This example shows how a user would complete the fields if they already have the partnership shapefiles downloaded and saved on their computer.

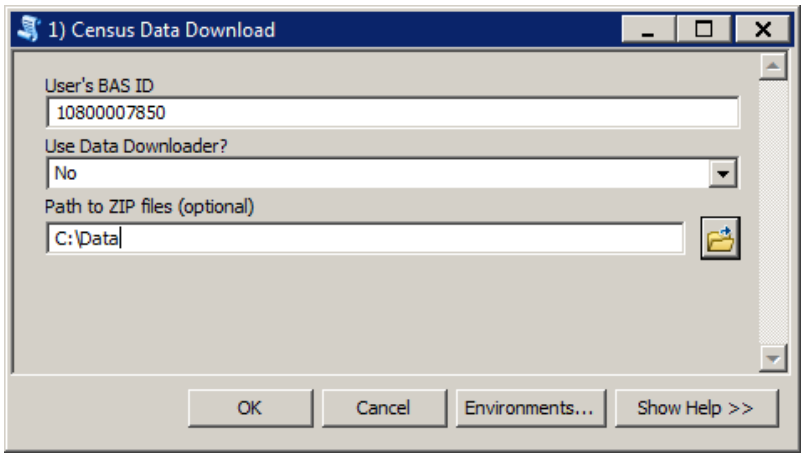


Figure 4. The Census Data Download Window with 'No' in the Use Data Downloader Field

3. Click **OK** to run.
4. When this tool is complete, there should now be a folder for the BAS ID in the projects folder. Inside that folder, there will be a geodatabase with reference data in it and an archive folder.

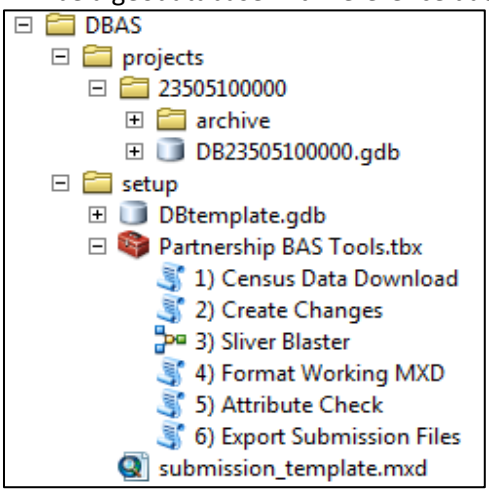


Figure 5. Partnership Tools Menu Showing a Folder for the BAS ID in the Projects Folder

Note: The archive folder contains other Census Bureau data that may be useful as well.

4 Create Changes Tool

Once the necessary Census Bureau data is obtained, run the **2) Create Changes** tool to create the change polygons. Before this tool can successfully complete, there must be an attribute field in the local boundary layer that contains the name of the government or governments as they appear in Census Bureau records (**Figure 6**). This includes matching capitalization, spacing, and in the case of MCDs a descriptor of the geography (e.g. township, village, borough, etc.) which can be found in the NAMELSAD field of the bas_cousub layer in the reference feature dataset (**Figure 7**). If it is a new entity or the legal name is changing, it does not need to agree though other attribution must be updated to reflect this change.

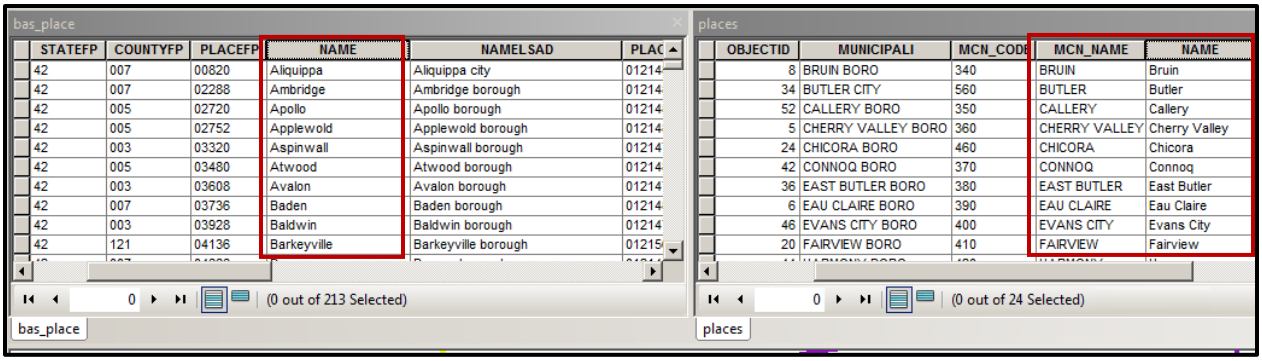


Figure 6. NAME Field in Census Data vs Local Boundary Data

The bas_place layer on the left shows how the Census Bureau NAME field is populated for all the places in Butler County, PA while the local places data shows how local data may need to be manipulated to agree with the Census Bureau NAME field.

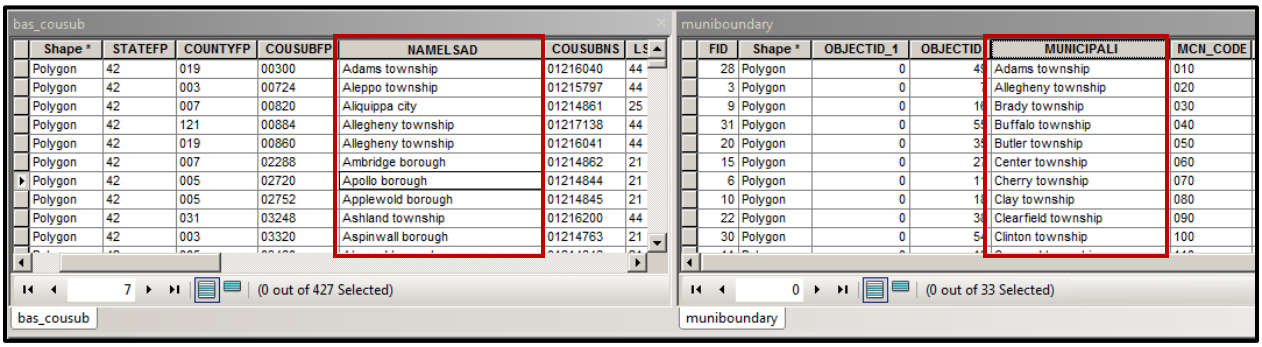


Figure 7. Appropriate Attribution for COUSUB or AIANNH Changes

The bas_cousub attribution on the left in the NAMELSAD field shows how the local MUNICIPALI field on the right should be formatted to ensure that the Create Changes tool works for the MCD changes in Butler County, PA.

1. Double click on **2) Create Changes** tool.

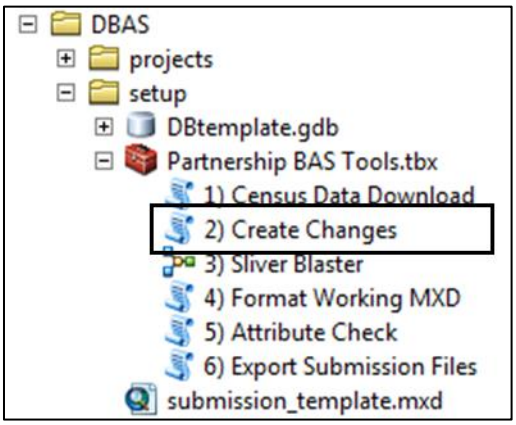


Figure 8. Partnership Tools Menu with Create Changes Tool Selected

2. In the **Create Changes** window:
   - In the **Local Boundary File** field, enter the path or navigate to the full boundary polygon.
   - Enter the 11-digit BAS ID in the **BAS ID** field.
   - Under **Changes Being Processed**, choose the type of changes to create from the dropdown options:
     a. Incplace (incorporated place).
     b. County.
     c. Cousub (MCDs).
     d. AIANNH (Tribal areas).

   - For the **Name Field in Local Data**, the boundary file may need to be modified to agree with a field in the Census Bureau's data. Type the name of the field (as it appears in ArcCatalog) containing the information matching the Census Bureau's NAME field. If processing an MCD or AIANNH file where the Census Bureau NAME field contains duplicates, match the Census Bureau's NAMELSAD.

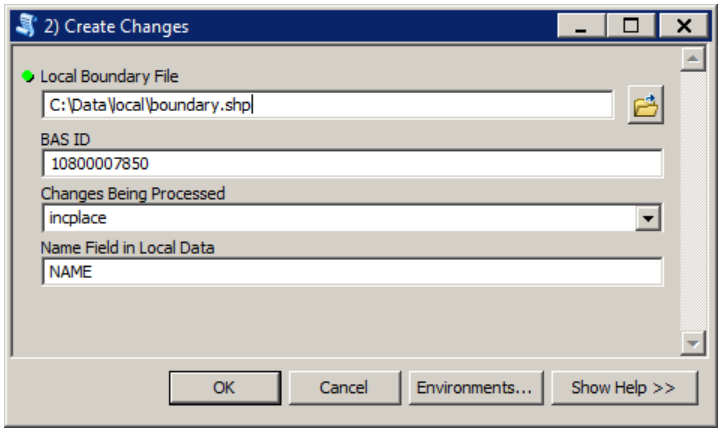


Figure 9. Create Changes Window

3. Click **OK** to run the tool.
4. Once the tool is complete, the output will be placed in the geodatabase under the submission feature dataset.

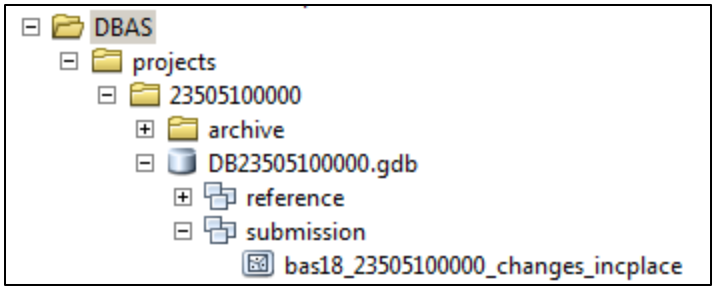


Figure 10. Partnership Tools Menu with Geodatabase

5. Repeat steps for any other levels of geography that need changes created.

5 Sliver Blaster Tool (Optional)

The Sliver Blaster tool is useful for governments that have numerous very small change polygons that are time consuming to manually parse through for deletion. Since the Census Bureau cannot guarantee inclusion of changes under 30 feet, use this tool to remove changes that are lower than that threshold. Participants can also change the tolerance for slivers if they know there are small changes that need to be included. This automated tool will vary in processing time depending on the number of features in the entity.

1. Double click on the **3) Sliver Blaster** tool.

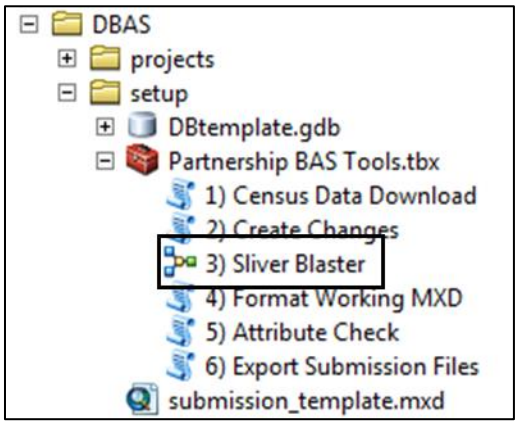


Figure 11. Partnership Tools Menu with Sliver Blaster Selected

2. In the **Sliver Blaster** tool window:
   - The **Changes File** refers to the file created in the previous step, found in the submission feature dataset.
   - The **Census Edges** feature class is found in the benchmark feature dataset and is called bas_edges.
   - The **Buffer Distance** field is set to 30 feet by default, but this can be adjusted to accommodate smaller changes.
3. Click **OK** to run.

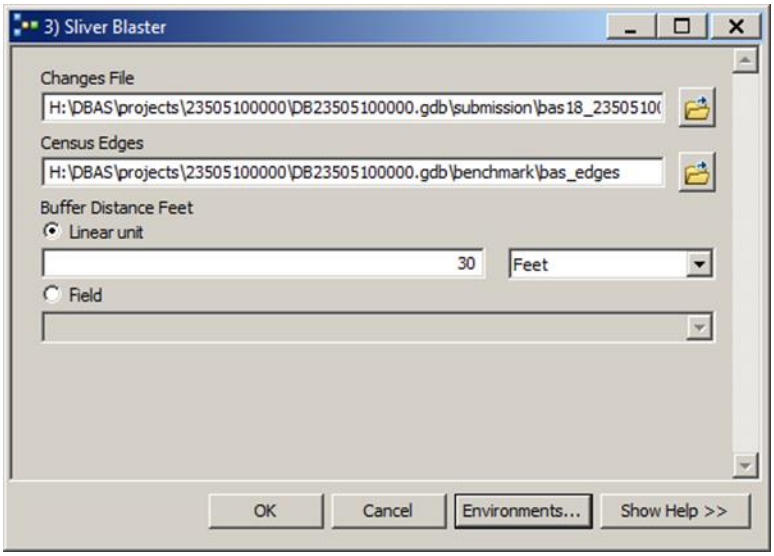


Figure 12. Sliver Blaster Window

6 Format Working MXD Tool (Optional)

The intent of this tool is to create a map document (.mxd) for users containing their change file and all of the reference layers they will need to finalize a submission. If users would prefer to use their own .mxd, this step is not required.

1. Double click on the **4) Format Working MXD** tool.

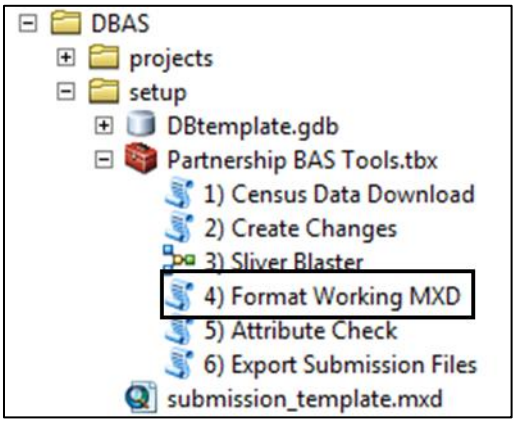


Figure 13. Partnership Tools Menu with Format Working MXD Selected

2. The only input for this tool is the **Working Folder**, which is the folder with the governments BAS ID as its name.

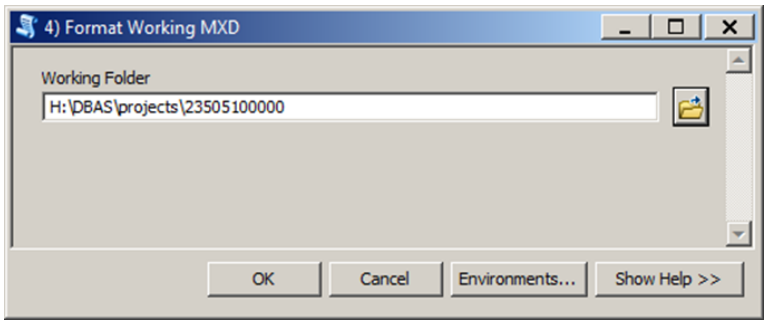


Figure 14. Format Working MXD Window

3. Click **OK** to run the tool.
4. Open the new .mxd and begin working with the change polygons.

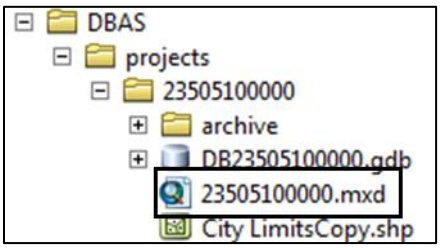


Figure 15. Projects Submenu with .mxd File Selected

7 Attribute Check Tool

This tool is used to verify that there are no inconsistencies with the data included in the submission. Run this tool during or after change polygons have been reviewed for spatial accuracy to produce a report of attribution errors (see **Section 5.6** of the *Boundary and Annexation Survey (BAS) Respondent Guide: Digital* for guidance on conducting a spatial review). It may also run for all levels of geography that have changes since it is run on each individual change file.

1. Double click on the **5) Attribute Check** tool**.**

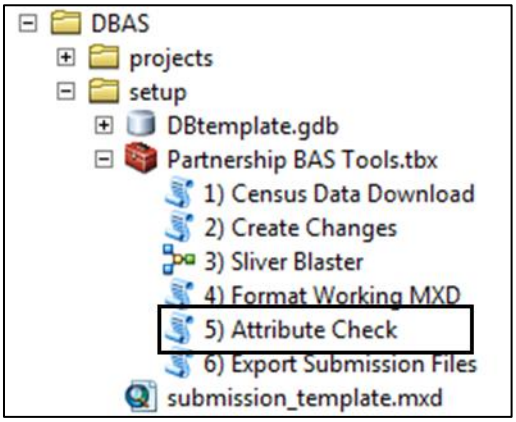


Figure 16. Partnership Tools Menu with Attribute Check Selected

2. In the **Attribute Check** window:
   - The **Change File** should be the change file created in tool **2) Create Changes** for which to generate a report.
   - In **Geography Type**, chose the type of geography being worked on from the dropdown. The same options as the Create Changes tool are available here.
   - The last input is the optional check box for **Includes Changes in Georgia**. This box only needs to be checked if responding in the state of Georgia.

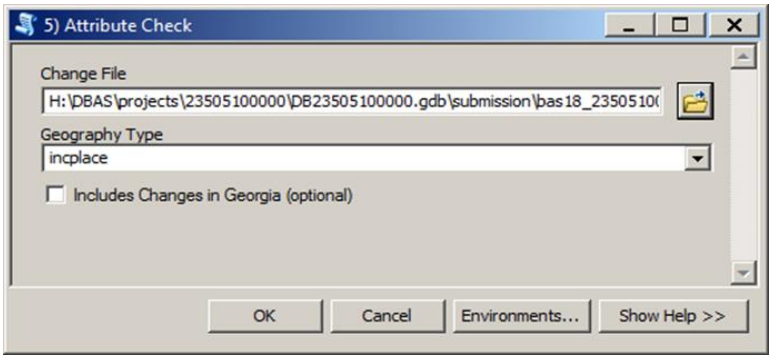


Figure 17. Attribute Check Window

3. Click **OK** to run the tool.
4. There should now be a text file in the working folder called **attribute_check_<geogtype>.txt** containing all the discrepancies identified in the change file that still need to be fixed.

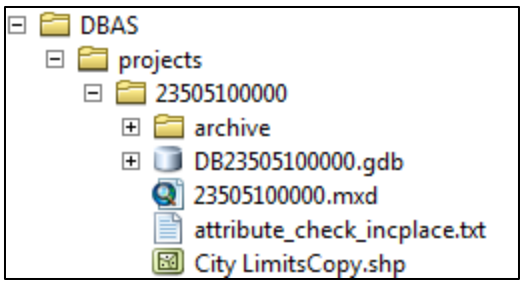


Figure 18. Projects Submenu Showing an attribute_check Text File

8 Export Submission Tool

Upon review of the changes file and the attribute error report, the finalized changes can be exported for submission to the Census Bureau. This tool can also be used to provide updated contact information with the submission.

1. Double click on the **6) Export Submission Files** tool.

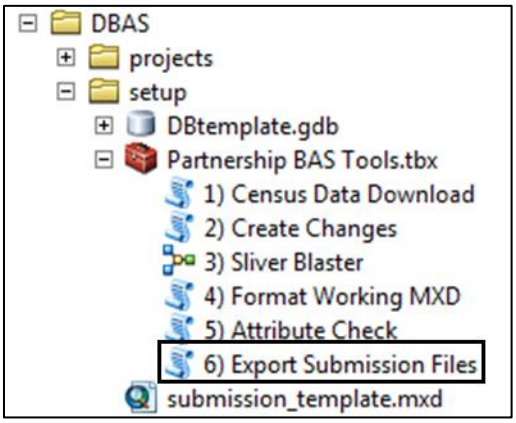


Figure 19. Partnership Tools Menu with Export Submission Files Selected

2. In the **Export Submission Files** tool window:
   - Enter the 11-digit BAS ID in the **BAS ID** field.
   - Under **Additional Files**, drag in or navigate to any additional files to be included in the submission. This can include parcel data, legal documentation, or any other helpful supporting data. This is an option;'/[field so it can also be left blank. There is no need to add 6\7the changes layers here as the tool will handle those already based on the BAS ID.
   - For **BAS Contact**, **Entity Name**, **Contact Title or Department Name**, **Address**, **Email**, and **Phone Number**, please include any or all contact information updates that are to be sent to the Census Bureau. These fields can be left blank if there are no updates, though if someone other than the BAS Contact prepared the submission, include the contact information.

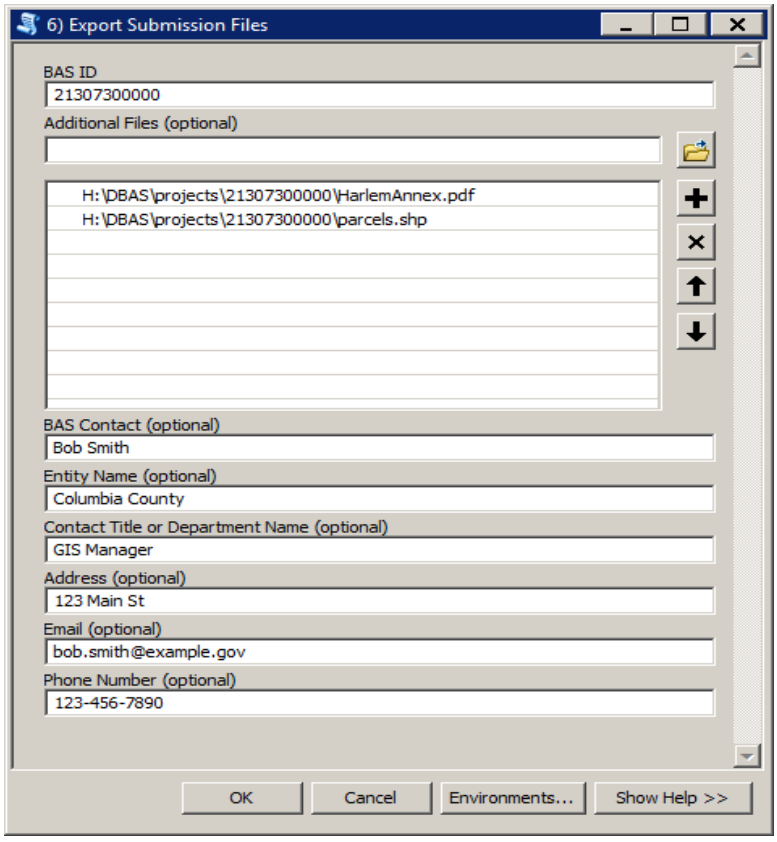


Figure 20. Export Submission Files Window

3. Click **OK** to run the tool.

9 Submitting Files through the Secure Web Incoming Module (SWIM)

The Census Bureau requires participants to submit updated BAS materials as ZIP files using the Census Bureau's **SWIM** site. Please submit only the ZIP file(s). **SWIM** is located at: <https://respond.census.gov/swim>. For instructions on how to use SWIM, see **Section 5.7.6**, **Submitting Digital Files through SWIM** of the *Boundary and Annexation Survey (BAS) Respondent Guide: Digital*.

Boundary and Annexation Survey (BAS) Respondent Guide: Digital

Instructions for Participating in the 2020 Boundary and Annexation Survey

Revised as of October 07, 2019

United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

This page intentionally left blank.

TABLE OF CONTENTS

Introduction ..... **ix**

A. The Boundary and Annexation Survey ix

B. What's New for the 2020 BAS? ix

C. Key Dates for BAS Respondents x

D. BAS State Agreements x

E. Legal Disputes x

Chapter 1 Digital BAS Requirements **1**

1.1 Digital BAS Participation Requirements 1

1.2 BAS Informational and Tutorial Videos 1

Chapter 2 Topological Relationships and Spatial Accuracy **2**

2.1 Topological Relationships in MAF/TIGER 2

2.2 GIS and Spatial Accuracy 3

2.3 Census Bureau Topology Training Video 5

Chapter 3 Census Bureau Provided Shapefiles **6**

3.1 Federal Information Processing Standards (FIPS) Codes 6

Chapter 4 Census Bureau GeoCoding **7**

4.1 MAF Structure Point (MSP) Geocoding 7

4.2 Address Range Geocoding 8

Chapter 5 Updating the Census Bureau Shapefiles **9**

5.1 General File Setup Guidelines 9

5.2 Changing the Map Projection 9

5.3 Boundary Changes 9

5.3.1 Annexations and Deannexations 10

5.3.2 Boundary Corrections 10

5.3.3 Boundary Changes to Legal Governments in Georgia and Indiana 11

5.3.4 New Incorporations 12

5.3.5 Disincorporations 12

5.3.6 Geographic Corridors 12

5.3.7 Geographic Offsets 13

5.4 Linear Feature Updates 14

5.4.1 Adding, Deleting, Renaming, and Recoding Linear Features 15

5.4.2 Address Range Updates 15
5.5 Area Landmarks, Hydrographic Areas, and Point Landmarks 15
5.5.1 Area Landmark/Hydrographic Area Updates 16
5.5.2 Point Landmark Updates 18
5.6 Reviewing Changes to the Census Bureau Shapefiles 19
5.6.1 Boundary-to-Feature Relationships 20
5.6.2 Large Boundary Corrections 22
5.6.3 Required Attribute Information 23
5.6.4 Appropriate Projection Information 23
5.6.5 Linear Feature Updates 23
5.7 Additional Information Review 24
5.7.1 Submitting Digital Data 24
5.7.2 Change Polygon Layer Naming Conventions 25
5.7.3 Whole Entity Polygon Layer Naming Conventions 26
5.7.4 Linear Feature, Area Landmark/Hydrographic Area, and Point Landmark Updates 26
5.7.5 Compressing the Digital Files 26
5.7.6 Submitting Digital Files through SWIM 28
Appendices 33
Appendix A Data Dictionary A-1
Appendix B 2020 Digital BAS Example Process 1 ..... B-1
B1 How to Use the BAS Partnership Toolbox B-1
B2 Toolbox Tools Setup B-1
B3 Census Data Download Tool B-2
B4 Create Changes Tool B-3
B5 Sliver Blaster Tool (Optional) B-6
B6 Format Working MXD Tool (Optional) B-7
B7 Attribute Check Tool B-8
B8 Export Submission Tool B-9
B9 Submitting through the Secure Web Incoming Module (SWIM) B-10
Appendix C 2020 Digital BAS Example Process 2 ..... C-1
C1 Required Census Bureau Shapefiles C-1
C2 Local Data C-1
C3 Symbolizing Layers in ArcGIS C-1

C4 Symbolizing Geographic Areas C-2
C5 Extracting Incorporated Place or MCD Data from Census Shapefiles C-2
C5.1 Filtering the Data C-3
C5.2 Exporting the Data to a New Shapefile C-3
C6 Merging Multipart Place Data C-4
C7 Creating Change Polygons C-5
C7.1 Creating Change Polygons Using Symmetrical Difference C-5
C7.2 Creating Change Polygons Using Union C-6
C8 Reviewing and Attributing Change Polygons C-8
C8.1 Examples C-9
C9 Attribute Information C-9
C9.1 To Begin Updating Attributes for Annexation C-9
C9.2 To Begin Updating Attributes for Deannexation C-10
C9.3 To Begin Updating Attributes for Geographic Corridors C-10
C9.4 To Begin Updating Attributes for Geographic Offsets C-10
C9.5 To Finish Updating Attributes C-10
C10 Renaming and Finalizing Change Polygons C-10
C10.1 Renaming the Shapefile C-11
C10.2 Submitting the shapefile C-11
C10.3 To Begin Updating Attributes for Boundary Corrections C-11
Appendix D MTFCC Descriptions D-1

LIST OF TABLES

Table 1: BAS Shapefile Naming Conventions 6
Table 2: Annexations and Deannexations 10
Table 3: Boundary Corrections 10
Table 4: New Incorporations 12
Table 5: Disincorporations 12
Table 6: Geographic Corridors 13
Table 7: Geographic Offsets 14
Table 8: Linear Feature Updates 15
Table 9. Address Range Updates 15
Table 10: Landmarks and Hydrographic Areas 16
Table 11: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas 17
Table 12: Point Landmark Updates 18
Table 13: Restricted Point Landmark MTFCC Codes 19
Table 14: Change Polygons 25
Table 15: Whole Entity Polygon Layer Naming Conventions 26
Table 16: Optional Files 26
Table 17: County and Equivalent Areas Shapefile A-1
Table 18: County Subdivisions Shapefile A-1
Table 19: Incorporated Place Shapefile A-2
Table 20: Consolidated City Shapefile A-2
Table 21: Edges Shapefile A-3
Table 22: Area Landmark Shapefile A-4
Table 23: Hydrographic Area Shapefile A-4
Table 24: Point Landmark Shapefile A-5
Table 25: Geographic Offset Shapefile A-5
Table 26: Suggested MTFCC Symbolization C-1

LIST OF FIGURES

Figure 1. Topological Integration of Four Classes 3
Figure 2. Overlay of Four Feature Classes 4
Figure 3. GIS Place Boundary Does Not Follow Road Feature 4
Figure 4. GPS Method of Geocoding 7
Figure 5. Address Range Method of Geocoding 8
Figure 6. Geographic Corridor Created 13
Figure 7. Geographic Corridor Not Created 13
Figure 8. Cadastral Data 14
Figure 9. Same Data Edited to Census Requirements 14
Figure 10. A Boundary Correction to Park A 16
Figure 11. Boundary Corrections Not Snapped to Existing Linear Features 20
Figure 12. Annexation Created without Snapping to Centerlines 21
Figure 13. Small Spatial Correction Not Incorporated 21
Figure 14. Small Spatial Correction Not Accepted 22
Figure 15. Large Boundary Corrections 22
Figure 16. New Road Features, Not Added to Existing Road 23
Figure 17. New Road Features, Correctly Added 23
Figure 18. Selecting and Zipping Return Files 27
Figure 19. Naming the ZIP File 28
Figure 20. SWIM Account Registration 29
Figure 21. SWIM Login Window 30
Figure 22. Welcome Screen with Upload History 30
Figure 23. Geographic Partnership Program Selection Window 30
Figure 24. Geographic Level Selection Window 31
Figure 25. Government Selection Window 31
Figure 26. File Upload Screen 31
Figure 27. File Browser Dialog Box 32
Figure 28. Entering Comments into the File Upload Window 32
Figure 29. Thank You Screen 32

Figure 30. Partnership BAS Tools Menu B-1
Figure 31. Partnership BAS Tools Menu with Census Data Download Selected B-2
Figure 32. The Census Data Download Window with 'Yes' in the Use Data Downloader Field.. B-2
Figure 33. The Census Data Download Window with 'No' in the Use Data Downloader Field .. B-3
Figure 34. Partnership Tools Menu Showing a Folder for the BAS ID in the Projects Folder..... B-3
Figure 35. NAME Field in Census Data vs Local Boundary Data B-4
Figure 36. Appropriate Attribution for COUSUB or AIANNH Changes B-4
Figure 37. Partnership Tools Menu with Create Changes Tool Selected B-4
Figure 38. Create Changes Window..... B-5
Figure 39. Partnership Tools Menu with Geodatabase B-5
Figure 40. Partnership Tools Menu with Sliver Blaster Selected..... B-6
Figure 41. Sliver Blaster Window B-6
Figure 42. Partnership Tools Menu with Format Working MXD Selected B-7
Figure 43. Format Working MXD Window..... B-7
Figure 44. Projects Submenu with mxd file Selected B-7
Figure 45. Partnership Tools Menu with Attribute Check Selected B-8
Figure 46. Attribute Check Window B-8
Figure 47. Projects Submenu Showing an attribute_check Text File B-9
Figure 48. Partnership Tools Menu with Export Submission Files Selected..... B-9
Figure 49. Export Submission Files Window B-10

This page intentionally left blank.

INTRODUCTION

A. The Boundary and Annexation Survey

The U.S. Census Bureau conducts the Boundary and Annexation Survey (BAS) annually to collect information about selected legally defined geographic areas, such as counties (and equivalent areas), incorporated places, minor civil divisions (MCDs), federally recognized American Indian Areas (AIAs) — including reservations, off-reservation trust lands and tribal subdivisions, and Hawaiian Homelands. BAS also provides an opportunity for participants to review the names and geographic relationships for these areas. Title 13, Section 6, United States Code authorizes this survey.

The Census Bureau uses the boundary information collected during BAS to tabulate data for the decennial and economic censuses, and to support the yearly delivery of the Population Estimates Program (PEP) and the American Community Survey (ACS) data. Maintaining correct boundaries and boundary-to-feature relationships through BAS helps ensure that the Census Bureau assigns the appropriate housing and population counts to each government.

In compliance with the Office of Management and Budget Circular A-16, BAS supports the Census Bureau's spatial data steward responsibilities for the Federal Geographic Data Committee (FGDC) and the Geospatial One-Stop by updating the inventory and boundaries of governments.

In addition, BAS is the source of up-to-date information on changes to the boundaries, codes and names of incorporated places, MCDs, counties (and equivalent areas), Hawaiian Homelands, and federally recognized AIAs, which include reservations and off-reservation trust lands used by the U.S. Geological Survey (USGS), the National Map, and the Geographic Names Information System (GNIS).

Please visit the BAS program website at <https://www.census.gov/programs-surveys/bas.html>.

For more information on BAS, please view the BAS video series on the Census Bureau's BAS website at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

B. What's New for the 2020 BAS?

1. The Boundary Validation Program (BVP) runs in parallel with the 2020 BAS. The BVP provides Tribal Chairs (TCs) and Highest Elected Officials (HEOs), of tribal, state, and local governments, the opportunity to review the Census Bureau's boundary data to ensure the Census Bureau has the correct legal boundary, name, and status information for eligible governments across the United States. For more information on the BVP, please visit the BVP website at: <https://www.census.gov/programs-surveys/bas/information/bvp.html>.
2. The 2020 BAS is the final opportunity for tribal, state, and local governments to provide legal boundary, name, and status information updates prior to 2020 Census data tabulation.

3. The Census Bureau developed a BAS Partnership Toolbox for ArcGIS users. This toolbox is designed to simplify and standardize the BAS updating process. The toolbox and additional information can be found at <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html> or refer to **Appendix B** for a step-by-step guide to using this new tool.

C. Key Dates for BAS Respondents

January 1, 2020—Boundary changes must be legally in effect on or before this date to be reported in the current survey year and to be used for the 2020 Census data tabulations. Boundary updates effective after this date will be held until the following BAS cycle.

March 1, 2020— Boundary updates returned by this date will be reflected in the 2020 Census, the Final BVP materials, and in next year's BAS materials.

May 31, 2020—Boundary updates returned by this date will be reflected in the 2020 Census and in next year's BAS materials.

D. BAS State Agreements

The Census Bureau has established a number of agreements with states for reporting boundary changes. Please visit the BAS State Agreements webpage within the BAS program website at <https://www.census.gov/programs-surveys/bas/information/state-agreements.html> or call **1-800-972-5651** for information regarding state agreements.

Note: The Census Bureau can only establish BAS state agreements for states that require local governments to report boundary changes to a state agency.

E. Legal Disputes

If the Census Bureau discovers that an area of land is in dispute between two or more jurisdictions, the Census Bureau will not make any boundary corrections until the parties come to a written agreement, or there is a documented final court decision regarding the dispute. To learn more, please contact the Census Bureau Legal Office at **1-301-763-9844**.

For disputes involving tribal areas, the Census Bureau must defer to the Office of the Solicitor at the Department of the Interior for a legal opinion. Often complicated land issues require an extended period of time for resolution, and in those cases, the Census Bureau will retain the current boundary in the database until a legal opinion is issued by the Solicitor's office.

CHAPTER 1 DIGITAL BAS REQUIREMENTS

1.1 Digital BAS Participation Requirements

1. All participants must create a new shapefile of boundary change polygons based off the current Census Bureau boundary. Submissions containing only a whole entity boundary shapefile of the current local data will not be accepted.
2. All participants must provide current information for the BAS point of contact, the person updating the shapefiles, and the HEO for the government.
3. All participants must provide legal documentation numbers and effective dates for all legal boundary changes (annexations and deannexations).
4. Each non-legal boundary correction must contain proper update documentation according to boundary correction guidelines listed below, or the Census Bureau will not make the correction for this BAS cycle.
5. All participants must use the Secure Web Incoming Module (SWIM) to submit their changes to the Census Bureau. Due to security requirements, the Census Bureau cannot accept submissions via File Transfer Protocol (FTP), email or any protocol other than the SWIM site. For details on registering and using SWIM, please see **Section 5.7.6, Submitting Digital Files via SWIM**. To access SWIM, enter the following URL in a new browser window: <https://respond.census.gov/swim/>.

1.2 BAS Informational and Tutorial Videos

The Census Bureau created training videos to give BAS participants detailed instructions and information on how to report and submit BAS changes. These videos are available on the BAS website at: <https://www.census.gov/programs-surveys/bas/library/videos.html>.

If there are any questions or concerns about the participation requirements, contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov.

For participants already familiar with GIS and BAS updating procedures, **Appendix B** and **Appendix C** provide step-by-step guidelines for making updates.

CHAPTER 2 TOPOLOGICAL RELATIONSHIPS AND SPATIAL ACCURACY

The Geography Division of the Census Bureau is responsible for developing geographic applications and executing related activities needed to support the Census Bureau in collecting and disseminating census data. For more than twenty years, the Census Bureau's Master Address File and Topologically Integrated Geographic Encoding and Reference (MAF/TIGER) System has been a critical resource for supporting the Census Bureau Geographic Partnership Programs.

The following section will describe how the Census Bureau uses a topologically integrated system and how this differs from traditional GIS, which use separate layers of data.

2.1 Topological Relationships in the MAF/TIGER System

At the Census Bureau, topology is described as the spatial relationship between different levels of geography. The MAF/TIGER system is a geographic database in which the topological structures define the location, connection, and relationships of streets, rivers, railroads, and other features. These topological structures help define the geographic areas for which the Census Bureau tabulates data.

Instead of having a separate layer for each feature class (roads, boundaries, etc.), all MAF/TIGER system information is stored in one layer or file**.** See **Figure 1** for a sample of a topologically integrated file in the MAF/TIGER system.

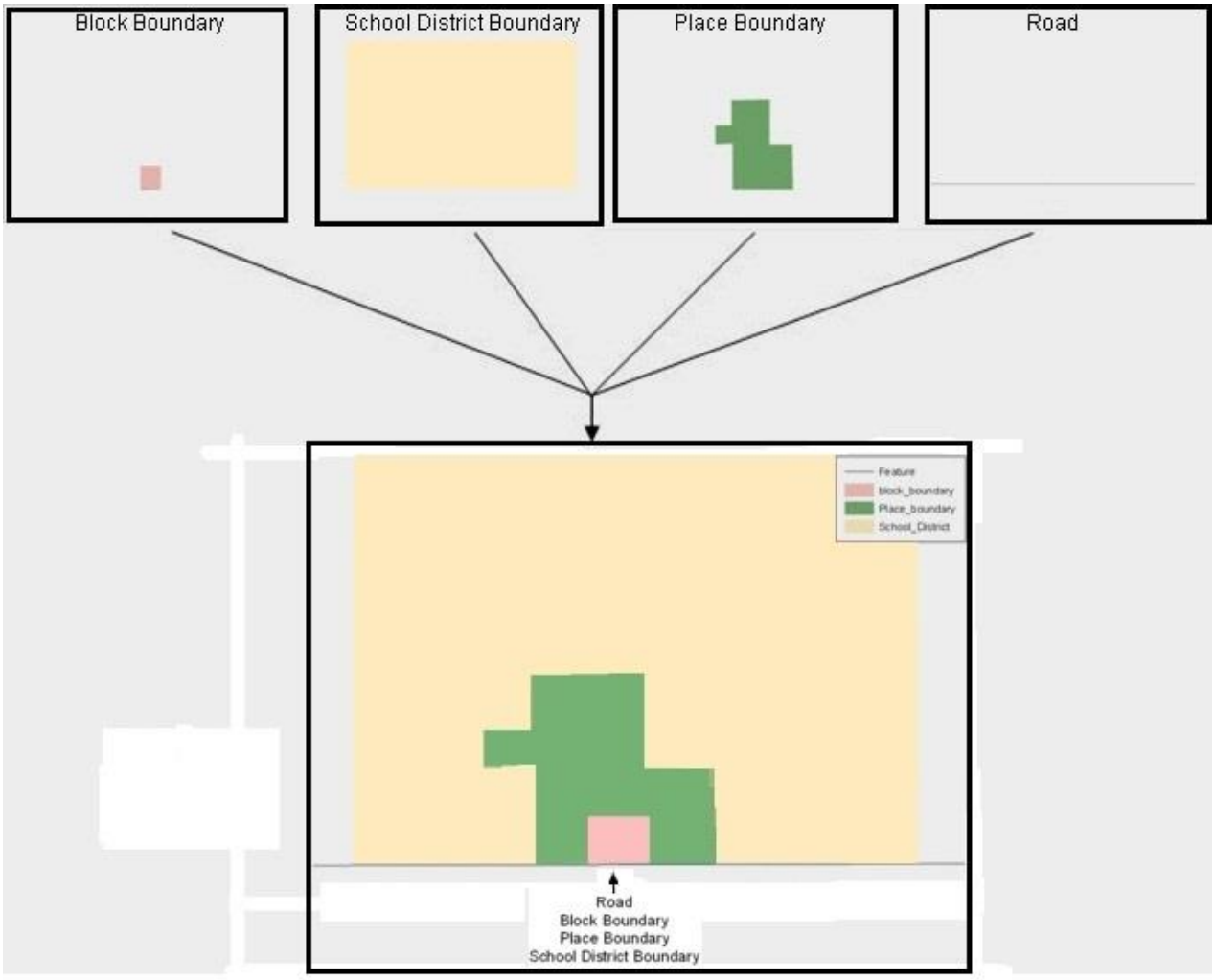


Figure 1. Topological Integration of Four Classes

This example shows the topological integration of four different feature classes into one layer. One road feature represents not only a road, but also a block boundary, place boundary, and a school district boundary.

2.2 GIS and Spatial Accuracy

In a GIS, feature classes are often not topologically integrated; they are separated into individual layers. When these layers are overlaid in a GIS, there may be boundary misalignments due to the nature of the data. These non-topologically integrated layers could cause issues in the MAF/TIGER system. **Figure 2** and **Figure 3** show how files that are not topologically integrated might appear in a GIS when overlaid.

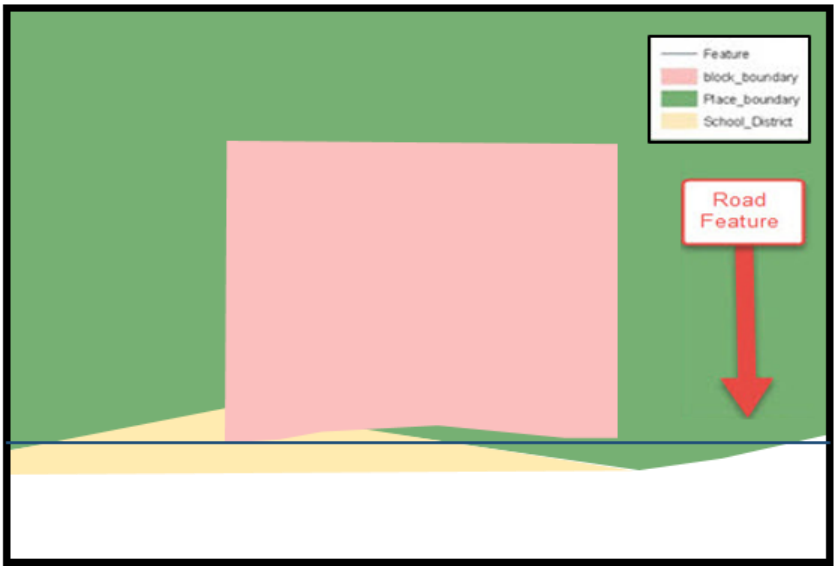


Figure 2. Overlay of Four Feature Classes

This example shows an overlay of four different feature classes. Notice how the topological relationship is compromised. The block, place, and school district boundaries, which are supposed to follow the road feature, are no longer aligned with the road in several locations.

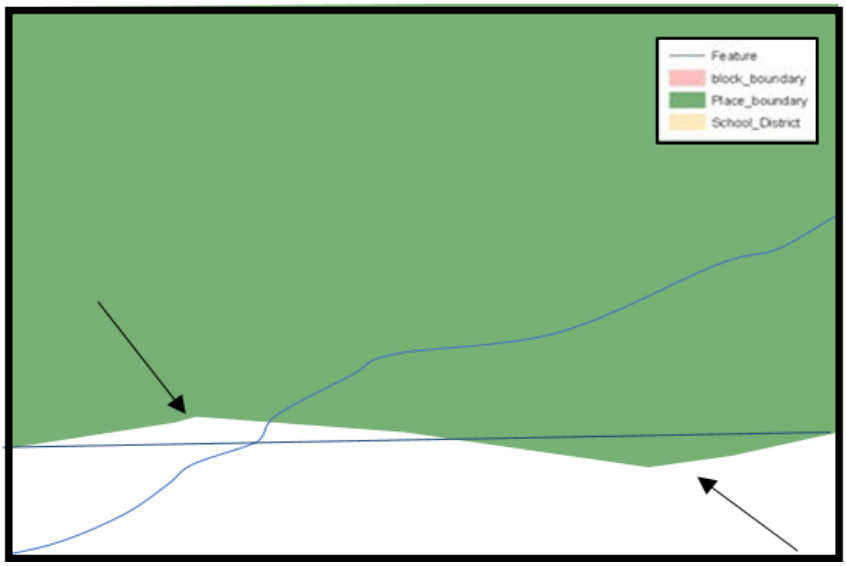


Figure 3. GIS Place Boundary Does Not Follow Road Feature

This example shows a situation where a local GIS place boundary does not follow a road feature. Assuming that the boundary follows the road feature in the MAF/TIGER system, changing the Census Bureau place boundary to match the local file exactly and become misaligned (see arrows) would dissolve the topological relationship in the MAF/TIGER system.

The spatial differences between local GIS data and the Census Bureau's topologically integrated file are often very small (less than ten feet) and can create boundary-to-feature relationship issues for the Census Bureau. Instructions on how to review digital submissions for small spatial boundary corrections are given in **Section 5.6: Reviewing Changes to the Census Bureau Shapefiles**. It also lists some of the potential consequences of making spatial boundary corrections that dissolve the topological relationships present in the MAF/TIGER system.

To find step-by-step instructions of suggested methods for correctly making boundary changes, please see **Appendix B** and **Appendix C**.

2.3 Census Bureau Topology Training Video

The Census Bureau created a video on the subject of topology and why topology is important to BAS. For more information, please go to <https://www.census.gov/programs-surveys/bas/library/videos.html> to watch the video.

CHAPTER 3 CENSUS BUREAU PROVIDED SHAPEFILES

The Census Bureau provides data layers in Esri shapefile format for download on the BAS website. Regardless of the number of geographic polygon-based shapefiles each participant downloads and edits, there is only one shapefile for the linear feature network for each county. See **Table 1** for the names of the shapefiles.

Table 1: BAS Shapefile Naming Conventions

Government Type	Shapefile Naming Convention
County	PVS_19_v2_county_<ssccc>.shp
Minor Civil Division	PVS_19_v2_mcd_<ssccc>.shp
Incorporated Place	PVS_19_v2_place_<ssccc>.shp
Consolidated City	PVS_19_v2_concity_<ssccc>.shp
Edges (Roads, Rail, Hydro, etc.)	PVS_19_v2_edges_<ssccc>.shp
Area Landmarks	PVS_19_v2_arealm_<ssccc>.shp
Point Landmarks	PVS_19_v2_pointlm_<ssccc>.shp
Hydro Area	PVS_19_v2_water_<ssccc>.shp
Geographic Offsets / Corridors	PVS_19_v2_offset_<ssccc>.shp

Please download shapefiles from the BAS website at <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> in order to review the boundaries and submit changes.

Note: <ssccc> represents the two-digit state FIPS code and three-digit county FIPS code.

All shapefiles provided by the Census Bureau are in the following unprojected geographic-based coordinate system:

- Geographic Coordinate System – North American Datum 1983 (GCS NAD83).
- Angular Unit: Degree (0.0174532925199433299).
- Prime Meridian: Greenwich (0.000000000000000000).
- Datum: D_North_American_1983.
- Spheroid: GRS_1980.
- Semi-major Axis: 6378137.000000000000000.
- Semi-minor Axis: 6356752.314140356100000000.
- Inverse Flattening: 298.257222101000020000.

3.1 Federal Information Processing Standards (FIPS) Codes

The Census Bureau recommends using FIPS codes to identify governments such as counties, MCDs, and incorporated places. Using a standard coding scheme facilitates the digital exchange of data. The Census Bureau includes these codes in the BAS shapefiles in the fields that end in 'FP'. The codes can be found online at <http://geonames.usgs.gov/domestic/download_data.htm>. If there are any questions or problems, contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov.

CHAPTER 4 CENSUS BUREAU GEOCODING

Geocoding is how the Census Bureau codes the location of the population within the legal boundaries of a geographic area. There are two primary methods of geocoding used by the Census Bureau, and both of these involve coding an address to a spatial polygon. One uses Global Positioning System (GPS) technology to create a Master Address File (MAF) structure point (MSP) and the other uses address ranges for geocoding.

4.1 MAF Structure Point (MSP) Geocoding

A field worker stands in front of a house or living quarters, and records the physical location with a GPS device (**Figure 4**). Usually, the GPS point should fall very close to the front door of the house. However, since GPS points were collected in the field, real-world obstacles like locked fences, poor satellite reception, or even aggressive dogs might sometimes prevent the worker from gaining access to the front door. In these circumstances, the worker may have to take the GPS coordinate from the sidewalk or side of the road.

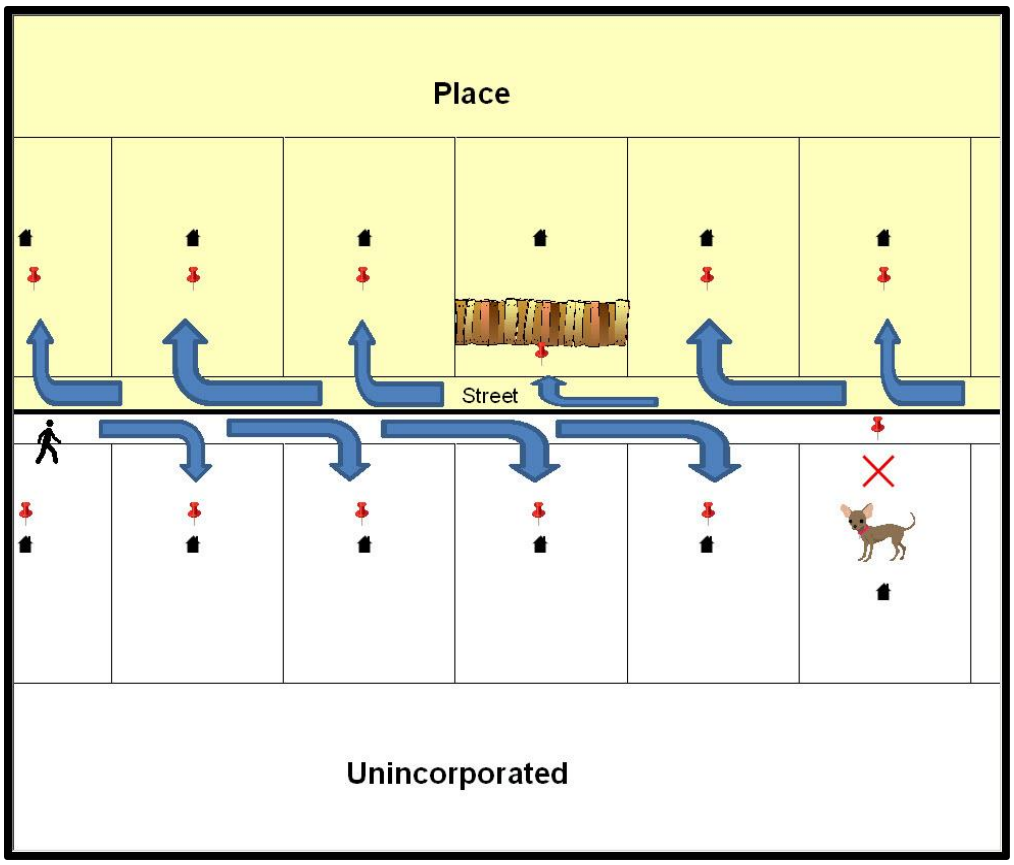


Figure 4. GPS Method of Geocoding

Notice that it is occasionally not possible for the field worker to go all the way to the front door due to unforeseen circumstances, like the fence or the dog shown above. Thus, the MSP (represented here by the red pins) can sometimes fall within the road or the road right-of-way.

4.2 Address Range Geocoding

When no MSP is available, the Census Bureau codes houses and living quarters according to a potential range of addresses associated with the adjacent stretch of road (**Figure 5**).

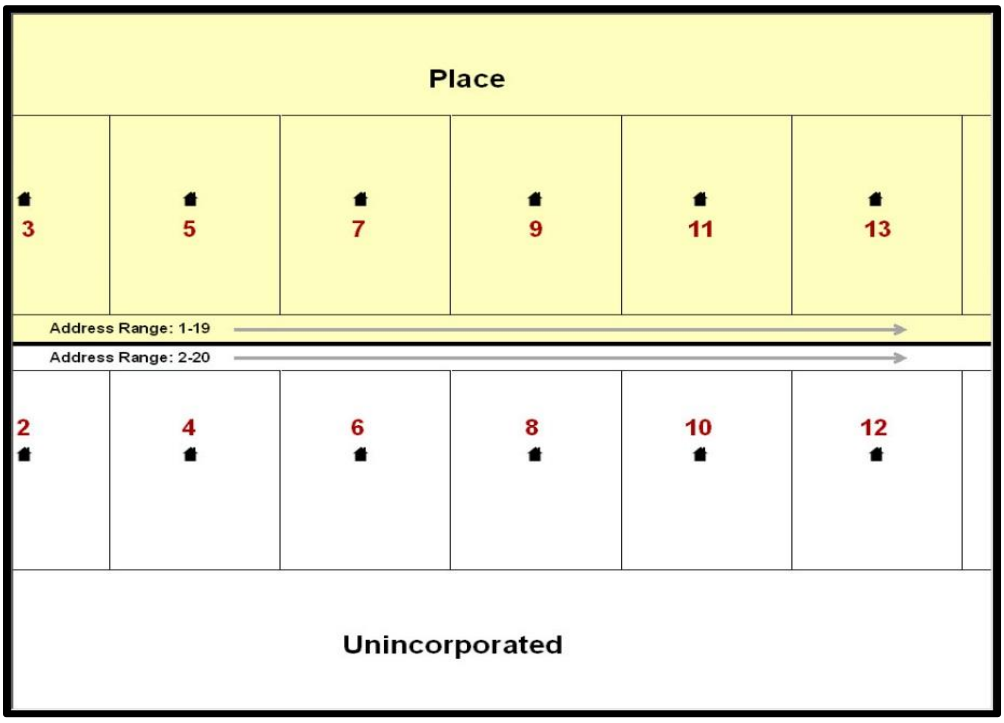


Figure 5. Address Range Method of Geocoding

When it is not possible to collect an MSP, houses are geocoded according to their placement along a range of potential addresses along that road. Since the address has a relationship with the road, boundaries placed on front-lot-lines will lead to mis-geocoding unless an offset flag is used.

While the two methods of geocoding differ greatly, both rely heavily on the integrated nature of the MAF/TIGER System. These geocoding methods are affected by the way streets and boundaries are represented in relation to one another. This interdependence between streets, boundaries, and geocoding means that Census Bureau representations of legal boundaries may sometimes differ from other representations (e.g., in local or state GIS). This is especially true regarding geographic corridors and offsets that follow road right of ways (or the front-lot-lines of parcels). In both of the examples above, delineating a boundary along the front-lot-line will tend to increase the risk of incorrect geocoding. As a result, using the road centerline as a boundary is the safer method.

When completing a BAS submission in which a road or road right-of-way is owned or maintained by a place but the adjacent housing is not, the respondent should use the centerline of the road (not the front-lot-line) as the boundary whenever possible. If local or state law requires the use of the front-lot-line boundary, the respondent must explicitly designate the polygon(s) between the road centerline and the front-lot-boundary as a corridor or an offset (see **Section 5.8, Geographic Corridors** and **Section 5.9, Geographic Offsets** of this document for more details).

CHAPTER 5 UPDATING THE CENSUS BUREAU SHAPEFILES

Census Bureau shapefiles downloaded from the partnership verification shapefiles (PVS) download page can be used to create new shapefiles for boundary and/or linear feature changes that have occurred since the last BAS update. Step-by-step instructions for these procedures can be found in **Appendix B** and **Appendix C** and in the videos at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

Note: If there are problems with the processing of returned files, the Census Bureau will email a feedback document requesting clarification of any issues. If the problem cannot be resolved before the project deadline, the changes in question will not be made during the current BAS.

5.1 General File Setup Guidelines

After downloading the shapefiles from the PVS download page, follow these procedures before beginning actual updates:

- Open the downloaded ZIP file to verify its contents.
- Copy the shapefiles into a directory on a server/hard drive.
- Open the shapefiles with GIS software.

5.2 Changing the Map Projection

Census Bureau files are in GCS NAD83 format and can be projected into any local coordinate system/projection. Most GIS software packages will allow users to transform file coordinate systems and projections. For example, if using ArcGIS, use its **'Project tool'** in **ArcToolbox**. Shapefile extracts contain defined projection information in the *.prj file. ArcGIS accesses the *.prj file for projection information so there is no need to define these parameters before changing the file coordinate systems.

When updates are complete, participants may submit the boundary change shapefile using any local coordinate system/projection if the shapefile contains a *.prj file or spatial reference materials such as metadata.

5.3 Boundary Changes

In order to update the MAF/TIGER system, participants must create a separate change polygon layer for each updated government type (county, MCD, place). Please create change polygons in relation to the current MAF/TIGER boundary.

Appendix B and **Appendix C** provide two examples for creating annexation and deannexation, boundary correction, new incorporation, geographic corridor, and geographic offset change polygons. See **Appendix C** for specific tools used to make changes to files.

Additionally, **Appendix B** covers the steps required to complete a submission using the new BAS Partnership Toolbox. The toolbox includes tools to download Census Bureau data, use the geoprocessing tool to create a changes layer containing all the differences between Census

Bureau and local boundaries, and create a ZIP file for submission through SWIM. Please review any boundary change polygons before submitting them (**Section 5.7, Additional Information Review**).

5.3.1 Annexations and Deannexations

The Census Bureau will accept annexations and deannexations from counties, MCDs, and incorporated places. For a boundary change to an existing legal government (or the new incorporation or disincorporation of a legal government) to be processed as a legal change, participants must provide the legal documentation number (e.g., law or ordinance number), effective date, and authorization type. They are not required to submit paperwork documenting the change.

Each annexation or deannexation change polygon must have the required attributes and corresponding change type populated, as seen in **Table 2**. The Census Bureau will snap any annexation or deannexation to a MAF/TIGER feature when it exists within **thirty** feet of that feature.

Note: Enter the name of the jurisdiction annexing or deannexing the area in the NAME field.

Table 2: Annexations and Deannexations

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU (Not Required in GA)	AREA (Required in GA)	RELATE
Annexation	X	X ('A')	X	X	X	* See Note	
Deannexation	X	X ('D')	X	X	X	* See Note	

(**Note:** 'X' = Required Field)

Note: Area in acres is required for Georgia, and requested for all other areas.

5.3.2 Boundary Corrections

The Census Bureau will also accept specific boundary corrections from counties, MCDs, and incorporated places. As with annexations and deannexations, the participant must create individual change polygons for each boundary correction. Each boundary correction must also have the required attributes and corresponding change type populated, as seen in **Table 3**, or the Census Bureau will reject them.

Note: Enter the name of the jurisdiction the boundary correction is for in the NAME field.

Table 3: Boundary Corrections

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Boundary Correction	X	X ('B')					X ('IN', 'OUT')

(**Note:** 'X' = Required Field)

The Census Bureau uses a topologically integrated database. As a result, the Census Bureau cannot process all types of boundary corrections for inclusion in the MAF/TIGER system. The Census Bureau **will** accept and process properly documented boundary corrections during the current BAS cycle that spatially interact with (abut) other BAS legal changes (annexation, deannexation, corridor, offset) and meet both of the following two conditions:

- In situations where the existing boundary has been digitized incorrectly or appears in the incorrect location due to Census Bureau activities.
- Where the overall shape of the geographic area is maintained and no feature-to-boundary relationships are dissolved.

The Census Bureau **will reject** boundary corrections:

- Along county boundaries unless there is a written agreement between the two counties that documents the correct location of the boundary.
- Between adjacent incorporated places or adjacent MCDs unless the county submitting the changes is part of a Consolidated BAS (CBAS) agreement or there is a written agreement between the two incorporated places or MCDs.
- That dissolve boundary-to-feature relationships (roads, rivers, railroads, etc.) if the difference is less than thirty feet.
- Which are greater than one square mile, or not contiguous with the rest of the government boundary. These boundary corrections may be part of annexations that were never reported to the Census Bureau. If they are previously unreported boundary changes, please include effective dates and legal documentation numbers for these changes; or
- That have a width of less than thirty feet over the entire polygon.

Note: Remember that the Census Bureau will snap any boundary correction to a MAF/TIGER feature when it exists within thirty feet of that feature.

5.3.3 Boundary Changes to Legal Governments in Georgia and Indiana

For questions about required documentation for a particular jurisdiction, contact the Census Bureau by phone at **1-800 972-5651** or by email at geo.bas@census.gov.

Georgia: Any legal boundary change made to an incorporated place in the state of Georgia must include: (1) the effective date and (2) the acreage of the legal change. In addition, before entering the change, ensure that all annexation/deannexation information has been reported to the Department of Community Affairs (DCA). The DCA provides the Census Bureau a list of the governments that reported boundary changes each year. Any legal boundary changes to incorporated places not on this list will not be placed in the MAF/TIGER System. For additional information, see: <https://www.census.gov/programs-surveys/bas/technical-documentation/methodology/state-agreements.html>.

Indiana: Per Indiana state law, counties must provide the legal boundary updates for townships. For more information, refer to Indiana Code 36-6 Government of Townships at <http://iga.in.gov/legislative/laws/2019/ic/titles/036>.

5.3.4 New Incorporations

Participants may submit new incorporations for incorporated places and MCDs through Digital BAS. As with other change types, an individual change polygon must be created for each new incorporation and possess the required attributes and the corresponding change type field must be populated (see **Table 4**). Participants should also provide the new incorporation paperwork (which should include the date of incorporation) as well as information for the HEO and BAS contact of the newly incorporated government.

Note: Enter the name of the new jurisdiction in the NAME field. For required documentation for new incorporations, contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov.

Table 4: New Incorporations

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
New Incorporation	X	X ('E')	X	X	X		

(**Note:** 'X' = Required Field)

5.3.5 Disincorporations

Participants may submit disincorporations through Digital BAS. As with other change types, an individual change polygon must be created for each disincorporation and must possess the required attributes. The corresponding change type must be populated as shown in **Table 5**. Participants should also provide the official disincorporation paperwork, which should include the official date of disincorporation.

Table 5: Disincorporations

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Disincorporation	X	X ('X')	X	X	X		

(**Note:** 'X' = Required Field)

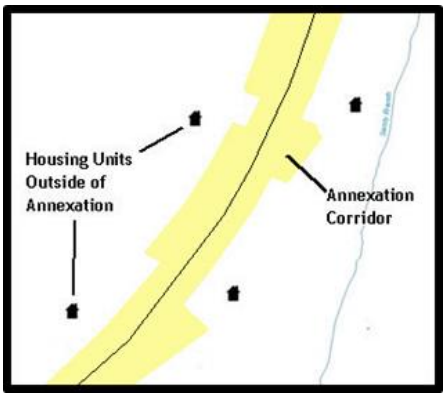
5.3.6 Geographic Corridors

The Census Bureau geocodes addresses based on the street centerline. If the geocoding of these addresses would result in the assignment of population to the incorrect government, participants should create a geographic corridor.

A **geographic corridor** is an area that includes only the road right-of-way and does not contain any structures addressed to either side of the street. **Figure 6** shows a corridor (shown in color) created where the incorporated place owns the right-of-way but the housing units are not included in the incorporated place. These are often used to connect two disconnected parts of a geography when local law does not permit for discontinuous annexations.

Figure 7 shows that the right-of-way belongs in the unincorporated area, while the housing units are included in the incorporated place (shown in color). This is important for some cities because they are portraying that the city is not responsible for road maintenance.

This is not relevant for Census Bureau tabulations and is not easy to depict in the MAF/TIGER system. This type of corridor should not be included in a BAS response.



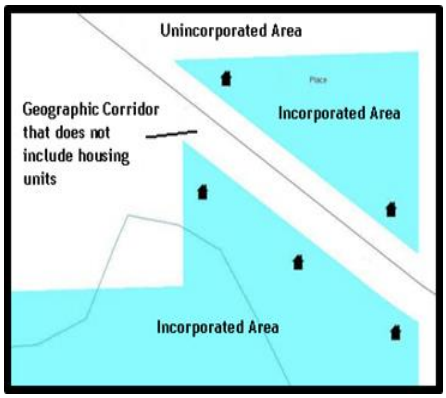


Figure 6. Geographic Corridor Created

Figure 7. Geographic Corridor Not Created

The image on the left (Figure 6) shows that a geographic corridor should be created to allow for proper geocoding of homes. The image on the right (Figure 7) shows that the geographic corridor should not be created and features should be snapped to the street centerline.

The Census Bureau will accept new geographic corridors. Please create individual change polygons for each new geographic corridor. Each change polygon must have the required attributes and corresponding change type populated, as seen in **Table 6**. In the **NAME** field, enter the name of the jurisdiction gaining or losing the area associated with the corridor. In the **RELATE** field, indicate whether the change is adding IN or taking OUT (removing) the corridor.

Table 6: Geographic Corridors

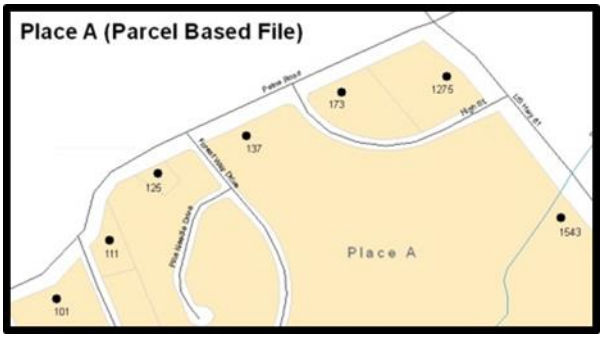
	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Geographic Corridor	X	X ('C')					X ('IN', 'OUT')

(**Note:** 'X' = Required Field)

5.3.7 Geographic Offsets

A **geographic offset** is an area claimed by a government that is only on one side of a road and does not include structures addressed to that side of the road.

The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping. The Census Bureau bases their maps on spatial data that is topologically integrated. This makes the maintenance of geographic offsets inefficient. Snapping a government boundary to the centerline wherever applicable will help to establish more accurate population counts. If a boundary is the front-lot-line, the Census Bureau strongly prefers that the boundary be snapped to the road. If a boundary is at the rear of a lot, then please depict it as such. **Figure 8** depicts a cadastral (parcel-based) boundary map and **Figure 9** shows how the boundary should be reported when sent to the Census Bureau.



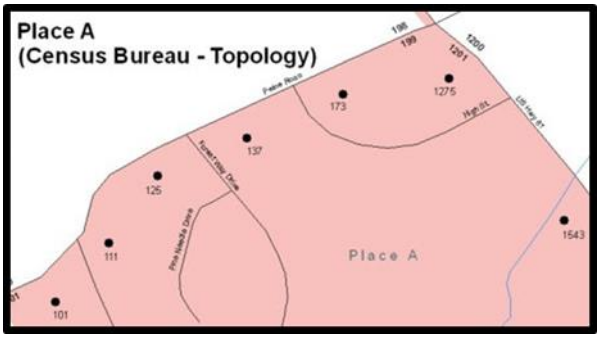


Figure 8. Cadastral Data

Figure 9. Same Data Edited to Census Requirements

On the left in Figure 8 is an example of cadastral data. Figure 9 on the right, is the same area shown edited to conform to census requirements.

The Census Bureau will accept new geographic offsets. Please create individual change polygons for each new geographic offset. Each change polygon must have the required attributes and corresponding change type populated, as seen in **Table 7**. In the **NAME** field, enter the name of the jurisdiction gaining or losing the area. In the **RELATE** field, indicate whether the change is adding IN or taking OUT (removing) the area represented as an offset.

Table 7: Geographic Offsets

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Geographic Offset	X	X ('F')					X ('IN', 'OUT')

(**Note:** 'X' = Required Field)

The Census Bureau has included an "offset" shapefile in the BAS materials (**PVS_19_v2_offset_<ssccc>.shp**), so that participants' jurisdiction can be checked for any existing corridors or offsets. While the Census Bureau prefers that new offsets are not created, (see above), this information can be helpful in determining if current boundaries are correct.

5.4 Linear Feature Updates

The Census Bureau will accept linear feature modifications when needed. The easiest method of updating linear features is to edit the **PVS_19_v2_edges_<stcou>.shp** included in the partnership shapefiles and export the modified or added records to a new separate linear feature update layer. This will ensure all required fields are present and populated before submission. The general guidelines for updating linear features are:

- If a road, subdivision, etc. is missing from the Census Bureau's feature network, add the feature(s), enter 'AL' in the CHNG_TYPE field, and provide the name (FULLNAME) and MTFCC.
- If a feature that does not exist is in the Census Bureau's feature network, mark the feature for deletion by entering 'DL' in the CHNG_TYPE field.
- If a feature is in the incorrect location in the Census Bureau's feature network, mark the feature for deletion and re-add it in the correct location. Only do this if the feature is very far off or in the wrong position relative to boundaries or other features.

Note: A video on updating linear features is available in the BAS video series at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

5.4.1 Adding, Deleting, Renaming, and Recoding Linear Features

Each linear feature update must have the required attributes and corresponding change type populated, as seen in **Table 8**. Preserve the TIGER/Line ID (TLID) in the TLID field when requesting to modify or delete features to ensure the correct features are affected. A TLID is not required for any features being added though an MTFCC is required for new features.

Table 8: Linear Feature Updates

	CHNG_TYPE	TLID	FULLNAME	MTFCC
Add Feature	X ('AL')		X	X
Delete Feature	X ('DL')	X		
Rename Feature	X ('CA')	X	X	
Recode Feature	X ('CA')	X		X

(**Note:** 'X' = Required Field)

Note: A list of MAF/TIGER Feature Classification Codes (MTFCC) can be found in **Appendix D**.

5.4.2 Address Range Updates

The Census Bureau accepts address range data as part of the linear feature update layer. As with other linear feature updates, address ranges must have the required attributes and corresponding change type populated. As existing address ranges cannot be shown in the Census Bureau's outgoing shapefiles, it is recommended that participants only add address ranges to new features (see **Table 9**).

Table 9. Address Range Updates

	CHNG_TYPE	FULLNAME	MTFCC	LTOADD	RTOADD	LFROMADD	RFROMADD
Address Ranges	X ('CA')			X	X	X	X

(**Note:** 'X' = Required Field)

5.5 Area Landmarks, Hydrographic Areas, and Point Landmarks

Area Landmarks (e.g., lakes) and point landmarks (e.g., mountain peaks) can be updated through the BAS, but are not required.

Acceptable area landmark updates include water bodies, swamps, quarries, national parks and forests. Airports, parks, schools, golf courses, museums, and cemeteries may be submitted as area landmarks or point landmarks.

Acceptable point landmark feature updates include mountain peaks or summits, libraries, city halls, community centers and police stations. Airports, parks, schools, golf courses, museums, and cemeteries may be submitted as point landmarks or area landmarks.

5.5.1 Area Landmark/Hydrographic Area Updates

The Census Bureau accepts updates to area landmarks and hydrographic areas in a similar manner to legal boundary changes. However, area landmarks and hydrographic areas are not legal governments, so no documentation or effective dates are required.

In order to submit area landmark and hydrographic area updates, create a separate change polygon layer. Updates to area landmarks and hydrographic areas include:

- Boundary corrections (adding and removing area).
- Creating a new area landmark or hydrographic area.
- Removing an area landmark or hydrographic area.
- Name changes.

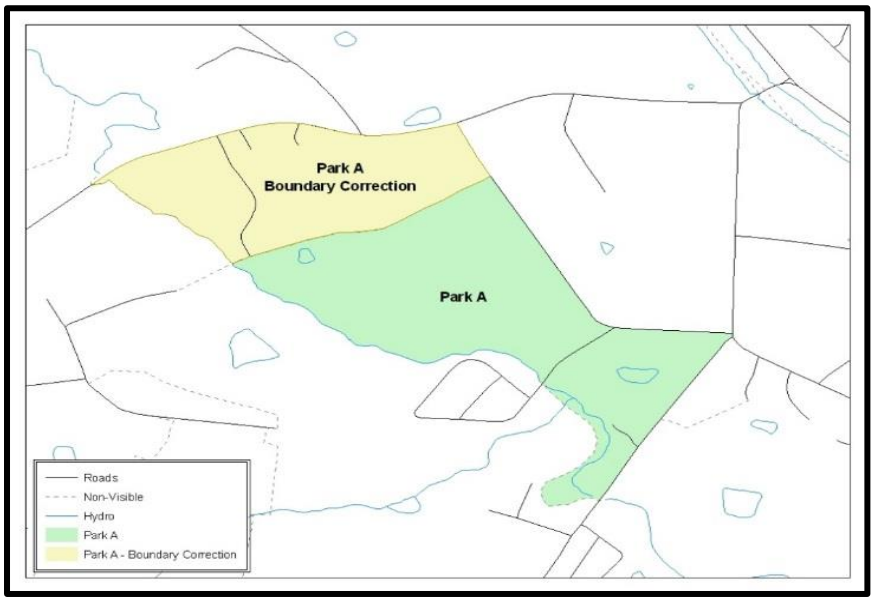


Figure 10. A Boundary Correction to Park A

Each area landmark or hydrographic area update must have the required attributes and corresponding change type populated. Preserve the AREAID in the AREAID field when requesting to modify or delete landmarks to ensure the correct areas are affected. An AREAID is not required for any areas being added though an MTFCC is required for new landmarks (refer to **Table 10**).

Table 10: Landmarks and Hydrographic Areas

	FULLNAME	CHNG_TYPE	RELATE	MTFCC	AREAID
Boundary Correction (Add Area)	X	X ('B')	X ('IN')		X
Boundary Correction (Remove Area)	X	X ('B')	X ('OUT')		X
Delete Landmark		X ('D')			X
Change Landmark Name	X	X ('G')			X
New Landmark	X	X ('E')		X	

(**Note:** 'X' = Required Field)

The steps in **Appendix C** provide information on how to create change polygons using ArcGIS. While the sample processes are written for legal boundary changes, the same methods apply for creating change polygons for area landmarks and hydrographic areas. When adding new area landmarks or hydrographic areas, only add the following types of areas:

- Water bodies.
- Glaciers.
- Airports.
- Cemeteries.
- Golf courses.
- Parks.

The Census Bureau cannot add other types of areas at this time (although some may already exist in the MAF/TIGER system). The acceptable MTFCC codes for new area landmarks or hydrographic areas are listed in **Table 11**.

Table 11: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas

MTFCC	Description
H2030*	Lake/Pond
H2040*	Reservoir
H2041*	Treatment Pond
H2051*	Bay/Estuary/Gulf/Sound
H2081*	Glacier
C3023	Island
K1231	Hospital/Hospice/Urgent Care Facility
K1235	Juvenile Institution
K1236	Local Jail or Detention Center
K1237	Federal Penitentiary, State Prison, or Prison Farm
K2110	Military Installation
K2180*	Park
K2181	National Park Service Land
K2182	National Forest or Other Federal Land
K2183	Tribal Park, Forest, or Recreation Area
K2184	State Park, Forest, or Recreation Area
K2185	Regional Park, Forest, or Recreation Area
K2186	County Park, Forest, or Recreation Area
K2187	County Subdivision Park, Forest, or Recreation Area
K2188	Incorporated Place Park, Forest, or Recreation Area
K2189	Private Park, Forest, or Recreation Area
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)
K2424	Marina
K2540	University or College
K2457*	Airport – Area Representation
K2561	Golf Course
K2582*	Cemetery

***May not be edited.**

Note: If adding an MTFCC K2457 (Airport – Area Representation) area landmark, please limit the updates to major airports (major regional and international airports). The feature should show the full extent of the airport facility, that is, do not limit the addition to simply the landing strips.

Area Landmark/Hydrographic Area Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating area landmark and hydrographic area changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

5.5.2 Point Landmark Updates

The Census Bureau accepts updates to point landmarks. Please submit point landmark updates as a separate point landmark update layer. Updates to point landmarks include:

- Adding a new point landmark.
- Deleting an existing point landmark.
- Renaming a point landmark.

The Census Bureau also cannot delete or modify any point landmarks imported from the USGS GNIS database. Changes submitted for the following types of landmarks may be left unchanged:

- K2451 (Airport).
- K2582 (Cemetery).
- C3022 (Summit or Pillar).
- C3081 (Locale or Populated Place).
- C3061 (Cul-de-sacs).

Each point landmark update must have the required attributes and corresponding change type populated. Preserve the POINTID in the POINTID field when requesting to modify or delete point landmarks to ensure the correct landmarks are affected. A POINTID is not required for any landmarks being added though an MTFCC is required for new landmarks.

Table 12: Point Landmark Updates

	FULLNAME	CHNG_TYPE	MTFCC	POINTID
New Point Landmark	X	X ('E')	X	
Delete Point Landmark		X ('D')		X
Change Name	X	X ('G')		X

(**Note:** 'X' = Required Field)

Due to Title 13 privacy concerns, any landmark with an MTFCC shown in **Table 13** below cannot be added to the MAF/TIGER System as a point landmark. The MAF/TIGER System no longer maintains any point landmarks with these MTFCCs. Landmarks with these codes could identify a residence or private business. Thus, it is also important *not* to add any of the point landmark types shown in the table using alternative MTFCCs.

Table 13: Restricted Point Landmark MTFCC Codes

MTFCC	Description
K1100	Housing Unit Location
K1121	Apartment Building or Complex
K1122	Rooming or Boarding House
K1223	Trailer Court or Mobile Home Park
K1226	Housing Facility/Dormitory for Workers
K1227	Hotel, Motel, Resort, Spa, Hostel, YMCA, or YWCA
K1228	Campground
K1229	Shelter or Mission
K1232	Halfway House/Group Home
K1233	Nursing Home, Retirement Home, or Home for the Aged
K1234	County Home or Poor Farm
K1235	Juvenile Institution
K1241	Sorority, Fraternity, or College Dormitory
K1251	Military Group Quarters
K1299	Other Group Quarters Location
K2100	Governmental
K2197	Mixed Use/Other Non-residential
K2300	Commercial Workplace
K2361	Shopping Center or Major Retail Center
K2362	Industrial Building or Industrial Park
K2363	Office Building or Office Park
K2364	Farm/Vineyard/Winery/Orchard
K2366	Other Employment Center
K2464	Marina
K2500	Other Workplace
K2564	Amusement Center

Point Landmark Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating point landmark changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

5.6 Reviewing Changes to the Census Bureau Shapefiles

Please review all changes to ensure that they are intentional and correct. The Census Bureau has created videos with information on many of the topics below. Videos can be found on the web at: <https://www.census.gov/programs-surveys/bas/library/videos.html>.

5.6.1 Boundary-to-Feature Relationships

Please review all changes to ensure that the correct boundary-to-feature relationships are being created or maintained. The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping; however, the Census Bureau bases maps on spatial data that is topologically integrated (see **Section 2.1, Topological Relationships in the MAF/TIGER System)**. Therefore, snap boundaries to street centerlines (or rivers, railroads, etc.) wherever applicable. This will help establish a more accurate population count for governments.

Figure 11 and **Figure 12** show situations where boundary changes should be snapped to existing linear features. The Census Bureau will snap boundary changes to any linear feature that is correctly located within **thirty** feet of the change.

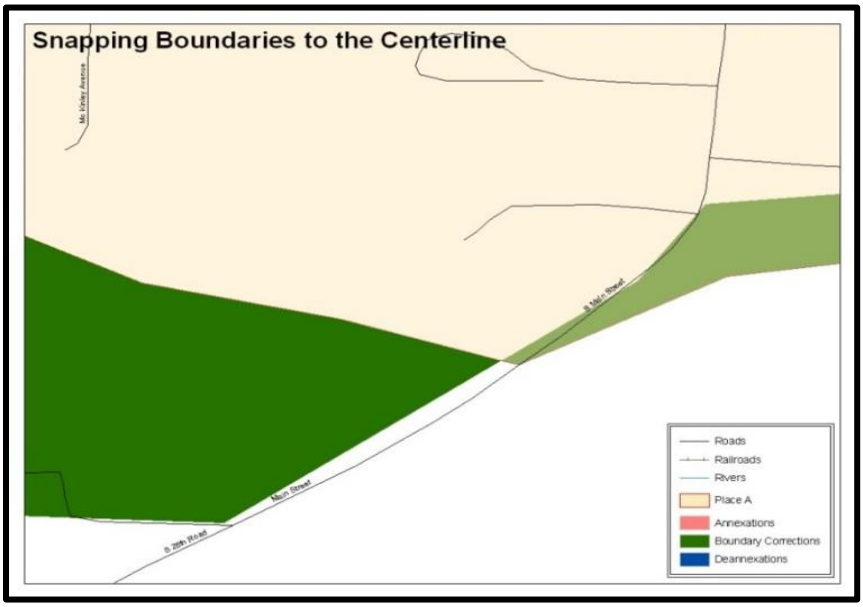


Figure 11. Boundary Corrections Not Snapped to Existing Linear Features

These boundary corrections are not snapped to existing linear features in the MAF/TIGER system. Both boundary corrections should be snapped to centerlines or population may be assigned to incorrect governments.

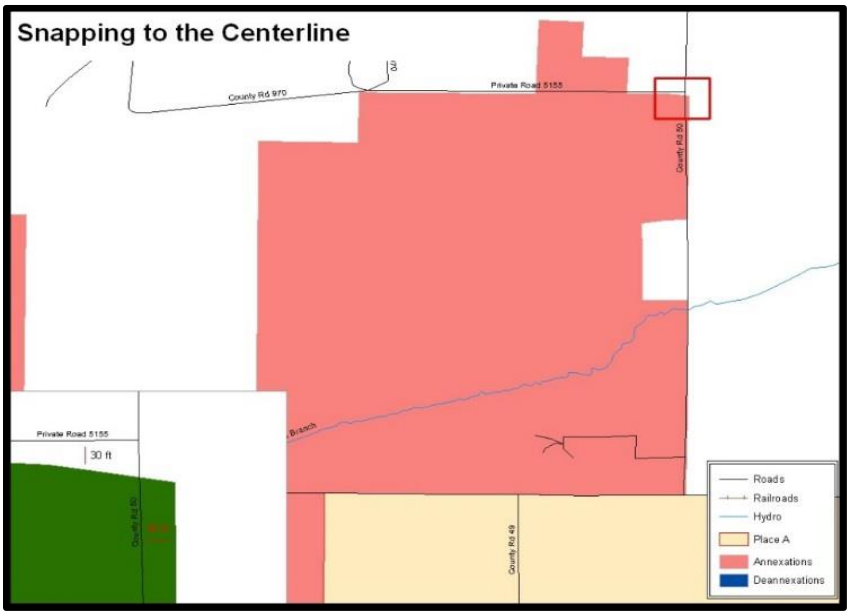


Figure 12. Annexation Created without Snapping to Centerlines

This is an example of an annexation created without snapping to existing centerlines in the MAF/TIGER system. Unless the boundary is snapped to centerlines, some of the population may be assigned to an incorrect government.

The Census Bureau will not accept boundary corrections that dissolve the current relationship between an existing boundary and linear feature without specific instruction that the relationship is incorrect. The Census Bureau will not incorporate any boundary corrections that create thirty feet or less of gap or overlap between the existing linear feature and boundary into the MAF/TIGER system. **Figure 13** and **Figure 14** show examples of changes that will not be accepted.

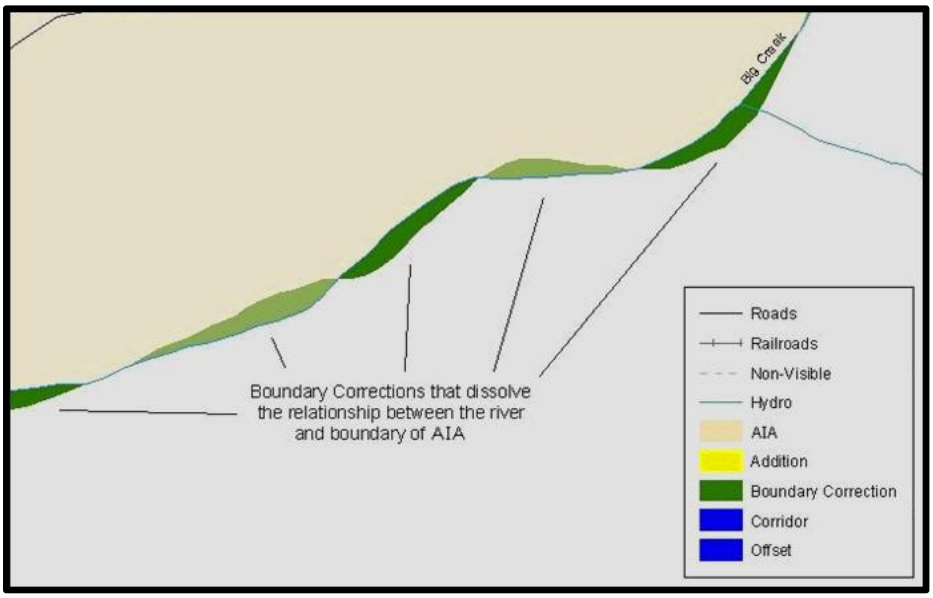


Figure 13. Small Spatial Correction Not Incorporated

Small spatial boundary corrections would dissolve the relationship with the river. These boundary corrections will not be incorporated into the MAF/TIGER system.

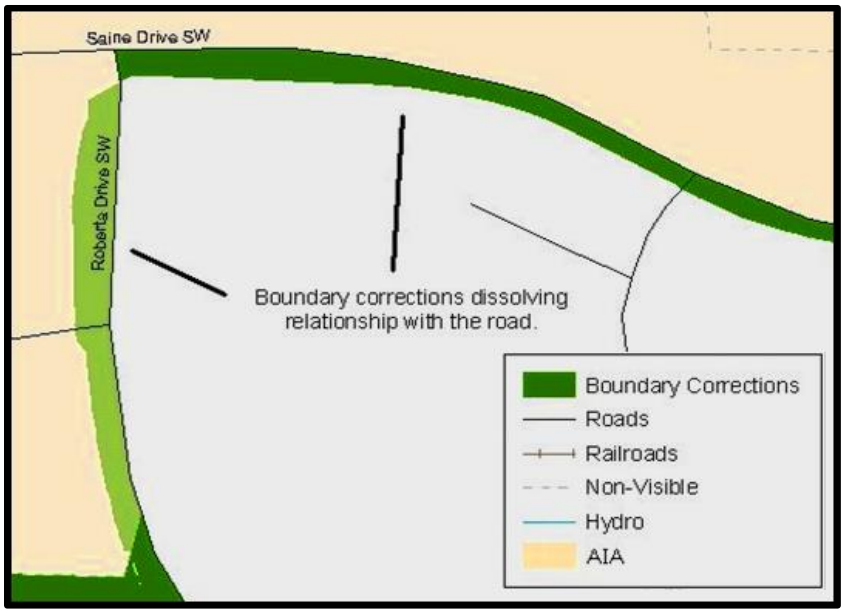


Figure 14. Small Spatial Correction Not Accepted

Small spatial boundary corrections would dissolve the boundary-to-feature relationship with multiple streets. Incorporating these changes would affect the population counts for the area. Therefore, the Census Bureau will not accept these small boundary corrections.

5.6.2 Large Boundary Corrections

The Census Bureau will not accept large boundary corrections to a government without the appropriate legal documentation numbers and effective dates. These large boundary corrections (**Figure 15**) may be legal boundary changes that occurred in the past and were never reported to the Census Bureau. Please submit the appropriate legal documentation number and effective date so that the changes may be incorporated into the MAF/TIGER system.

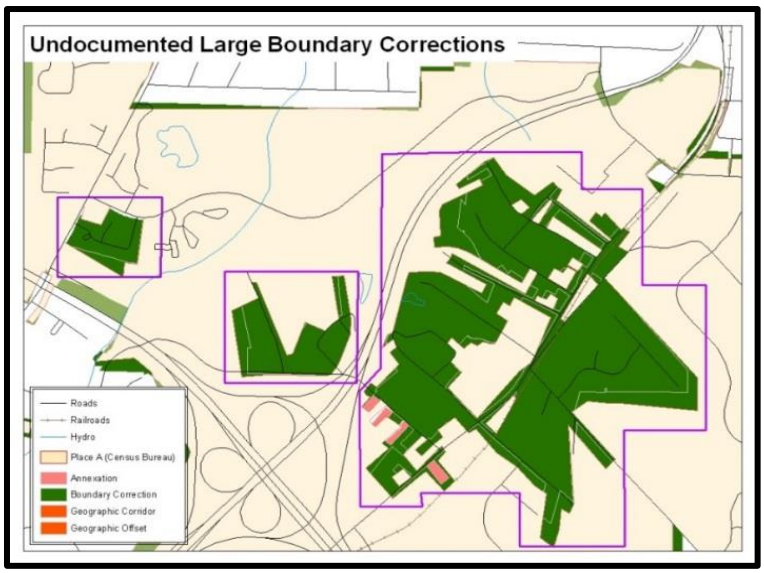


Figure 15. Large Boundary Corrections

Without the appropriate documentation, the Census Bureau will not accept large boundary corrections.

Note: There may be a few instances when large boundary corrections need to be made because of incorrect digitizing or where the boundary appears in the incorrect location due to other Census Bureau activities.

5.6.3 Required Attribute Information

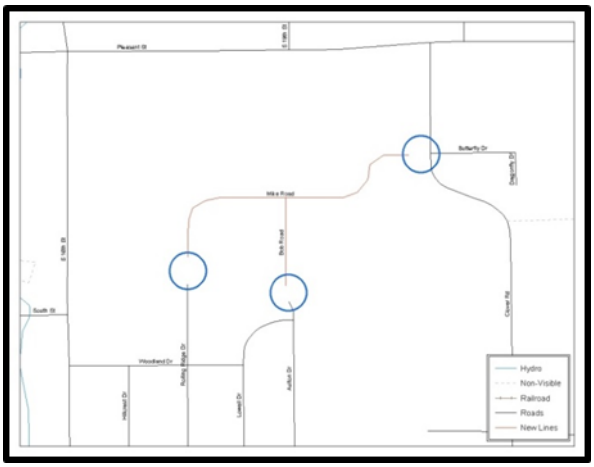
It is important to review each change polygon and confirm that the correct attribute information is included. Without the correct attribute information, the Census Bureau will be unable to process and incorporate the changes into the MAF/TIGER system. See **Section 5.3 Boundary Changes** for the required attribute information and corresponding change type codes.

5.6.4 Appropriate Projection Information

It is important that the appropriate projection information is included. Each update layer submitted should contain a correct *.prj file so that the Census Bureau can convert the projection back to GCS_NAD83. If the GIS being used cannot create a *.prj file, include the projection information in metadata. This is critical for the Census Bureau to be able to process the file and incorporate the updates into the MAF/TIGER system.

5.6.5 Linear Feature Updates

Please review linear feature changes to ensure that they align with the features currently in the MAF/TIGER system. If linear feature changes do not align with current MAF/TIGER linear features, the Census Bureau may not incorporate the submitted updates (**Figure 16** and **Figure 17**).



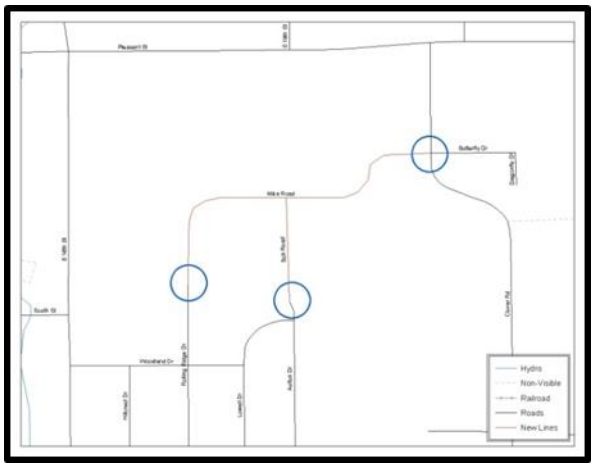


Figure 16. New Road Features, Not Added to Existing Road

Figure 17. New Road Features, Correctly Added

The image on the left (Figure 16) shows new road features added to the existing feature network, but not connected to existing road features. The image on the right (Figure 17) shows the correction connecting the new roads to the existing road features.

5.7 Additional Information Review

The Census Bureau will not make any boundary change that affect adjacent legal governments without the appropriate documentation. Please review any change polygons that affect adjacent governments to determine if they are intentional legal changes.

Note: The Census Bureau will snap any annexation, deannexation, or boundary correction to a MAF/TIGER feature when it exists within thirty feet of that feature. This helps maintain the boundary-to-feature relationships in the MAF/TIGER system and will ensure correct housing tabulation counts for governments.

5.7.1 Submitting Digital Data

Participants reporting changes to the BAS are required to submit at least the change polygon shapefile. The total number of shapefiles submitted depends on what types of changes are reported. The following is a list of change files *may* be needed:

1. **Change Polygon Layers** (county, MCD, incorporated place, and consolidated city)
   - These layers consist of the changes that the Census Bureau needs to make.
   - A layer of change polygons should be created for each level of geography (county, MCD, place, etc.) for which changes are being submitted.
2. **Whole Modified Entity Layer** (county, minor civil division, incorporated place, and consolidated city)
   - These layers should only contain the complete and current boundary for the government being updated.
   - A whole entity layer should be created for each level of geography for which change polygons are being created.
3. Local Government Feature Network, Parcel, and Boundary Layers *(optional)*
   - These layers will help the Census Bureau resolve any questionable change polygons and establish the correct boundary-to-feature relationships.
4. **Feature Update Layer** (only if there are feature (road, river, railroad, etc.) additions, deletions, name changes, recodes, or address range updates)
   - Include a linear feature update layer with only feature segments requiring a correction.
5. Area Landmarks/Hydrographic Areas Update Layer
   - An area landmark/hydrographic area update layer should be submitted only if there are area landmark and/or hydrographic area updates.
6. Point Landmark Update Layer
   - A point landmark update layer should be submitted only if there are point landmark updates.

7. **BAS Contact Text File** (if the BAS point of contact (the person that receives the BAS Annual Response Email) has changed).
    - This can be updated online at: <http://www.census.gov/geo/partnerships/bas/bas_ar_form.html>.
    - This update should include the following information:
        - First Name.
        - Last Name.
        - Department.
        - Position.
        - Shipping Address.
        - City.
        - State.
        - Zip Code.
        - Phone: xxx-xxx-xxxx.
        - Fax: xxx-xxx-xxxx.
        - Email.
        - HEO Term Expires: mm/yyyy.
        - HEO Term Length: x years.

5.7.2 Change Polygon Layer Naming Conventions

The following table provides change polygon layer naming conventions for county submissions, MCDs, incorporated places, and consolidated cities. The <basID> in the change polygon layer naming conventions represents the participant's BAS ID, found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 14: Change Polygons

Participant	Submitting Changes For:	Shapefile Naming Conventions
County	County	bas20_<basID>_changes_county.shp
County	Minor Civil Division	bas20_<basID>_changes_cousub.shp
County	Incorporated Place	bas20_<basID>_changes_incplace.shp
Minor Civil Division	Minor Civil Division	bas20_<basID>_changes_cousub.shp
Incorporated Place	Incorporated Place	bas20_<basID>_changes_incplace.shp
Consolidated City	Consolidated City	bas20_<basID>_changes_concity.shp

5.7.3 Whole Entity Polygon Layer Naming Conventions

The following table provides the whole entity polygon layer naming conventions for county, minor civil divisions, incorporated places, and consolidated cities. The <basID> in the whole entity polygon layer naming conventions represents the participant's BAS ID, found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 15: Whole Entity Polygon Layer Naming Conventions

Participant	Changes Submitted For:	Shapefile Naming Conventions
County	County	bas20_<basID>_WholeEntity_county.shp
County	Minor Civil Division	bas20_<basID>_WholeEntity_cousub.shp
County	Incorporated Place	bas20_<basID>_WholeEntity_incplace.shp
Minor Civil Division	Minor Civil Division	bas20_<basID>_WholeEntity_cousub.shp
Incorporated Place	Incorporated Place	bas20_<basID>_WholeEntity_incplace.shp
Consolidated City	Consolidated City	bas20_<basID>_WholeEntity_concity.shp

5.7.4 Linear Feature, Area Landmark/Hydrographic Area, and Point Landmark Updates

The following table provides the update layer naming conventions for the edges, area landmark, and point landmark update layers (not required). The <basID> in the naming conventions for the edges, area landmark, and point landmark update layers represents the participant's BAS ID found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 16: Optional Files

Participant	Changes Submitted For:	Shapefile Naming Conventions
All Participants	Edges	bas20_<basID>_LN_Changes.shp
All Participants	Area Landmarks/ Hydrographic Areas	bas20_<basID>_Alndk_Changes.shp
All Participants	Point Landmarks	bas20_<basID>_Plndk_Changes.shp

5.7.5 Compressing the Digital Files

The Census Bureau requires participants to submit all BAS returns through SWIM as compressed (zipped) files. Please compress **ALL** updated materials (including change polygon shapefiles, whole entity shapefiles, linear feature updates, landmark updates, local government feature network and boundary layers, any supporting documentation, and the text or other file with the participant's updated BAS contact information) as zipped files.

Note: Centerline files or any additional information that may be helpful for Census to process the participant's file are optional. One example where this would be helpful is if a particular polygon was not snapped to a river or road because the boundary does not follow the river or road.

Refer to **Figure 18** and the steps listed below to compress digital files:

1. Navigate to the directory with the shapefiles.
1. Select all files and right click on the selection.
2. Select WinZip, and then Add to ZIP file.

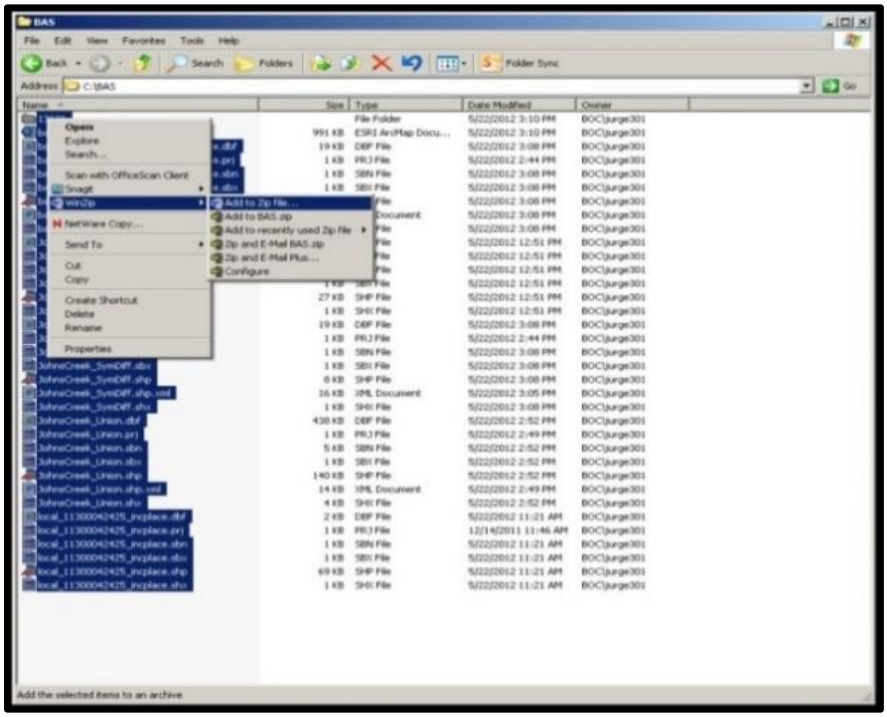


Figure 18. Selecting and Zipping Return Files

Note: Versions of WinZip may vary so the interface may be slightly different. Software other than WinZip (e.g., 7zip) may be used to zip the return files.

3. In the Add window, in the Add to archive field, type the filename in the proper naming convention: bas20_<basID>_return and then click Add (**Figure 19**).

Note: Look for the BAS ID number on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

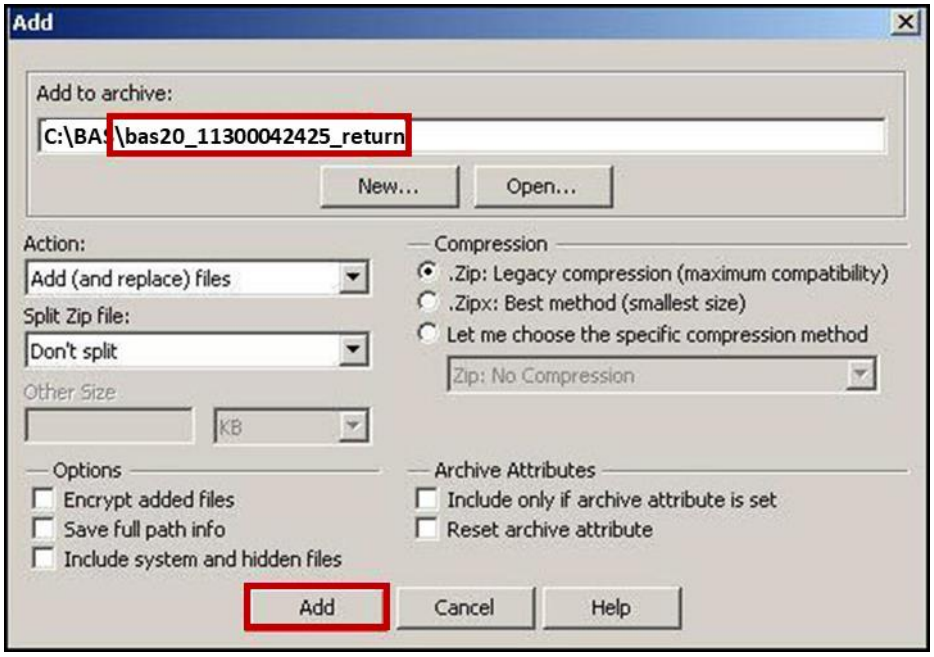


Figure 19. Naming the ZIP File

4. Check the folder where the ZIP file was saved to verify that it was created properly. If the ZIP file is correct, then the return file is ready for submission.

Note: If assistance is required in preparing or zipping the BAS return files, please call the Census Bureau at **1-800-972-5651** or email geo.bas@census.gov.

5.7.6 Submitting Digital Files through SWIM

SWIM is a one-stop location for submitting geographic program files to the Census Bureau. The Census Bureau now requires that all BAS participants use the Census Bureau's SWIM for submitting update materials.

Do not send submissions as an email attachment, as the Census Bureau cannot accept them due to security policy.

The Census Bureau will email the BAS contact a SWIM registration token and digital submission instructions five days after the BAS contact responds to the BAS Annual Response indicating that they have changes to report. To respond online, please fill out the online form at <http://www.census.gov/geo/partnerships/bas/bas_ar_form.html>. The five-day waiting period will give the Census Bureau staff time to update the BAS contact record if necessary so that the email reaches the right person.

This token is good for one personal account within the SWIM. Once participants have registered for an account in SWIM, they will no longer need the token to login into the system. If participants require additional individual SWIM accounts within their organization, please contact the Census Bureau at **1-800-972-5651** or email geo.bas@census.gov.

Current SWIM Users

If participants are participating in other Census Bureau partnership programs, or have participated in previous BAS years, and already have SWIM accounts, they may use their current account to submit files for BAS. They do not need to set up a new account.

Participants will **not** be able to upload a file larger than **250 MB**.

SWIM **blocks** participants from uploading a ZIP file that contains another ZIP file.

Follow the instructions listed below:

1. In a web browser, navigate to <https://respond.census.gov/swim>.
2. Login:
   a) **New Users**: Participants must have a registration token to create a new account (please see above on how to obtain a SWIM token). Once participants have their token, they should sign-up by clicking the 'Register Account' button. Registration is self-serve, but does require the new user to enter a registration token to validate their rights to the system.

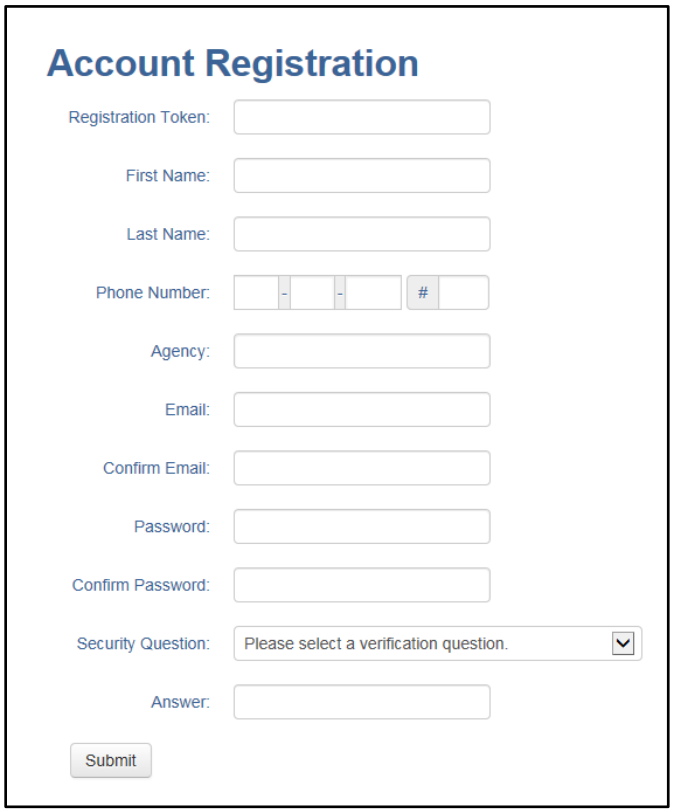


Figure 20. SWIM Account Registration

   b) **Existing** Users: If participants already have a registered account from a previous BAS year, they should login with their user credentials.

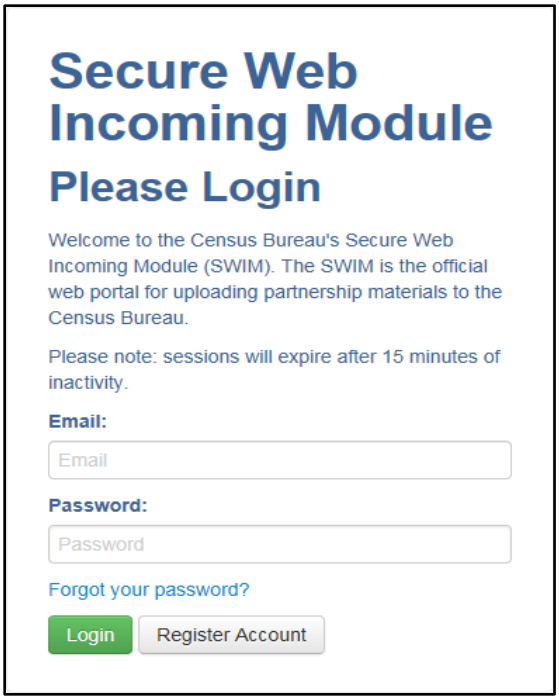


Figure 21. SWIM Login Window

3. If participants have submitted files before, SWIM lists them on the startup screen upon login. Click 'Start New Upload' to continue.

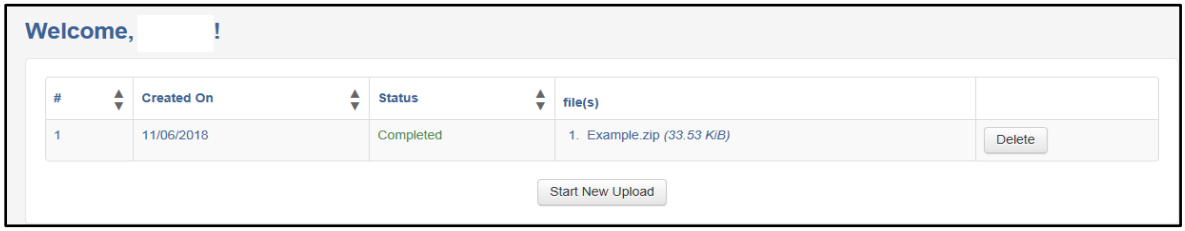


Figure 22. Welcome Screen with Upload History

4. On the next screen, select the "Boundary Annexation Survey (BAS)" option as the geographic partnership program, and click 'Next' to continue.

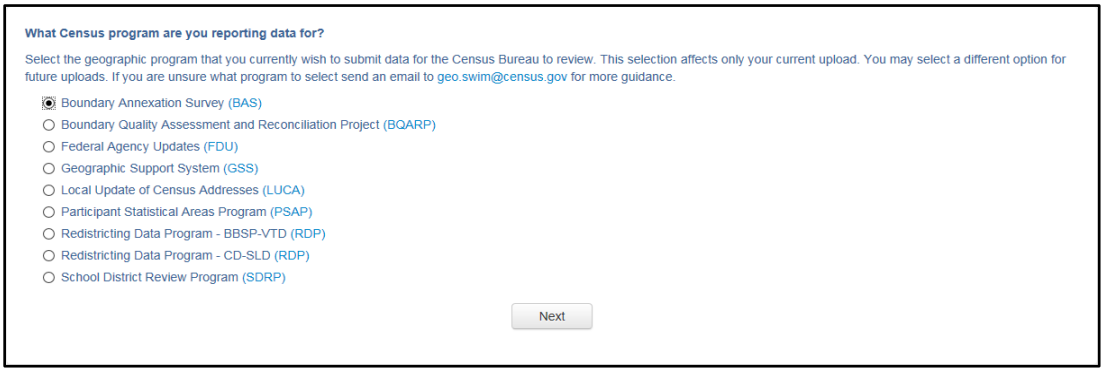


Figure 23. Geographic Partnership Program Selection Window

5. On this screen, participants will select a geographic level. This is the geography type of their agency (e.g., if submitting data for a county government, select county. If an incorporated place, then select place...etc.). Click 'Next' to continue.

Figure 24. Geographic Level Selection Window

6. Participants will find the name of their government using the drop-down selectors. These options dynamically update based on the geography type selected from the previous screen. Click 'Next' to continue.

Figure 25. Government Selection Window

7. On the file upload screen, please click on the '+ Add file' button and a file browser dialog will appear.

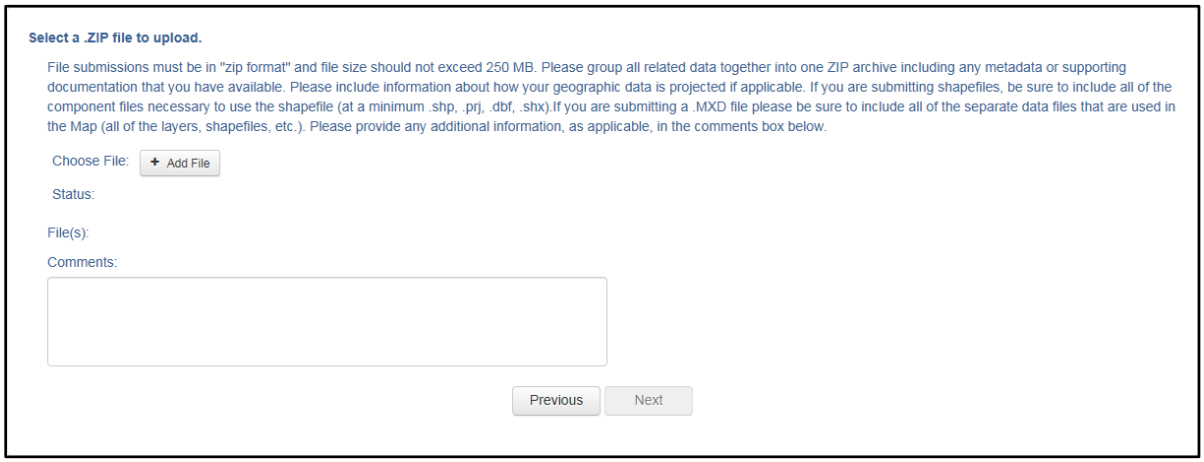


Figure 26. File Upload Screen

8. In the file browser dialog box, select the ZIP file that is to be uploaded. Please be aware that the SWIM website only accepts ZIP files. Click 'Open' to continue.

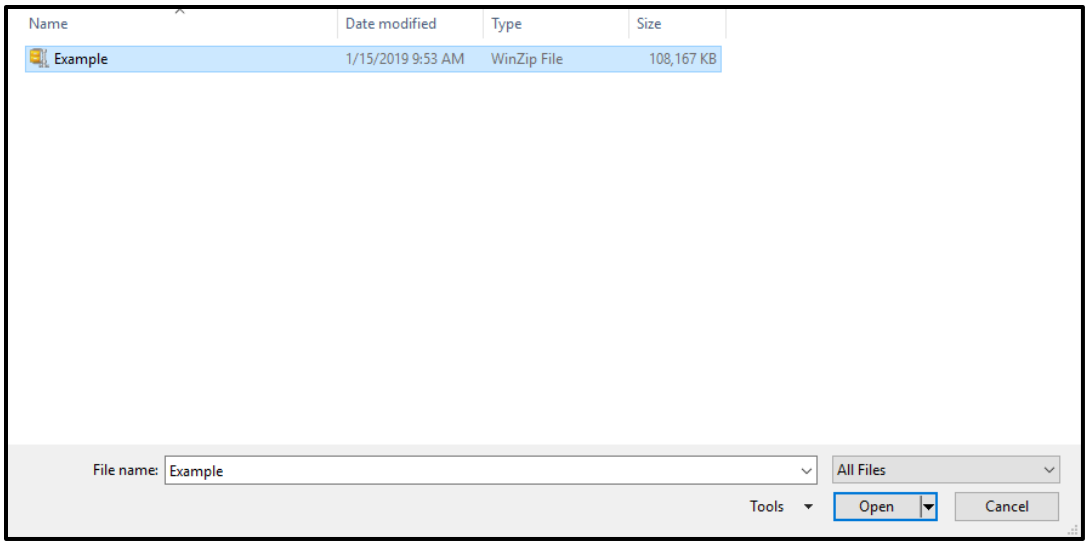


Figure 27. File Browser Dialog Box

9. At this time, participants may enter any comments that they wish to include with their file. Click 'Next' to upload the submission.

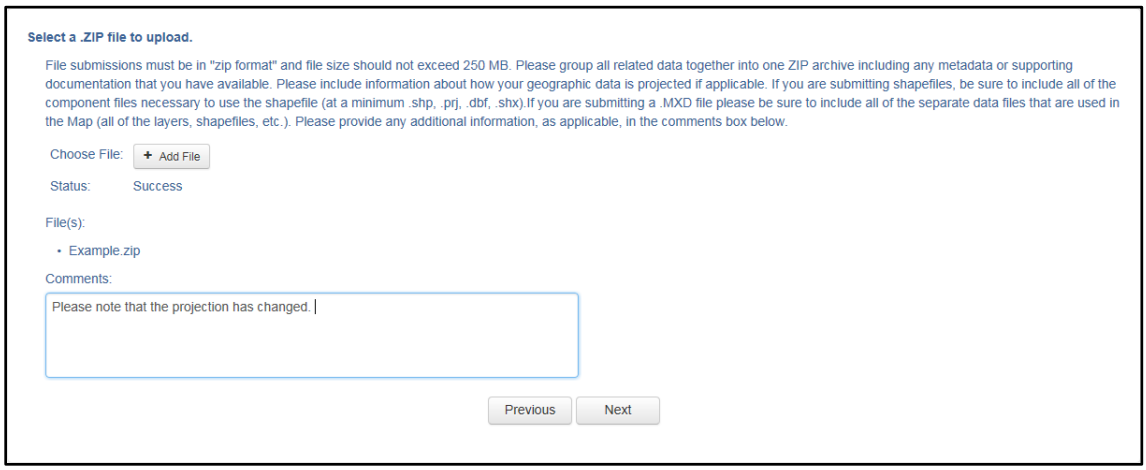


Figure 28. Entering Comments into the File Upload Window

10. The final screen will be a 'Thank You' screen confirming receipt of the file submission. If this screen does not appear, or if issues occur during this upload process, please contact the Census Bureau at **1-800-972-5651** or <geo.bas@census.gov>.

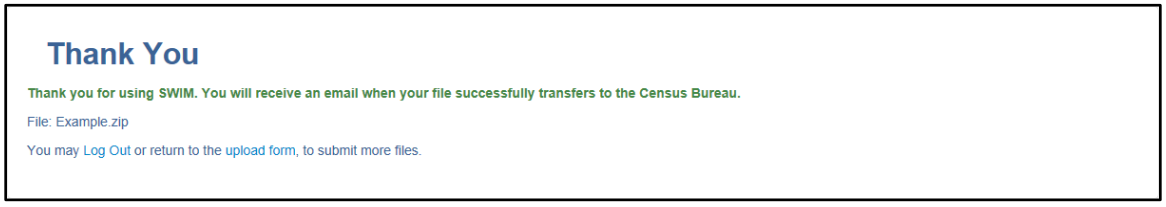


Figure 29. Thank You Screen

APPENDICES

This page intentionally left blank.

APPENDIX A DATA DICTIONARY

Table 17: County and Equivalent Areas Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
COUNTYNS	8	String	ANSI feature code for the county or equivalent feature
NAMELSAD	100	String	Name with translated LSAD code
LSAD	2	String	Legal/Statistical Area Description code
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 18: County Subdivisions Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
COUSUBFP	5	String	FIPS 55 county subdivision code
NAMELSAD	100	String	Name with translated LSAD
COUSUBNS	8	String	ANSI feature code for the county subdivision
LSAD	2	String	Legal/Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 19: Incorporated Place Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
PLACEFP	5	String	FIPS 55 place code
NAMELSAD	100	String	Name with translated LSAD
PLACENS	8	String	ANSI feature code for the place
LSAD	2	String	Legal / Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing and entity
PARTFLG	1	String	Indicates if only part of a feature is represented
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 20: Consolidated City Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
CONCITYFP	5	String	FIPS 55 place code
NAMELSAD	100	String	Name with translated LSAD
PLACENS	8	String	ANSI feature code for the place
LSAD	2	String	Legal/Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
PARTFLG	1	String	Indicates if only part of a feature is represented
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Acreage of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 21: Edges Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
TLID	10	Double	Permanent edge ID
TFIDL	10	Double	Permanent face ID (left)
TFIDR	10	Double	Permanent face ID (right)
MTFCC	5	String	MAF/TIGER Feature Class Code
FIDELITY	1	String	Indication to a respondent when their entity boundary has changed through spatial enhancement
FULLNAME	40	String	Decoded feature name with abbreviated qualifier, direction, and feature type
SMID	22	String	Spatial Theta ID
SMIDTYPE	1	String	SMIDTYPE code
BBSPFLG	1	String	Redistricting data project participant's submitted request of an EDGE for selection as a block boundary
CBBFLG	1	String	Indicates the status of an EDGE for a selection as a block boundary
BBSP_2020	1	String	New BBSP flag
CHNG_TYPE	4	String	Type of linear feature update
JUSTIFY	150	String	Justification of change
LTOADD	10	String	Left To Address
RTOADD	10	String	Right To Address
LFROMADD	10	String	Left From Address
RFROMADD	10	String	Right From Address

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
ZIPL	5	String	Left ZIP Code
ZIPR	5	String	Right ZIP Code
EXTTYP	1	Char	Extension type
MTUPDATE	10	Date	Date of last update to the edge

Table 22: Area Landmark Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Area landmark name
PARTFLG	1	String	Indicates if only part of a feature is represented
AREAID	22	String	Object ID
ANSICODE	8	String	ANSI code for area landmarks
CHNG_TYPE	2	String	Type of area landmark update
EFF_DATE	8	Date	Effective date or vintage
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
BAG	3	String	Block area grouping

Table 23: Hydrographic Area Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
ANSICODE	8	String	ANSI code for hydrography area
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Hydro landmark name
CHNG_TYPE	2	String	Type of hydrographic area update
HYDROID	22	String	Object ID
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change

Table 24: Point Landmark Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
POINTID	22	String	Object ID
ANSICODE	8	String	ANSI code for point landmarks
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Point landmark name
CHNG_TYPE	2	String	Type of point landmark update
JUSTIFY	150	String	Justification of change

Table 25: Geographic Offset Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
TFID	20	Integer	Permanent Face ID
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
OFFSET	1	String	Geographic Offset / Corridor Flag
ADDEXCLUDE	1	String	Address Exclusion Indicator
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change

APPENDIX B 2020 DIGITAL BAS EXAMPLE PROCESS 1

The 2020 Digital BAS Example Process 1 provides step-by-step instructions for using the BAS Partnership Toolbox to facilitate the updating process. For best results, use the toolbox in ArcGIS 10.0 and higher.

B1 How to Use the BAS Partnership Toolbox

In an effort to ease the burden of creating BAS updates, a toolbox was developed for ArcGIS. This toolbox simplifies the updating process by automating the downloading of data, creating changes, removing slivers, formatting and checking attribution, and preparing/exporting files for submission. Before running these tools, users will need the following:

- **The BAS Partnership Toolbox**, which can be downloaded at: <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html>.
- **The BAS ID for the government being processed.** This can be found on the BAS Annual Response email or online at: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.
- **A shapefile or feature class showing the legal boundary of the government.**
  - Data in this layer should have data including the name of the government being processed formatted to agree with the Census Bureau's naming convention for the same government as found in the NAME field or the NAMELSAD field for Minor Civil Division (MCD) and American Indian / Alaska Native / Native Hawaiian (AIANNH).
- **The 2020 BAS Partnership Shapefiles located at:** <https://www.census.gov/geographies/mapping-files/2019/geo/bas/2019-bas-shapefiles.html>.

B2 Toolbox Tools Setup

These Toolbox tools were designed primarily for use in ArcCatalog though they run in ArcMap as well. The instructions for most steps are assuming use in ArcCatalog.

1. Unzip the **Digital BAS Partnership Tools.zip** to the C: drive or other preferred working folder. The folder location does not matter as long as it can be accessed from ArcCatalog. Inside there will be a folder called DBAS, containing all the files to work with for a government. Open ArcCatalog and connect to the DBAS folder. When expanded, the following should be visible:

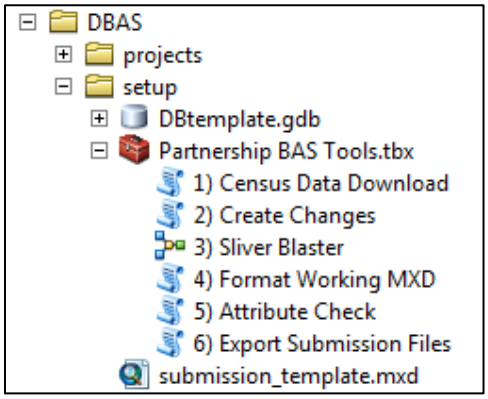


Figure 30. Partnership BAS Tools Menu

Note: To connect to a folder in ArcCatalog, click on the Connect to Folder button on the Standard Toolbar, find the DBAS folder, and then click OK.

B3 Census Data Download Tool

The Census Data Download tool will gather all the partnership shapefile data needed to create changes from the Census Bureau website. If the data is on a Census Bureau provided disc, this tool will also work but only if the data is loaded to the computer before running the tool. This tool can also use the ZIP files downloaded from the 2020 BAS Partnership Shapefiles site: <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> and outlined in **Chapter 3**. Please follow the steps below to run the Census Data Download tool.

1. Expand the **DBAS folder** and the **setup subfolder**. In the setup folder, find the **Partnership Toolbox**. Expand the toolbox and double click on the **1) Census Data Download** tool.

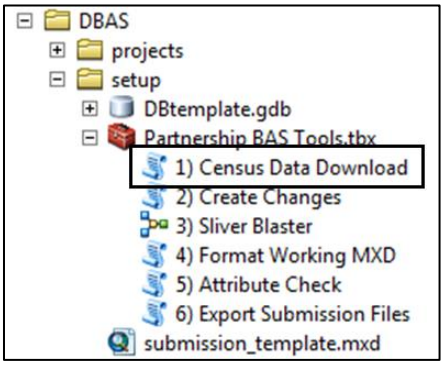


Figure 31. Partnership BAS Tools Menu with Census Data Download Selected

2. There are two ways to use this tool: one that downloads the data from the Census Bureau for the user and one that takes in a folder with the Census Bureau data already downloaded.
   - Enter the 11-digit BAS ID in the **User's BAS ID** field.
   - Select Yes or No under the **Use Data Downloader?** field. If you select No, you must enter a path to the already downloaded partnership shapefiles in the next field.
   - Navigate or drag the folder into **Path to ZIP files** field. Make sure the folder only contains the Census Bureau ZIP files to ensure there are no future data issues.

This example shows how a user would complete the fields to have data downloaded for them.

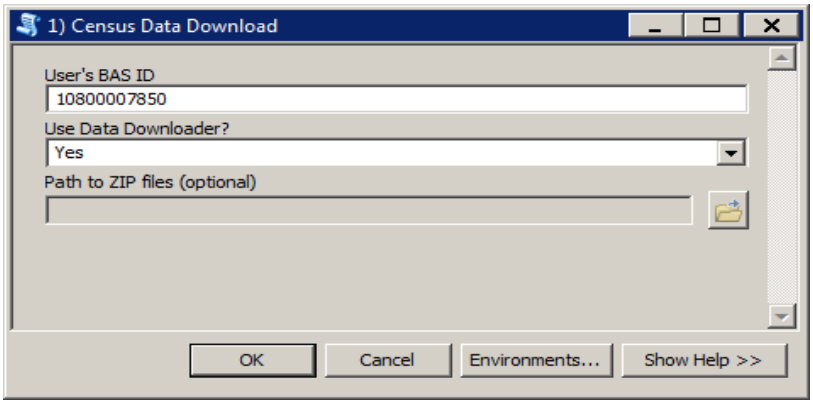


Figure 32. The Census Data Download Window with 'Yes' in the Use Data Downloader Field

This example shows how a user would complete the fields if they already have the partnership shapefiles downloaded and saved on their computer.

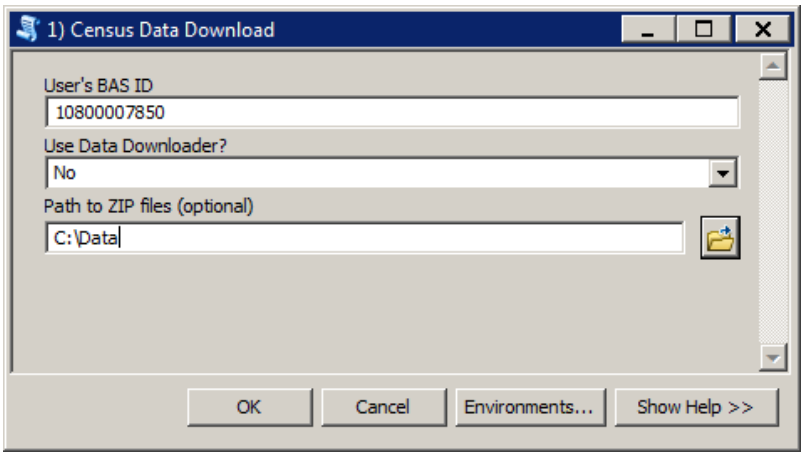


Figure 33. The Census Data Download Window with 'No' in the Use Data Downloader Field

3. Click **OK** to run.
4. When this tool is complete, there should now be a folder for the BAS ID in the projects folder. Inside that folder, there will be a geodatabase with reference data in it and an archive folder.

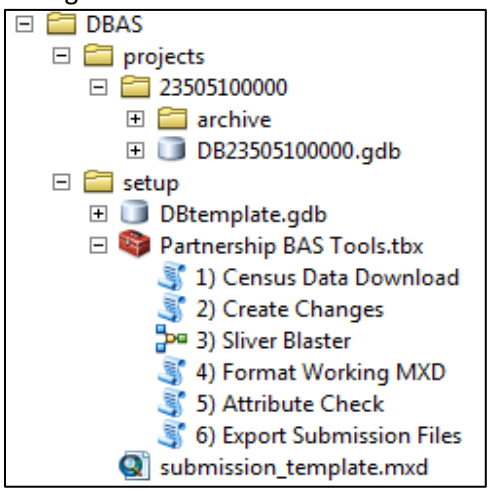


Figure 34. Partnership Tools Menu Showing a Folder for the BAS ID in the Projects Folder

Note: The archive folder contains other Census Bureau data that may be useful as well.

B4 Create Changes Tool

Once the necessary Census Bureau data is obtained, run the **2) Create Changes** tool to create the change polygons. Before this tool can successfully complete, there must be an attribute field in the local boundary layer that contains the name of the government or governments as they appear in Census Bureau records (**Figure 35**). This includes matching capitalization, spacing, and in the case of MCDs a descriptor of the geography (e.g. township, village, borough, etc.) which can be found in the NAMELSAD field of the bas_cousub layer in the reference feature dataset (**Figure 36**). If it is a new entity or the legal name is changing, it does not need to agree though other attribution must be updated to reflect this change.

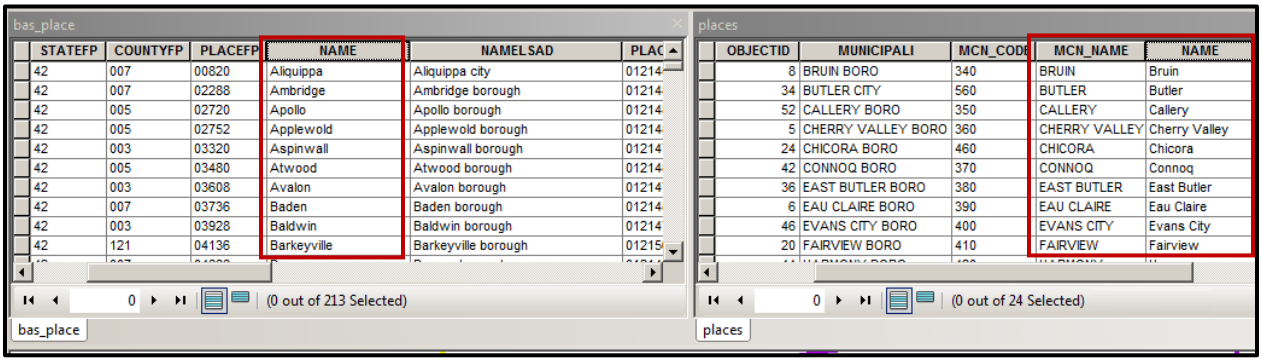


Figure 35. NAME Field in Census Data vs Local Boundary Data

The bas_place layer on the left shows how the Census Bureau NAME field is populated for all the places in Butler County, PA while the local places data shows how local data may need to be manipulated to agree with the Census Bureau NAME field.

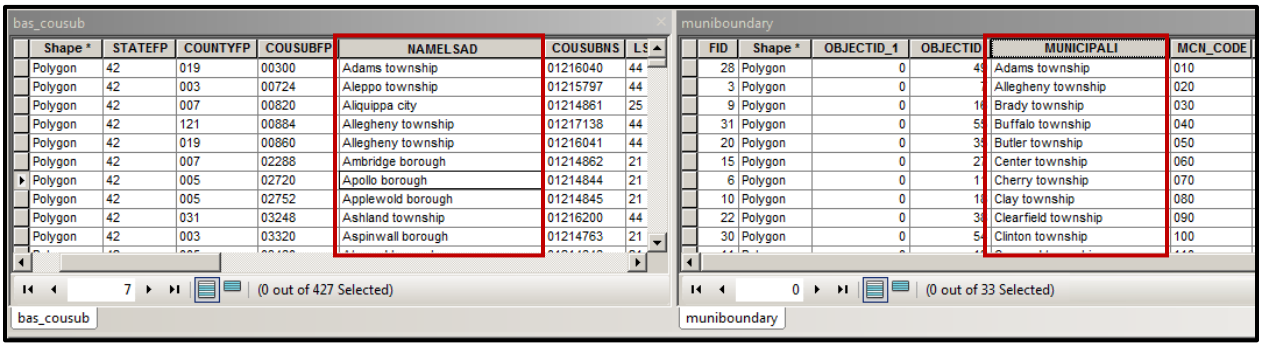


Figure 36. Appropriate Attribution for COUSUB or AIANNH Changes

The bas_cousub attribution on the left in the NAMELSAD field shows how the local MUNICIPALI field on the right should be formatted to ensure that the Create Changes tool works for the MCD changes in Butler County, PA.

1. Double click on **2) Create Changes** tool.

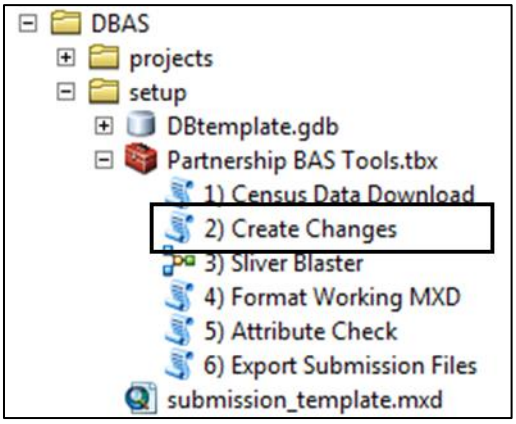


Figure 37. Partnership Tools Menu with Create Changes Tool Selected

2. In the **Create Changes** window:
   - In the **Local Boundary File** field, enter the path or navigate to the full boundary polygon.
   - Enter the 11-digit BAS ID in the **BAS ID** field.
   - Under **Changes Being Processed**, choose the type of changes to create from the dropdown options:
     a. Incplace (incorporated place).
     b. County.
     c. Cousub (MCDs).
     d. AIANNH (Tribal areas).
   - For the **Name Field in Local Data**, the boundary file may need to be modified to agree with a field in the Census Bureau's data. Type the name of the field (as it appears in ArcCatalog) containing the information matching the Census Bureau's NAME field. If processing an MCD or AIANNH file where the Census Bureau NAME field contains duplicates, match the Census Bureau's NAMELSAD.

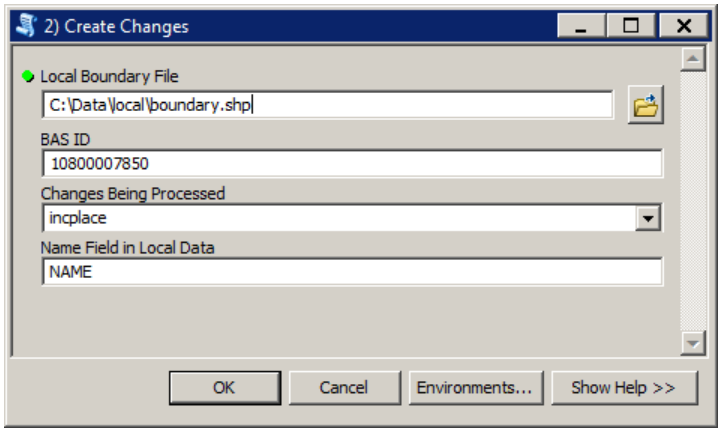


Figure 38. Create Changes Window

3. Click **OK** to run the tool.
4. Once the tool is complete, the output will be placed in the geodatabase under the submission feature dataset.

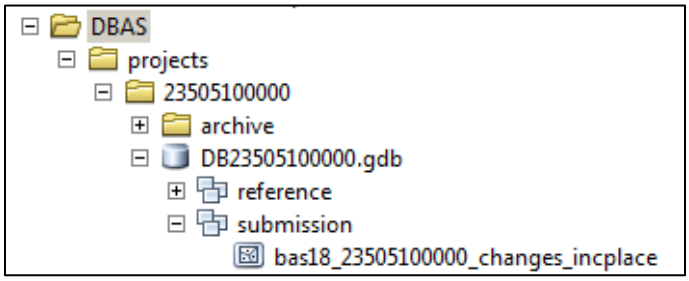


Figure 39. Partnership Tools Menu with Geodatabase

5. Repeat steps for any other levels of geography that need changes created.

B5 Sliver Blaster Tool (Optional)

The Sliver Blaster tool is useful for governments that have numerous very small change polygons that are time consuming to manually parse through for deletion. Since the Census Bureau cannot guarantee inclusion of changes under 30 feet, use this tool to remove changes that are lower than that threshold. Participants can also change the tolerance for slivers if they know there are small changes that need to be included. This automated tool will vary in processing time depending on the number of features in the entity.

1. Double click on the **3) Sliver Blaster** tool.

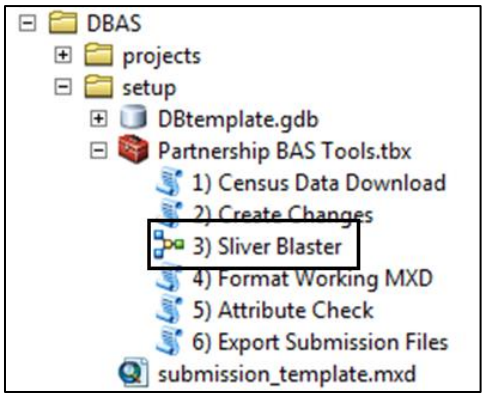


Figure 40. Partnership Tools Menu with Sliver Blaster Selected

2. In the **Sliver Blaster** tool window:
   - The **Changes File** refers to the file created in the previous step, found in the submission feature dataset.
   - The **Census Edges** feature class is found in the benchmark feature dataset and is called bas_edges.
   - The **Buffer Distance** field is set to 30 feet by default, but this can be adjusted to accommodate smaller changes.
3. Click **OK** to run.

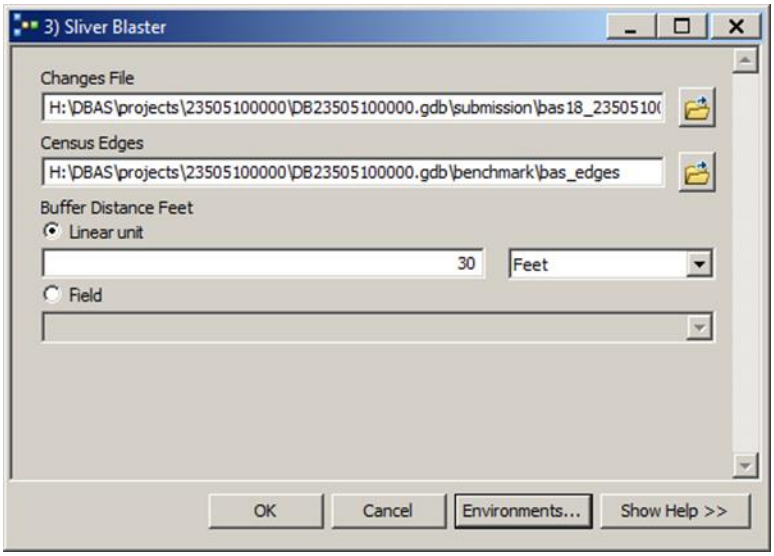


Figure 41. Sliver Blaster Window

B6 Format Working MXD Tool (Optional)

The intent of this tool is to create a map document (.mxd) for users containing their change file and all of the reference layers they will need to finalize a submission. If users would prefer to use their own .mxd, this step is not required.

1. Double click on the **4) Format Working MXD** tool.

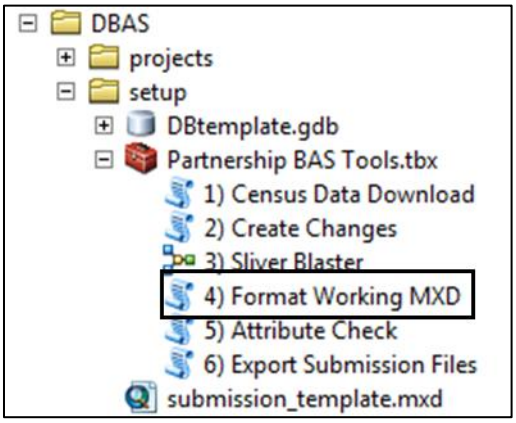


Figure 42. Partnership Tools Menu with Format Working MXD Selected

2. The only input for this tool is the **Working Folder**, which is the folder with the governments BAS ID as its name.

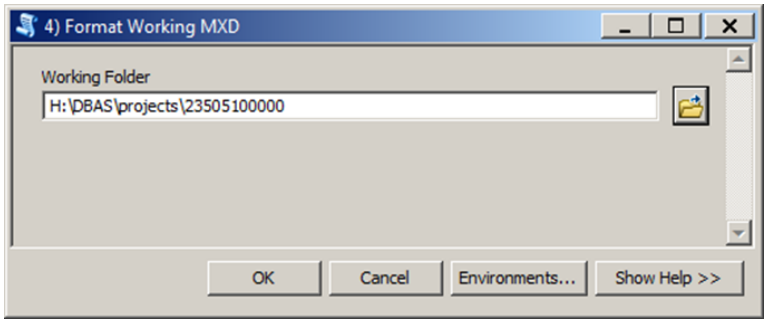


Figure 43. Format Working MXD Window

3. Click **OK** to run the tool.
4. Open the new .mxd and begin working with the change polygons.

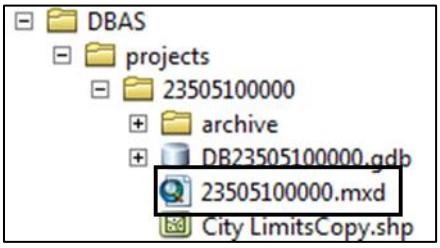


Figure 44. Projects Submenu with mxd file Selected

B7 Attribute Check Tool

This tool is used to verify that there are no inconsistencies with the data included in the submission. Run this tool during or after change polygons have been reviewed for spatial accuracy to produce a report of attribution errors (see **Section 5.6** for guidance on conducting a spatial review). It may also run for all levels of geography that have changes since it is run on each individual change file.

1. Double click on the **5) Attribute Check** tool**.**

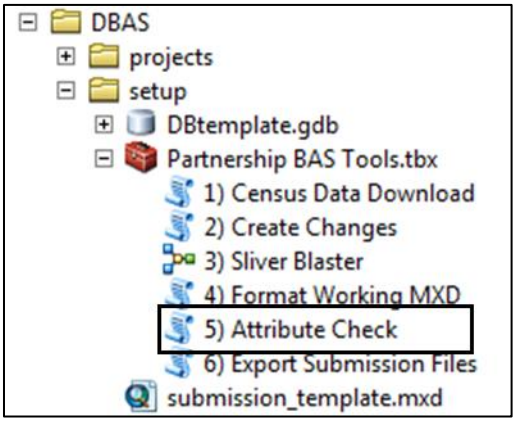


Figure 45. Partnership Tools Menu with Attribute Check Selected

2. In the **Attribute Check** window:
   - The **Change File** should be the change file created in tool **2) Create Changes** for which to generate a report.
   - In **Geography Type**, chose the type of geography being worked on from the dropdown. The same options as the Create Changes tool are available here.
   - The last input is the optional check box for **Includes Changes in Georgia**. This box only needs to be checked if responding in the state of Georgia.

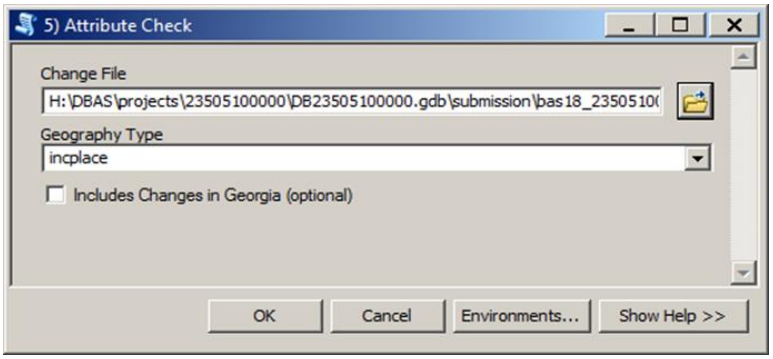


Figure 46. Attribute Check Window

3. Click **OK** to run the tool.
4. There should now be a text file in the working folder called **attribute_check_<geogtype>.txt** containing all the discrepancies identified in the change file that still need to be fixed.

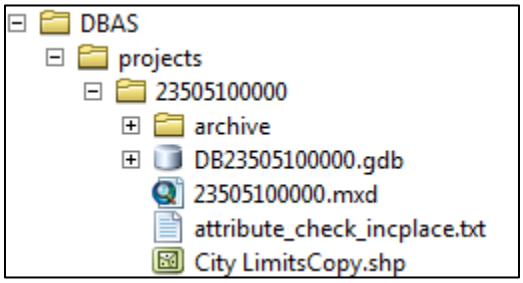


Figure 47. Projects Submenu Showing an attribute_check Text File

B8 Export Submission Tool

Upon review of the changes file and the attribute error report, the finalized changes can be exported for submission to the Census Bureau. This tool can also be used to provide updated contact information with the submission.

1. Double click on the **6) Export Submission Files** tool.

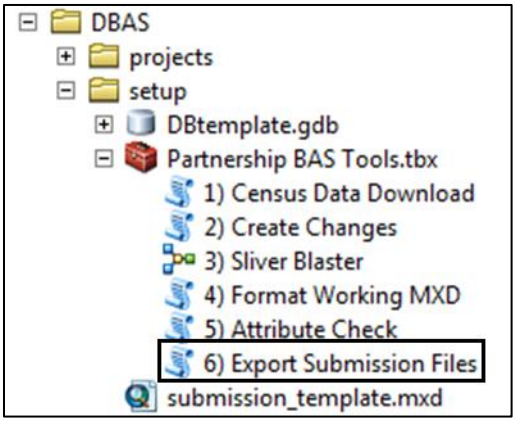


Figure 48. Partnership Tools Menu with Export Submission Files Selected

2. In the **Export Submission Files** tool window:
   - Enter the 11-digit BAS ID in the **BAS ID** field.
   - Under **Additional Files**, drag in or navigate to any additional files to be included in the submission. This can include parcel data, legal documentation, or any other helpful supporting data. This is an optional field so it can also be left blank. There is no need to add the changes layers here as the tool will handle those already based on the BAS ID.
   - For **BAS Contact**, **Entity Name**, **Contact Title or Department Name**, **Address**, **Email**, and **Phone Number**, please include any or all contact information updates that are to be sent to the Census Bureau. These fields can be left blank if there are no updates, though if someone other than the BAS Contact prepared the submission, include the contact information.

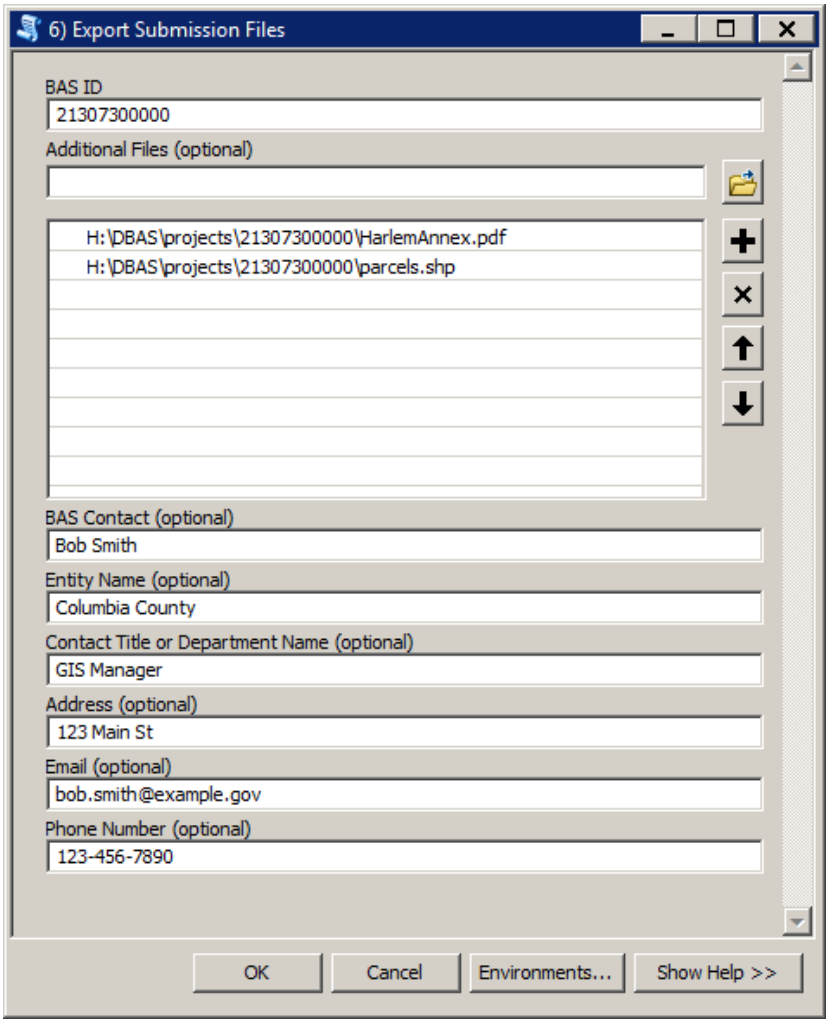


Figure 49. Export Submission Files Window

3. Click **OK** to run the tool.

B9 Submitting through the Secure Web Incoming Module (SWIM)

The Census Bureau requires participants to submit updated BAS materials as ZIP files using the Census Bureau's **SWIM** site. Please submit only the ZIP file(s). **SWIM** is located at <https://respond.census.gov/swim>. For instructions on how to use SWIM, see **Section 5.7.6, Submitting Digital Files through SWIM**.

APPENDIX C 2020 DIGITAL BAS EXAMPLE PROCESS 2

The 2020 Digital BAS Example Process 2 provides step-by-step instructions for participants creating their own change shapefiles using ArcGIS.

C1 Required Census Bureau Shapefiles

When downloading shapefiles for the 2020 BAS, shapefiles will begin with the prefix **PVS** (e.g., **PVS_19_v2_edges_<ssccc>.shp**). Throughout this guide, Census Bureau uses the prefix of **bas_2020**, but the **PVS files** are exactly the same.

Copy the data to a hard drive/server and unzip the data to ensure that the correct data was downloaded. For an incorporated place, these layers are critical:

- PVS_19_v2_place_<ssccc>.shp
- PVS_19_v2_edges_<ssccc>.shp

Note: <ssccc> represents the two-digit state code and three-digit county code.

The shapefiles should include the home county/counties as well as all adjacent counties (if necessary).

Note: The Census Bureau suggests that participants make an extra copy of the data as an emergency backup.

C2 Local Data

The minimum data necessary is a jurisdiction polygon shapefile showing only the outer boundary or boundaries. Local parcel files are not acceptable for this method. If each jurisdiction's boundaries are contiguous, the file should contain only one polygon for each government; if some of the governments within the jurisdiction are non-contiguous, they may be saved as a multi-part polygon or consist of one polygon for each disjointed part. Other local data layers that may be helpful, if available, include centerline data, hydrography, railroad or other linear feature data, and imagery.

C3 Symbolizing Layers in ArcGIS

The following are suggestions for symbolizing Census data in ArcGIS. For the Edges layer, symbolize the linear features by grouping like MTFCC codes (codes sharing the same first character). See **Table 26**.

Table 26: Suggested MTFCC Symbolization

MTFCC 1st Character	Linear Feature Type	Symbol
H	Hydrographic	
P	Non-Visible Feature (boundary)	

MTFCC 1st Character	Linear Feature Type	Symbol
R	Railroad	
S	Road	

C4 Symbolizing Geographic Areas

Symbolize the place layer using Fill Color of RGB (255, 235, 190) with no outline.

Note: County participants with many adjacent incorporated places may want to use different colors to distinguish one place from another.

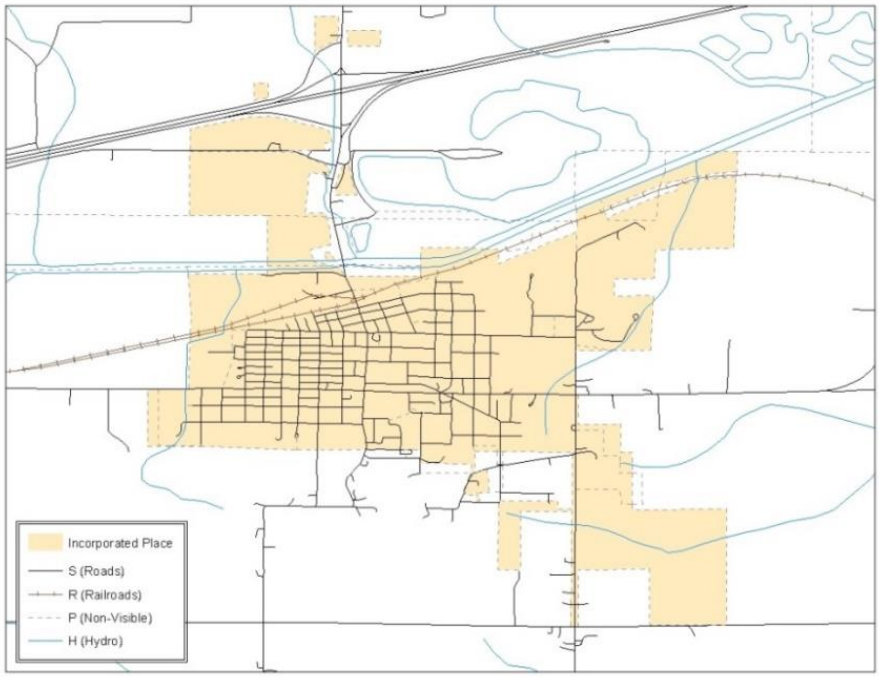


Figure 50. Suggested Map Symbolization

C5 Extracting Incorporated Place or MCD Data from Census Shapefiles

Participants submitting for a single incorporated place or MCD will need to extract their government from the appropriate data layer.

Note: County participants submitting county boundary changes can skip this step. Use the *PVS_19_v2_county_<ssccc>* shapefile which only contains the county boundary. Counties submitting for multiple incorporated places or MCDs skip ahead to **Section C6, Merging Multipart Place Data**.

C5.1 Filtering the Data

1. In ArcMap, click **Selection** and then click **Select by Attributes**.
2. In the Select By Attributes window:
   - From the Layer dropdown, select PVS_19_v2_{place|mcd}_<ssccc>.
   - Double click "**NAME.**"
   - Left click the = button.
   - Click the **Get Unique Values** button.
   - In the list, locate and double click the name of the government (It will appear in the formula).
   - Click **OK**.

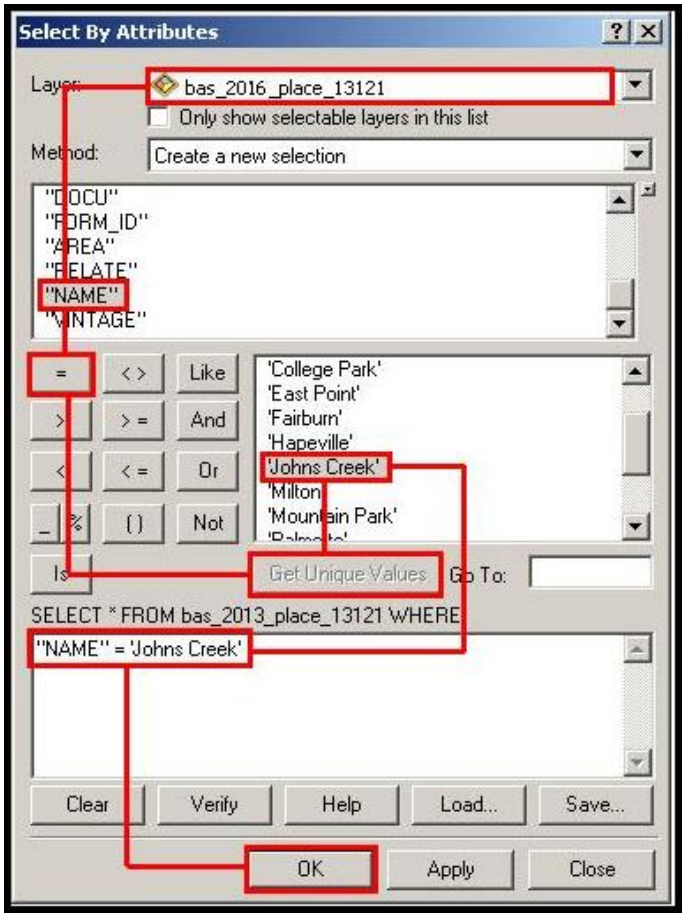


Figure 51. Filtering Data

C5.2 Exporting the Data to a New Shapefile

1. In the **Table of Contents**, right click the Incorporated **Place** or **MCD** layer, select **Data**, and then click **Export Data**.
2. In the **Export Data** window:
   - From the **Export** dropdown, choose **Selected Features**.
   - In the **Output feature class** field, enter a location to save the shapefile.
   - Click **OK**.

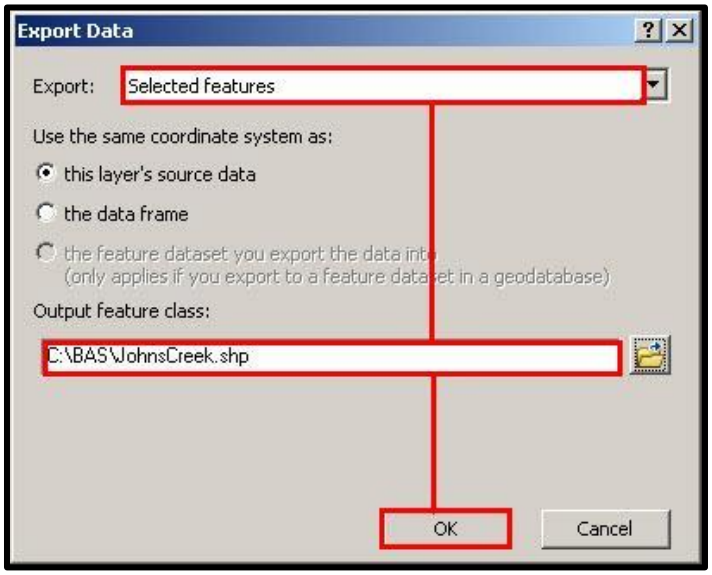


Figure 52. Export Data Window

Note: If the incorporated place spans more than one county, it will need to be exported from each county's place shapefile and merged. Follow the instructions in **Section C6, Merging Multipart Place Data** if the incorporated place needs to merge, otherwise skip to **Section C7.2, Creating Change Polygons Using Union**.

C6 Merging Multipart Place Data

1. In **ArcToolbox**, double-click **Data Management Tools**, then double-click **General**, and then double-click **Merge**.
2. In the **Merge** window:
   - Next to the **Input Datasets** field, click the arrow and select each layer (or use the Browse button to the right of the field to find the layers)
   - In the **Output Dataset** field, browse to and select a location to save the shapefile.
     - Name the shapefile **Export_Output_Final** or **Merged**, or anything easy to find/remember.
   - Click **OK**.

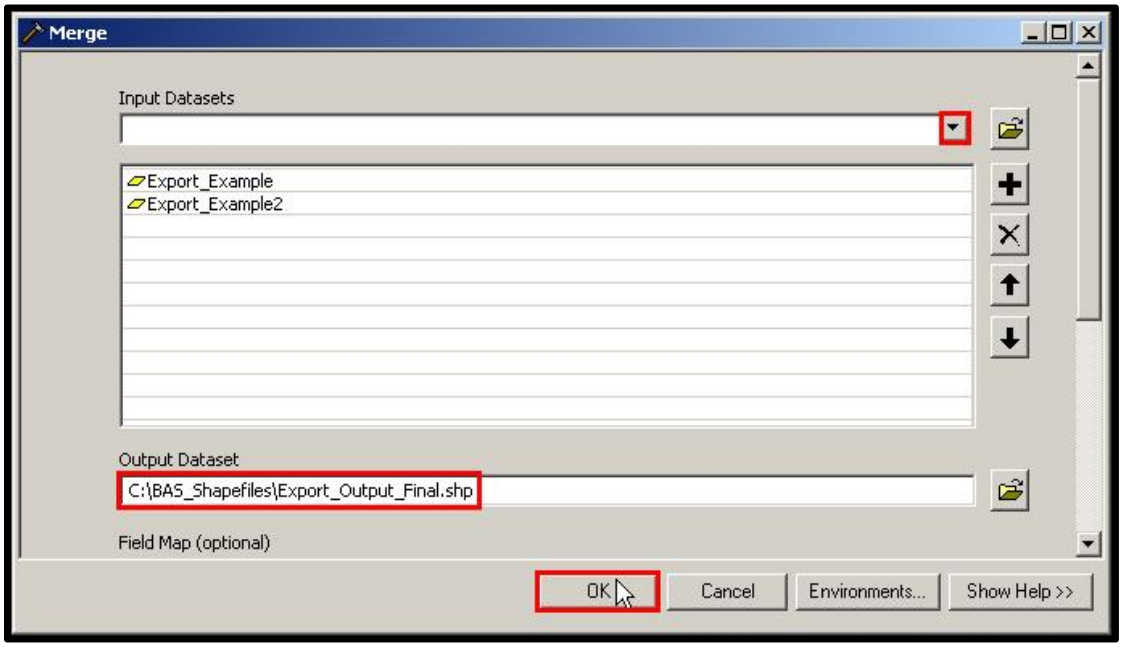


Figure53. Finalizing the Merge Process

C7 Creating Change Polygons

There are two methods used for creating change polygons. Symmetrical Difference is the recommended method for single geographic areas and those with an appropriate ArcGIS license. Steps for using a symmetrical difference are outlined in **Section C7.1, Creating Change Polygons Using Symmetrical Difference**. Otherwise the Union method is acceptable and outlined in **Section C7.2, Creating Change Polygons Using Union**.

C7.1 Creating Change Polygons Using Symmetrical Difference

1. In **ArcToolbox**, double-click **Analysis Tools**, then double-click **Overlay**, and then double-click **Symmetrical Difference**.
2. In the Symmetrical Difference window:
   - In the **Input Features** field, click the arrow (or browse) and select the layer created in **Section C6, Merging Multipart Place Data** if the Census Bureau data required merging.
   - In the **Update Features** field, click the arrow (or browse) and select the local government boundary layer (the participant's data).
   - In the **Output Feature Class** field, browse to and select a location to save the shapefile.
     - Name the shapefile **Differences_between_BAS_local**, **Differences1**, or anything easy to find/remember.
   - Click **OK**.

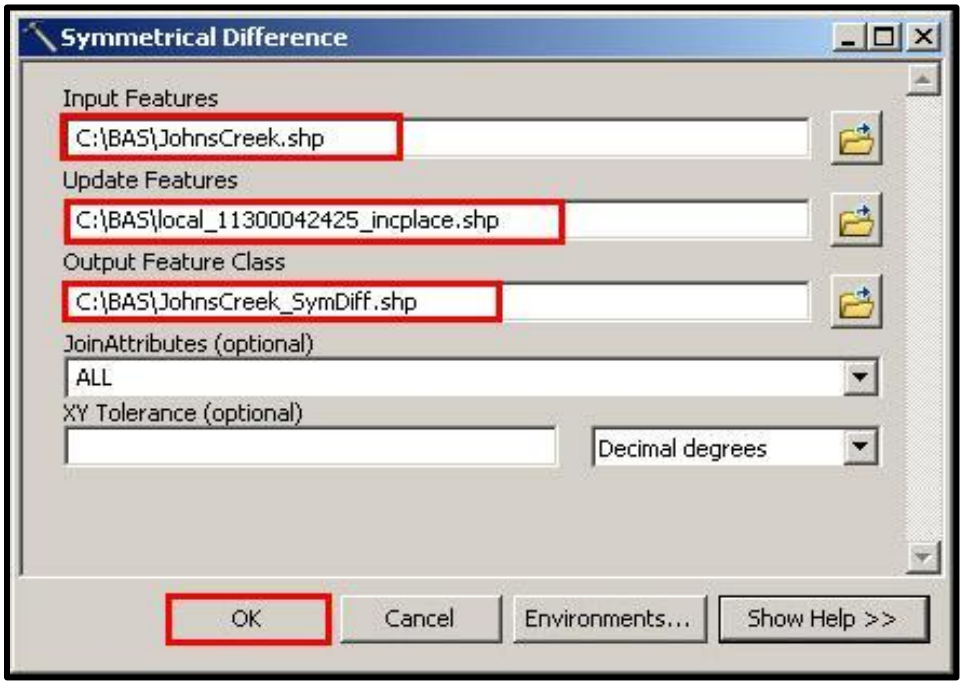


Figure 54. Finalizing the Symmetrical Difference Process

Note: This process creates a layer that contains all of the differences between Census Bureau and local boundaries. However, the Symmetrical Difference tool creates multipart polygons that need to be broken up and individually coded.

3. Turn on Editing (using the **Editing** dropdown in the **Editor** toolbar). Select all of the records in the layer that was created in the Symmetrical Difference step.

4. On the **Advanced Editing** toolbar, click the **Explode** tool . The layer will now contain a separate record for each change.

The created layer shows individual change polygons representing the differences between the Census Bureau and local government boundaries. Please review these differences and code them appropriately.

Skip to **Section C8, Reviewing and Attributing Change Polygons**.

C7.2 Creating Change Polygons Using Union

1. In **ArcToolbox**, double-click **Analysis Tools**, then double-click **Overlay**, and then double-click **Union**.

2. In the **Union** window:

   - In the **Input Features** field, click the arrow (or browse) and select **PVS_19_v2_{place|mcd}_<ssccc>**, and the local incorporated place or MCD layer.
   - In the **Output Feature Class**, browse to and select a location to save the shapefile.
     - Name the shapefile **Export_Output_union**, or **Union**, or anything easy to find/remember.

- Click **OK**.

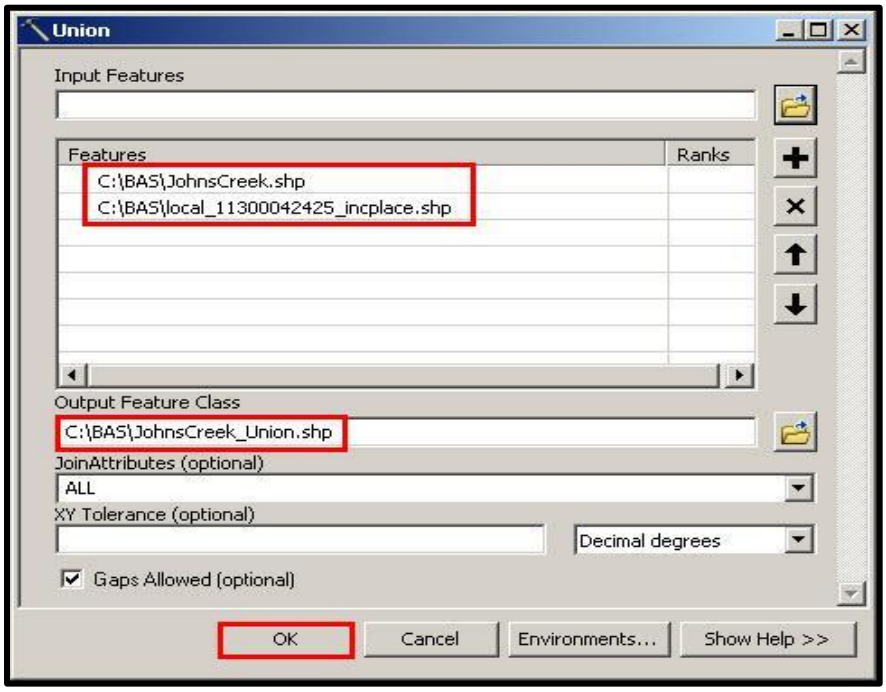


Figure 55. Finalizing the Union Process

The union operation will create records that contain differences as well as areas that are in common between the Census Bureau and local government boundary layers.

The next step is selecting and deleting the areas in common between the Census Bureau and local government boundary layers.

1. On the **Editor** toolbar, click **Editor**, and then click **Start Editing**.
2. If a **Start Editing** window opens, in the top pane click to highlight the **union** shapefile, and then click **OK**.

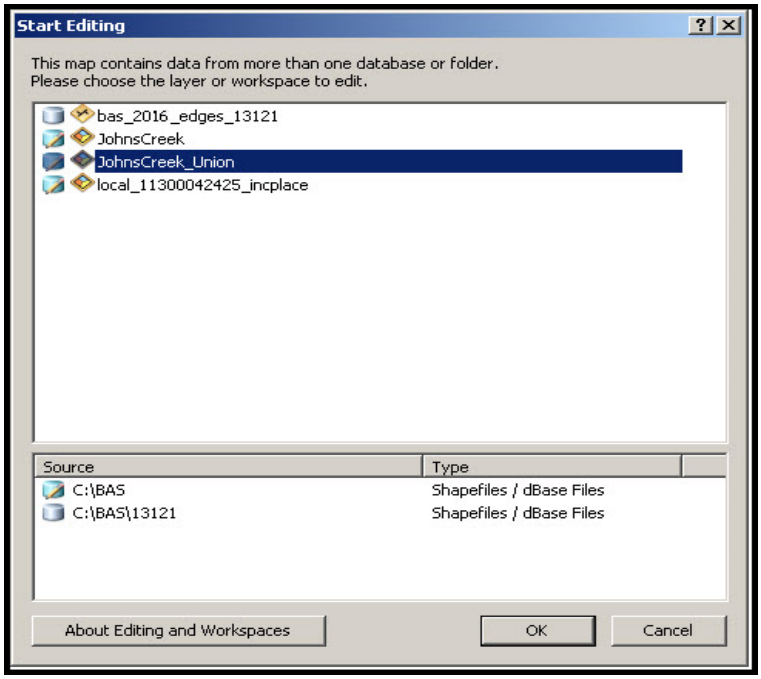


Figure 56. Locating the Union Shapefile

3. In **ArcMap**, in the **Tools** toolbar, click the **Select Features** button.
   - Locate features on the map that the Census Bureau and the local government layers have in common.
   - Select each feature individually, or click and hold the left mouse button and drag a box to highlight the common features.
   - Press **Delete**.
   - Repeat these steps until only the features that have changed are left in the map.
4. Once all of the areas in common have been removed from the union shapefile, on the **Editor** toolbar, click **Editor**, and then click **Save Edits**.
5. Select all of the remaining records in the layer that was created in the Union step.
6. On the **Advanced Editing** toolbar, click the **Explode** tool. The layer will now contain a separate record for each change.

The new layer shows individual change polygons representing the differences between the Census Bureau and the local government's representation of the boundaries. Please review these differences make sure they are coded appropriately. Continue to the next section for instructions on reviewing and coding change polygons.

C8 Reviewing and Attributing Change Polygons

After the individual change polygons have been created, each must be reviewed and appropriately coded. When reviewing the polygons, please refer to **Section 5.3, Boundary Changes** in the main part of this guide to look for polygons that should be deleted from the

submission, as well as those that should be snapped to nearby visible features to maintain boundary-to-feature relationships.

C8.1 Examples

These examples show very small sliver polygons that should be deleted during review as they eliminate boundary-to-feature relationships with a river (left) and a road (right). Furthermore, these boundary corrections also are not located near legal changes or corridor/offset changes (type 'A', 'D', 'C', 'F'), so they should be removed from consideration.

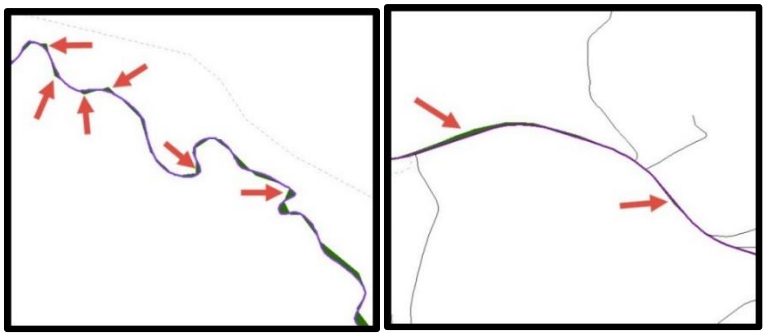


Figure 57. Small Slivers That Should Be Deleted

The examples in Figure 57 show small slivers along rivers (left) or roads (right) that should be deleted.

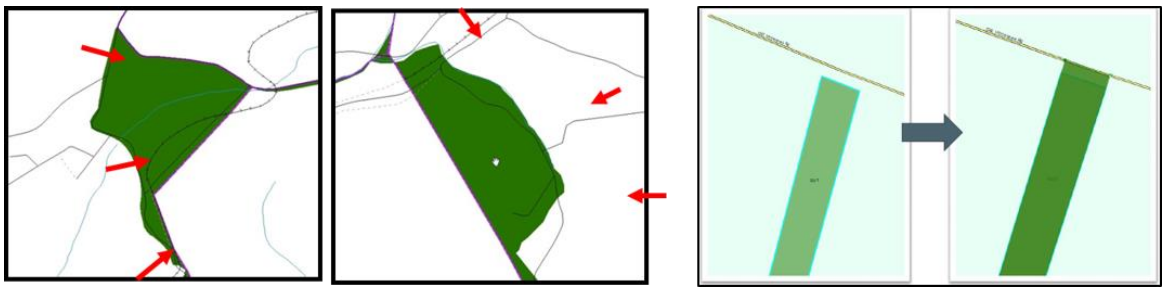


Figure 58. Polygons (Before and After) Snapped to Roads or Rivers

The two examples one the left show polygons that should be snapped to rivers (left) or roads (right). The two examples on the right show how a snapped area will look.

C9 Attribute Information

Note: All updates MUST be attributed. **Table 2**, **Table 3**, and **Table 4** in **Section 5.3, Boundary Changes** cover the required attributes.

C9.1 To Begin Updating Attributes for Annexation

- On the **Editor Toolbar**, click **Editor**, and then click **Start Editing**.
- On the **Editor Toolbar**, click the **Edit** Tool button and select the annexation polygon.
- On the **Editor Toolbar**, click the **Attributes** button.

- In the **Attributes** window, fill out the mandatory fields required for an annexation:
  - **NAME, CHNG_TYPE, AUTHTYPE, DOCU** and **EFF_DATE**.
  - The **CHNG_TYPE** for an annexation is **A**.

C9.2 To Begin Updating Attributes for Deannexation

- On the **Editor Toolbar**, click the **Edit Tool** button and select the deannexation polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a deannexation:
  - **NAME, CHNG_TYPE, AUTHTYPE, DOCU** and **EFF_DATE.**
  - The **CHNG_TYPE** for an annexation is **D**.

C9.3 To Begin Updating Attributes for Geographic Corridors

- On the **Editor Toolbar**, click the **Edit Tool** button and select the corridor polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a corridor:
  - **NAME, CHNG_TYPE, RELATE**.
  - The **CHNG_TYPE** for a corridor changes is **C**.
  - In the **RELATE** field, enter **IN** if the change is adding corridor area to the place or **OUT** if the change is removing corridor area.

C9.4 To Begin Updating Attributes for Geographic Offsets

- On the **Editor Toolbar**, click the **Edit Tool** button and select the offset polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for an offset:
  - **NAME, CHNG_TYPE, RELATE**.
  - The **CHNG_TYPE** for an offset change is **F**.
  - In the **RELATE** field, enter **IN** if the change is adding offset area to the place or **OUT** if the change is removing offset area.

C9.5 To Finish Updating Attributes

- Once all of the attribute changes have been made, in the **ArcMap** menu, click **Editor**, and then click **Stop Editing**. (In the **Save** window, click **Yes**.)

C10 Renaming and Finalizing Change Polygons

After creating and coding all change polygons, please rename the change polygon layer prior to its submission to the Census Bureau. This process must be completed for each level of geography (county, place, MCD) that has changes.

C10.1 Renaming the Shapefile

1. In **ArcMap**, open the **ArcCatalog**

tab.
2. In **ArcCatalog**, navigate to shapefile, right-click and select **Rename**.
3. Save the output shapefile in the proper naming convention: **bas20_<basID>_changes_<government_type>**.

Note: The BAS ID numbers can be found on the BAS Annual Response Email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>

Note: See **Section 5.7.5, Compressing the Digital Files** for instructions on zipping updates.

C10.2 Submitting the shapefile

The Census Bureau requires participants submit BAS return ZIP files using the Census Bureau's **SWIM** site. Please submit only the ZIP file. The **SWIM** is located at <https://respond.census.gov/swim>. For instructions on how to use SWIM, see **Section 5.7.6, Submitting Digital Files through SWIM** of this respondent guide.

C10.3 To Begin Updating Attributes for Boundary Corrections

- On the **Editor Toolbar**, click the **Edit Tool** button and select the boundary correction polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a boundary correction:
  - **NAME, CHNG_TYPE, RELATE**.
  - The **CHNG_TYPE** for a boundary correction is **B**.
  - In the **RELATE** field, enter **IN** if the boundary correction is adding area or **OUT** if the boundary correction is removing area.

Note: If a county is reporting for adjacent incorporated places or MCDs, and a boundary correction to one government affect or takes land from another, use RELATE = IN and NAME = <government being added to>. This is due to the fact that RELATE = OUT leaves a question as to whether or not there should be a gap between the two governments.

APPENDIX D MTFCC DESCRIPTIONS

The MAF/TIGER Feature Classification Code (MTFCC) is a 5-digit code assigned by the Census Bureau to classify and describe geographic objects or features in Census Bureau MAF/TIGER products.

MTFCC	Feature Class	Feature Class Description
C3022	Mountain Peak or Summit	A prominent elevation rising above the surrounding level of the Earth's surface.
C3023	Island	An area of dry or relatively dry land surrounded by water or low wetland [including archipelago, atoll, cay, hammock, hummock, isla, isle, key, moku and rock].
C3024	Levee	An embankment flanking a stream or other flowing water feature to prevent overflow.
C3026	Quarry (not water-filled), Open Pit Mine or Mine	An area from which commercial minerals are or were removed from the Earth; not including an oilfield or gas field.
C3027	Dam	A barrier built across the course of a stream to impound water and/or control water flow.
C3061	Cul-de-sac	An expanded paved area at the end of a street used by vehicles for turning around. For mapping purposes, the Census Bureau maps it only as a point feature.
C3062	Traffic Circle	A circular intersection allowing for continuous movement of traffic at the meeting of roadways.
C3066	Gate	A movable barrier across a road.
C3067	Toll Booth	A structure or barrier where a fee is collected for using a road.
C3071	Lookout Tower	A manmade structure, higher than its diameter, used for observation.
C3074	Lighthouse Beacon	A manmade structure, higher than its diameter, used for transmission of light and possibly sound generally to aid in navigation.
C3075	Tank/Tank Farm	One or more manmade structures, each higher than its diameter, used for liquid (other than water) or gas storage or for distribution activities.
C3076	Windmill Farm	One or more manmade structures used to generate power from the wind.
C3077	Solar Farm	One or more manmade structures used to generate power from the sun.
C3078	Monument or Memorial	A manmade structure to educate, commemorate, or memorialize an event, person, or feature.
C3079	Boundary Monument Point	A material object placed on or near a boundary line to preserve and identify the location of the boundary line on the ground.
C3080	Survey Control Point	A point on the ground whose position (horizontal or vertical) is known and can be used as a base for additional survey work.
C3081	Locality Point	A point that identifies the location and name of an unbounded locality (e.g., crossroad, community, populated place or locale).
C3085	Alaska Native Village Official Point	A point that serves as the core of an Alaska Native village and is used in defining Alaska Native village statistical areas.
G2100	American Indian Area	A legally defined state- or federally recognized reservation and/or off-reservation trust land (excludes statistical American Indian areas).
G2120	Hawaiian Home Land	A legal area held in trust for the benefit of Native Hawaiians.

MTFCC	Feature Class	Feature Class Description
G2130	Alaska Native Village Statistical Area	A statistical geographic entity that represents the residences, permanent and/or seasonal, for Alaska Natives who are members of or receiving governmental services from the defining legal Alaska Native Village corporation.
G2140	Oklahoma Tribal Statistical Area	A statistical entity identified and delineated by the Census Bureau in consultation with federally recognized American Indian tribes that have no current reservation, but had a former reservation in Oklahoma.
G2150	State-designated Tribal Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a state-appointed liaison for a state-recognized American Indian tribe that does not currently have a reservation and/or lands in trust.
G2160	Tribal Designated Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a federally recognized American Indian tribe that does not currently have a reservation and/or off-reservation trust land.
G2170	American Indian Joint Use Area	An area administered jointly and/or claimed by two or more American Indian tribes.
G2200	Alaska Native Regional Corporation	Corporate entities established to conduct both business and nonprofit affairs of Alaska Natives pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). There are twelve geographically defined ANRCs and they are all within and cover most of the State of Alaska (the Annette Island Reserve-an American Indian reservation-is excluded from any ANRC). The boundaries of ANRCs have been legally established.
G2300	Tribal Subdivision	Administrative subdivisions of federally recognized American Indian reservations, off-reservation trust lands, or Oklahoma tribal statistical areas (OTSAs). These entities are internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations, off-reservation trust lands, or OTSAs.
G2400	Tribal Census Tract	A relatively small and permanent statistical subdivision of a federally recognized American Indian reservation and/or off-reservation trust land, delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G2410	Tribal Block Group	A cluster of census blocks within a single tribal census tract delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G3100	Combined Statistical Area	A grouping of adjacent metropolitan and/or micropolitan statistical areas that have a degree of economic and social integration, as measured by commuting.
G3110	Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using whole counties and equivalents.
G3120	Metropolitan Division	A county or grouping of counties that is a subdivision of a Metropolitan Statistical Area containing an urbanized area with a population of 2.5 million or more.
G3200	Combined New England City and Town Area	A grouping of adjacent New England city and town areas that have a degree of economic and social integration, as measured by commuting.

MTFCC	Feature Class	Feature Class Description
G3210	New England City and Town Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using Minor Civil Divisions (MCDs) in New England.
G3220	New England City and Town Division	A grouping of cities and towns in New England that is a subdivision of a New England City and Town Area containing an urbanized area with a population of 2.5 million or more.
G3500	Urban Area	Densely settled territory that contains at least 2,500 people. The subtypes of this feature are Urbanized Area (UA), which consists of 50,000 + people and Urban Cluster, which ranges between 2,500 and 49,999 people.
G4000	State or Equivalent Feature	The primary governmental divisions of the United States. The District of Columbia is treated as a statistical equivalent of a state for census purposes, as is Puerto Rico.
G4020	County or Equivalent Feature	The primary division of a state or state equivalent area. The primary divisions of 48 states are termed County, but other terms are used such as Borough in Alaska, Parish in Louisiana, and Municipio in Puerto Rico. This feature includes independent cities, which are incorporated places that are not part of any county.
G4040	County Subdivision	The primary divisions of counties and equivalent features for the reporting of Census Bureau data. The subtypes of this feature are Minor Civil Division, Census County Division/Census Subarea, and Unorganized Territory. This feature includes independent places, which are incorporated places that are not part of any county subdivision.
G4050	Estate	Estates are subdivisions of the three major islands in the United States Virgin Islands (USVI).
G4060	Subbarrio (Subminor Civil Division)	Legally defined divisions (subbarrios) of minor civil divisions (barrios-pueblo and barrios) in Puerto Rico.
G4110	Incorporated Place	A legal entity incorporated under state law to provide general-purpose governmental services to a concentration of population. Incorporated places are generally designated as a city, borough, municipality, town, village, or, in a few instances, have no legal description.
G4120	Consolidated City	An incorporated place that has merged governmentally with a county or minor civil division, but one or more of the incorporated places continues to function within the consolidation. It is a place that contains additional separately incorporated places.
G4210	Census Designated Place	A statistical area defined for a named concentration of population and the statistical counterpart of an incorporated place.
G4300	Economic Census Place	The lowest level of geographic area for presentation of some types of Economic Census data. It includes incorporated places, consolidated cities, census designated places (CDPs), minor civil divisions (MCDs) in selected states, and balances of MCDs or counties. An incorporated place, CDP, MCD, or balance of MCD qualifies as an economic census place if it contains 5,000 or more residents, or 5,000 or more jobs, according to the most current data available.
G5020	Census Tract	Relatively permanent statistical subdivisions of a County or equivalent feature delineated by local participants as part of the Census Bureau's Participant Statistical Areas Program.

MTFCC	Feature Class	Feature Class Description
G5030	Block Group	A cluster of census blocks having the same first digit of their four-digit identifying numbers within a Census Tract. For example, block group 3 (BG 3) within a Census Tract includes all blocks numbered from 3000 to 3999.
G5035	Block Area Grouping	A user-defined group of islands forming a single census tabulation block. A BAG must: (1) consist of two or more islands, (2) have a perimeter entirely over water, (3) not overlap, and (4) not cross the boundary of other tabulation geographies, such as county or incorporated place boundaries.
G5040	Tabulation Block	The lowest-order census defined statistical area. It is an area, such as a city block, bounded primarily by physical features but sometimes by invisible city or property boundaries. A tabulation block boundary does not cross the boundary of any other geographic area for which the Census Bureau tabulates data. The subtypes of this feature are Count Question Resolution (CQR), current, and census.
G5200	Congressional District	The 435 areas from which people are elected to the U.S. House of Representatives. Additional equivalent features exist for state equivalents with nonvoting delegates or no representative. The subtypes of this feature are 106th, 107th, 108th, 109th, and 111th Congressional Districts, plus subsequent Congresses.
G5210	State Legislative District (Upper Chamber	Areas established by a state or equivalent government from which members are elected to the upper or unicameral chamber of a state governing body. The upper chamber is the senate in a bicameral legislature, and the unicameral case is a single house legislature (Nebraska).
G5220	State Legislative District (Lower Chamber)	Areas established by a state or equivalent government from which members are elected to the lower chamber of a state governing body. The lower chamber is the House of Representatives in a bicameral legislature.
G5240	Voting District	The generic name for the geographic features, such as precincts, wards, and election districts, established by state, local, and tribal governments for the purpose of conducting elections.
G5400	Elementary School District	A geographic area within which officials provide public elementary grade-level educational services for residents.
G5410	Secondary School District	A geographic area within which officials provide public secondary grade-level educational services for residents.
G5420	Unified School District	A geographic area within which officials provide public educational services for all grade levels for residents.
G6120	Public-Use Microdata Area	A decennial census area with a population of at least 100,000 or more persons for which the Census Bureau provides selected extracts of household-level data that are screened to protect confidentiality.
G6300	Traffic Analysis District	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data. A Traffic Analysis District (TAD) consists of one or more Traffic Analysis Zones (TAZs).
G6320	Traffic Analysis Zone	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data.

MTFCC	Feature Class	Feature Class Description
G6330	Urban Growth Area	An area defined under state authority to manage urbanization that the Census Bureau includes in the MAF/TIGER® System in agreement with the state.
G6350	ZIP Code Tabulation Area (Five-Digit)	An approximate statistical-area representation of a U.S. Postal Service (USPS) 5-digit ZIP Code service area.
G6400	Commercial Region	For the purpose of presenting economic statistical data, municipios in Puerto Rico are grouped into commercial regions.
H1100	Connector	A known, but nonspecific, hydrographic connection between two nonadjacent water features.
H2025	Swamp/Marsh	A poorly drained wetland, fresh or saltwater, wooded or grassy, possibly covered with open water [includes bog, cienega, marais and pocosin].
H2030	Lake/Pond	A standing body of water that is surrounded by land.
H2040	Reservoir	An artificially impounded body of water.
H2041	Treatment Pond	An artificial body of water built to treat fouled water.
H2051	Bay/Estuary/Gulf/Sound	A body of water partly surrounded by land [includes arm, bight, cove and inlet].
H2053	Ocean/Sea	The great body of salt water that covers much of the earth.
H2060	Gravel Pit/Quarry filled with water	A body of water in a place or area from which commercial minerals were removed from the Earth.
H2081	Glacier	A body of ice moving outward and down slope from an area of accumulation; an area of relatively permanent snow or ice on the top or side of a mountain or mountainous area [includes ice field and ice patch].
H3010	Stream/River	A natural flowing waterway [includes anabranch, awawa, branch, brook, creek, distributary, fork, kill, pup, rio, and run].
H3013	Braided Stream	A natural flowing waterway with an intricate network of interlacing channels.
H3020	Canal, Ditch or Aqueduct	An artificial waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft [includes lateral].
K1225	Crew-of-Vessel Location	A point or area in which the population of military or merchant marine vessels at sea are assigned, usually being at or near the home port pier.
K1231	Hospital/Hospice/Urgent Care Facility	One or more structures where the sick or injured may receive medical or surgical attention [including infirmary].
K1235	Juvenile Institution	A facility (correctional and non-correctional) where groups of juveniles reside; this includes training schools, detention centers, residential treatment centers and orphanages.
K1236	Local Jail or Detention Center	One or more structures that serve as a place for the confinement of adult persons in lawful detention, administered by a local (county, municipal, etc.) government.
K1237	Federal Penitentiary, State Prison, or Prison Farm	An institution that serves as a place for the confinement of adult persons in lawful detention, administered by the federal government or a state government.
K1238	Other Correctional Institution	One or more structures that serve as a place for the confinement of adult persons in lawful detention, not elsewhere classified or administered by a government of unknown jurisdiction.

MTFCC	Feature Class	Feature Class Description
K1239	Convent, Monastery, Rectory, Other Religious Group Quarters	One or more structures intended for use as a residence for those having a religious vocation.
K1246	Community Center	Community Center.
K2110	Military Installation	An area owned and/or occupied by the Department of Defense for use by a branch of the armed forces (such as the Army, Navy, Air Force, Marines, or Coast Guard), or a state owned area for the use of the National Guard.
K2165	Government Center	A place used by members of government (either federal, state, local, or tribal) for administration and public business.
K2167	Convention Center	An exhibition hall or conference center with enough open space to host public and private business and social events.
K2180	Park	Parkland defined and administered by federal, state, and local governments.
K2181	National Park Service Land	Area—National parks, National Monuments, and so forth—under the jurisdiction of the National Park Service.
K2182	National Forest or Other Federal Land	Land under the management and jurisdiction of the federal government, specifically including areas designated as National Forest, and excluding areas under the jurisdiction of the National Park Service.
K2183	Tribal Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of an American Indian tribe.
K2184	State Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a state government.
K2185	Regional Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a regional government.
K2186	County Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a county government.
K2187	County Subdivision Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a minor civil division (town/township) government.
K2188	Incorporated Place Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a municipal government.
K2189	Private Park, Forest, or Recreation Area	A privately owned place or area set aside for recreation or preservation of a cultural or natural resource.
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of some other type of government or agency such as an independent park authority or commission.
K2191	Post Office	An official facility of the U.S. Postal Service used for processing and distributing mail and other postal material.
K2193	Fire Department	Fire Department.
K2194	Police Station	Police Station.
K2195	Library	Library.

MTFCC	Feature Class	Feature Class Description
K2196	City/Town Hall	City/Town Hall.
K2400	Transportation Terminal	A facility where one or more modes of transportation can be accessed by people or for the shipment of goods; examples of such a facility include marine terminal, bus station, train station, airport and truck warehouse.
K2424	Marina	A place where privately owned, light-craft are moored.
K2432	Pier/Dock	A platform built out from the shore into the water and supported by piles. This platform may provide access to ships and boats, or it may be used for recreational purposes.
K2451	Airport or Airfield	A manmade facility maintained for the use of aircraft [including airstrip, landing field and landing strip].
K2452	Train Station, Trolley or Mass Transit Rail Station	A place where travelers can board and exit rail transit lines, including associated ticketing, freight, and other commercial offices.
K2453	Bus Terminal	A place where travelers can board and exit mass motor vehicle transit, including associated ticketing, freight, and other commercial offices.
K2454	Marine Terminal	A place where travelers can board and exit water transit or where cargo is handled, including associated ticketing, freight, and other commercial offices.
K2455	Seaplane Anchorage	A place where an airplane equipped with floats for landing on or taking off from a body of water can debark and load.
K2456	Airport—Intermodal Transportation Hub/Terminal	A major air transportation facility where travelers can board and exit airplanes and connect with other (i.e. non-air) modes of transportation.
K2457	Airport—Statistical Representation	The area of an airport adjusted to include whole 2000 census blocks used for the delineation of urban areas.
K2458	Park and Ride Facility/Parking Lot	A place where motorists can park their cars and transfer to other modes of transportation.
K2459	Runway/Taxiway	A fairly level and usually paved expanse used by airplanes for taking off and landing at an airport.
K2460	Helicopter Landing Pad	A fairly level and usually paved expanse used by helicopters for taking off and landing.
K2540	University or College	A building or group of buildings used as an institution for post-secondary study, teaching, and learning [including seminary].
K2543	School or Academy	A building or group of buildings used as an institution for preschool, elementary or secondary study, teaching, and learning [including elementary school and high school].
K2545	Museum, Visitor Center, Cultural Center, or Tourist Attraction	An attraction of historical, cultural, educational or other interest that provides information or displays artifacts.
K2561	Golf Course	A place designed for playing golf.
K2582	Cemetery	A place or area for burying the dead [including burying ground and memorial garden].
K2586	Zoo	A facility in which terrestrial and/or marine animals are confined within enclosures and displayed to the public for educational, preservation, and research purposes.
K3544	Place of Worship	A sanctified place or structure where people gather for religious worship; examples include church, synagogue, temple, and mosque.

MTFCC	Feature Class	Feature Class Description
L4010	Pipeline	A long tubular conduit or series of pipes, often underground, with pumps and valves for flow control, used to transport fluid (e.g., crude oil, natural gas), especially over great distances.
L4020	Powerline	One or more wires, often on elevated towers, used for conducting high-voltage electric power.
L4031	Aerial Tramway/Ski Lift	A conveyance that transports passengers or freight in carriers suspended from cables and supported by a series of towers.
L4110	Fence Line	A man-made barrier enclosing or bordering a field, yard, etc., usually made of posts and wire or wood, used to prevent entrance, to confine, or to mark a boundary.
L4121	Ridge Line	The line of highest elevation along a ridge.
L4125	Cliff/Escarpment	A very steep or vertical slope [including bluff, crag, head, headland, nose, palisades, precipice, promontory, rim and rimrock].
L4130	Point-to-Point Line	A line defined as beginning at one location point and ending at another, both of which are in sight.
L4140	Property/Parcel Line (Including PLSS)	This feature class may denote a nonvisible boundary of either public or private lands (e.g., a park boundary) or it may denote a Public Land Survey System or equivalent survey line.
L4150	Coastline	The line that separates either land or Inland water from Coastal, Territorial or Great Lakes water. Where land directly borders Coastal, Territorial or Great Lakes water, the shoreline represents the Coastline. Where Inland water (such as a river) flows into Coastal, Territorial or Great Lakes water, the closure line separating the Inland water from the other class of water represents the Coastline.
L4165	Ferry Crossing	The route used to carry or convey people or cargo back and forth over a waterbody in a boat.
P0001	Nonvisible Linear Legal/Statistical Boundary	A legal/statistical boundary line that does not correspond to a shoreline or other visible feature on the ground.
P0002	Perennial Shoreline	The more-or-less permanent boundary between land and water for a water feature that exists year-round.
P0003	Intermittent Shoreline	The boundary between land and water (when water is present) for a water feature that does not exist year-round.
P0004	Other non-visible bounding Edge (e.g., Census water boundary, boundary of an aerial feature)	A bounding Edge that does not represent a legal/statistical boundary, and does not correspond to a shoreline or other visible feature on the ground. Many such Edges bound area landmarks, while many others separate water features from each other (e.g., where a bay meets the ocean).
R1011	Railroad Feature (Main, Spur, or Yard)	A line of fixed rails or tracks that carries mainstream railroad traffic. Such a rail line can be a main line or spur line, or part of a rail yard.
R1051	Carline, Streetcar Track, Monorail, Other Mass Transit	Mass transit rail lines (including lines for rapid transit, monorails, streetcars, light rail, etc.) that are typically inaccessible to mainstream railroad traffic and whose tracks are not part of a road right-of-way.
R1052	Cog Rail Line, Incline Rail Line, Tram	A special purpose rail line for climbing steep grades that is typically inaccessible to mainstream railroad traffic. Note that aerial tramways and streetcars (which may also be called “trams”) are accounted for by other MTFCCs and do not belong in R1052.
S1100	Primary Road	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are

MTFCC	Feature Class	Feature Class Description
		distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
S1200	Secondary Road	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.
S1400	Local Neighborhood Road, Rural Road, City Street	Generally, a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.
S1500	Vehicular Trail (4WD)	An unpaved dirt trail where a four-wheel drive vehicle is required. These vehicular trails are found almost exclusively in very rural areas. Minor, unpaved roads usable by ordinary cars and trucks belong in the S1400 category.
S1630	Ramp	A road that allows controlled access from adjacent roads onto a limited access highway, often in the form of a cloverleaf interchange. These roads are unaddressable and do not carry a name in the MAF/TIGER System.
S1640	Service Drive usually along a limited access highway	A road, usually paralleling a limited access highway, that provides access to structures along the highway. These roads can be named and may intersect with other roads.
S1710	Walkway/Pedestrian Trail	A path that is used for walking, being either too narrow for or legally restricted from vehicular traffic.
S1720	Stairway	A pedestrian passageway from one level to another by a series of steps.
S1730	Alley	A service road that does not generally have associated addressed structures and is usually unnamed. It is located at the rear of buildings and properties and is used for deliveries.
S1740	Private Road for service vehicles (logging, oil fields, ranches, etc.)	A road within private property that is privately maintained for service, extractive, or other purposes. These roads are often unnamed.
S1750	Internal U.S. Census Bureau use	Internal U.S. Census Bureau use.
S1780	Parking Lot Road	The main travel route for vehicles through a paved parking area.
S1820	Bike Path or Trail	A path that is used for manual or small, motorized bicycles, being either too narrow for or legally restricted from vehicular traffic.
S1830	Bridle Path	A path that is used for horses, being either too narrow for or legally restricted from vehicular traffic.
S2000	Road Median	The unpaved area or barrier between the carriageways of a divided road.

Note: The information in this table was last updated in November 2017.

Boundary and Annexation Survey (BAS): Digital Quick Start Guide

Initial Steps

1) Report if making updates by one of the following methods:
   - Complete the Annual Response Form on the BAS website: <https://www.census.gov/programs-surveys/bas.html>.
   - Call: **1-800-972-5651**.
   - Email: <geo.bas@census.gov>.
2) Obtain the following materials from the BAS website, BAS annual response email, or DVD (if requested):
   - ***Boundary and Annexation Survey (BAS) Respondent Guide: Digital***: <https://www.census.gov/programs-surveys/bas/information/respondent-guides.html>.
   - **BAS Partnership Toolbox** and **BAS Partnership Toolbox Overview**: <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html>.
   - **BAS ID**: Refer to the subject line in the BAS annual response email. It includes the BAS ID.
   - **BAS Partnership Shapefiles**: <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html>.
3) Review respondent guide and training videos.
   - Review the *BAS Respondent Guide: Digital* along with the training videos on the BAS website before beginning any boundary or linear feature updates.

Boundary Review

1) Compare the Census Bureau's representation of the participating government's boundary to the local representation of the boundary, and extract the differences (change polygons). The differences can be extracted using one of the sample methods in the *BAS Respondent Guide: Digital* or using the geoprocessing tools in ArcGIS. The BAS Partnership Toolbox, Create Changes tool, does this for the BAS participant.
2) Populate the applicable mandatory fields for each change polygon. The Census Bureau will not be able to accept changes without the appropriate attribution or documentation. The following are mandatory fields:
   - NAME: Government name (all changes).
   - CHNG_TYPE: Type of area update; see tables (all changes).
   - AUTHTYPE: Authorization type; see tables (all legal changes – annexations, deannexations, new incorporations, disincorporations).
   - DOCU: Supporting documentation (all legal changes).
   - EFF_DATE: Effective date; if after January 1, 2020, legal changes will not be included in the 2020 Census.
   - RELATE: Relationship description; IN or OUT (all boundary corrections).
3) BAS participants have the option to return linear feature (road, railroad, hydrology) and landmark updates. Review the *BAS Respondent Guide: Digital* for more information on these types of changes.

Geographic Area Changes	CHNG_TYPE
Disincorporation	X
New Incorporation	E
Annexation	A
Boundary Correction	B
Geographic Corridor	C
Deannexation	D
Geographic Offset	F

Authorization Types	AUTHTYPE
Ordinance	O
Resolution	R
Local Law	L
State Level Action	S
Other	X

Boundary Review – Quality Control

1) Verify that all mandatory fields are populated.
2) Verify that all legal changes have appropriate legal documentation, authorization types, and effective dates.
3) Verify that all boundary changes are greater than thirty feet, unless they include housing units.
4) Verify that all boundary corrections less than thirty feet do not dissolve boundary to feature relationships with roads, railroads, hydrography, etc. (Example: road right of ways.)

File Naming Conventions and Submission Preparation

Note: The BAS Partnership Toolbox will complete these requirements for BAS participants. For participants not using the Toolbox, please follow the steps below.

1) Name all return files (change polygons, linear feature updates, whole entity files, etc.) using the file naming conventions outlined in the *BAS Respondent Guide: Digital*. Table 1 contains examples of the file naming conventions.
2) Include important metadata information. It is critical that all return files have correct *.prj files.
3) Include a text file with the BAS and Highest Elected Official contact information, or update the contact information using the online Annual Response Form. (See *Initial Steps* section for link).
4) Zip all return files together and name the file bas20_<BASID>_return.zip. <BASID> should be replaced with the eleven-digit BAS ID code (e.g. bas20_20100100000_return.zip).

Table 1: File Naming Conventions

Changes Submitted For	Change Shapefile Naming Conventions	Whole Entity Shapefile Naming Conventions
County	bas20_<basID>_changes_county	bas20_<basID>_WholeEntity_county
Minor Civil Division	bas20_<basID>_changes_cousub	bas20_<basID>_WholeEntity_cousub
Incorporated Place	bas20_<basID>_changes_incplace	bas20_<basID>_WholeEntity_incplace
Consolidated City	bas20_<basID>_changes_concity	bas20_<basID>_WholeEntity_concity
Edges	bas20_<basID>_LN_Changes	N/A
Area/Hydrographic Landmarks	bas20_<basID>_Alndk_Changes	N/A
Point Landmarks	bas20_<basID>_Plndk_Changes	N/A

Return Updates Using the Secure Web Incoming Module (SWIM)

1) Open a web browser window and enter the SWIM URL: <https://respond.census.gov/swim/>.
2) Participants who already have a SWIM account should skip to Step 4 and enter their email address and password to login.
3) Participants who do not have a SWIM account click 'Register Account':
   - Enter the 12-digit token provided by the Census Bureau.
   - Create a password following the five criteria below:
     1) It must be at least eight characters in length.
     2) It must have at least one upper case character.
     3) It must have at least one lower case character.
     4) It must have at least one number.
     5) It must have at least one special character (valid characters are: #, !, $, &, ?, ~). Do not use commas since they are for spacing purposes only.
   - Complete the registration information form.
4) Login into SWIM.
5) Upload BAS submission:
   - Select the **Start New Upload** button.
   - Select the **BAS** radio button.
   - Select the **Entity** Type (State, Place, County, Minor Civil Division (MCD), Tribal Area, or Consolidated City).
   - Select the **State and County**.
   - Click the **+ Add File** button.
   - Double-click on the .**ZIP file** to upload. Add additional files in the same manner.
   - Add any additional information to the Comments field.
   - Click **Next**. A **Thank You** screen will appear.
6) Logout of SWIM.

BAS Schedule and Deadlines

- **January 1, 2020** – Boundary changes must be legally in effect on or before this date to be reported in the current survey year and to be used for the 2020 Census data tabulations. Boundary updates effective after this date will be held until the following BAS cycle.
- **March 1, 2020** – Boundary updates returned by this date will be reflected in the 2020 Census, in the Final BVP materials, and in next year's BAS materials.
- **May 31, 2020** – Boundary updates returned by this date will be reflected in the 2020 Census and in next year's BAS materials.

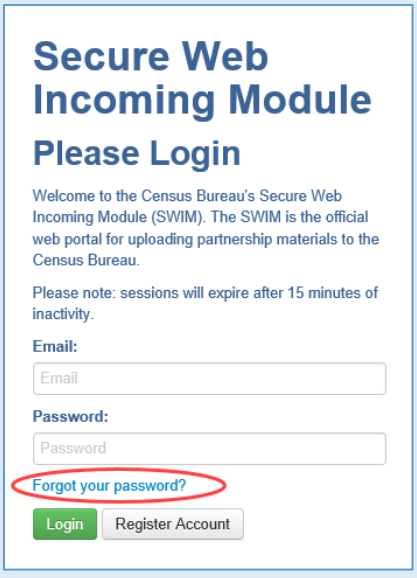
Contact Information

Please contact the Census Bureau for questions:

- Email: <geo.bas@census.gov>.
- Phone: **1-800-972-5651**.
- Fax: **1-800-972-5652**.

Note: SWIM email addresses and passwords are case sensitive.

Forgot your password?
Participants may reset their password using the "Forgot your password?" link on the login page. Follow the prompts to enter the case-sensitive email address and provide the security answer. If the security answer is correct, the SWIM system sends a password reset link to the email account for use in resetting the password. Once logged into SWIM, users can modify their password and security answer by selecting the 'Change Security' link at the top, right-hand side of the page.



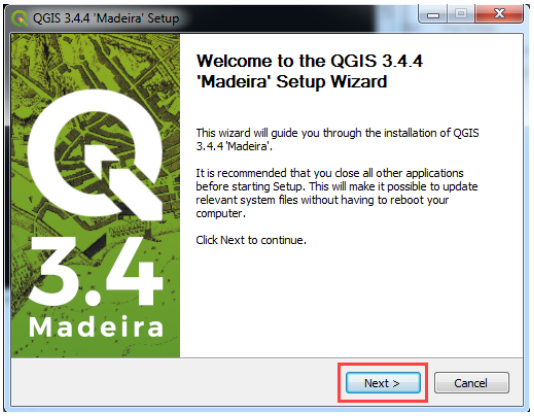
Boundary and Annexation Survey (BAS):
Geographic Update Partnership Software (GUPS) Quick Start Guide

Initial Steps

1) Report if making updates by one of the following methods:
   - Complete the Annual Response Form on the BAS website: <https://www.census.gov/programs-surveys/bas.html>.
   - Call: **1-800-972-5651**.
   - Email: <geo.bas@census.gov>.
2) Obtain the following materials from the BAS website or DVD (if requested):
   - ***Boundary and Annexation Survey (BAS) Respondent Guide: GUPS***: <https://www.census.gov/programs-surveys/bas/information/respondent-guides.html>.
   - **GUPS**: <https://www2.census.gov/geo/pvs/gups/>.

   Note: Those requesting the GUPS and data on DVD will receive the software and data disc in the mail.
3) Review respondent guide and training videos.
   - Review the *BAS Respondent Guide: GUPS* along with the training videos on the BAS website before beginning any boundary or linear feature updates.

Download and Install GUPS



1) Download the GUPS tool from the BAS website to the computer.
2) Unzip the file and extract all contents of the unzipped package to a folder on the computer.
3) Click the **Setup-x.x.x** batch file to start the installation.
4) When the installer opens, the **Welcome to the QGIS GUPS Setup Wizard** screen will appear. Follow the instructions on the Wizard and click the *Next* button.
5) The **License Agreement** screen will appear. Review the License Agreement and click the *I Agree* button to continue the install process.
6) The **Choose Install Location** screen will appear. Click the *Browse* button to choose the location where GUPS will be installed. It is recommended to install the application at the default location shown (C:\Program Files\QGIS GUPS). Click *Next* to continue the install process.
7) The **Choose Components** screen will appear. The Select Components to Install box will be grayed out as it is the default. Click *Install* to continue.
8) The software should take five to ten minutes to complete the install. When the install is complete, the **Completing the QGIS GUPS Setup Wizard** screen will appear. To complete the install, click the *Finish* button at the bottom of the screen.
   Note: The software should run automatically for those requesting a DVD. If it does not, please navigate to the DVD drive and begin with Step 3, above).

Start New BAS Project

1) Double-click the QGIS icon on the desktop. [QGIS splash screen appears].
2) Click *Close (X)* on QGIS Tips screen. [Map Management dialog page opens].
3) Use the **Program** and **Sub-program** dropdown boxes to select **Boundary and Annexation Survey and 2020 Boundary and Annexation Survey respectively**.
4) Use the **State** dropdown box to select the state to update.
5) Use the **Working County** dropdown box to select the county to update.
6) Use the **Select Data Folder, Directory or Location** dropdown box to select the location from which to pull the county's shapefiles. (Options: Census Web (*suggested*), Census-provided CD/DVD, or My Computer).
7) Use the **Entity Type** dropdown box to select the entity represented (County, Minor Civil Division, Place, or State).
8) Once selected, a list of adjacent counties will appear highlighted. (Uncheck any counties not wanted on the Map View).
   - If adjacent counties are selected, load their shapefiles from the Select Data Folder, Directory or Location dropdown box.
   - Files load and GUPS is ready to make BAS updates.

Perform Geographic Review/Updates

1) Use the BAS Module in GUPS to:
   - Add, delete, and modify legal governments (Counties [and equivalent areas], MCDs, Incorporated Places, and Consolidated Cities).
   - Add, delete, and modify linear features (roads, railroads, and hydrography).
   - Add, delete, and modify area landmarks and hydrographic areas.
   - Add, delete, and modify point landmarks.
   - Provide address data for newly annexed areas.

Perform Quality Control

1) Use the validation tools provided in GUPS to review changes before returning updates to the Census Bureau:
   - Review Change Polygon Tool.
   - Geography Review Tool.

Create Return ZIP Files

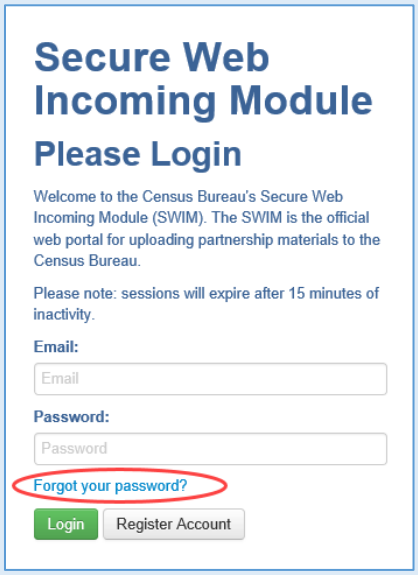
1) Select **Export to Zip** icon on the BAS Toolbar.
2) From the **Select Output Type** dialog box, select **Export for Census** button to create a file to return to the Census Bureau. Click the **Share with Another Participant** button if preferred.
3) Click **OK**.
4) A window opens showing the location of the of the output file on the local system. This is the file to be returned to the Census Bureau in the next steps.

Return Updates Using the Secure Web Incoming Module (SWIM)

1) Open a browser window and enter the SWIM URL: <https://respond.census.gov/swim/>.
2) Participants who already have a SWIM account should skip to Step 4 and enter their email address and password to login.
3) Participants who do not have a SWIM account click 'Register Account':
   - Enter the 12-digit token provided by the Census Bureau.
   - Create a password following the five criteria below:
     1) It must be at least eight characters in length.
     2) It must have at least one upper case character.
     3) It must have at least one lower case character.
     4) It must have at least one number.
     5) It must have at least one special character (valid characters are: #, !, $, &, ?, ~). Do not use commas since they are for spacing purposes only.
   - Complete the registration information form.
4) Login into SWIM:
5) Upload a BAS submission:
   - Select **Start New Upload** button.
   - Select **BAS** radio button
   - Select the **Entity** type (State, Place, County, MCD, Tribal Area, or Consolidated City).
   - Select the **State and County**.
   - Click the **+ Add File** button.
   - Select the **.ZIP file** to upload.
   - Double-click on the file to upload. Add additional files in the same manner.
   - Add any additional information to the Comments field.
   - Click **Next**. A **Thank You** screen will appear.
6) Logout of SWIM.

Note: SWIM email addresses and passwords are case sensitive.

Forgot your password?
Participants may reset their password using the "Forgot your password?" link on the login page. Follow the prompts to enter the case-sensitive email address and provide the security answer. If the security answer is correct, the SWIM system sends a password reset link to the email account for use in resetting the password. Once logged into SWIM, users can modify their password and security answer by selecting the 'Change Security' link at the top, right-hand side of the page.



BAS Schedule and Deadlines

- **January 1, 2020** – Boundary changes must be legally in effect on or before this date to be reported in the current survey year and to be used for the 2020 Census data tabulations. Boundary updates effective after this date will be held until the following BAS cycle.
- **March 1, 2020** – Boundary updates returned by this date will be reflected in the 2020 Census, in the Final BVP materials, and in next year's BAS materials.
- **May 31, 2020** – Boundary updates returned by this date will be reflected in the 2020 Census and in next year's BAS materials.

Contact Information

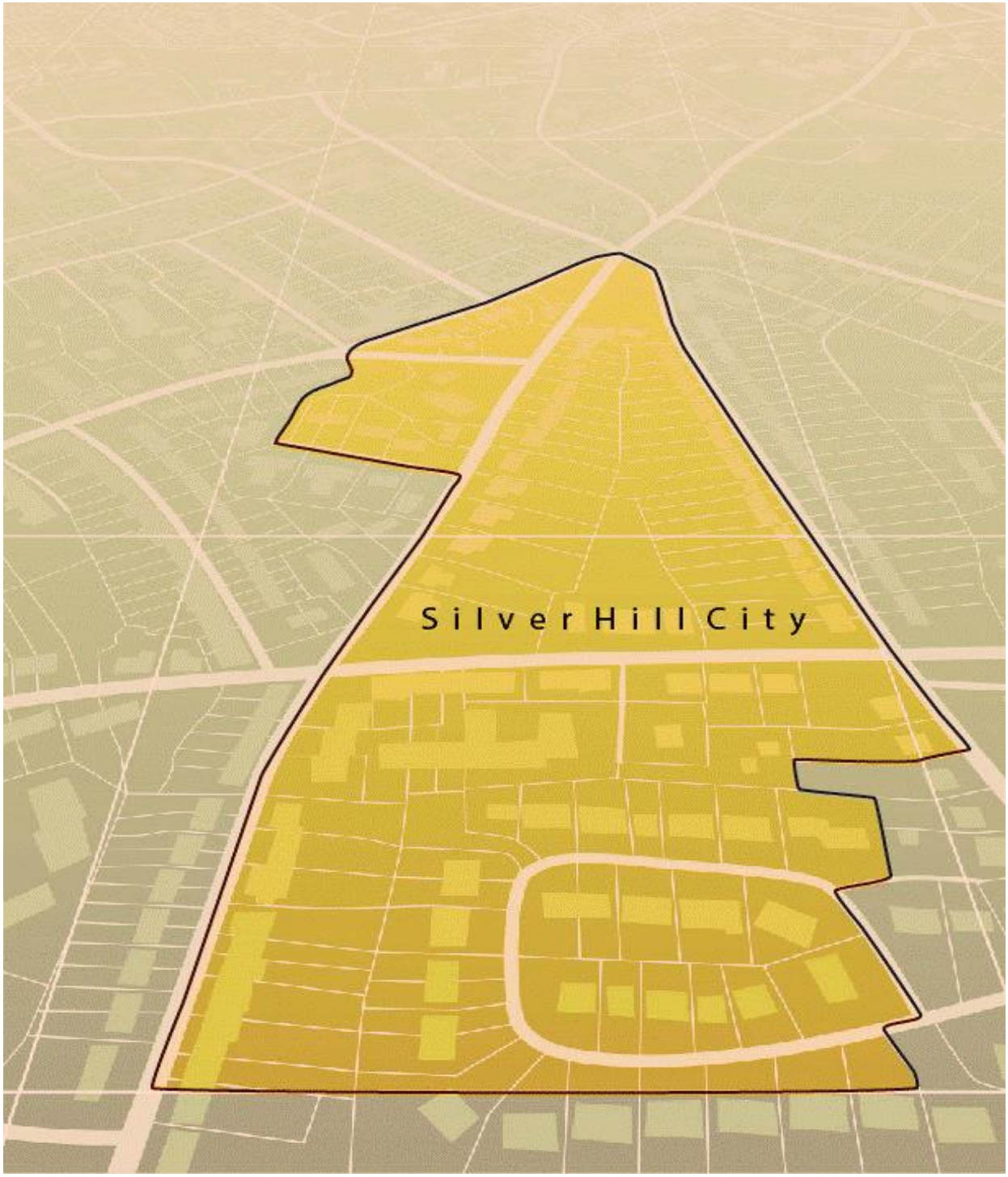
Please contact the Census Bureau for questions:

- Email: <geo.bas@census.gov>.
- Phone: **1-800-972-5651**.
- Fax: **1-800-972-5652**.

Boundary and Annexation Survey (BAS) Respondent Guide: Paper

Instructions for Participating in the 2020 Boundary and Annexation Survey

Revised as of October 07, 2019



United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

This page intentionally left blank

TABLE OF CONTENTS

Introduction v

A. The Boundary and Annexation Survey v

B. What's New for the 2020 BAS? v

C. Key Dates for BAS Respondents vi

D. BAS State Agreements vi

E. Legal Disputes vi

Part 1: Completing the BAS Forms 1

1.1 Forms Included in the BAS Package 1

1.2 Name or Type Changes 1

1.3 Contact Information 1

1.4 Legal Boundary Changes 1

1.5 Other Changes 1

Part 2: Census Bureau Geocoding 2

2.1 MAF Structure Point (MSP) Geocoding 2

2.2 Address Range Geocoding 2

Part 3: Reviewing and Updating BAS Maps 4

3.1 Maps Included in the BAS Package 4

3.2 Requesting Additional Maps 4

3.3 Reviewing Boundaries with Imagery in TIGERweb 4

3.4 General Guidelines for Reviewing and Updating BAS Maps 4

3.5 Legal Boundary Changes 5

3.5.1 How to Draw Legal Boundary Changes 5

3.5.2 Boundary Changes Involving Coincident Features 6

3.5.3 Boundary Corrections 7

3.5.4 Geographic Corridors and Offsets 8

3.5.4.1 Geographic Corridors 8

3.5.4.2 Geographic Offsets 10

3.5.5 New Incorporations 11

3.5.6 Disincorporations 11

3.5.7 Tribal Subdivisions 11

3.5.7.1 Tribal Subdivision Program Procedures 12

3.5.7.2 Updating Existing Tribal Subdivisions 13

3.5.7.3 Tribal Subdivision Documentation 13

3.5.8 County Review and Consolidations 14

3.5.9 Public Land Survey System 14

Part 4: Feature Modifications 15
4.1 Modifying Locations of Streets 15
4.1.1 Adding Streets 16
4.1.2 Adding Street Names in a Congested Area 16
4.1.3 Correcting Street Names 17
4.1.4 Deleting Streets 17
4.1.5 Labeling Unnamed Streets 17
4.1.6 Adding Cul-De-Sacs or Circles 18
4.2 Annotating Address Range 18
4.2.1 When Adding Address Ranges 18
4.3 Point Landmarks 19
4.4 Area Landmarks 19
Part 5: Signing Updated Maps and Returning BAS Materials 20
Appendices 21
Appendix A. Additional Documentation of Changes Forms A-1
A.1 Places A-1
A.2 Counties and Equivalent Areas A-2
A.3 Minor Civil Divisions A-3
A.4 Reservations and Off-Reservation Trust Land A-4
Appendix B. MTFCC Descriptions B-1
Appendix C. Reading a Map C-1
C.1 Index Maps C-1
C.2 Parent Maps C-2
C.3 Inset Maps C-3
C.4 Scales C-4
C.5 Compass Rose C-5
C.6 Legend C-5

LIST OF FIGURES

Figure 1. GPS Method of Geocoding 2
Figure 2. Address Range Method of Geocoding 3
Figure 3. Shared Boundary 5
Figure 4. Correctly Annotating a Legal Boundary Change 5
Figure 5. Correctly Annotating an AIA Trust Land 6
Figure 6. Annotating a Legal Boundary Change 7
Figure 7. Annotating a Legal Change to an Incorporated Place 7
Figure 8. Annotating a Boundary Correction to an Incorporated Place Boundary 8
Figure 9. Geographic Corridor and Geographic Offset 8
Figure 10. Where the Right-of-way Belongs in the Unincorporated Area 9
Figure 11. Housing Units in the Unincorporated Area 9
Figure 12. Indicating a Geographic Corridor by Using a Red Pencil 9
Figure 13. (Left) The Place Boundary is Along the Front-lot-line 10
Figure 14. (Right) The Place Boundary is on the Rear-lot-line 10
Figure 15. Depicting a Geographic Offset on a Paper Submission 11
Figure 16. Recording New Tribal Subdivision Information 13
Figure 17. Modifying a Street Feature, No Boundary Movement 15
Figure 18. Modifying a Street Feature with Boundary Movement 15
Figure 19. Adding an MTFCC Code When Adding a New Street 16
Figure 20. Adding Street Name Features in a Congested Area When Adding Streets 16
Figure 21. Correcting a Street Name 17
Figure 22. Deleting a Street Feature 17
Figure 23. Adding Unnamed Road Features 17
Figure 24. Adding Cul-de-sac and Circle Features 18
Figure 25. Adding Street Feature/Annotating with Name and Address Breaks 18
Figure 26. Adding a Point Landmark 19
Figure 27. Adding an Area Landmark 19
Figure 28. BAS Paper Map Signature Box 20
Figure 29. Index Map C-1

Figure 30. The Parent Map C-2
Figure 31. The Key to Adjacent Sheets C-2
Figure 32. The Sheet Location within Entity key C-3
Figure 33. An Inset Map as it is Displayed on the Index Map C-3
Figure 34. Inset Maps C-4
Figure 35. Bar Scale C-4
Figure 36. Large Scale Map C-5
Figure 37. Compass Rose C-5
Figure 38. Legend Describing What Each Symbol Means C-6
Figure 39. Map Depicting Multiple Features Concurrently C-6

INTRODUCTION

A. The Boundary and Annexation Survey

The U.S. Census Bureau conducts the Boundary and Annexation Survey (BAS) annually to collect information about selected legally defined geographic areas, such as counties (and equivalent areas), incorporated places, minor civil divisions (MCDs), federally recognized American Indian Areas (AIAs) — including reservations, off-reservation trust lands and tribal subdivisions, and Hawaiian Homelands. BAS also provides an opportunity for participants to review the names and geographic relationships for these areas. Title 13, Section 6, United States Code authorizes this survey.

The Census Bureau uses the boundary information collected during BAS to tabulate data for the decennial and economic censuses, and to support the yearly delivery of the Population Estimates Program (PEP) and the American Community Survey (ACS) data. Maintaining correct boundaries and boundary-to-feature relationships through BAS helps ensure that the Census Bureau assigns the appropriate housing and population counts to each government.

In compliance with the Office of Management and Budget Circular A-16, BAS supports the Census Bureau's spatial data steward responsibilities for the Federal Geographic Data Committee (FGDC) and the Geospatial One-Stop by updating the inventory and boundaries of governments.

In addition, BAS is the source of up-to-date information on changes to the boundaries, codes and names of incorporated places, MCDs, counties (and equivalent areas), Hawaiian Homelands, and federally recognized AIAs, which include reservations and off-reservation trust lands used by the U.S. Geological Survey (USGS), the National Map, and the Geographic Names Information System (GNIS).

Please visit the BAS program website at <https://www.census.gov/programs-surveys/bas.html>.

For more information on BAS, please view the BAS video series on the Census Bureau's BAS website at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

B. What's New for the 2020 BAS?

1. The Boundary Validation Program (BVP) runs in parallel with the 2020 BAS. The BVP provides Tribal Chairs (TCs) and Highest Elected Officials (HEOs), of tribal, state, and local governments, the opportunity to review the Census Bureau's boundary data to ensure the Census Bureau has the correct legal boundary, name, and status information for eligible governments across the United States. For more information on the BVP, please visit the BVP website at: <https://www.census.gov/programs-surveys/bas/information/bvp.html>.
2. The 2020 BAS is the final opportunity for tribal, state, and local governments to provide legal boundary, name, and status information updates prior to 2020 Census data tabulation.
3. The Census Bureau developed a BAS Partnership Toolbox for ArcGIS users. This toolbox is designed to simplify and standardize the BAS updating process. The toolbox and additional information can be found at <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html>.

C. Key Dates for BAS Respondents

January 1, 2020—Boundary changes must be legally in effect on or before this date to be reported in the current survey year and to be used for the 2020 Census data tabulations. Boundary updates effective after this date will be held until the following BAS cycle.

March 1, 2020— Boundary updates returned by this date will be reflected in the 2020 Census, the Final BVP materials, and in next year's BAS materials.

May 31, 2020—Boundary updates returned by this date will be reflected in the 2020 Census and in next year's BAS materials.

D. BAS State Agreements

The Census Bureau has established a number of agreements with states for reporting boundary changes. Please visit the BAS State Agreements webpage within the BAS program website at <https://www.census.gov/programs-surveys/bas/information/state-agreements.html> or call **1-800-972-5651** for information regarding state agreements.

Note: The Census Bureau can only establish BAS state agreements for states that require local governments to report boundary changes to a state agency.

E. Legal Disputes

If the Census Bureau discovers that an area of land is in dispute between two or more jurisdictions, the Census Bureau will not make any boundary corrections until the parties come to a written agreement, or there is a documented final court decision regarding the dispute. To learn more, please contact the Census Bureau Legal Office at **1-301-763-9844**.

For disputes involving tribal areas, the Census Bureau must defer to the Office of the Solicitor at the Department of the Interior for a legal opinion. Often complicated land issues require an extended period of time for resolution, and in those cases, the Census Bureau will retain the current boundary in the database until a legal opinion is issued by the Solicitor's office.

PART 1: COMPLETING THE BAS FORMS

1.1 Forms Included in the BAS Package

The forms in the BAS package should be used to verify legal names, legal status, contact information, previous legal boundary changes submitted to the Census Bureau, and to document any recent or missing legal boundary changes. There are four types of forms:

1. BAS-1 for Incorporated Places.
2. BAS-2 for Counties and Equivalent Areas.
3. BAS-3 for Minor Civil Divisions (MCDs).
4. BAS-5 for American Indian Reservations and Off-Reservation Trust Land.

1.2 Name or Type Changes

Please verify that the legal name and legal status of the government or AIA are accurate. Make any necessary corrections by crossing out the error and clearly printing the correct information. Provide an effective date for name, type, or status changes. County participants should verify the list of active and inactive entities within their counties.

1.3 Contact Information

Please verify that the Census Bureau has the most recent BAS, HEO, or TC contact information for the government or AIA. Fill in any missing or incorrect information, especially blank email addresses. If the primary address of the BAS contact, HEO, or TC is a PO Box, provide the Census Bureau with a physical address that can be used for the delivery of maps. Contact changes or updates may also be provided to the Census Bureau throughout the year by email to geo.bas@census.gov.

1.4 Legal Boundary Changes

Please record all legal boundary changes in the Documentation of Changes section of the BAS form. Include legal boundary changes that occurred prior to **January 1** of the current survey year if they do not appear on the current BAS maps. Please include legal authorization, such as a local ordinance or resolution number, and the effective date of the legal action. If additional pages are needed to record legal changes, a copy of the Documentation of Changes is provided in the appendix.

1.5 Other Changes

Please indicate if there are any boundary corrections or feature updates that need to be made on the BAS maps. This will assist the Census Bureau in identifying and accounting for any updates made to the maps.

PART 2: CENSUS BUREAU GEOCODING

Geocoding is how the Census Bureau codes the location of the population within the legal boundaries of a geographic area. There are two primary methods of geocoding used by the Census Bureau, and both of these involve coding an address to a spatial polygon. One uses Global Positioning System (GPS) technology to create a Master Address File (MAF) structure point (MSP) and the other uses address ranges for geocoding.

2.1 MAF Structure Point (MSP) Geocoding

A field worker stands in front of a house or living quarters, and records the physical location with a GPS device (**Figure 1**). Usually, the GPS point should fall very close to the front door of the house. However, since GPS points are collected in the field, real-world obstacles like locked fences, poor satellite reception, or even aggressive dogs might sometimes prevent the worker from gaining access to the front door. In these circumstances, the worker may have to take the GPS coordinate from the sidewalk or side of the road.

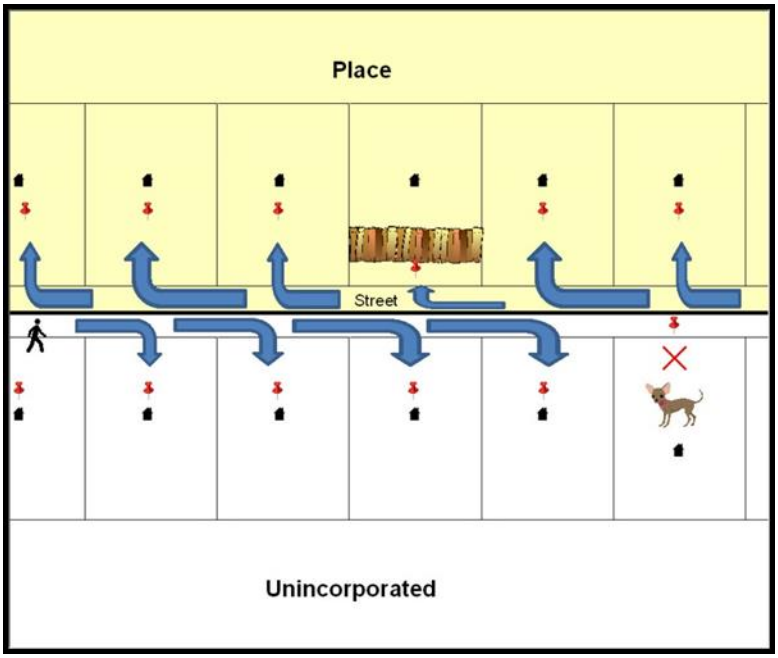


Figure 1. GPS Method of Geocoding

Notice that it is occasionally not possible for the field worker to go all the way to the front door, due to unforeseen circumstances, like the fence or the dog shown above. Thus, the MSP (represented by the red pins) can sometimes fall within the road or the road right-of-way.

2.2 Address Range Geocoding

When no MSP is available, the Census Bureau codes houses and living quarters according to a potential range of addresses associated with the adjacent stretch of road (**Figure 2**).

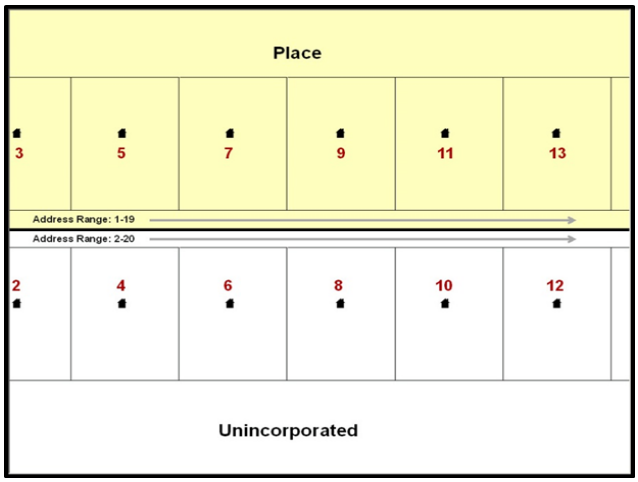


Figure 2. Address Range Method of Geocoding

When it is not possible to collect an MSP, houses are geocoded according to their placement along a range of potential addresses along that road. Since the address has a relationship with the road, boundaries placed on front-lot-lines will lead to mis-geocoding unless an offset flag is used.

While the two methods of geocoding differ greatly, both rely heavily on the integrated nature of the Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) System. These geocoding methods are affected by the way streets and boundaries are represented in relation to one another. This interdependence between streets, boundaries, and geocoding means that Census Bureau representations of legal boundaries may sometimes differ from other representations (e.g., in local or state GIS). This is especially true regarding geographic corridors and offsets that follow road right of ways (or the front-lot-lines of parcels). In both of the examples above, delineating a boundary along the front-lot-line will tend to increase the risk of incorrect geocoding. As a result, using the road centerline as a boundary is the safer method.

When completing a BAS submission in which a road or road right-of-way is owned or maintained by a place or AIA but the adjacent housing is not, the respondent should use the centerline of the road (not the front-lot-line) as the boundary whenever possible. If local or state law requires the use of the front-lot-line boundary, the respondent must explicitly designate the polygon(s) between the road centerline and the front-lot-boundary as a corridor or an offset (see **Section 3.5.4, Geographic Corridors and Offsets** of this document for more details).

PART 3: REVIEWING AND UPDATING BAS MAPS

3.1 Maps Included in the BAS Package

The Census Bureau mails an index map showing the entire government or AIA, along with more detailed individual map sheets. Index maps are provided as a reference to help locate a map sheet. Governments and AIAs with more than 30 map sheets receive only an index map and the map sheets that show the boundary ring. Governments that require more than 30 boundary ring map sheets receive only the index map. Please review **Appendix C.** for a further description of the map types.

3.2 Requesting Additional Maps

If an individual map sheet or full set of maps was not provided for a county, incorporated place, MCD, or AIA where boundary changes or feature updates need to be made, please call **1-800-972-5651** or email geo.bas@census.gov to request the additional materials. **Do not make updates on the index map.**

3.3 Reviewing Boundaries with Imagery in TIGERweb

Governments that have requested paper maps can use TIGERweb <https://tigerweb.geo.census.gov/tigerwebmain/TIGERweb_main.html> for a more detailed version of their boundaries with imagery before annotating the paper maps. Instructions for using TIGERweb for BAS can be found on the BAS website at <https://www2.census.gov/geo/pdfs/partnerships/bas/TIGERwebforBAS.pdf>.

3.4 General Guidelines for Reviewing and Updating BAS Maps

1. Colored pencils are provided in the package. The red pencil should be used to indicate legal boundary changes and non-legal boundary corrections for all counties, places, MCDs, and AIAs. The purple pencil should be used to indicate feature changes or corrections. The blue pencil should be used by AIAs to add or modify tribal subdivisions.
2. Compare the BAS maps to a local source for a government (e.g., a local plat map, or a county assessor's dataset). Update the map(s) if the boundaries shown do not correctly depict the boundaries in effect as of **January 1** of the current survey year.
3. Annexations and deannexations from previous years may be provided in addition to updates in effect as of **January 1;** however, the Census Bureau does require legal documentation when submitting these legal updates.
4. The maps show boundaries for multiple legal and statistical boundaries. If a government's legal boundaries are coextensive with another boundary, the symbols on the map will alternate. In **Figure 3** the county shares a boundary with an incorporated place and Census Designated Place (CDP); therefore, the symbols on the map alternate between county, incorporated place, and CDP.

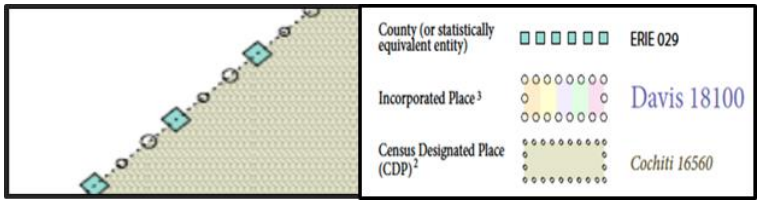


Figure 3. Shared Boundary

The combined line represents a county, incorporated place, and CDP boundary.

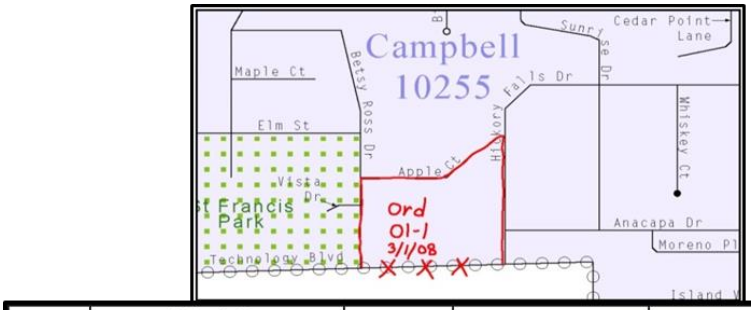
3.5 Legal Boundary Changes

Legal boundary changes are the result of legal actions (e.g., annexations), and documenting such changes is the primary goal of the BAS. AIA legal documentation (e.g., statute, federal court decision, trust deed) must accompany all AIA legal boundary changes, while legal boundary change submissions from incorporated places, MCDs, and counties must provide an authorization number, such as a resolution or ordinance number[1], and the effective date.

3.5.1 How to Draw Legal Boundary Changes

Figure 4 and **Figure 5** illustrate the correct way to draw legal boundary changes on BAS maps.

- Using the red pencil provided, cross out the portion of the boundary that is no longer current with a string of "**X**s".
- Draw the new boundary line(s) ensuring the boundary is closed.
- Add the ordinance number or other legal identifier of the action authorizing the change, along with the effective date of each annexation or deannexation that is drawn on the map.
- Record all legal changes in the **Documentation of Changes** section of the BAS form.

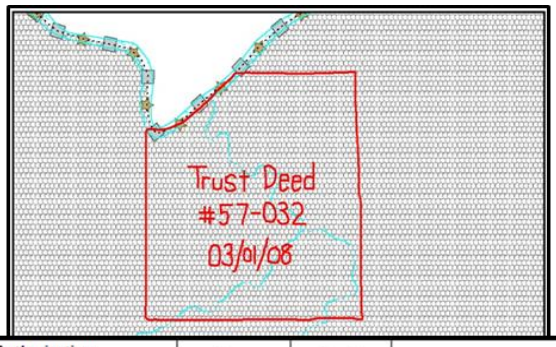


Change Type A/D/B/O (1)	Authorization Type O/R/L/S/X (2)	Authorization Number (3)	Date Month/Day Year (4)	County/Equivalent Name (5)	Minor Civil Division Name (if any) (6)	Area Acres (Tenths) (7)
A	O	ORD 01-1	3/1/2008	ALBANY	NA	0.7

Figure 4. Correctly Annotating a Legal Boundary Change

Draw "**X**s" with the red pencil and record the changes in the Documentation of Changes section of the BAS form.

[1] Legal boundary changes from the State of Georgia are the exception: a state statute requires participants to include acreage, and the Census Bureau requests that the respondent includes an authorization number.



Change Type A/D/B/O (1)	Authorization Type A/C/D/N/X (2)	Authorization Identifying Number (If any) (3)	Date Month/Day Year (4)	Land Type R/T (5)	County/Equivalent Name (6)	Area Acres (Tenths) (7)
A	D	TRUST DEED 57-032	3/1/2008	T	COUNTY ABC	640.7

Figure 5. Correctly Annotating an AIA Trust Land

Correctly annotate an AIA trust land and record the change in the Documentation of Changes section of the BAS form. The original reservation is not deleted and therefore does not require a string of "**X**s".

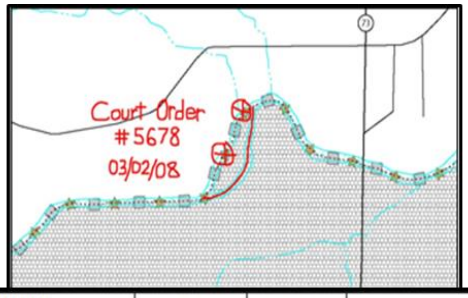
3.5.2 Boundary Changes Involving Coincident Features

Figure 6 and **Figure 7** illustrate how to adjust a boundary that is coincident with (i.e., follows exactly) a feature, such as a river or street. In this case, the feature location is correct, but the *boundary location* is incorrect.

- Using the red pencil, cross out the portion of the boundary that is no longer current using a string of "**X**s" inside circles.
- Draw the updated boundary.
- Add the authorization number or other identifier of the action authorizing the change along with the effective date of each addition or deletion.
- Record all legal changes in the **Documentation of Changes** section of the BAS form.

If both the boundary and feature need to be moved, cross out the incorrect boundary with a string of red "**X**s" and then draw a red line representing the new location of the boundary and road.

Figure 6 shows a change to the boundary where only the boundary moves as well as the accompanying **Documentation of Changes** form excerpt. Similarly, the left image of **Figure 7** illustrates a change where only the boundary moves, but the right image shows a boundary change where the associated feature moves along with the boundary. If these changes are the result of an annexation or deannexation, include the authorization number and effective date.



Change Type A/D/B/O (1)	Authorization Type A/C/D/N/X (2)	Authorization Identifying Number (If any) (3)	Date Month/Day Year (4)	Land Type R/T (5)	County/Equivalent Name (6)	Area Acres (Tenths) (7)
A	D	COURT ORDER 5678	3/2/2008	T	COUNTY ABC	125.3

Figure 6. Annotating a Legal Boundary Change

Annotating a legal boundary change coincident with a river feature, where the river location does not change, but the boundary does. The legal change is also recorded in the Documentation of Changes.

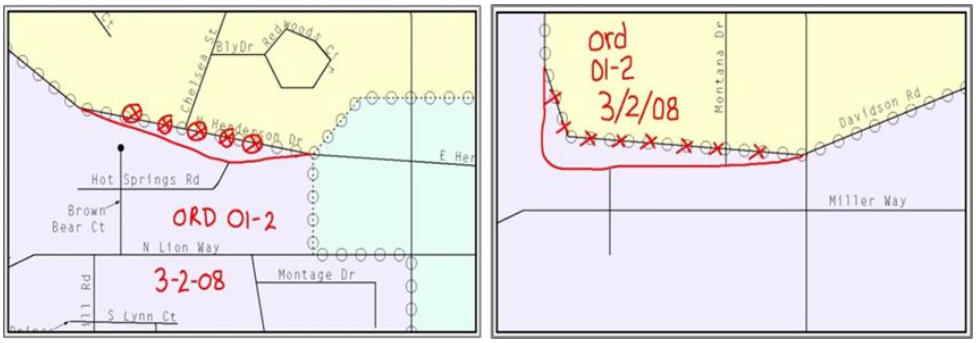


Figure 7. Annotating a Legal Change to an Incorporated Place

Annotating a legal change to an incorporated place boundary coincident with a road feature. The legal change is recorded in the Documentation of Changes. Left: Only the boundary moves to the new location. The street feature location is correct, but the boundary location is incorrect. Right: Both the boundary and the street feature move to a new location. Both the boundary and the street feature location are incorrect.

3.5.3 Boundary Corrections

A boundary correction is the adjustment of a boundary to correct an error in how the Census Bureau depicts an existing boundary. Boundary corrections should follow the general shape of the existing boundary. Legal documentation is not required when submitting a boundary correction to the Census Bureau. Boundary corrections also do not need to be reported on the Documentation of Changes BAS form.

Figure 8 illustrates how to complete a boundary correction.

- Using the red pencil, cross out the incorrect boundary with a string of "**X**s".
- Add a line showing the correct boundary.
- Print the letters **BC** inside the change to identify the update as a boundary correction rather than a legal change.

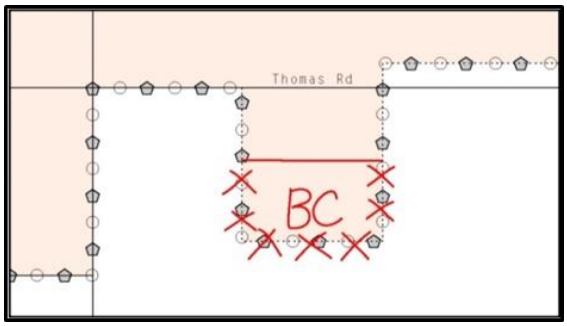


Figure 8. Annotating a Boundary Correction to an Incorporated Place Boundary

3.5.4 Geographic Corridors and Offsets

3.5.4.1 Geographic Corridors

Figure 9 shows a corridor that has been created where the incorporated place or AIA owns the right-of-way, and wishes for that ownership to be displayed on the Census Bureau's maps, but the housing units are not included in the incorporated place or AIA (shown in color). Without a corridor, the housing units along this road would be incorrectly geocoded into the incorporated place or AIA. Thus, if it is important to the place or AIA that its ownership and/or maintenance of the road and/or its right-of-ways be displayed on Census Bureaus' maps, a geographic corridor should be created. However, the Census Bureau does not require places and AIAs to report right-of-ways; maintaining geographic corridors in a nationwide database is not essential to the mission of the Census Bureau and the right-of-way should only be included if it is crucial to the place or AIA, or if state or local laws require it.

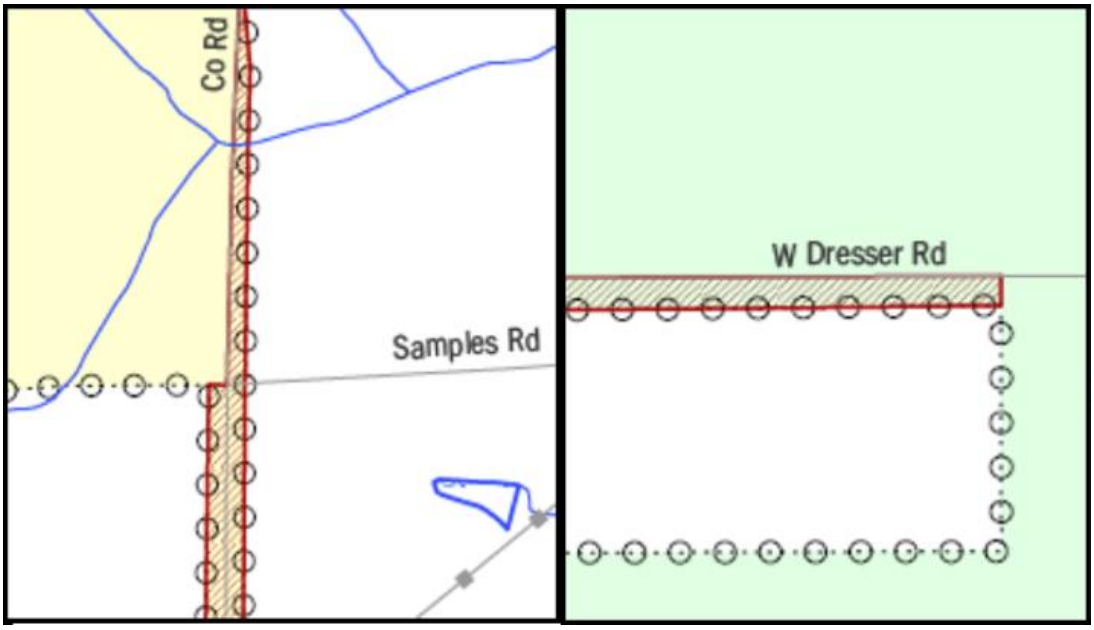


Figure 9. Geographic Corridor and Geographic Offset

The image on the left illustrates a geographic corridor (Co Rd, south of Samples Rd) and a geographic offset (Co Rd, north of Samples Rd). The geographic corridor and offset are both part of the incorporated place (yellow area), but dwelling units are not. The image on the right illustrates a geographic offset, designated by red diagonal lines. The offset is part of the incorporated place (green area). However, the dwelling units are counted outside of the incorporated place.

Figure 10 below shows a case where the right-of-way belongs in the unincorporated area, while the housing units in **Figure 11** are included in the incorporated place (shown in color). While depicting this corridor may be important for local purposes, it is not relevant for Census Bureau tabulations because no house can be built in a road right-of-way. This type of corridor should **not** be included in a BAS response.

Please note that the Census Bureau does not require places or AIAs to display right-of-ways or road maintenance corridors that do not contain or potentially contain housing or population. If local or state law does not require depiction of these geographic features, the Census Bureau prefers that they be left off BAS submissions. If it is necessary for the place or AIA to depict them, they must be submitted as a geographic corridor.

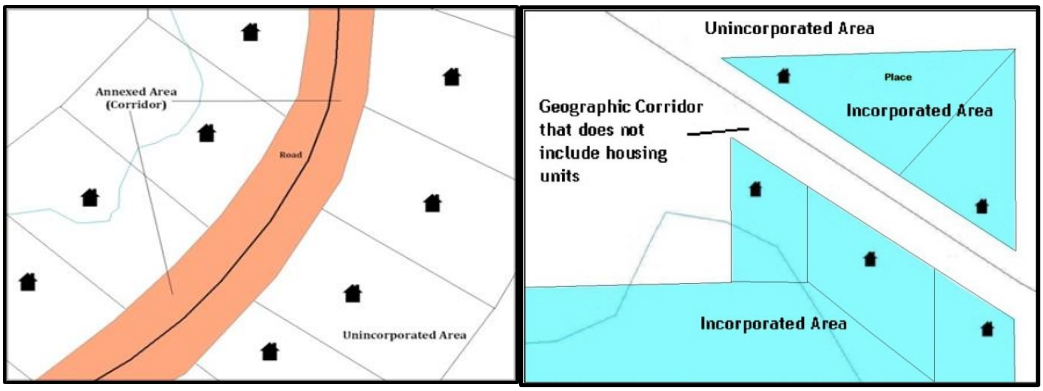


Figure 10. Where the Right-of-way Belongs in the Unincorporated Area

Figure 11. Housing Units in the Unincorporated Area

Geographic corridors can be provided to the Census Bureau if the centerline representation results in addresses being assigned to the wrong government. However, geographic corridors should only be created if the addresses along the street do not belong to the participant's government. To indicate a geographic corridor on the map, use the red pencil to draw a line on each side of the road. Mark the beginning and end of each line with perpendicular hatch (**//**) marks. Write the letters "GC" beside each line (**Figure 12**). To remove a geographic corridor or offset, use the red pencil to mark the beginning and end of the corridor or offset with perpendicular hatch (**//**) marks and write "remove GC."

Figure 12. Indicating a Geographic Corridor by Using a Red Pencil

To indicate a geographic corridor on the BAS return, use the red pencil to draw a line on each side of the road. Mark the beginning and end of each line with perpendicular hatch (//) marks. Write the letters "GC" beside each line.

3.5.4.2 Geographic Offsets

The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping. The Census Bureau bases its maps on spatial data that is topologically integrated. This makes the maintenance of geographic offsets inefficient. Delineating a government boundary on the centerline wherever applicable will help to establish more accurate population counts. If a boundary is on the front-lot-line adjacent to a road on the map, the Census Bureau strongly prefers that the boundary be delineated on the road centerline already shown on the map. If a boundary is on the rear or side lot line, then it should be depicted as such. If it is unclear whether a particular line is a front-lot-line or something else, please contact the Census Bureau for assistance. Generally, if a house or other building could not conceivably be built in the area between the potential line and the centerline of the road, then the line can be considered a front-lot-line.

Figure 13 shows a situation in which the place boundary is along the **front-lot-line**. In this example, the respondent must either delineate the boundary on the road centerline, or create an offset. In **Figure 14**, the place boundary is on the **rear-lot-line**, so the respondent should not delineate it on the road centerline or create an offset; instead, the respondent should delineate a new edge that actually follows the rear-lot-line.

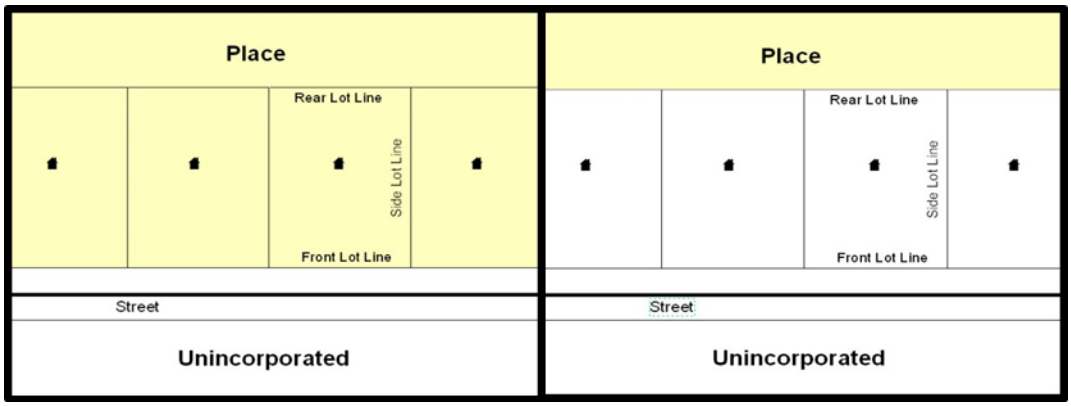


Figure 13. (Left) The Place Boundary is Along the Front-lot-line
Figure 14. (Right) The Place Boundary is on the Rear-lot-line

To indicate a geographic offset on the map, use the red pencil to draw a line parallel to the road, along which the offset will be created. Mark the beginning and end of the line with perpendicular hatch (**//**) marks. Write the letters "OFF" on the side of the road where the geographic offset exists (**Figure 15**).

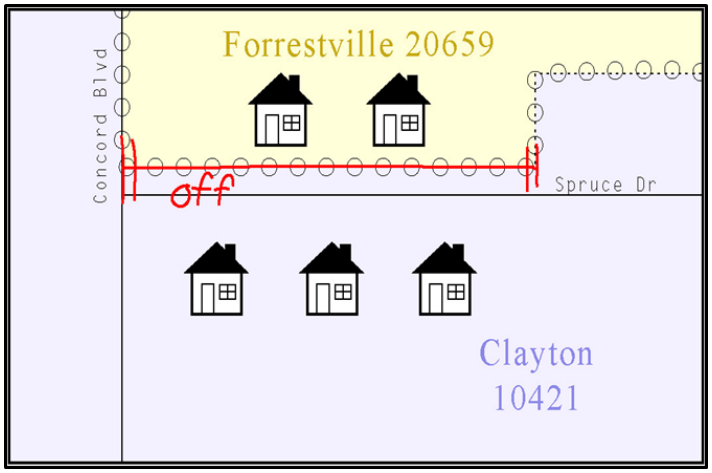


Figure 15. Depicting a Geographic Offset on a Paper Submission

3.5.5 New Incorporations

Newly incorporated places should provide the Census Bureau with:

- A copy of the official new incorporation papers, including date of incorporation.
- A map indicating the boundaries of the new incorporation.
- Contact information for the HEO and a contact for the BAS.

3.5.6 Disincorporations

Disincorporated governments should provide the Census Bureau with a copy of the official papers of disincorporation, including the effective date.

3.5.7 Tribal Subdivisions

The Census Bureau considers any type of unit of self-government or administration in tribal areas as a **tribal subdivision**. A tribe may submit only one type of subdivision, even if it has more than one type of distinct administrative area that could qualify as a tribal subdivision (e.g., tribal election districts, tribal water districts, or health service areas with different boundaries). The Census Bureau recognizes two types of tribal subdivisions - active (A) or inactive (I):

- Active subdivisions are defined as having a functioning government, with elected officials, that provides programs and services.
- Inactive subdivisions have no functioning government or elected officials and receive services solely from the tribe.

a) Some examples of areas submitted as tribal subdivisions are:
   - Areas used by a tribe for the election of tribal government officials (e.g., districts or precincts used for the election of tribal council members).
   - Areas used by a tribal government for tax purposes.
   - Areas used by a tribal government for the provision of general services or specified services, such as:
     - Water districts.
     - Health service areas.
     - Emergency service delivery areas (911, fire, and/or police).
     - Grazing districts or range units.
   - Historical or traditional areas recognized by a tribal government.
   - Sub-reservation tribal community governments.

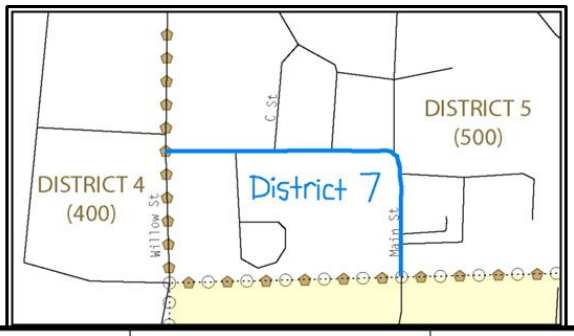
b) Keep the following criteria in mind when defining tribal subdivisions:
   - Tribal subdivisions should cover all, or most, of a tribe's land base.
   - The delineation of tribal subdivisions is restricted to the area contained within reservations and/or associated off-reservation trust lands.
   - There is no minimum population threshold for a tribal subdivision.
   - A tribal subdivision may be noncontiguous.
   - Tribes may designate only **one** type of tribal subdivision. If a tribe has more than one level of tribal subdivision within its land base, the Census Bureau recommends delineating subdivisions corresponding to the lowest geographic level (those geographic areas containing the smallest area) of the tribe's administrative hierarchy.
   - Tribal subdivisions should not be based solely on land ownership or other cadastral areas, nor should they consist of divisions based on the U.S. Public Land Survey System (PLSS) of townships, ranges, and sections, if these areas have no governmental or administrative function for a tribe.
   - The following descriptions can be appended to chosen subdivision names (e.g., Red Rock Community):
     - District.
     - Community.
     - Area.
     - Chapter.
     - Segment.
     - Administrative Area.
     - Addition.
     - County District.

3.5.7.1 Tribal Subdivision Program Procedures

If this is the first time that tribal subdivisions are being provided to the Census Bureau (**Figure 16**):

- Using the blue pencil, please add the boundaries on the BAS map(s).
- Please note: each tribal subdivision must be labeled on each map sheet with its name (e.g., "District 3," "Arlee District," "White Rock Chapter," "Parmelee Community").
- Record the name, type, and status of each subdivision in the **Tribal Names and Status Documentation** section of the BAS-5 form.
- If a tribal subdivision boundary follows a visible feature such as a stream, road, or fence line, please be sure to indicate that on the BAS map. Add the visible feature the boundary follows if it is not already shown on the map.

Note: If a full set of BAS maps has not been sent, please request them by calling the Census Bureau at **1-800-972-5651**.



OFFICIAL NAME OF TRIBAL SUBDIVISION If the name shown has **changed** — • Please draw a line through it, • Print the correct name above it, and • Enter the date the change was effective in column (8). If the name is **misspelled** — • Please correct the spelling only. • Do not enter a date in column (8). (1)	TYPE Is this an active [**A**] or inactive [**I**] subdivision? (See definitions above.) If the type shown is incorrect — • Please draw a line through it, • Print the correct type above it, and • Enter the date the change was effective in column (8). if applicable. (2)	STATUS CHANGES If changes in status have occurred: *mark (X) the appropriate column and enter the effective date in column (8).* New subdivision (3)	Deleted subdivision (4)	Subdivision never existed (5)	Legal boundary change (6)	Boundary correction (7)	EFFECTIVE DATE *Month, day, year* (8)
DISTRICT 7	I	X					1/1/2008

Figure 16. Recording New Tribal Subdivision Information

Depicting a new tribal subdivision and recording the information in the Tribal Names and Status Documentation section of the BAS form.

3.5.7.2 Updating Existing Tribal Subdivisions

If tribal subdivisions were delineated during a prior survey, they are symbolized on the enclosed BAS maps by a dashed pentagon-shaped gold line.

Before adding or revising tribal subdivision boundaries on the enclosed map(s):

- Using the red pencil, please note any changes to the boundary of the land base on the map(s).
- Using the blue pencil, please add and/or revise the boundaries of the tribal subdivisions on the enclosed BAS map(s).

Note: The names and types (active or inactive) of tribal subdivisions are listed in the Tribal Names and Status Documentation section of the BAS-5 form. This information should be reviewed and updated.

3.5.7.3 Tribal Subdivision Documentation

New tribal subdivisions and name changes to existing tribal subdivisions require documentation, regardless of whether they are being delineated for the first time, or being added to those previously reported. This documentation should be in the form of a tribal resolution or a tribal constitution. Include a copy of this documentation with the BAS maps and BAS-5 form when returning these materials to the Census Bureau.

Corrections to the Census Bureau's depiction of tribal subdivision boundaries or names do not require documentation. If there are any questions or if additional maps are needed, please contact the Census Bureau at **1-800-972-5651**.

3.5.8 County Review and Consolidations

Counties receive boundary information from the Census Bureau for all governments within their county boundary. Counties should review the names and legal status of active and inactive incorporated places and MCDs found on page 3 of the BAS-2 form.

- Active governments are defined as having a functioning government, with elected officials, that provides programs and services.
- Inactive governments have no functioning government or elected officials, receive services solely from the county, and should be reviewed by the county during BAS.

Although it is not required, counties may update boundaries for incorporated places and MCDs on the county BAS maps. The Census Bureau encourages counties to establish Consolidated BAS (CBAS) agreements with local governments in order to consolidate resources, reduce the burden on local governments, and avoid duplication of work. Under a CBAS agreement, the county is responsible for reporting boundary changes to the Census Bureau. Participating local governments would no longer receive an annual BAS package. One hundred percent participation is not required and governments may opt out of the agreement at any time. Contact the Census Bureau at geo.bas@census.gov for more information on participating in a CBAS agreement or visit the CBAS webpage at <https://www.census.gov/programs-surveys/bas/information/consolidated-bas.html>.

3.5.9 Public Land Survey System

Boundaries are often based on nonvisible features, such as Public Land Survey System (PLSS) lines (i.e. township, section, range lines, etc.). The Census Bureau is currently working on a program through which PLSS lines can be incorporated into the MAF/TIGER System. If any of the government's existing or new boundaries are known to follow PLSS lines, this should be designated on the BAS submission by writing "PLSS" in red pencil next to (and parallel to) the appropriate boundary segments. In areas where the Census Bureau has obtained accurate PLSS shapefiles, the Census Bureau will then be able to compare these lines to those shapefiles and ensure accurate placement of the boundary.

PART 4: FEATURE MODIFICATIONS

The primary purpose of the BAS is to collect legal boundary information. However, please also submit feature (e.g. streets, rivers) updates and modifications occurring near or coincident with a legal boundary through the BAS. Feature modifications that are internal to the boundary of an incorporated place, county or MCD will be accepted, but are not required as part of the BAS.

4.1 Modifying Locations of Streets

The following figures illustrate how to correct the location of a street feature:

- Using the purple pencil, please cross out the incorrect feature location with "**X**s".
- Please draw the feature in the correct location.
- Please print the name of the feature along the length of the feature as shown in **Figure 17** and **Figure 18**.

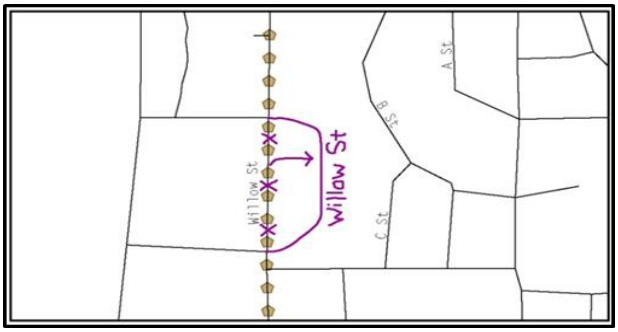


Figure 17. Modifying a Street Feature, No Boundary Movement

In this example, the street location moves, but the boundary does not.

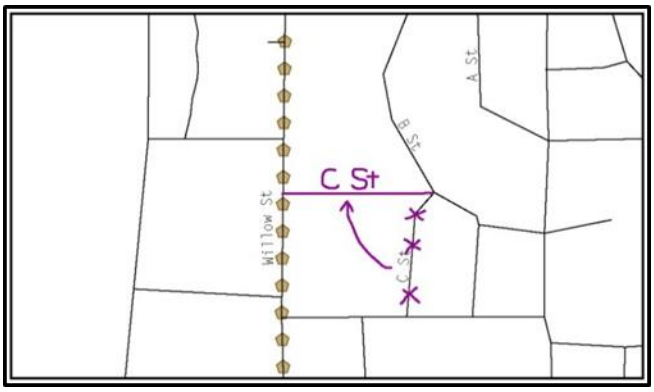


Figure 18. Modifying a Street Feature with Boundary Movement

In this example, both the street location and the boundary move.

The Census Bureau recently completed a nationwide program to improve the positional accuracy of all streets and other features that appear in the Census Bureau's MAF/TIGER System. It is not necessary to make small positional corrections on the BAS maps; correct only those streets that are incorrectly located, mislabeled or distorted. Additionally, new streets may be added, and nonexistent streets may be deleted.

4.1.1 Adding Streets

- Using the purple pencil, please draw the feature and its name on the map.
- Where possible, please provide the address range for any new streets.
- Please provide the MAF/TIGER Feature Class Code (MTFCC) (See **Appendix B**) for all new streets (Figure 19).
- Alternate street names may be written in parentheses below the primary street name.

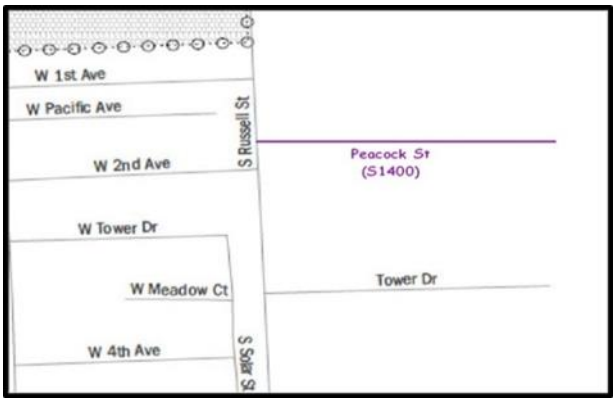


Figure 19. Adding an MTFCC Code When Adding a New Street

Note: Due to the difficulty of showing multiple names for a street, only the primary street name is shown on BAS maps. Please note that, even though alternate street names are not shown on the maps, they do exist in our database. For example, US Hwy 30 may be locally known as Main St., but on the BAS map, only US Hwy 30 will be displayed; however, within our MAF/TIGER System, both names are listed. If an alternate street name has been reported in the past, it does not need to be reported to the Census Bureau again.

4.1.2 Adding Street Names in a Congested Area

- If an area of the map is too congested to add all feature names, using the purple pencil, please number each feature and list this number and the corresponding feature name in the map margin or in an uncongested spot close to the feature's actual location (**Figure 20**).
- Do not repeat numbers on a map sheet.

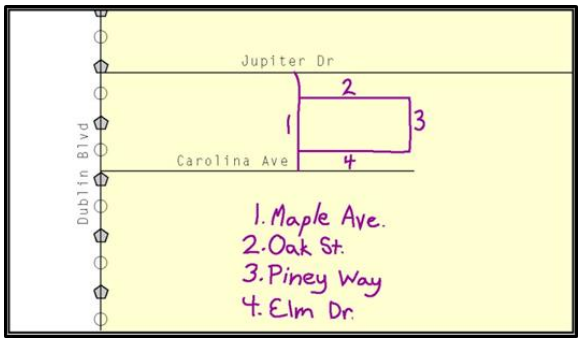


Figure 20. Adding Street Name Features in a Congested Area When Adding Streets

4.1.3 Correcting Street Names

- Using the purple pencil, please draw a line through the incorrect street name.
- Please print the correct street name along the feature.

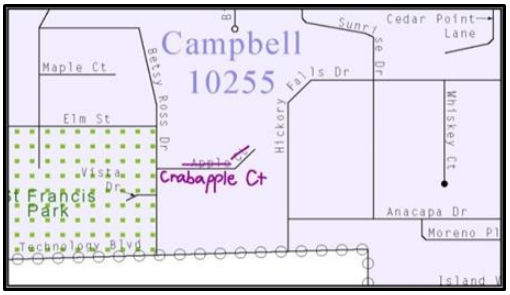


Figure 21. Correcting a Street Name

4.1.4 Deleting Streets

- Delete street features only if they are nonexistent, or impassable. Do not delete a street because the local jurisdiction is not responsible for maintaining it.
- Using the purple pencil, please mark the beginning and end of the base feature to be deleted with hatch (**//**) marks perpendicular to the feature as shown below.
- Cross-out the nonexistent street feature using a string of "**X**s".

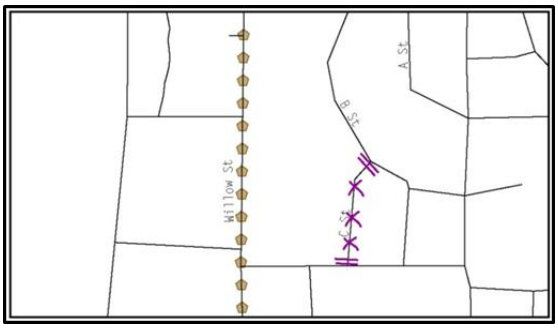


Figure 22. Deleting a Street Feature

4.1.5 Labeling Unnamed Streets

- Using the purple pencil, please label any unnamed streets on the maps.
- Label any unnamed private roads with "**PR**". Examples of private roads are driveways and unnamed roads in commercial or industrial parks.

Figure 23. Adding Unnamed Road Features

4.1.6 Adding Cul-De-Sacs or Circles

- Using the purple pencil, please draw the feature as follows:
  - Cul-de-sacs are entirely paved, and should be drawn as a solid dot.
  - Circles have an area of unpaved ground within them, and should be drawn as an unfilled circle.
- Print the name of the associated street leading to the cul-de-sac or circle.

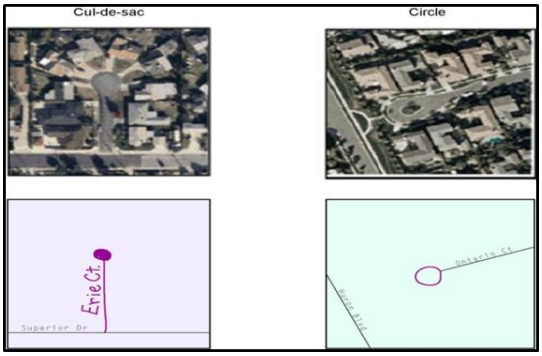


Figure 24. Adding Cul-de-sac and Circle Features

4.2 Annotating Address Range

Addresses are stored in the Census Bureau spatial database as potential address ranges. The BAS maps show the break in the potential address range created where a street is bisected by a boundary. These address range breaks are shown because it is important that the Census Bureau assign the correct addresses to each government.

Note: Some streets on the BAS maps do not display address breaks due to space considerations.

Add address ranges on both ends of the street **only** if one of the following circumstances exists:

1. A road where house numbers, street names, and/or addresses were added or deleted.
2. A street was added that crosses a boundary.
3. The address ranges created by a boundary are incorrect on the map.

4.2.1 When Adding Address Ranges

Using the purple pencil, please add in the address ranges, providing the lowest and/or highest possible addresses where the road intersects a boundary.

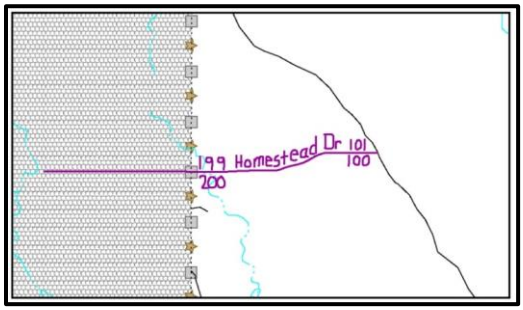


Figure 25. Adding Street Feature/Annotating with Name and Address Breaks

4.3 Point Landmarks

BAS maps display a select number of point landmarks (e.g., mountain peaks). Point landmarks can be updated through BAS, but are not required.

Acceptable point landmark feature updates include mountain peaks or summits, libraries, city halls, community centers and police stations. Airports, parks, schools, golf courses, museums, and cemeteries may be submitted as point landmarks or area landmarks.

Features that contain residences or private business should not be added as point landmarks or area features (e.g. hotels, campgrounds, retirement homes, farms).

The BAS maps also include select point landmarks (e.g. airports, cemeteries, summits) taken from USGS topography maps and the USGS Geographic Names Information System (GNIS). These landmarks represent the official federally recognized name and will not be removed or updated without USGS verification.

When adding a point landmark:

- Using the purple pencil, place a solid dot at the location of the point landmark.
- Print the name of the landmark next to the dot.

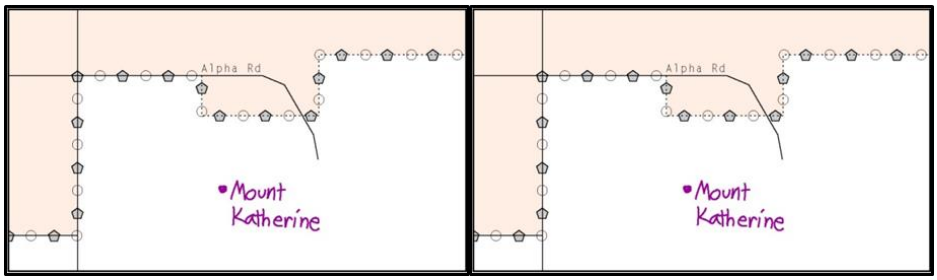


Figure 26. Adding a Point Landmark

4.4 Area Landmarks

The BAS maps display a select number of area landmarks (e.g., lakes). Like point landmarks, area landmarks can be updated through the BAS, but are not required.

Acceptable area landmark updates include water bodies, swamps, quarries, national parks and forests. Airports, parks, schools, golf courses, museums, and cemeteries may be submitted as area landmarks or point landmarks.

Features that contain residences or private business should not be added as point landmarks or area features (e.g. hotels, campgrounds, retirement homes, farms).

When adding an area landmark:

- Using the purple pencil, draw the area landmark boundary in the correct location.
- Print the name of the landmark inside or next to the feature.

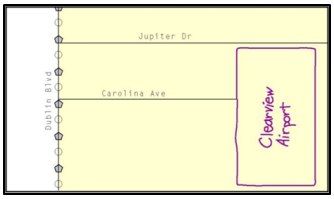


Figure 27. Adding an Area Landmark

PART 5: SIGNING UPDATED MAPS AND RETURNING BAS MATERIALS

For each map sheet that has changes, fill in the Signature Box on one copy of the map:

BAS SIGNATURE BOX	
The corrected boundaries shown on the map are accurate as of January 1, 20yy.	
Print Name	
Position	
Signature	
Telephone	Date

Figure 28. BAS Paper Map Signature Box

Return the set of signed maps and the BAS form to the Census Bureau by using the postage-paid envelope.

APPENDICES

This page intentionally left blank

APPENDIX A. ADDITIONAL DOCUMENTATION OF CHANGES FORMS

A.1 PLACES

Documentation of Changes
INCORPORATED PLACES

Incorporated place	Type	State

BAS ID		STATE CODE		PLACE CODES	Former FIPS

SPECIAL INSTRUCTIONS (If any)

Please follow the instructions below and review the preprinted entries for correctness and completeness. Print in the spaces provided the information requested for all annexations, deannexations, and other changes that have occurred during the previous year.

Instructions for Entering Data in Columns

(1) Change – Enter **A** for annexations, **D** for deannexations, **B** for boundary corrections, or **O** for other changes.
(2) Authorization – Enter the authorization **type**. (**O** = Ordinance, **R** = Resolution, **L** = Local Law, **S** = State-level action, and **X** = Other)
(3) Authorization – Enter the authorization **number** for the change you are reporting.
(4) Date – Enter the *effective* date of the change. (**Month, day, year**)
(5) County/Equivalent – Enter the **name of the county or equivalent area** in which the change occurred.
(6) Minor Civil Division – Enter the **name of the minor civil division** (if any) in which the change occurred.
(7) Area – Enter the **estimated size** (in tenths of acres) of the annexation, deannexation or other change.

Change Type A/D/B/O (1)	**Authorization** Type O/R/L/S/X (2)	**Authorization** Number (3)	**Date** Month/Day Year (4)	**County/Equivalent** Name (5)	**Minor Civil Division** Name (if any) (6)	**Area** Acres (Tenths) (7)

If additional space is needed, please use the BAS-1 "Documentation of Changes" form found in the BAS Respondent Guide.

FORM BAS-1 (9-26-2011)

A.2 COUNTIES AND EQUIVALENT AREAS

Documentation of Changes – *Continued*
COUNTIES AND EQUIVALENT AREAS

County, parish, borough or equivalent area	Type	State

BAS ID		STATE CODE		COUNTY CODE	

Change Type A/D/B/O (1)	**Authorization**		**Date** Month/Day, Year (4)	**Entity** Name (5)	**County/ Equivalent** Name (6)	**Minor Civil Division** Name (if any) (7)	**Area** Acres (tenths) (8)
	Type O/R/L/S/X (2)	Authorization Number (3)					

If additional space is needed, please use the BAS-2 "Documentation of Changes" form found in the BAS Respondent Guide.

FORM BAS-2 (9-16-2010)

A.3 MINOR CIVIL DIVISIONS

Documentation of Changes – *Continued*
MINOR CIVIL DIVISIONS

Minor civil division	Type	County	State

BAS ID		STATE CODE		COUNTY CODE		MCD CODES	Former FIPS

SPECIAL INSTRUCTIONS (If any)

Change Type A/D/B/O (1)	**Authorization** Type O/R/L/S/X (2)	**Authorization** Authorization Number (3)	**Date** Month/Day, Year (4)	**Minor Civil Division** Name (5)	**Area** Acres (tenths) (6)

If additional space is needed, please use the BAS-3 "Documentation of Changes" form found in the BAS Respondent Guide.

FORM BAS-3 (9-16-2010)

A.4 RESERVATIONS AND OFF-RESERVATION TRUST LAND

Documentation of Changes – *Continued*
AMERICAN INDIAN RESERVATIONS AND OFF-RESERVATION TRUST LAND

American Indian reservation/off-reservation trust land name

BAS ID		CENSUS CODE		CODE	

Change Type A/D/B/O (1)	**Authorization** Type A/C/D/N/X (2)	**Authorization** Identifying Number (If any) (3)	**Date** Month/Day, Year (4)	**Land** Type R/T (5)	**County/Equivalent** Name (6)	**Area** Acres (tenths) (7)

FORM BAS-5 (9-17-2010)

APPENDIX B. MTFCC DESCRIPTIONS

The MAF/TIGER Feature Classification Code (MTFCC) is a 5-digit code assigned by the Census Bureau to classify and describe geographic objects or features in Census Bureau MAF/TIGER products.

MTFCC	Feature Class	Feature Class Description
C3022	Mountain Peak or Summit	A prominent elevation rising above the surrounding level of the Earth's surface.
C3023	Island	An area of dry or relatively dry land surrounded by water or low wetland [including archipelago, atoll, cay, hammock, hummock, isla, isle, key, moku and rock].
C3024	Levee	An embankment flanking a stream or other flowing water feature to prevent overflow.
C3026	Quarry (not water-filled), Open Pit Mine or Mine	An area from which commercial minerals are or were removed from the Earth; not including an oilfield or gas field.
C3027	Dam	A barrier built across the course of a stream to impound water and/or control water flow.
C3061	Cul-de-sac	An expanded paved area at the end of a street used by vehicles for turning around. For mapping purposes, the Census Bureau maps it only as a point feature.
C3062	Traffic Circle	A circular intersection allowing for continuous movement of traffic at the meeting of roadways.
C3066	Gate	A movable barrier across a road.
C3067	Toll Booth	A structure or barrier where a fee is collected for using a road.
C3071	Lookout Tower	A manmade structure, higher than its diameter, used for observation.
C3074	Lighthouse Beacon	A manmade structure, higher than its diameter, used for transmission of light and possibly sound generally to aid in navigation.
C3075	Tank/Tank Farm	One or more manmade structures, each higher than its diameter, used for liquid (other than water) or gas storage or for distribution activities.
C3076	Windmill Farm	One or more manmade structures used to generate power from the wind.
C3077	Solar Farm	One or more manmade structures used to generate power from the sun.
C3078	Monument or Memorial	A manmade structure to educate, commemorate, or memorialize an event, person, or feature.
C3079	Boundary Monument Point	A material object placed on or near a boundary line to preserve and identify the location of the boundary line on the ground.
C3080	Survey Control Point	A point on the ground whose position (horizontal or vertical) is known and can be used as a base for additional survey work.
C3081	Locality Point	A point that identifies the location and name of an unbounded locality (e.g., crossroad, community, populated place or locale).
C3085	Alaska Native Village Official Point	A point that serves as the core of an Alaska Native village and is used in defining Alaska Native village statistical areas.
G2100	American Indian Area	A legally defined state- or federally recognized reservation and/or off-reservation trust land (excludes statistical American Indian areas).
G2120	Hawaiian Home Land	A legal area held in trust for the benefit of Native Hawaiians.
G2130	Alaska Native Village Statistical Area	A statistical geographic entity that represents the residences, permanent and/or seasonal, for Alaska Natives who are members of or receiving governmental services from the defining legal Alaska Native Village corporation.

MTFCC	Feature Class	Feature Class Description
G2140	Oklahoma Tribal Statistical Area	A statistical entity identified and delineated by the Census Bureau in consultation with federally recognized American Indian tribes that have no current reservation, but had a former reservation in Oklahoma.
G2150	State-designated Tribal Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a state-appointed liaison for a state-recognized American Indian tribe that does not currently have a reservation and/or lands in trust.
G2160	Tribal Designated Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a federally recognized American Indian tribe that does not currently have a reservation and/or off-reservation trust land.
G2170	American Indian Joint Use Area	An area administered jointly and/or claimed by two or more American Indian tribes.
G2200	Alaska Native Regional Corporation	Corporate entities established to conduct both business and nonprofit affairs of Alaska Natives pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). There are twelve geographically defined ANRCs and they are all within and cover most of the State of Alaska (the Annette Island Reserve-an American Indian reservation-is excluded from any ANRC). The boundaries of ANRCs have been legally established.
G2300	Tribal Subdivision	Administrative subdivisions of federally recognized American Indian reservations, off-reservation trust lands, or Oklahoma tribal statistical areas (OTSAs). These entities are internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations, off-reservation trust lands, or OTSAs.
G2400	Tribal Census Tract	A relatively small and permanent statistical subdivision of a federally recognized American Indian reservation and/or off-reservation trust land, delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G2410	Tribal Block Group	A cluster of census blocks within a single tribal census tract delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G3100	Combined Statistical Area	A grouping of adjacent metropolitan and/or micropolitan statistical areas that have a degree of economic and social integration, as measured by commuting.
G3110	Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using whole counties and equivalents.
G3120	Metropolitan Division	A county or grouping of counties that is a subdivision of a Metropolitan Statistical Area containing an urbanized area with a population of 2.5 million or more.
G3200	Combined New England City and Town Area	A grouping of adjacent New England city and town areas that have a degree of economic and social integration, as measured by commuting.
G3210	New England City and Town Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using Minor Civil Divisions (MCDs) in New England.
G3220	New England City and Town Division	A grouping of cities and towns in New England that is a subdivision of a New England City and Town Area containing an urbanized area with a population of 2.5 million or more.

MTFCC	Feature Class	Feature Class Description
G3500	Urban Area	Densely settled territory that contains at least 2,500 people. The subtypes of this feature are Urbanized Area (UA), which consists of 50,000 + people and Urban Cluster, which ranges between 2,500 and 49,999 people.
G4000	State or Equivalent Feature	The primary governmental divisions of the United States. The District of Columbia is treated as a statistical equivalent of a state for census purposes, as is Puerto Rico.
G4020	County or Equivalent Feature	The primary division of a state or state equivalent area. The primary divisions of 48 states are termed County, but other terms are used such as Borough in Alaska, Parish in Louisiana, and Municipio in Puerto Rico. This feature includes independent cities, which are incorporated places that are not part of any county.
G4040	County Subdivision	The primary divisions of counties and equivalent features for the reporting of Census Bureau data. The subtypes of this feature are Minor Civil Division, Census County Division/Census Subarea, and Unorganized Territory. This feature includes independent places, which are incorporated places that are not part of any county subdivision.
G4050	Estate	Estates are subdivisions of the three major islands in the United States Virgin Islands (USVI).
G4060	Subbarrio (Subminor Civil Division)	Legally defined divisions (subbarrios) of minor civil divisions (barrios-pueblo and barrios) in Puerto Rico.
G4110	Incorporated Place	A legal entity incorporated under state law to provide general-purpose governmental services to a concentration of population. Incorporated places are generally designated as a city, borough, municipality, town, village, or, in a few instances, have no legal description.
G4120	Consolidated City	An incorporated place that has merged governmentally with a county or minor civil division, but one or more of the incorporated places continues to function within the consolidation. It is a place that contains additional separately incorporated places.
G4210	Census Designated Place	A statistical area defined for a named concentration of population and the statistical counterpart of an incorporated place.
G4300	Economic Census Place	The lowest level of geographic area for presentation of some types of Economic Census data. It includes incorporated places, consolidated cities, census designated places (CDPs), minor civil divisions (MCDs) in selected states, and balances of MCDs or counties. An incorporated place, CDP, MCD, or balance of MCD qualifies as an economic census place if it contains 5,000 or more residents, or 5,000 or more jobs, according to the most current data available.
G5020	Census Tract	Relatively permanent statistical subdivisions of a County or equivalent feature delineated by local participants as part of the Census Bureau's Participant Statistical Areas Program.
G5030	Block Group	A cluster of census blocks having the same first digit of their four-digit identifying numbers within a Census Tract. For example, block group 3 (BG 3) within a Census Tract includes all blocks numbered from 3000 to 3999.
G5035	Block Area Grouping	A user-defined group of islands forming a single census tabulation block. A BAG must: (1) consist of two or more islands, (2) have a perimeter entirely over water, (3) not overlap, and (4) not cross the boundary of other tabulation geographies, such as county or incorporated place boundaries.

MTFCC	Feature Class	Feature Class Description
G5040	Tabulation Block	The lowest-order census defined statistical area. It is an area, such as a city block, bounded primarily by physical features but sometimes by invisible city or property boundaries. A tabulation block boundary does not cross the boundary of any other geographic area for which the Census Bureau tabulates data. The subtypes of this feature are Count Question Resolution (CQR), current, and census.
G5200	Congressional District	The 435 areas from which people are elected to the U.S. House of Representatives. Additional equivalent features exist for state equivalents with nonvoting delegates or no representative. The subtypes of this feature are 106th, 107th, 108th, 109th, and 111th Congressional Districts, plus subsequent Congresses.
G5210	State Legislative District (Upper Chamber	Areas established by a state or equivalent government from which members are elected to the upper or unicameral chamber of a state governing body. The upper chamber is the senate in a bicameral legislature, and the unicameral case is a single house legislature (Nebraska).
G5220	State Legislative District (Lower Chamber)	Areas established by a state or equivalent government from which members are elected to the lower chamber of a state governing body. The lower chamber is the House of Representatives in a bicameral legislature.
G5240	Voting District	The generic name for the geographic features, such as precincts, wards, and election districts, established by state, local, and tribal governments for the purpose of conducting elections.
G5400	Elementary School District	A geographic area within which officials provide public elementary grade-level educational services for residents.
G5410	Secondary School District	A geographic area within which officials provide public secondary grade-level educational services for residents.
G5420	Unified School District	A geographic area within which officials provide public educational services for all grade levels for residents.
G6120	Public-Use Microdata Area	A decennial census area with a population of at least 100,000 or more persons for which the Census Bureau provides selected extracts of household-level data that are screened to protect confidentiality.
G6300	Traffic Analysis District	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data. A Traffic Analysis District (TAD) consists of one or more Traffic Analysis Zones (TAZs).
G6320	Traffic Analysis Zone	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data.
G6330	Urban Growth Area	An area defined under state authority to manage urbanization that the Census Bureau includes in the MAF/TIGER® System in agreement with the state.
G6350	ZIP Code Tabulation Area (Five-Digit)	An approximate statistical-area representation of a U.S. Postal Service (USPS) 5-digit ZIP Code service area.
G6400	Commercial Region	For the purpose of presenting economic statistical data, municipios in Puerto Rico are grouped into commercial regions.
H1100	Connector	A known, but nonspecific, hydrographic connection between two nonadjacent water features.
H2025	Swamp/Marsh	A poorly drained wetland, fresh or saltwater, wooded or grassy, possibly covered with open water [includes bog, cienega, marais and pocosin].
H2030	Lake/Pond	A standing body of water that is surrounded by land.
H2040	Reservoir	An artificially impounded body of water.

MTFCC	Feature Class	Feature Class Description
H2041	Treatment Pond	An artificial body of water built to treat fouled water.
H2051	Bay/Estuary/Gulf/Sound	A body of water partly surrounded by land [includes arm, bight, cove and inlet].
H2053	Ocean/Sea	The great body of salt water that covers much of the earth.
H2060	Gravel Pit/Quarry filled with water	A body of water in a place or area from which commercial minerals were removed from the Earth.
H2081	Glacier	A body of ice moving outward and down slope from an area of accumulation; an area of relatively permanent snow or ice on the top or side of a mountain or mountainous area [includes ice field and ice patch].
H3010	Stream/River	A natural flowing waterway [includes anabranch, awawa, branch, brook, creek, distributary, fork, kill, pup, rio, and run].
H3013	Braided Stream	A natural flowing waterway with an intricate network of interlacing channels.
H3020	Canal, Ditch or Aqueduct	An artificial waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft [includes lateral].
K1225	Crew-of-Vessel Location	A point or area in which the population of military or merchant marine vessels at sea are assigned, usually being at or near the home port pier.
K1231	Hospital/Hospice/Urgent Care Facility	One or more structures where the sick or injured may receive medical or surgical attention [including infirmary].
K1235	Juvenile Institution	A facility (correctional and non-correctional) where groups of juveniles reside; this includes training schools, detention centers, residential treatment centers and orphanages.
K1236	Local Jail or Detention Center	One or more structures that serve as a place for the confinement of adult persons in lawful detention, administered by a local (county, municipal, etc.) government.
K1237	Federal Penitentiary, State Prison, or Prison Farm	An institution that serves as a place for the confinement of adult persons in lawful detention, administered by the federal government or a state government.
K1238	Other Correctional Institution	One or more structures that serve as a place for the confinement of adult persons in lawful detention, not elsewhere classified or administered by a government of unknown jurisdiction.
K1239	Convent, Monastery, Rectory, Other Religious Group Quarters	One or more structures intended for use as a residence for those having a religious vocation.
K1246	Community Center	Community Center.
K2110	Military Installation	An area owned and/or occupied by the Department of Defense for use by a branch of the armed forces (such as the Army, Navy, Air Force, Marines, or Coast Guard), or a state owned area for the use of the National Guard.
K2165	Government Center	A place used by members of government (either federal, state, local, or tribal) for administration and public business.
K2167	Convention Center	An exhibition hall or conference center with enough open space to host public and private business and social events.
K2180	Park	Parkland defined and administered by federal, state, and local governments.
K2181	National Park Service Land	Area—National parks, National Monuments, and so forth—under the jurisdiction of the National Park Service.
K2182	National Forest or Other Federal Land	Land under the management and jurisdiction of the federal government, specifically including areas designated as National Forest, and excluding areas under the jurisdiction of the National Park Service.

MTFCC	Feature Class	Feature Class Description
K2183	Tribal Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of an American Indian tribe.
K2184	State Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a state government.
K2185	Regional Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a regional government.
K2186	County Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a county government.
K2187	County Subdivision Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a minor civil division (town/township) government.
K2188	Incorporated Place Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a municipal government.
K2189	Private Park, Forest, or Recreation Area	A privately owned place or area set aside for recreation or preservation of a cultural or natural resource.
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of some other type of government or agency such as an independent park authority or commission.
K2191	Post Office	An official facility of the U.S. Postal Service used for processing and distributing mail and other postal material.
K2193	Fire Department	Fire Department.
K2194	Police Station	Police Station.
K2195	Library	Library.
K2196	City/Town Hall	City/Town Hall.
K2400	Transportation Terminal	A facility where one or more modes of transportation can be accessed by people or for the shipment of goods; examples of such a facility include marine terminal, bus station, train station, airport and truck warehouse.
K2424	Marina	A place where privately owned, light-craft are moored.
K2432	Pier/Dock	A platform built out from the shore into the water and supported by piles. This platform may provide access to ships and boats, or it may be used for recreational purposes.
K2451	Airport or Airfield	A manmade facility maintained for the use of aircraft [including airstrip, landing field and landing strip].
K2452	Train Station, Trolley or Mass Transit Rail Station	A place where travelers can board and exit rail transit lines, including associated ticketing, freight, and other commercial offices.
K2453	Bus Terminal	A place where travelers can board and exit mass motor vehicle transit, including associated ticketing, freight, and other commercial offices.
K2454	Marine Terminal	A place where travelers can board and exit water transit or where cargo is handled, including associated ticketing, freight, and other commercial offices.
K2455	Seaplane Anchorage	A place where an airplane equipped with floats for landing on or taking off from a body of water can debark and load.
K2456	Airport—Intermodal Transportation Hub/Terminal	A major air transportation facility where travelers can board and exit airplanes and connect with other (i.e. non-air) modes of transportation.
K2457	Airport—Statistical Representation	The area of an airport adjusted to include whole 2000 census blocks used for the delineation of urban areas.

MTFCC	Feature Class	Feature Class Description
K2458	Park and Ride Facility/Parking Lot	A place where motorists can park their cars and transfer to other modes of transportation.
K2459	Runway/Taxiway	A fairly level and usually paved expanse used by airplanes for taking off and landing at an airport.
K2460	Helicopter Landing Pad	A fairly level and usually paved expanse used by helicopters for taking off and landing.
K2540	University or College	A building or group of buildings used as an institution for post-secondary study, teaching, and learning [including seminary].
K2543	School or Academy	A building or group of buildings used as an institution for preschool, elementary or secondary study, teaching, and learning [including elementary school and high school].
K2545	Museum, Visitor Center, Cultural Center, or Tourist Attraction	An attraction of historical, cultural, educational or other interest that provides information or displays artifacts.
K2561	Golf Course	A place designed for playing golf.
K2582	Cemetery	A place or area for burying the dead [including burying ground and memorial garden].
K2586	Zoo	A facility in which terrestrial and/or marine animals are confined within enclosures and displayed to the public for educational, preservation, and research purposes.
K3544	Place of Worship	A sanctified place or structure where people gather for religious worship; examples include church, synagogue, temple, and mosque.
L4010	Pipeline	A long tubular conduit or series of pipes, often underground, with pumps and valves for flow control, used to transport fluid (e.g., crude oil, natural gas), especially over great distances.
L4020	Powerline	One or more wires, often on elevated towers, used for conducting high-voltage electric power.
L4031	Aerial Tramway/Ski Lift	A conveyance that transports passengers or freight in carriers suspended from cables and supported by a series of towers.
L4110	Fence Line	A man-made barrier enclosing or bordering a field, yard, etc., usually made of posts and wire or wood, used to prevent entrance, to confine, or to mark a boundary.
L4121	Ridge Line	The line of highest elevation along a ridge.
L4125	Cliff/Escarpment	A very steep or vertical slope [including bluff, crag, head, headland, nose, palisades, precipice, promontory, rim and rimrock].
L4130	Point-to-Point Line	A line defined as beginning at one location point and ending at another, both of which are in sight.
L4140	Property/Parcel Line (Including PLSS)	This feature class may denote a nonvisible boundary of either public or private lands (e.g., a park boundary) or it may denote a Public Land Survey System or equivalent survey line.
L4150	Coastline	The line that separates either land or Inland water from Coastal, Territorial or Great Lakes water. Where land directly borders Coastal, Territorial or Great Lakes water, the shoreline represents the Coastline. Where Inland water (such as a river) flows into Coastal, Territorial or Great Lakes water, the closure line separating the Inland water from the other class of water represents the Coastline.
L4165	Ferry Crossing	The route used to carry or convey people or cargo back and forth over a waterbody in a boat.
P0001	Nonvisible Linear Legal/Statistical Boundary	A legal/statistical boundary line that does not correspond to a shoreline or other visible feature on the ground.
P0002	Perennial Shoreline	The more-or-less permanent boundary between land and water for a water feature that exists year-round.

MTFCC	Feature Class	Feature Class Description
P0003	Intermittent Shoreline	The boundary between land and water (when water is present) for a water feature that does not exist year-round.
P0004	Other non-visible bounding Edge (e.g., Census water boundary, boundary of an aerial feature)	A bounding Edge that does not represent a legal/statistical boundary, and does not correspond to a shoreline or other visible feature on the ground. Many such Edges bound area landmarks, while many others separate water features from each other (e.g., where a bay meets the ocean).
R1011	Railroad Feature (Main, Spur, or Yard)	A line of fixed rails or tracks that carries mainstream railroad traffic. Such a rail line can be a main line or spur line, or part of a rail yard.
R1051	Carline, Streetcar Track, Monorail, Other Mass Transit	Mass transit rail lines (including lines for rapid transit, monorails, streetcars, light rail, etc.) that are typically inaccessible to mainstream railroad traffic and whose tracks are not part of a road right-of-way.
R1052	Cog Rail Line, Incline Rail Line, Tram	A special purpose rail line for climbing steep grades that is typically inaccessible to mainstream railroad traffic. Note that aerial tramways and streetcars (which may also be called “trams”) are accounted for by other MTFCCs and do not belong in R1052.
S1100	Primary Road	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
S1200	Secondary Road	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.
S1400	Local Neighborhood Road, Rural Road, City Street	Generally, a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.
S1500	Vehicular Trail (4WD)	An unpaved dirt trail where a four-wheel drive vehicle is required. These vehicular trails are found almost exclusively in very rural areas. Minor, unpaved roads usable by ordinary cars and trucks belong in the S1400 category.
S1630	Ramp	A road that allows controlled access from adjacent roads onto a limited access highway, often in the form of a cloverleaf interchange. These roads are unaddressable and do not carry a name in the MAF/TIGER System.
S1640	Service Drive usually along a limited access highway	A road, usually paralleling a limited access highway, that provides access to structures along the highway. These roads can be named and may intersect with other roads.
S1710	Walkway/Pedestrian Trail	A path that is used for walking, being either too narrow for or legally restricted from vehicular traffic.
S1720	Stairway	A pedestrian passageway from one level to another by a series of steps.
S1730	Alley	A service road that does not generally have associated addressed structures and is usually unnamed. It is located at the rear of buildings and properties and is used for deliveries.
S1740	Private Road for service vehicles (logging, oil fields, ranches, etc.)	A road within private property that is privately maintained for service, extractive, or other purposes. These roads are often unnamed.
S1750	Internal U.S. Census Bureau use	Internal U.S. Census Bureau use.

MTFCC	Feature Class	Feature Class Description
S1780	Parking Lot Road	The main travel route for vehicles through a paved parking area.
S1820	Bike Path or Trail	A path that is used for manual or small, motorized bicycles, being either too narrow for or legally restricted from vehicular traffic.
S1830	Bridle Path	A path that is used for horses, being either too narrow for or legally restricted from vehicular traffic.
S2000	Road Median	The unpaved area or barrier between the carriageways of a divided road.
Note: The information in this table was last updated in November 2017.		

APPENDIX C. READING A MAP

C.1 Index Maps

In order to decide what map to use for the BAS submission, it is necessary to view the government as a whole, and choose the correct parent map sheet based on its location within the government. Do this by referring to the index map (**Figure 29**), a relatively small-scale map that shows the entire government, and the location and number of all parent map sheets within that government. Each parent map sheet has a numerical locator which differentiates it from the other parent map sheets associated with that government. The numbering begins with the northern and western-most parent map sheets, and continues left-to-right, in much the same pattern as words in a book. By referring to the index map, determine which parent map sheet(s) to use for the BAS submission, and then access it based on its number on the index map.

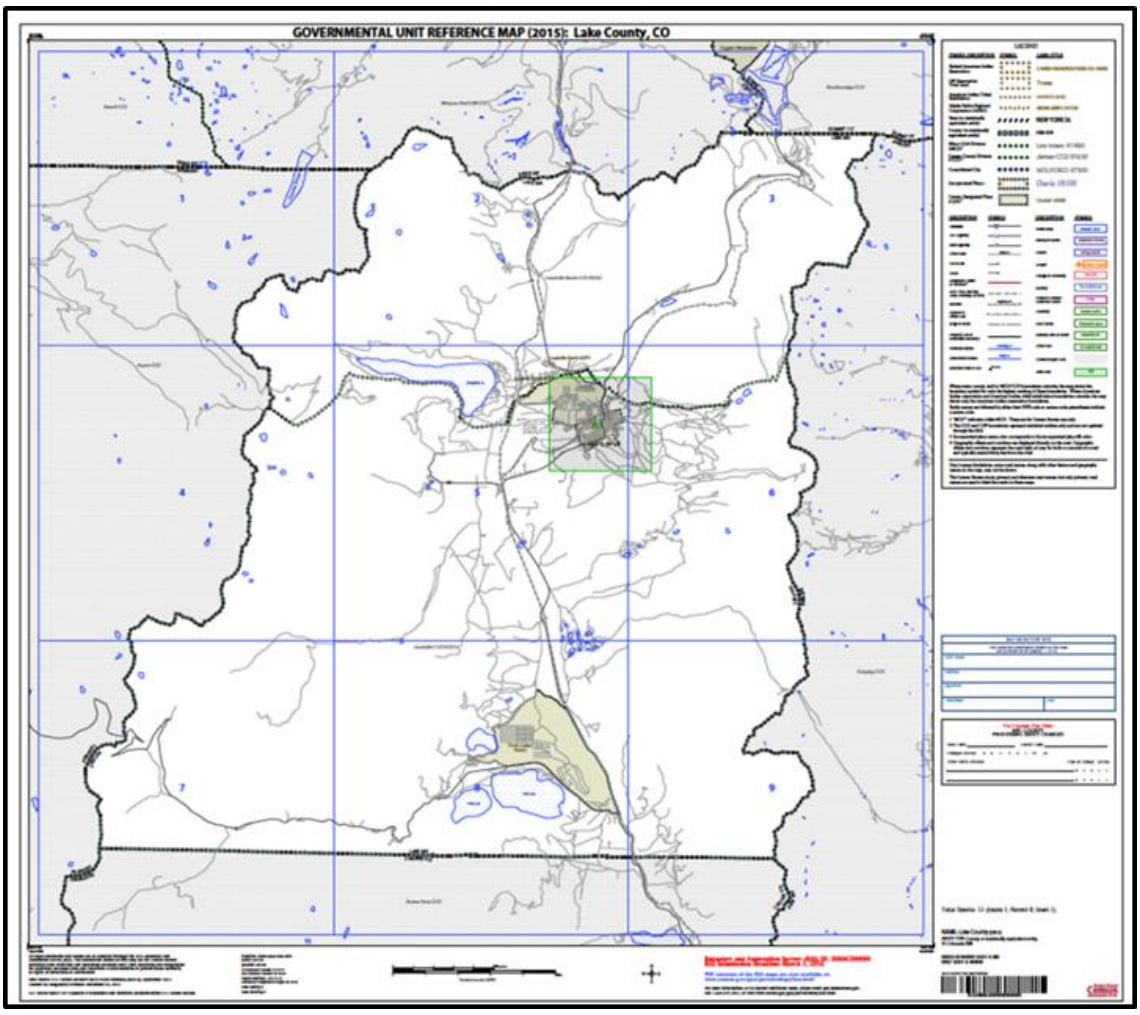


Figure 29. Index Map

The Index Map sheet shows the location of all parent map sheets and inset map sheets within a government.

The index map is not appropriate for BAS submissions. Its purpose is as a reference or index of parent maps, and it will not be accepted as a BAS submission.

C.2 Parent Maps

Many governments, such as incorporated places and counties, are too large to be shown on a single map; that is, the scale is too small to allow the necessary details for BAS updates. Thus, it is necessary to separate the government into sections, each of which has its own map, called the parent map sheet[2] (**Figure 30**). Thus, a single government is often represented with numerous map sheets, with each parent map sheet showing a small section of the government. Each parent map is assigned a number, beginning with the number one and increasing progressively for each additional parent map sheet (i.e. 1, 2, 3, 4, etc.). In this way, viewing and editing map sheets becomes more manageable, and it becomes possible to depict an area with the level of detail necessary to make changes or challenges. In most instances, the parent map is the one that should be used for BAS submissions.

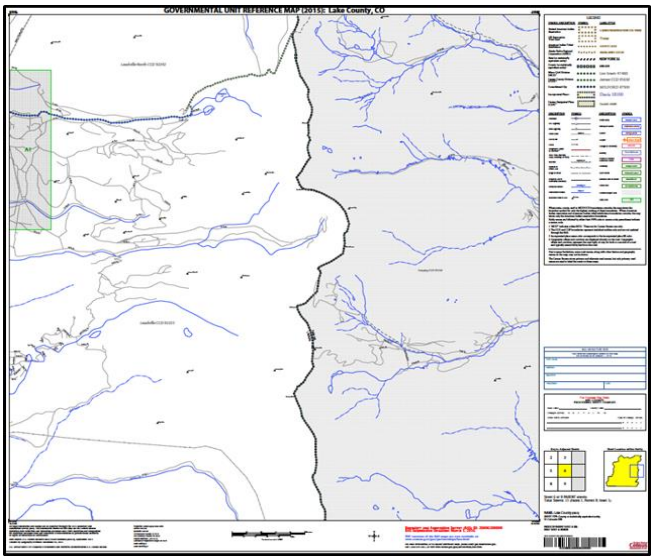


Figure 30. The Parent Map

The parent map sheet shows a section of a government at a relatively large scale.

In the bottom right-hand corner of the parent map sheet, there is a key to the parent map sheet's location in relation to adjacent map sheets as shown in **Figure 30** above. A larger example of this key is shown in **Figure 31**. This key helps the user quickly determine which adjacent map sheet to use.

2	3	
5	6	
8	9	

Figure 31. The Key to Adjacent Sheets

The key to adjacent sheets shows where the parent map sheet lies in relation to adjacent sheets.

[2]Within the scope of BAS, the terms 'map' and 'map sheet' have the same meaning, and they are used interchangeably throughout this document.

Next to the key to adjacent sheets, there is a small outline of the entire government (the inside of which is colored yellow), and a blue outline of the parent map sheet. This key displays the location of the map sheet in relation to the government as a whole as is shown in **Figure 32**.

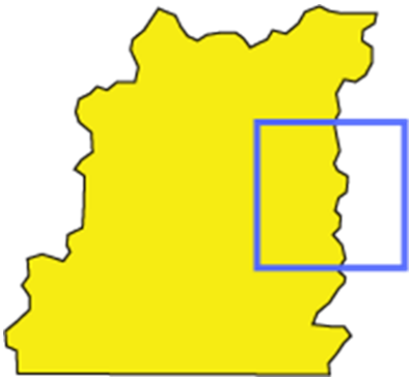


Figure 32. The Sheet Location within Government key

The sheet location within government key shows where the parent map sheet is located within the government to which it belongs.

C.3 Inset Maps

In some instances, in highly congested areas, even a parent map sheet provides insufficient detail for BAS purposes. In such cases, rather than using a parent map, the area is depicted within an inset map (**Figure 33**). This refers to a map with a very large scale, so that it displays a smaller area than the parent map sheet, but with greater detail. On the index map, an inset map is represented by a green outline, and is assigned a number preceded by a letter (i.e. A1, A2, B1, etc.), as shown in **Figure 34**Error! Reference source not found.. Inset maps are only found in areas with a large number of features, and as such are used less often than parent maps.

Figure 33. An Inset Map as it is Displayed on the Index Map

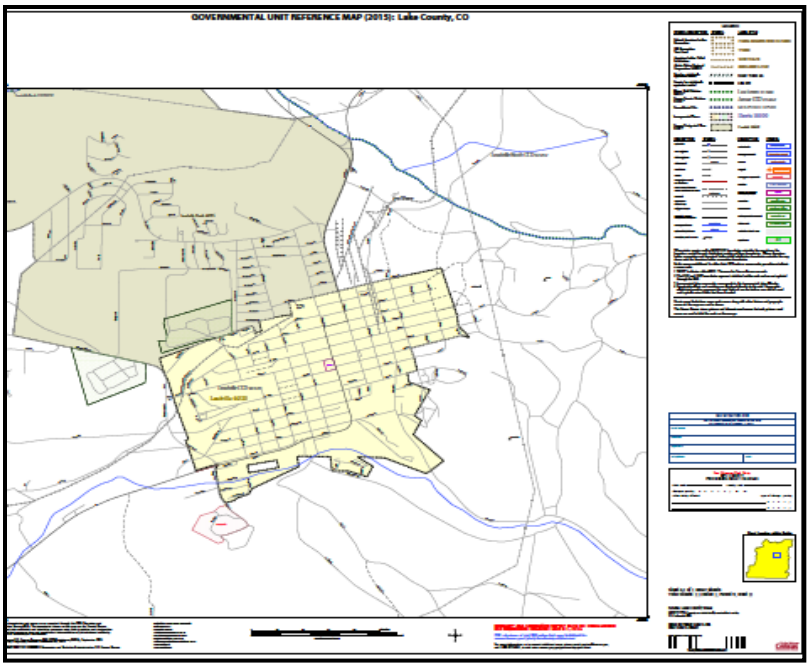


Figure 34. Inset Maps

Inset maps show areas of relative congestion at a large scale, allowing a greater amount of detail.

C.4 Scales

A map is a paper or digital representation of an area. Naturally, the map is always smaller than the area it represents, so nearly all maps are equipped with a scale, which depicts the ratio of distance on the map to the actual distance on land. The scale can be designed any number of ways, but two of the most common scales are ratio scales (**Figure 35**), which describe a ratio between the map and the real world (e.g., 1: 24,000), and bar scales, which depict that relationship graphically by displaying how much a certain distance on the map represents in the real world (Figure 35). In other words, if a map has a ratio scale of 1: 24,000, it means that one inch on the map represents 24,000 inches on the ground. (This works with any unit of measurement, so long as the unit being used on the map is the same as – or properly converted from – the unit being depicted on the ground.) Often a map will have both types of scale.

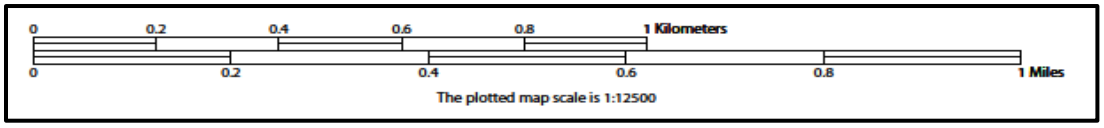


Figure 35. Bar Scale

The map from which this scale was taken has a ratio scale of 1:12,500. The bar scale shows distances in kilometers and miles.

A bar scale will often be a set length (e.g., one inch), and/or represent a set distance (e.g., one mile). The bar scale is used to determine distance on the map by using a ruler. Simply place the ruler on the map to determine the distance on the map; then place the ruler along the bar scale, which will show how much that distance represents on the ground.

Maps that display a small area, but with a relatively large amount of detail, are considered large-scale maps (see **Figure 36**). A map that displays a large area, but shows less detail,

is called a small-scale map. This is because the representative fraction of a large-scale map (e.g., 1/7,500 or 1:7,500) is a larger fraction than that of a small-scale map (e.g., 1/250,000 or 1:250,000).

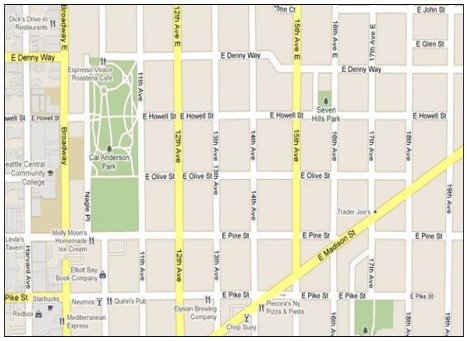


Figure 36. Large Scale Map

A large-scale map shows a greater amount of detail; this example displays streets, parks, churches and restaurants.

C.5 Compass Rose

All maps should have some sort of diagram depicting at least one – but sometimes all – of the cardinal directions (north, south, east, and west) that the map reader can use to orient the map. This diagram is called a compass rose (see **Figure 37**). A compass rose can have any number of designs, and north can be shown in any direction on the map, but most maps are oriented with north at the top of the map. It is important to check the compass rose when beginning to read a map, in order to determine the direction in which the map is oriented (i.e., which direction is at the top of the map).

Figure 37. Compass Rose

C.6 Legend

Because a map is a graphic representation of a real-world area, it is necessary, and convenient, to symbolize real world features with representative symbols. These symbols can take any form, so long as they are consistent within any individual map. In order to describe what each symbol means, most maps have a legend (see **Figure 38**). The legend is typically located on the side or bottom of the map, although they can be anywhere so long as they do not obstruct the integral parts of the map. Typically, the legend will have a small example of each symbol (e.g. a line, or a picture of a tent), and next to the symbol, in text, a brief description of what is being depicted (e.g. “road”, or “campground”).

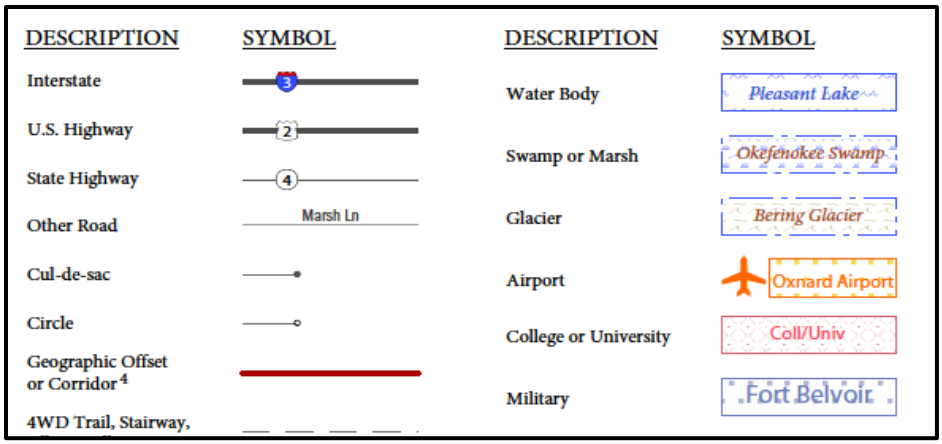


Figure 38. Legend Describing What Each Symbol Means

Sometimes a map needs to depict multiple features concurrently. This is because some lines are the boundaries of multiple geographies at the same time (i.e. a county boundary can also be a city boundary, a voting district boundary, and even a highway or river). Such instances can be depicted in various ways, but Census Bureau maps depict coincident lines by alternating the symbols for each type of line as shown in **Figure 39** below. In other words, if a line is both a county boundary (symbolized by a series of squares) and a city boundary (a series of circles), that boundary will be depicted as a series of alternating squares and circles for the length of the concurrency.

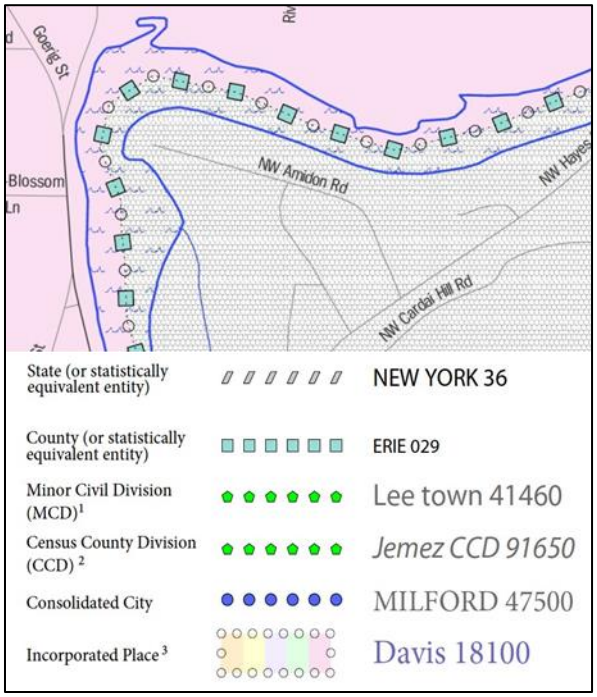


Figure 39. Map Depicting Multiple Features Concurrently

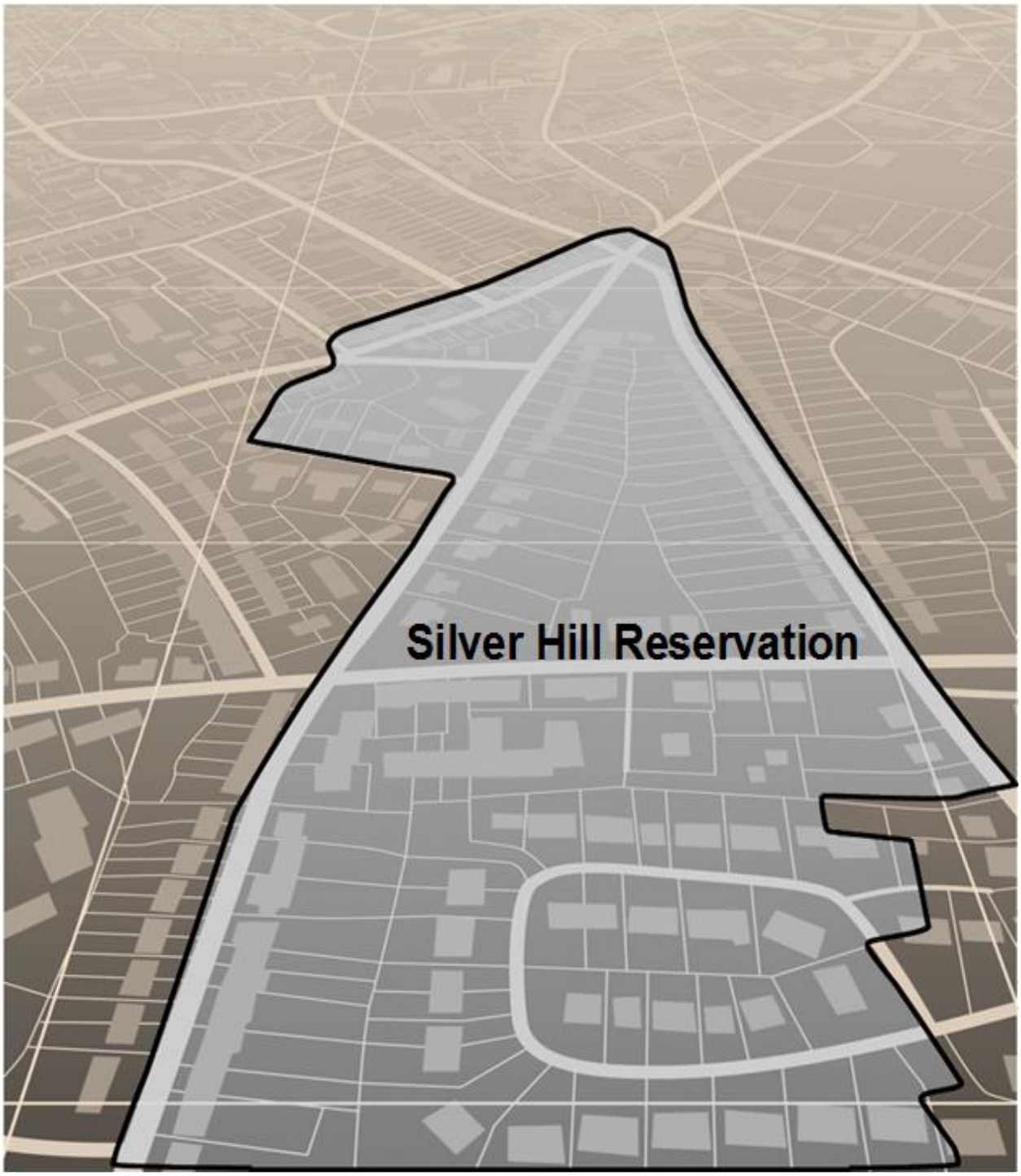
In this case, the city and the county boundaries are coincident, and run through the middle of the river.

In situations where higher-level geographies (e.g. national, state, county, or county subdivisions) coincide, the Census Bureau's maps display only the symbol of the highest-ranking of these boundaries. In other words, if a particular boundary is shared by both a state and county, only the symbol representing the state boundary will be displayed.

Boundary and Annexation Survey (BAS) Tribal Respondent Guide: Digital

Instructions for Participating in the 2020 Boundary and Annexation Survey

Revised as of October 07, 2019



United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

This page intentionally left blank.

TABLE OF CONTENTS

Introduction viii

A. The Boundary and Annexation Survey viii

B. What's New for the 2020 BAS? viii

C. Key Dates for BAS Respondents ix

D. BAS State Agreements ix

E. Legal Disputes ix

Chapter 1 Digital BAS Requirements 1

1.1 Digital BAS Participation Requirements 1

1.2 Tribal Areas that can be Submitted through BAS 1

1.3 BAS Informational and Tutorial Videos 2

Chapter 2 Topological Relationships and Spatial Accuracy 3

2.1 Topological Relationships in the MAF/TIGER System 3

2.2 GIS and Spatial Accuracy 4

2.3 Census Bureau Topology Training Video 6

Chapter 3 Census Bureau Provided Shapefiles 7

3.1 Federal Information Processing Standards (FIPS) Codes 7

Chapter 4 Census Bureau GEOCODING 8

4.1 MAF Structure Point (MSP) Geocoding 8

4.2 Address Range Geocoding 9

Chapter 5 Updating the Census Bureau Shapefiles 10

5.1 General File Setup Guidelines 10

5.2 Changing the Map Projection 10

5.3 Boundary Changes 10

5.3.1 Additions and Deletions 11

5.3.2 Boundary Corrections 11

5.3.3 Tribal Subdivisions 12

5.3.3.1 New Tribal Subdivisions 12

5.3.3.2 Criteria for Defining Tribal Subdivisions 13

5.3.3.3 Updating Tribal Subdivisions 13

5.3.4 Geographic Corridors 14

5.3.5 Geographic Offsets 15

5.4 Linear Feature Updates 16

5.4.1 Adding, Deleting, Renaming, and Recoding Linear Features 16
5.4.2 Address Range Updates 16
5.5 Area Landmarks, Hydrographic Areas, and Point Landmarks 17
5.5.1 Area Landmark/Hydrographic Area Updates 17
5.5.2 Point Landmark Updates 19
5.6 Reviewing Changes to the Census Bureau Shapefiles 21
5.6.1 Boundary-to-Feature Relationships 21
5.6.2 Large Boundary Corrections 23
5.6.3 Required Attribute Information 24
5.6.4 Appropriate Projection Information 24
5.6.5 Linear Feature Updates 24
5.7 Additional Information Review 25
5.7.1 Submitting Acceptable Documentation 25
5.7.2 Submitting Digital Data 26
5.7.3 Change Polygon Layer Naming Conventions 27
5.7.4 Whole Entity Polygon Layer Naming Conventions 27
5.7.5 Linear Feature, Area Landmark/Hydrographic Area, and Point Landmark Updates 27
5.7.6 Compressing the Digital Files 28
5.7.7 Submitting Digital Files through SWIM 29
Appendices 34
Appendix A Data Dictionary A-1
Appendix B 2020 Digital BAS Example Process 1 ..... B-1
B1 How to Use the BAS Partnership Toolbox B-1
B2 Toolbox Tools Setup B-1
B3 Census Data Download Tool B-2
B4 Create Changes Tool B-3
B5 Sliver Blaster Tool (Optional) B-6
B6 Format Working MXD Tool (Optional) B-7
B7 Attribute Check Tool B-8
B8 Export Submission Tool B-9
B9 Submitting through the Secure Web Incoming Module (SWIM) B-10
Appendix C 2020 Digital BAS Example Process 2 ..... C-1
C1 Required Census Bureau Shapefiles C-1
C2 Tribal Data C-1

C3 Symbolizing Layers in ArcGIS C-1
C4 Symbolizing Geographic Areas C-2
C5 Extracting AIA Data from Census Bureau Shapefiles C-2
C5.1 Filtering the Data C-2
C5.2 Exporting the Data to a New Shapefile C-3
C6 Creating Change Polygons C-5
C6.1 Creating Change Polygons Using Symmetrical Difference C-5
C6.2 Creating Change Polygons Using Union C-6
C7 Reviewing and Attributing Change Polygons C-9
C7.1 Examples C-9
C8 Attribute Information C-9
C8.1 To Begin Updating Attributes for Additions C-10
C8.2 To Begin Updating Attributes for Deletions C-10
C8.3 To Begin Updating Attributes for Geographic Corridors C-10
C8.4 To Begin Updating Attributes for Geographic Offsets C-10
C8.5 To Finish Updating Attributes C-10
C9 Renaming and Finalizing Change Polygons C-11
C9.1 Renaming the shapefile: C-11
C9.2 Submitting the shapefile: C-11
C9.3 To Begin Updating Attributes for Boundary Corrections C-11
Appendix D MTFCC Descriptions D-1

LIST OF TABLES

Table 1: Available Change Types by Government Type 2
Table 2: BAS Shapefile Naming Conventions 7
Table 3: Additions and Deletions 11
Table 4: Boundary Corrections 11
Table 5: New Entities 13
Table 6: Geographic Corridors 14
Table 7: Geographic Offsets 15
Table 8: Linear Feature Updates 16
Table 9: Address Range Updates 17
Table 10: Landmarks and Hydrographic Areas 18
Table 11: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas 18
Table 12: Point Landmark Updates 20
Table 13: Restricted Point Landmark MTFCC Codes 20
Table 14: Change Polygons 27
Table 15: Whole Entity Polygon Naming Conventions 27
Table 16: Optional Files 27
Table 17: American Indian Areas - Legal (AIAL) Shapefile A-1
Table 18: American Indian Tribal Subdivisions (AITS) Shapefile A-1
Table 19: Edges Shapefile A-2
Table 20: Area Landmark Shapefile A-3
Table 21: Hydrographic Area Shapefile A-3
Table 22: Point Landmark Shapefile A-3
Table 23: Geographic Offset Shapefile A-4
Table 24: Suggested MTFCC Symbolization C-1
Table 25: MTFCC Code/Class/Decsription D-1

LIST OF FIGURES

Figure 1. Topological Integration of Four Classes 4
Figure 2. Overlay of Four Feature Classes 5
Figure 3. GIS AIA Boundary Does Not Follow Road Feature 5
Figure 4. GPS Method of Geocoding 8
Figure 5. Address Range Method of Geocoding 9
Figure 6. Geographic Corridor Created 14
Figure 7. Geographic Corridor Not Created 14
Figure 8. Cadastral Data 15
Figure 9. Same Data Edited to Census Bureau Requirements 15
Figure 10. A Boundary Correction to Park A 17
Figure 11. Boundary Corrections Not Snapped to Existing Linear Features 21
Figure 12. Addition Created without Snapping to Centerlines 22
Figure 13. Small Spatial Correction Not Incorporated 22
Figure 14. Small Spatial Correction Not Accepted 23
Figure 15. Large Boundary Corrections 23
Figure 16. New Road Features, Not Added to Existing Road 24
Figure 17. New Road Features, Correctly Added 24
Figure 18. Selecting and Zipping Return Files 28
Figure 19. Naming the ZIP File 29
Figure 20. SWIM Account Registration 30
Figure 21. SWIM Login Window 31
Figure 22. Welcome Screen with Upload History 31
Figure 23. Geographic Partnership Program Selection Window 31
Figure 24. Geographic Level Selection Window 32
Figure 25. Government Selection Window 32
Figure 26. File Upload Screen 32
Figure 27. File Browser Dialog Box 33
Figure 28. Entering Comments into the File Upload Window 33
Figure 29. Thank You Screen 33

Figure 30. Partnership BAS Tools Menu B-1
Figure 31. Partnership BAS Tools Menu with Census Data Download Selected B-2
Figure 32. The Census Data Download Window with 'Yes' in the Use Data Downloader Field .. B-2
Figure 33. The Census Data Download Window with 'No' in the Use Data Downloader Field .. B-3
Figure 34. Partnership Tools Menu Showing a Folder for the BAS ID in the Projects Folder B-3
Figure 35. NAME Field in Census Data vs Local Boundary Data B-4
Figure 36. Appropriate Attribution for COUSUB or AIANNH Changes B-4
Figure 37. Partnership Tools Menu with Create Changes Tool Selected B-4
Figure 38. Create Changes Window B-5
Figure 39. Partnership Tools Menu with Geodatabase B-5
Figure 40. Partnership Tools Menu with Sliver Blaster Selected B-6
Figure 41. Sliver Blaster Window B-6
Figure 42. Partnership Tools Menu with Format Working MXD Selected B-7
Figure 43. Format Working MXD Window B-7
Figure 44. Projects Submenu with mxd file Selected B-7
Figure 45. Partnership Tools Menu with Attribute Check Selected B-8
Figure 46. Attribute Check Window B-8
Figure 47. Projects Submenu Showing an attribute_check Text File B-9
Figure 48. Partnership Tools Menu with Export Submission Files Selected B-9
Figure 49. Export Submission Files Window B-10
Figure 50. Suggested Map Symbolization C-2
Figure 51. Filtering Data C-3
Figure 52. Export Data Window C-4
Figure 53. Finalizing the Merge Process C-5
Figure 54. Finalizing the Symmetrical Difference Process C-6
Figure 55. Finalizing the Union Process C-7
Figure 56. Locating the Union Shapefile C-8
Figure 57. Small Slivers That Should Be Deleted C-9
Figure 58. Polygons (Before and After) Snapped to Roads or Rivers C-9

INTRODUCTION

A. The Boundary and Annexation Survey

The U.S. Census Bureau conducts the Boundary and Annexation Survey (BAS) annually to collect information about selected legally defined geographic areas, such as counties (and equivalent areas), incorporated places, minor civil divisions (MCDs), federally recognized American Indian Areas (AIAs) — including reservations, off-reservation trust lands and tribal subdivisions, and Hawaiian Homelands. BAS also provides an opportunity for participants to review the names and geographic relationships for these areas. Title 13, Section 6, United States Code authorizes this survey.

The Census Bureau uses the boundary information collected during BAS to tabulate data for the decennial and economic censuses, and to support the yearly delivery of the Population Estimates Program (PEP) and the American Community Survey (ACS) data. Maintaining correct boundaries and boundary-to-feature relationships through BAS helps ensure that the Census Bureau assigns the appropriate housing and population counts to each government.

In compliance with the Office of Management and Budget Circular A-16, BAS supports the Census Bureau's spatial data steward responsibilities for the Federal Geographic Data Committee (FGDC) and the Geospatial One-Stop by updating the inventory and boundaries of governments.

In addition, BAS is the source of up-to-date information on changes to the boundaries, codes and names of incorporated places, MCDs, counties (and equivalent areas), Hawaiian Homelands, and federally recognized AIAs, which include reservations and off-reservation trust lands used by the U.S. Geological Survey (USGS), the National Map, and the Geographic Names Information System (GNIS).

Please visit the BAS program website at <https://www.census.gov/programs-surveys/bas.html>.

For more information on BAS, please view the BAS video series on the Census Bureau's BAS website at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

B. What's New for the 2020 BAS?

1. The Boundary Validation Program (BVP) runs in parallel with the 2020 BAS. The BVP provides Tribal Chairs (TCs) and Highest Elected Officials (HEOs), of tribal, state, and local governments, the opportunity to review the Census Bureau's boundary data to ensure the Census Bureau has the correct legal boundary, name, and status information for eligible governments across the United States. For more information on the BVP, please visit the BVP website at: <https://www.census.gov/programs-surveys/bas/information/bvp.html>.
2. The 2020 BAS is the final opportunity for tribal, state, and local governments to provide legal boundary, name, and status information updates prior to 2020 Census data tabulation.

3. The Census Bureau developed a BAS Partnership Toolbox for ArcGIS users. This toolbox is designed to simplify and standardize the BAS updating process. The toolbox and additional information can be found at <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html> or refer to **Appendix B** for a step-by-step guide to using this new tool.

C. Key Dates for BAS Respondents

January 1, 2020—Boundary changes must be legally in effect on or before this date to be reported in the current survey year and to be used for the 2020 Census data tabulations. Boundary updates effective after this date will be held until the following BAS cycle.

March 1, 2020— Boundary updates returned by this date will be reflected in the 2020 Census, the Final BVP materials, and in next year's BAS materials.

May 31, 2020—Boundary updates returned by this date will be reflected in the 2020 Census and in next year's BAS materials.

D. BAS State Agreements

The Census Bureau has established a number of agreements with states for reporting boundary changes. Please visit the BAS State Agreements webpage within the BAS program website at <https://www.census.gov/programs-surveys/bas/information/state-agreements.html> or call **1-800-972-5651** for information regarding state agreements.

Note: The Census Bureau can only establish BAS state agreements for states that require local governments to report boundary changes to a state agency.

E. Legal Disputes

If the Census Bureau discovers that an area of land is in dispute between two or more jurisdictions, the Census Bureau will not make any boundary corrections until the parties come to a written agreement, or there is a documented final court decision regarding the dispute. To learn more, please contact the Census Bureau Legal Office at **1-301-763-9844**.

For disputes involving tribal areas, the Census Bureau must defer to the Office of the Solicitor at the Department of the Interior for a legal opinion. Often complicated land issues require an extended period of time for resolution, and in those cases, the Census Bureau will retain the current boundary in the database until a legal opinion is issued by the Solicitor's office.

CHAPTER 1 DIGITAL BAS REQUIREMENTS

1.1 Digital BAS Participation Requirements

1. All participants must create a new shapefile of boundary change polygons based off of the current Census Bureau boundary. Submissions containing only a whole entity boundary shapefile of the current local data will not be accepted.
2. All participants must provide current information for the tribal BAS point of contact, the person updating the shapefiles, and the name of the TC.
3. All participants must provide legal documentation (such as trust deeds and Federal Register Notice) and effective dates for all legal boundary changes (new reservation land and/or off-reservation trust land).
4. Each non-legal boundary correction must contain proper update documentation according to boundary correction guidelines listed below in **Section 1.2, Tribal Areas that can be Submitted through BAS**, or the Census Bureau will not make the correction for this BAS cycle.
5. All participants must use the Secure Web Incoming Module (SWIM) to submit their changes to the Census Bureau. Due to security requirements, the Census Bureau cannot accept submissions via File Transfer Protocol (FTP), email or any protocol other than the SWIM site. For details on registering and using SWIM, please see **Section 5.7.7, Submitting Digital Files through SWIM**. To access SWIM, enter the following URL in a new browser window: <https://respond.census.gov/swim/>.

1.2 Tribal Areas that can be Submitted through BAS

The following can be updated through Tribal BAS:

- **Federal American Indian Reservations** are areas that have been set aside by the United States for the use of tribes, the exterior boundaries of which are more particularly defined in the final tribal treaties, agreements, executive orders, federal statutes, secretarial orders, or judicial determinations.
- **Federal Off-Reservation Trust Lands** are areas for which the United States holds title in trust for the benefit of a tribe (tribal trust land) or for an individual American Indian (individual trust land).

Note: Trust lands may be located on or off a reservation; however, the Census Bureau tabulates data only for off-reservation trust lands. Please do not submit on-reservation trust land because the Census Bureau can only show the exterior reservation boundary. The Census Bureau does not identify fee land (or land in fee simple status) or restricted fee lands as specific geographic areas.

- **Tribal Subdivisions** are legal administrative subdivisions of federally recognized American Indian reservations and off-reservation trust lands, and are described as additions, administrative areas, areas, chapters, county districts, communities, districts, or segments. These are internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations and off-reservation trust lands.

- **Hawaiian Homelands** are areas held in trust for Native Hawaiians by the state of Hawaii, pursuant to the Hawaiian Homes Commission Act of 1920, as amended.

Table 1 shows the specific changes allowed for each government type.

Table 1: Available Change Types by Government Type

Government Type	Available Change Types
Hawaiian Home Land (HHL)	• New Entity • Deleted Entity • Addition • Deletion • Boundary Correction (add) • Boundary Correction (remove) • Geographic Corridor • Geographic Offset
Reservation / Trust Land	• New Entity (No Land previously; Have Reservation land and adding Trust Lands for first time, or Have Trust land and are adding Reservation for first time) • Deleted Entity (changing from Reservation to Trust land or Trust Land to Reservation) • Addition (adding to type of geography that already exists) • Deletion (Deleting a portion of Reservation or Trust Land) • Boundary Correction (add) • Boundary Correction (remove) • Geographic Corridor • Geographic Offset
Tribal Subdivision	• Adding tribal subdivisions for first time • Deleting tribal subdivisions all together • Addition • Deletion • Boundary Correction (add) • Boundary Correction (remove)

1.3 BAS Informational and Tutorial Videos

The Census Bureau created training videos to give BAS participants detailed instructions and information on how to report and submit BAS changes. These videos are available on the BAS website at: <https://www.census.gov/programs-surveys/bas/library/videos.html>.

If there are any questions or concerns about the participation requirements, contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov.

For participants already familiar with Geographic Information Systems (GIS) and BAS updating procedures, **Appendix B** and **Appendix C** provide step-by-step guidelines for making updates.

CHAPTER 2 TOPOLOGICAL RELATIONSHIPS AND SPATIAL ACCURACY

The Geography Division of the Census Bureau is responsible for developing geographic applications and executing related activities needed to support the Census Bureau in collecting and disseminating census data. For more than twenty years, the Census Bureau's Master Address File and Topologically Integrated Geographic Encoding and Reference (MAF/TIGER) System has been a critical resource for supporting the Census Bureau Geographic Partnership Programs.

The following section will describe how the Census Bureau uses a topologically integrated system and how this differs from traditional GIS, which use separate layers of data.

2.1 Topological Relationships in the MAF/TIGER System

At the Census Bureau, topology is described as the spatial relationship between different levels of geography. The MAF/TIGER system is a geographic database in which the topological structures define the location, connection, and relationships of streets, rivers, railroads, and other features. These topological structures help define the geographic areas for which the Census Bureau tabulates data.

Instead of having a separate layer for each feature class (roads, boundaries, etc.) all MAF/TIGER information is stored in one layer or file. See **Figure 1** for a sample of a topologically integrated file in the MAF/TIGER system.

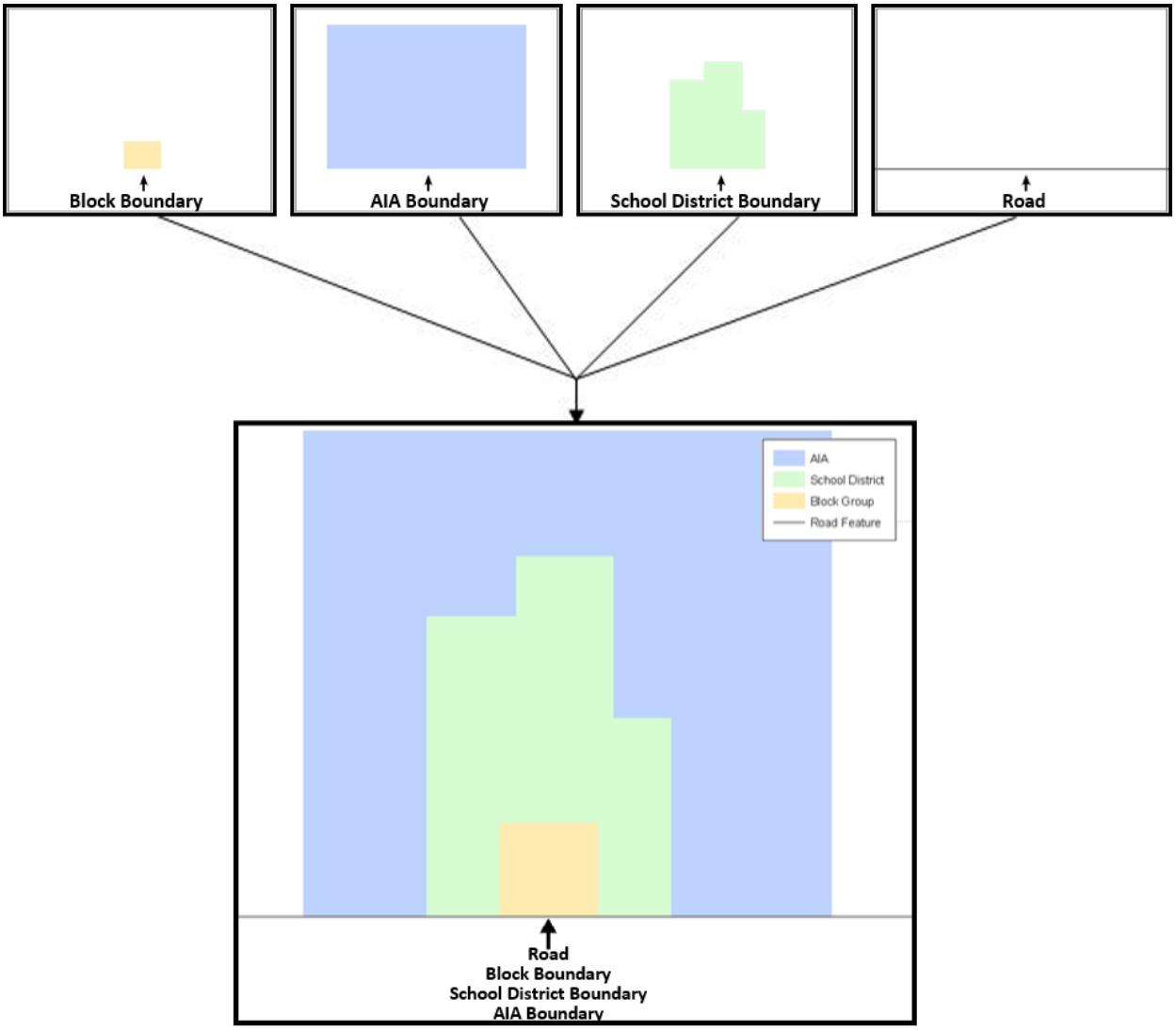


Figure 1. Topological Integration of Four Classes

This example shows the topological integration of four different feature classes into one layer. One road feature represents not only a road, but also a block boundary, AIA boundary, and a school district boundary.

2.2 GIS and Spatial Accuracy

In a GIS, feature classes are often not topologically integrated; they are separated into individual layers. When these layers are overlaid in a GIS, there may be boundary misalignments due to the nature of the data. These non-topologically integrated layers could cause issues in the MAF/TIGER system. **Figure 2** and **Figure 3** show how files that are not topologically integrated might appear in a GIS when overlaid.

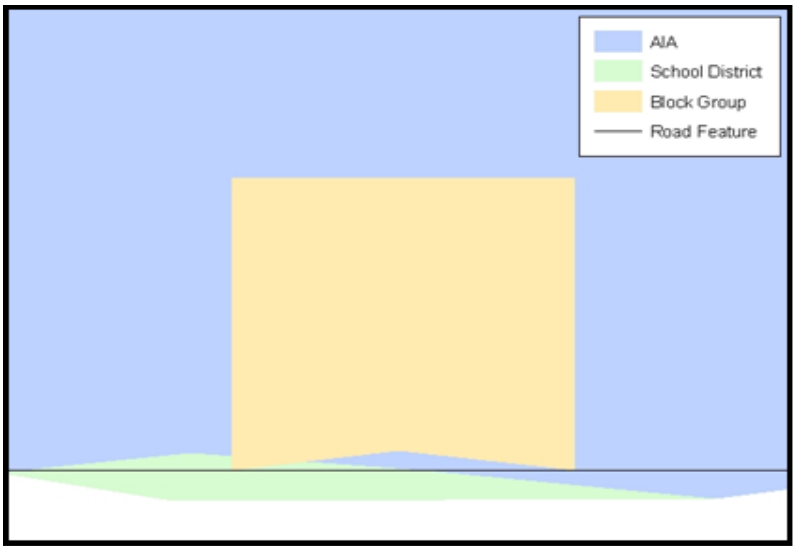


Figure 2. Overlay of Four Feature Classes

This example shows an overlay of four different feature classes. Notice how the topological relationship is compromised. The block, AIA, and school district boundaries, which are supposed to follow the road feature, no longer align with the road in several locations.

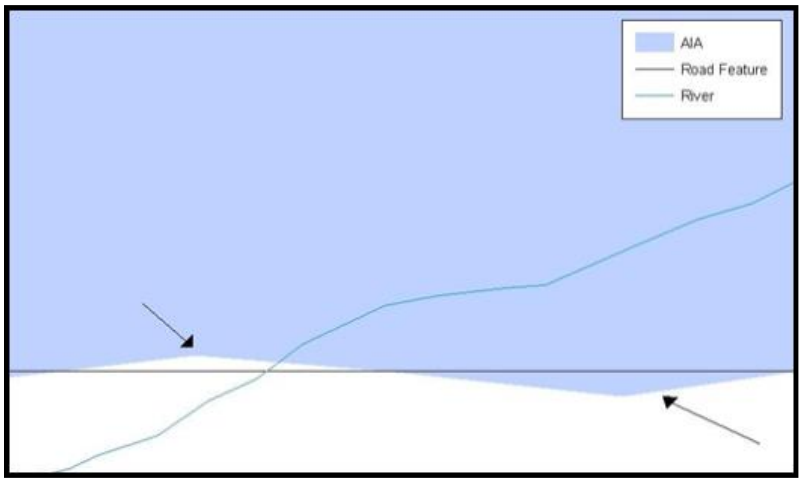


Figure 3. GIS AIA Boundary Does Not Follow Road Feature

This example shows a situation where a local GIS AIA boundary does not follow a road feature. Assuming that the boundary follows the road feature, changing the AIA boundary to match the local file exactly and become misaligned (see arrows) would dissolve the topological relationship in the MAF/TIGER system.

The spatial differences between local GIS data and the Census Bureau's topologically integrated file are often very small (less than ten feet) and can create boundary-to-feature relationship issues for the Census Bureau. Instructions on how to review digital submissions for small spatial boundary corrections are given in **Section 5.6**, **Reviewing Changes to the Census Bureau Shapefiles**. It also lists some of the potential consequences of making spatial boundary corrections that dissolve the topological relationships present in the MAF/TIGER system.

To find step-by-step instructions of suggested methods for correctly making boundary changes, please see **Appendix B** and **Appendix C**.

2.3 Census Bureau Topology Training Video

The Census Bureau created a video on the subject of topology and why topology is important to BAS. For more information, please go to <https://www.census.gov/programs-surveys/bas/library/videos.html> to watch the video.

CHAPTER 3 CENSUS BUREAU PROVIDED SHAPEFILES

The Census Bureau provides data layers in Esri shapefile format for download on the BAS website. Regardless of the number of geographic polygon-based shapefiles each participant downloads and edits, there is only one shapefile for the linear feature network for each county. See **Table 2** for the names of the shapefiles.

Note: Shapefiles are 'county' based so it is necessary to download all of the shapefiles for each county in which the tribe has reservation and/or off-reservation trust lands.

Table 2: BAS Shapefile Naming Conventions

Government Type	Shapefile Naming Convention
Federal Reservations and Off-Reservation Trust Lands	PVS_19_v2_aial_<ssccc>.shp
Tribal Subdivision	PVS_19_v2_aitsl_<ssccc>.shp
Hawaiian Homeland	PVS_19_v2_hhl_<ssccc>.shp
Edges (Roads, Rail, Hydro, etc.)	PVS_19_v2_edges_<ssccc>.shp
Area Landmarks	PVS_19_v2_arealm_<ssccc>.shp
Point Landmarks	PVS_19_v2_pointlm_<ssccc>.shp
Hydro Area	PVS_19_v2_water_<ssccc>.shp
Geographic Offsets / Corridors	PVS_19_v2_offset_<ssccc>.shp

Please download shapefiles from the BAS website at <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> in order to review the boundaries and submit changes.

Note: <ssccc> represents the two-digit state code and three-digit county code.

All shapefiles provided by the Census Bureau are in the following unprojected geographic-based coordinate system:

- Geographic Coordinate System – North American Datum 1983 (GCS NAD83).
- Angular Unit: Degree (0.0174532925199433299).
- Prime Meridian: Greenwich (0.000000000000000000).
- Datum: D_North_American_1983.
- Spheroid: GRS_1980.
- Semi-major Axis: 6378137.000000000000000.
- Semi-minor Axis: 6356752.314140356100000000.
- Inverse Flattening: 298.257222101000020000.

3.1 Federal Information Processing Standards (FIPS) Codes

The Census Bureau recommends using FIPS codes to identify governments such as counties, AIAs, etc. Using a standard coding scheme facilitates the digital exchange of data.

- The Census Bureau includes these codes in the BAS shapefiles in the fields that end in 'FP'. The codes can be found online at <http://geonames.usgs.gov/domestic/download_data.htm>. If there are any questions or problems, contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov

CHAPTER 4 CENSUS BUREAU GEOCODING

Geocoding is how the Census Bureau codes the location of the population within the legal boundaries of a geographic area. There are two primary methods of geocoding used by the Census Bureau. Both of these involve coding an address to a spatial polygon. One uses Global Positioning System (GPS) technology to create a Master Address File (MAF) structure point (MSP) and the other uses address ranges for geocoding.

4.1 MAF Structure Point (MSP) Geocoding

A field worker stands in front of a house or living quarters, and records the physical location with a GPS device (**Figure 4**). Usually, the GPS point should fall very close to the front door of the house. However, since GPS points were collected in the field, real-world obstacles like locked fences, poor satellite reception, or even aggressive dogs might sometimes prevent the worker from gaining access to the front door. In these circumstances, the worker may have to take the GPS coordinate from the sidewalk or side of the road.

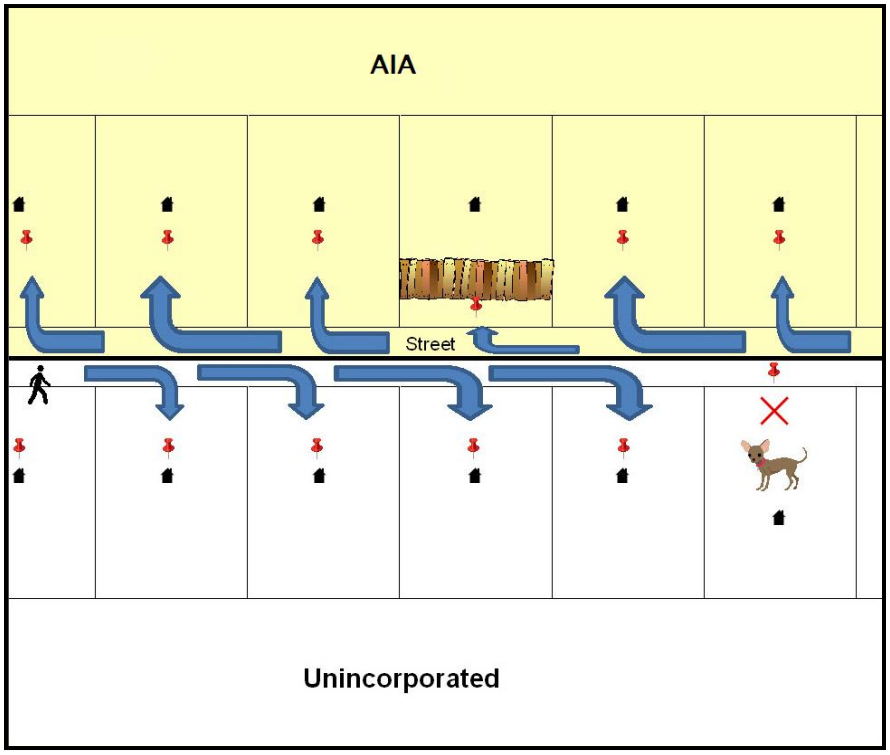


Figure 4. GPS Method of Geocoding

Notice that it is occasionally not possible for the field worker to go all the way to the front door, due to unforeseen circumstances, like the fence or the dog shown above. Thus, the MSP (represented here by the red pins) can sometimes fall within the road or the road right-of-way.

4.2 Address Range Geocoding

When no MSP is available, the Census Bureau codes houses and living quarters according to a potential range of addresses associated with the adjacent stretch of road (**Figure 5**).

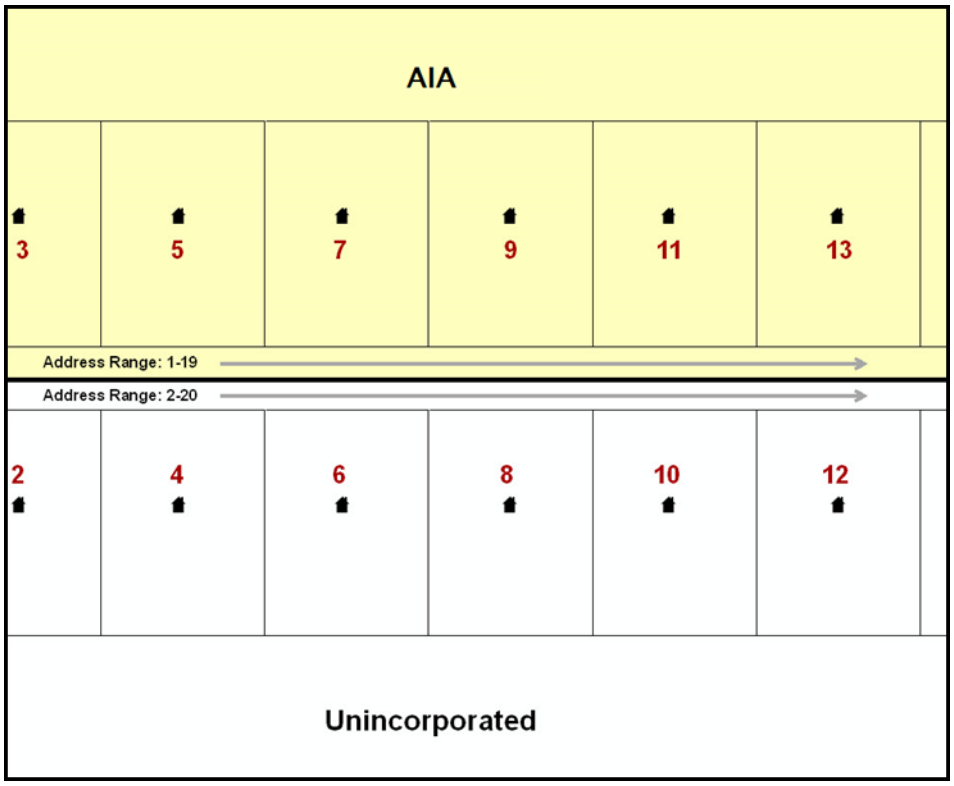


Figure 5. Address Range Method of Geocoding

When it is not possible to collect an MSP, houses are geocoded according to their placement along a range of potential addresses along that road. Since the address is being related to the road, boundaries placed on front-lot-lines will lead to mis-geocoding unless an offset flag is used.

While the two methods of geocoding differ greatly, both rely heavily on the integrated nature of the MAF/TIGER System. These geocoding methods are affected by the way streets and boundaries are represented in relation to one another. This interdependence between streets, boundaries, and geocoding means that Census Bureau representations of legal boundaries may sometimes differ from other representations (e.g., in local or state GIS). This is especially true regarding geographic corridors and offsets that follow road right of ways (or the front-lot-lines of parcels). In both of the examples above, delineating a boundary along the front-lot-line will tend to increase the risk of incorrect geocoding. As a result, using the road centerline as a boundary is the safer method.

When completing a BAS submission in which a road or road right-of-way is owned or maintained by a place or AIA but the adjacent housing is not, the respondent should use the centerline of the road (not the front-lot-line) as the boundary whenever possible.

CHAPTER 5 UPDATING THE CENSUS BUREAU SHAPEFILES

Census Bureau shapefiles downloaded from the partnership verification shapefiles (PVS) download page can be used to create new shapefiles for boundary and/or linear feature changes that have occurred since the last BAS update. Step-by-step instructions for these procedures can be found in **Appendix B** and **Appendix C** and in BAS video series at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

Note: If there are problems with the processing of returned files, the Census Bureau will email a feedback document requesting clarification of any issues. If the problem cannot be resolved before the project deadline, the changes in question will not be made during the current BAS.

5.1 General File Setup Guidelines

After downloading the shapefiles from the PVS download page, follow these procedures before beginning actual updates:

- Open the downloaded ZIP file to verify its contents.
- Copy the shapefiles into a directory on a server/hard drive.
- Open the shapefiles with GIS software.

5.2 Changing the Map Projection

Census Bureau files are in GCS NAD83 format and can be projected into any local coordinate system/projection. Most GIS software packages will allow users to transform file coordinate systems and projections. For example, if using ArcGIS, use its **'Project tool'** in **ArcToolbox**. Shapefile extracts contain defined projection information in the *.prj file. ArcGIS accesses the *.prj file for projection information so there is no need to define these parameters before changing the file coordinate systems.

When updates are complete, participants may submit the boundary change shapefile using any local coordinate system/projection if the shapefile contains a *.prj file or spatial reference materials such as metadata.

5.3 Boundary Changes

In order to update the MAF/TIGER system, participants must create a separate change polygon layer for each updated government type (AIA, tribal subdivision, or Hawaiian Homeland). Please create change polygons in relation to the current MAF/TIGER boundary.

Appendix B and **Appendix C** provide two examples for creating annexation and deannexation, boundary correction, new incorporation, geographic corridor, and geographic offset change polygons. See **Appendix C** for specific tools used to make changes to files.

Additionally, **Appendix B** covers the steps required to complete a submission using the new BAS Partnership Toolbox. The toolbox includes tools to download Census Bureau data, use the geoprocessing tool to create a changes layer containing all the differences between Census

Bureau and local boundaries, and create a ZIP file for submission through SWIM. Please review any boundary change polygons before submitting them (**Section 5.7, Additional Information Review**).

5.3.1 Additions and Deletions

The Census Bureau will accept additions and deletions from AIAs and Hawaiian Homelands, such as new reservation lands and off-reservation trust lands. Each addition or deletion change polygon must have the required attributes and corresponding change type populated, as seen in **Table 3**. The Census Bureau will snap any addition or deletion to a MAF/TIGER feature when it exists within **thirty** feet of that feature.

Note: Enter the name of the jurisdiction (AIA or Hawaiian Homeland) adding or deleting the area in the NAME field.

Table 3: Additions and Deletions

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	RELATE
Addition	X	X ('A')	X	X	X	
Deletion	X	X ('D')	X	X	X	

(**Note:** 'X' = Required Field)

5.3.2 Boundary Corrections

The Census Bureau will also accept specific boundary corrections from AIAs and Hawaiian Homelands. As with additions and deletions, the participant must create individual change polygons for each boundary correction. Each boundary correction must also have the required attributes and corresponding change type populated, as seen in **Table 4**, or the Census Bureau will reject them.

Note: Enter the name of the jurisdiction the boundary correction is for in the NAME field.

Table 4: Boundary Corrections

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	AREA	RELATE
Boundary Correction	X	X ('B')					X ('IN', 'OUT')

(**Note:** 'X' = Required Field)

The Census Bureau uses a topologically integrated database. As a result, the Census Bureau cannot process all types of boundary corrections for inclusion in MAF/TIGER. The Census Bureau **will** accept and process properly documented boundary corrections during the current BAS cycle that spatially interact with (abut) other BAS legal changes (addition, deletion, corridor, offset) and meet both of the following two conditions:

- In situations where the existing boundary has been digitized incorrectly or appears in the incorrect location due to Census Bureau activities.

- Where the overall shape of the geographic area is maintained and no feature-to-boundary relationships are dissolved.

The Census Bureau **will reject** boundary corrections:

- That dissolve boundary-to-feature relationships (roads, rivers, railroads, etc.) if the difference is less than thirty feet.
- Which are greater than one square mile, or not contiguous with the rest of the government boundary. These boundary corrections may be part of additions which were never reported to the Census Bureau. If so, legal documentation should be provided; or
- That have a width of less than thirty feet over the entire polygon.

Note: Remember that the Census Bureau will snap any boundary correction to a MAF/TIGER feature when it exists within thirty feet of that feature.

5.3.3 Tribal Subdivisions

Tribes may submit the boundaries for one type of administrative area within their reservation(s) and/or off-reservation trust lands (land base) for inclusion in the MAF/TIGER system. The Census Bureau will consider any type of unit of self-government or administration as a "tribal subdivision." Tribal subdivisions should cover all, or most, of the tribe's land base. If a tribe has more than one type of distinct administrative area that could qualify as a tribal subdivision (such as tribal election districts, tribal water districts, or health service areas with different boundaries), the tribe may submit only one type of subdivision. Tribal subdivisions can be considered either active (**A**) or inactive (**I**). Active subdivisions are defined as having a functioning government with elected officials that provide programs and services. Inactive subdivisions have no functioning government or elected officials and receive services solely from the tribe. Some examples of areas submitted as tribal subdivisions are:

- Areas used by a tribe for the election of tribal government officials (such as districts or precincts used for the election of tribal council members).
- Areas used by a tribal government for tax purposes.
- Areas used by a tribal government for the provision of general services or specified services, such as:
  - Water districts.
  - Health service areas.
  - Emergency service delivery areas (such as 911, fire, and/or police); or
  - Grazing districts or range units.
- Historical or traditional areas recognized by a tribal government.
- Local tribal community governments.

5.3.3.1 New Tribal Subdivisions

AIA participants may submit new tribal subdivisions through Tribal Digital BAS. As with other change types, an individual change polygon must be created for each new tribal subdivision and possess the required attributes and the corresponding change type field must be populated (see **Table 5**).

Note: Enter the name of the new jurisdiction in the NAME field.

Table 5: New Entities

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	RELATE
New Entity	X (subdivision name)	X ('E')	X (date of tribal resolution)	X	X (tribal resolution number)	

(**Note:** 'X' = Required Field)

5.3.3.2 Criteria for Defining Tribal Subdivisions

- The delineation of tribal subdivisions is restricted to the area contained within reservation(s) and/or associated off-reservation trust lands (land base).
- There is no minimum population threshold for a tribal subdivision.
- Tribal subdivisions should cover all, or most, of the tribe's land base.
- A tribal subdivision may be discontinuous.
- A tribe may designate only ONE type of tribal subdivision. If a tribe has more than one level of tribal subdivisions within its land base, the Census Bureau recommends delineating subdivisions corresponding to the lowest geographic level (those geographic areas containing the smallest area) of the tribe's administrative hierarchy.
- Tribal subdivisions should not be based solely on land ownership or other cadastral areas, nor should they consist of divisions based on the U.S. Public Land Survey System (PLSS) of townships, ranges, and sections, if these areas have no governmental or administrative function for the tribe.
- Some examples of descriptors for tribal subdivisions are:
  - District.
  - Community.
  - Area.
  - Chapter.
  - Segment.
  - Administrative Area.
  - Addition.
  - County District.

5.3.3.3 Updating Tribal Subdivisions

Tribal Subdivisions are updated in a similar manner to boundary changes (such as additions or deletions). In order to submit tribal subdivision updates, please create a separate tribal subdivision change polygon layer. Updates that can be made to tribal subdivisions include additions, deletions, boundary corrections (adding and removing area), and creating new tribal subdivisions. Please note that all tribal subdivision updates (additions, deletions, name changes, and new tribal subdivisions), with the exception of boundary corrections, require a tribal resolution. **Table 8**, **Table 9**, and **Table 10** display the required attributes for each of the change types. Review the example processes in **Appendix B** and **Appendix C** for information on how to create change polygons. Change polygons for tribal subdivisions may be created in the same manner as for reservations and off-reservation trust lands.

5.3.4 Geographic Corridors

The Census Bureau geocodes addresses based on the street centerline. If the geocoding of these addresses would result in the assignment of population to the incorrect geographic area, participants should create a geographic corridor.

A **geographic corridor** is an area that includes only the road right-of-way and does not contain any structures addressed to either side of the street. **Figure 6** shows a corridor (shown in color) created where the AIA owns the right-of-way but the housing units are not included within the AIA. Without a corridor, the housing units along this road would be included in the AIA.

Figure 7 shows that the right-of-way belongs in the unincorporated area, while the housing units are included in the AIA (shown in color). This is important for some governments because they are portraying that the government is not responsible for road maintenance. This is not relevant for Census Bureau tabulations and is not easy to depict in the Census Bureau's nationwide database. This type of corridor should not be included in a BAS response.

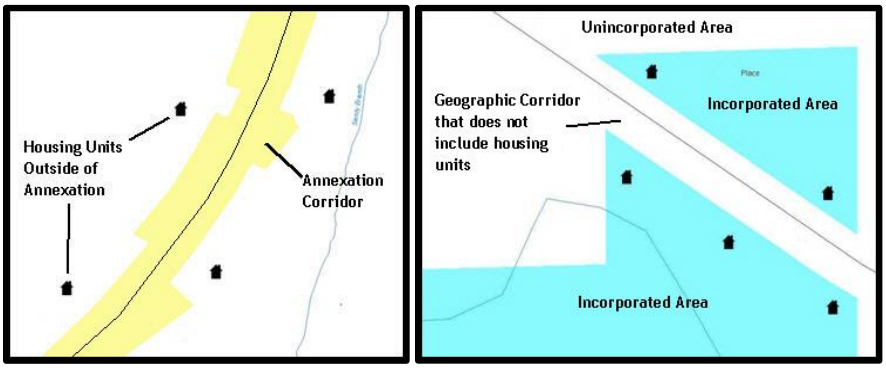


Figure 6. Geographic Corridor Created
Figure 7. Geographic Corridor Not Created

The image on the left (Figure 6) shows that a geographic corridor should be created to allow for proper geocoding of homes. The image on the right (Figure 7) shows that the geographic corridor should not be created and features should be snapped to the street centerline.

The Census Bureau will accept new geographic corridors. Please create individual change polygons for each new geographic corridor. Each change polygon must have the required attributes and corresponding change type populated, as seen in **Table 6**. In the **NAME** field, enter the name of the jurisdiction. In the **RELATE** field, indicate whether the change is adding IN or taking OUT (removing) the corridor.

Table 6: Geographic Corridors

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	RELATE
Geographic Corridor	X	X ('C')				X ('IN', 'OUT')

(**Note**: 'X' = Required Field)

5.3.5 Geographic Offsets

A **geographic offset** is an area claimed by a government that is only on one side of a road and does not include structures addressed to that side of the road.

The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping. The Census Bureau bases their maps on spatial data that is topologically integrated. This makes the maintenance of geographic offsets inefficient. Snapping a government boundary to the centerline wherever applicable will help to establish more accurate population counts. If a boundary is the front-lot-line, Census Bureau strongly prefers that the boundary be snapped to the road. If a boundary is at the rear of a lot, then please depict it as such. **Figure 8** depicts a cadastral (parcel-based) boundary map and **Figure 9** shows how the boundary should be reported when sent to the Census Bureau.

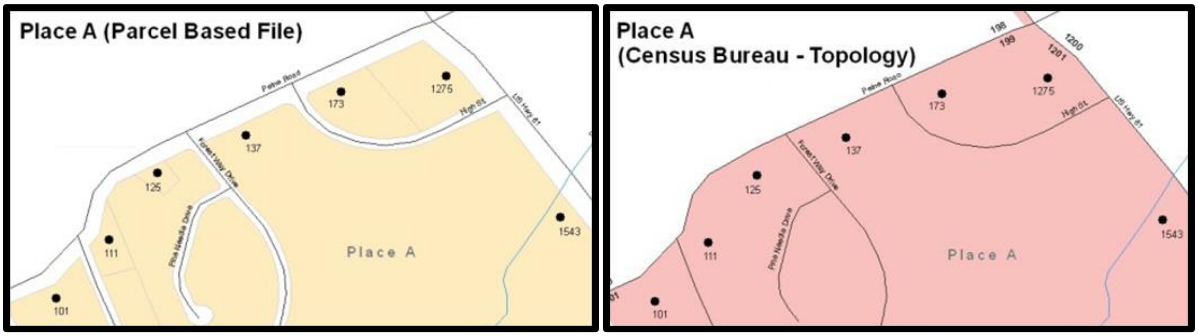


Figure 8. Cadastral Data

Figure 9. Same Data Edited to Census Bureau Requirements

On the left in Figure 8Figure 8 is an example of cadastral data. Figure 9 on the right, is the same area shown edited to conform to Census Bureau requirements.

The Census Bureau will accept new geographic offsets. Please create individual change polygons for each new geographic offset. Each change polygon must have the required attributes and corresponding change type populated, as seen in **Table 6** and **Table 7**. In the **NAME** field, enter the name of the jurisdiction. In the **RELATE** field, indicate whether the change is adding IN or taking OUT (removing) the area represented as an offset.

Table 7: Geographic Offsets

	NAME	CHNG_TYPE	EFF_DATE	AUTHTYPE	DOCU	RELATE
Geographic Offset	X	X ('F')				X ('IN', 'OUT')

(**Note**: 'X' = Required Field)

The Census Bureau has included an "offset" shapefile in the BAS materials (**PVS_19_v2_offset_<ssccc>.shp**), so that the jurisdiction can be checked for any existing corridors or offsets. While the Census Bureau prefers that new offsets are not created, (see above), this information can be helpful in determining if current boundaries are correct.

5.4 Linear Feature Updates

The Census Bureau will accept linear feature modifications when needed. The easiest method of updating linear features is to edit the **PVS_19_v2_edges_<stcou>.shp** included in the partnership shapefiles and export the modified or added records to a new separate linear feature update layer. This will ensure all required fields are present and populated before submission. The general guidelines for updating linear features are:

- If a road, subdivision, etc. is missing from the Census Bureau's feature network, add the feature(s), enter 'AL' in the CHNG_TYPE field, and provide the name (FULLNAME) and MTFCC.
- If a feature that does not exist is in the Census Bureau's feature network, mark the feature for deletion by entering 'DL' in the CHNG_TYPE field.
- If a feature is in the incorrect location in the Census Bureau's feature network, mark the feature for deletion and re-add it in the correct location. Only do this if the feature is very far off or in the wrong position relative to boundaries or other features.

Note: A video on updating linear features is available in the BAS video series at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

5.4.1 Adding, Deleting, Renaming, and Recoding Linear Features

Each linear feature update must have the required attributes and corresponding change type populated as seen in **Table 8**. Preserve the TIGER/Line ID (TLID) in the TLID field when requesting to modify or delete features to ensure the correct features are affected. A TLID is not required for any features being added though an MTFCC is required for new features.

Table 8: Linear Feature Updates

	CHNG_TYPE	TLID	FULLNAME	MTFCC
Add Feature	X ('AL')		X	X
Delete Feature	X ('DL')	X		
Rename Feature	X ('CA')	X	X	
Recode Feature	X ('CA')	X		X

(**Note**: 'X' = Required Field)

Note: A list of MAF/TIGER Feature Classification Code (MTFCC) codes can be found in **Appendix D.**

5.4.2 Address Range Updates

The Census Bureau accepts address range data as part of the linear feature update layer. As with other linear feature updates, address ranges must have the required attributes and corresponding change type populated. As existing address ranges cannot be shown in the Census Bureau's outgoing shapefiles, it is recommend that participants generally only add address ranges to new features (see **Table 9**).

Table 9: Address Range Updates

	CHNG_TYPE	FULLNAME	MTFCC	LTOADD	RTOADD	LFROMADD	RFROMADD
Address Ranges	X ('CA')			X	X	X	X

(**Note**: 'X' = Required Field)

5.5 Area Landmarks, Hydrographic Areas, and Point Landmarks

5.5.1 Area Landmark/Hydrographic Area Updates

The Census Bureau accepts updates to area landmarks and hydrographic areas in a similar manner to legal boundary changes. However, area landmarks and hydro areas are not legal governments, so no documentation or effective dates are required.

In order to submit area landmark and hydrographic area updates, create a separate change polygon layer. Updates to area landmarks and hydrographic areas include:

- Boundary corrections (adding and removing area).
- Creating a new area landmark or hydrographic area.
- Removing an area landmark or hydrographic area.
- Name changes.

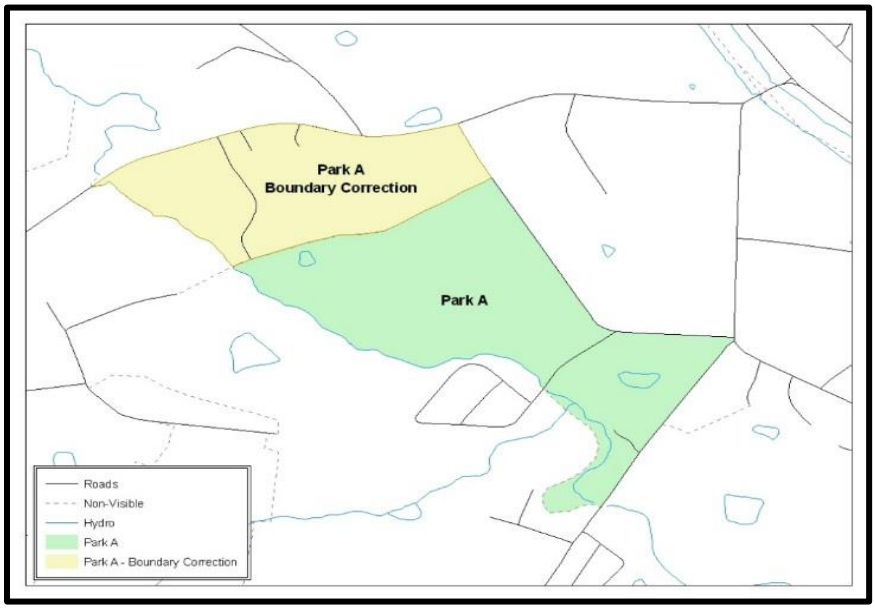


Figure 10. A Boundary Correction to Park A

Each area landmark or hydrographic area update must have the required attributes and corresponding change type populated. Preserve the AREAID in the AREAID field when requesting to modify or delete landmarks to ensure the correct areas are affected. An AREAID is not required for any areas being added though an MTFCC is required for new landmarks (refer to (refer to **Table 10**).

Table 10: Landmarks and Hydrographic Areas

	FULLNAME	CHNG_TYPE	RELATE	MTFCC	AREAID
Boundary Correction (Add Area)	X	X ('B')	X ('IN')		X
Boundary Correction (Remove Area)	X	X ('B')	X ('OUT')		X
Delete Landmark		X ('D')			X
Change Landmark Name	X	X ('G')			X
New Landmark	X	X ('E')		X	

(**Note**: 'X' = Required Field)

The steps in **Appendix C** provide information on how to create change polygons using ArcGIS. While the sample processes are written for legal boundary changes, the same methods apply for creating change polygons for area landmarks and hydrographic areas. When adding new area landmarks or hydrographic areas, only add the following types of areas:

- Water bodies.
- Glaciers.
- Airports.
- Cemeteries.
- Golf courses.
- Parks.

The Census Bureau cannot add other types of areas at this time (although some may already exist in the MAF/TIGER system). The acceptable MTFCC codes for new area landmarks or hydrographic areas are listed in **Table 11.**

Table 11: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas

MTFCC	Description
H2030*	Lake/Pond
H2040*	Reservoir
H2041*	Treatment Pond
H2051*	Bay/Estuary/Gulf/Sound
H2081*	Glacier
C3023	Island
K1231	Hospital/Hospice/Urgent Care Facility
K1235	Juvenile Institution
K1236	Local Jail or Detention Center
K1237	Federal Penitentiary, State Prison, or Prison Farm
K2110	Military Installation
K2180*	Park
K2181	National Park Service Land
K2182	National Forest or Other Federal Land
K2183	Tribal Park, Forest, or Recreation Area
K2184	State Park, Forest, or Recreation Area
K2185	Regional Park, Forest, or Recreation Area
K2186	County Park, Forest, or Recreation Area

MTFCC	Description
K2187	County Subdivision Park, Forest, or Recreation Area
K2188	Incorporated Place Park, Forest, or Recreation Area
K2189	Private Park, Forest, or Recreation Area
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)
K2424	Marina
K2540	University or College
K2457*	Airport – Area Representation
K2561	Golf Course
K2582*	Cemetery

***May not be edited.**

Note: If adding an MTFCC K2457 (Airport – Area Representation) area landmark, please limit the updates to major airports (major regional and international airports). The feature should show the full extent of the airport facility, that it, do not limit the addition to simply the landing strips.

Area Landmark/Hydrographic Area Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating area landmark and hydrographic area changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

5.5.2 Point Landmark Updates

The Census Bureau accepts updates to point landmarks. Please submit point landmark updates as a separate point landmark update layer. Updates to point landmarks include:

- Adding a new point landmark.
- Deleting an existing point landmark.
- Renaming a point landmark.

The Census Bureau also cannot delete or modify any point landmarks imported from the USGS GNIS database. Changes submitted for the following types of landmarks may be left unchanged:

- K2451 (Airport).
- K2582 (Cemetery).
- C3022 (Summit or Pillar).
- C3081 (Locale or Populated Place).
- C3061 (Cul-de-sacs).

Each point landmark update must have the required attributes and corresponding change type populated. Preserve the POINTID in the POINTID field when requesting to modify or delete point landmarks to ensure the correct landmarks are affected. A POINTID is not required for any landmarks being added though an MTFCC is required for new landmarks.

Table 12: Point Landmark Updates

	FULLNAME	CHNG_TYPE	MTFCC	POINTID
New Point Landmark	X	X ('E')	X	
Delete Point Landmark		X ('D')		X
Change Name	X	X ('G')		X

(**Note**: 'X' = Required Field)

Due to Title 13 privacy concerns, any landmark with an MTFCC shown in **Table 13**: Restricted Point Landmark MTFCC Codes below cannot be added to the MAF/TIGER System as a point landmark. The MAF/TIGER System no longer maintains any point landmarks with these MTFCCs. Landmarks with these codes could identify a residence or private business. Thus, it is also important *not* to add any of the point landmark types shown in the table using alternative MTFCCs.

Table 13: Restricted Point Landmark MTFCC Codes

MTFCC	Description
K1100	Housing Unit Location
K1121	Apartment Building or Complex
K1122	Rooming or Boarding House
K1223	Trailer Court or Mobile Home Park
K1226	Housing Facility/Dormitory for Workers
K1227	Hotel, Motel, Resort, Spa, Hostel, YMCA, or YWCA
K1228	Campground
K1229	Shelter or Mission
K1232	Halfway House/Group Home
K1233	Nursing Home, Retirement Home, or Home for the Aged
K1234	County Home or Poor Farm
K1235	Juvenile Institution
K1241	Sorority, Fraternity, or College Dormitory
K1251	Military Group Quarters
K1299	Other Group Quarters Location
K2100	Governmental
K2197	Mixed Use/Other Non-residential
K2300	Commercial Workplace
K2361	Shopping Center or Major Retail Center
K2362	Industrial Building or Industrial Park
K2363	Office Building or Office Park
K2364	Farm/Vineyard/Winery/Orchard
K2366	Other Employment Center
K2464	Marina
K2500	Other Workplace
K2564	Amusement Center

Point Landmark Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating point landmark changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

5.6 Reviewing Changes to the Census Bureau Shapefiles

Please review all changes to ensure that they are intentional and correct. The Census Bureau has created videos with information on many of the topics below. Videos can be found on the web at: <https://www.census.gov/programs-surveys/bas/library/videos.html>.

5.6.1 Boundary-to-Feature Relationships

Please review all changes to ensure that the correct boundary-to-feature relationships are being created or maintained. The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping; however, the Census Bureau bases maps on spatial data that is topologically integrated (see **Section 2.1, Topological Relationships in the MAF/TIGER system**). Therefore, snap boundaries to street centerlines (or rivers, railroads, etc.) wherever applicable. This will help establish a more accurate population count for tribal governments.

The following examples show situations where boundary changes should be snapped to existing linear features. The Census Bureau will snap boundary changes to any linear feature that is correctly located within **thirty** feet of the change.

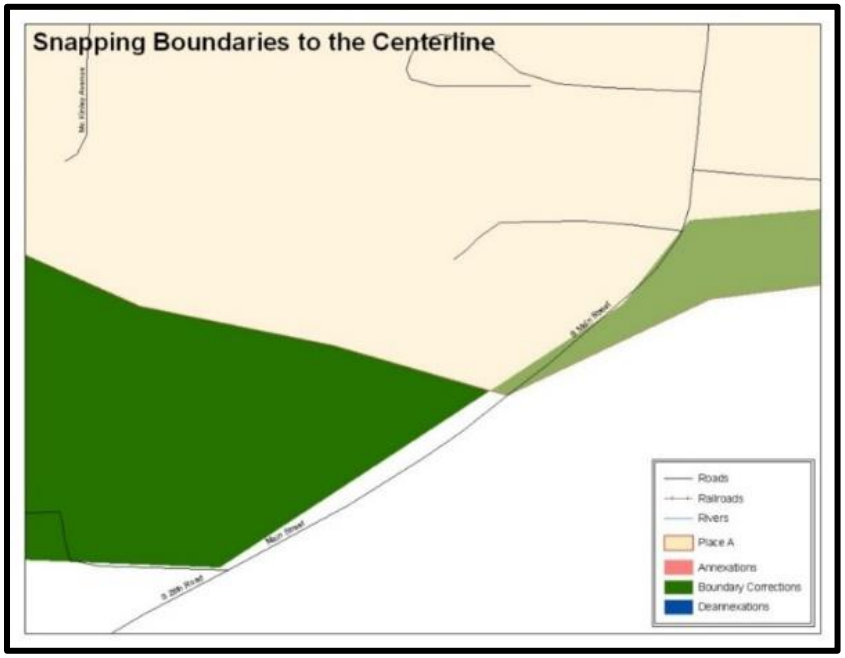


Figure 11. Boundary Corrections Not Snapped to Existing Linear Features

These boundary corrections are not snapped to existing linear features in the MAF/TIGER system. Both boundary corrections should be snapped to centerlines or population may be assigned to incorrect governments.

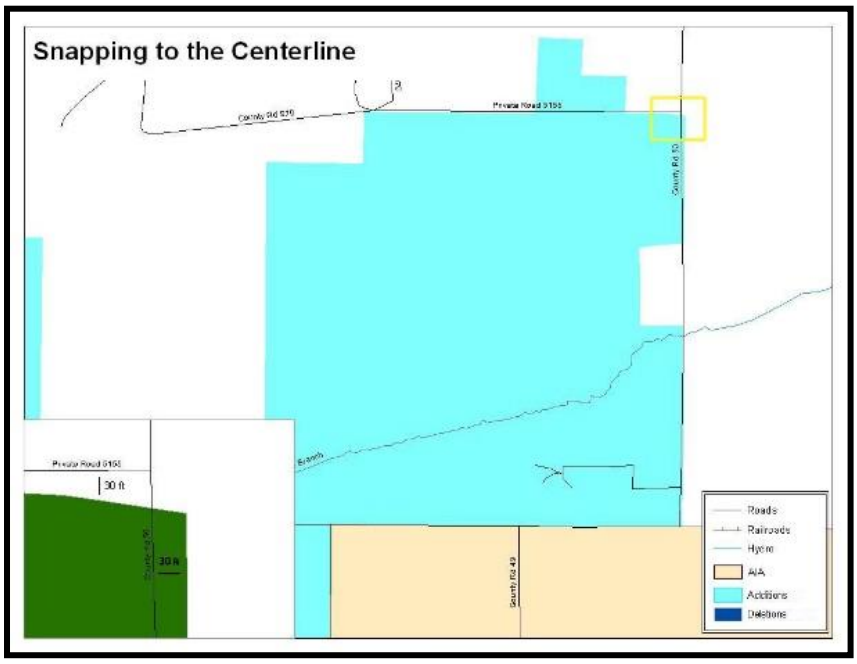


Figure 12. Addition Created without Snapping to Centerlines

This is an example of an addition created without snapping to existing centerlines in the MAF/TIGER system. Unless the boundary is snapped to centerlines, some of the population may be assigned to an incorrect government.

The Census Bureau will not accept boundary corrections that dissolve the current relationship between an existing boundary and linear feature without specific instructions that the relationship is incorrect. The Census Bureau will not incorporate any boundary corrections that create thirty feet or less of gap or overlap between the existing linear feature and boundary into the MAF/TIGER system. See below for examples of changes that will not be accepted.

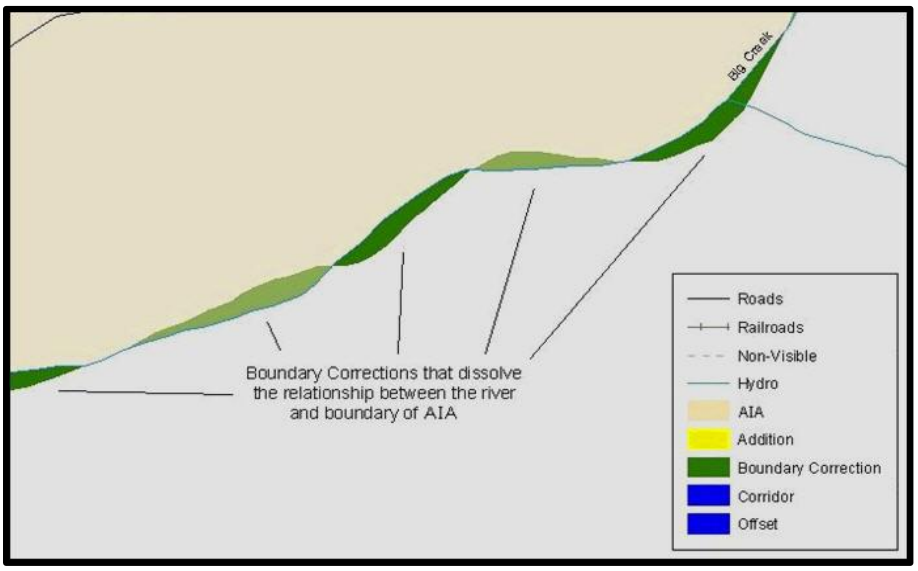


Figure 13. Small Spatial Correction Not Incorporated

Small spatial boundary corrections would dissolve the relationship with the river. These boundary corrections will not be incorporated into the MAF/TIGER system.

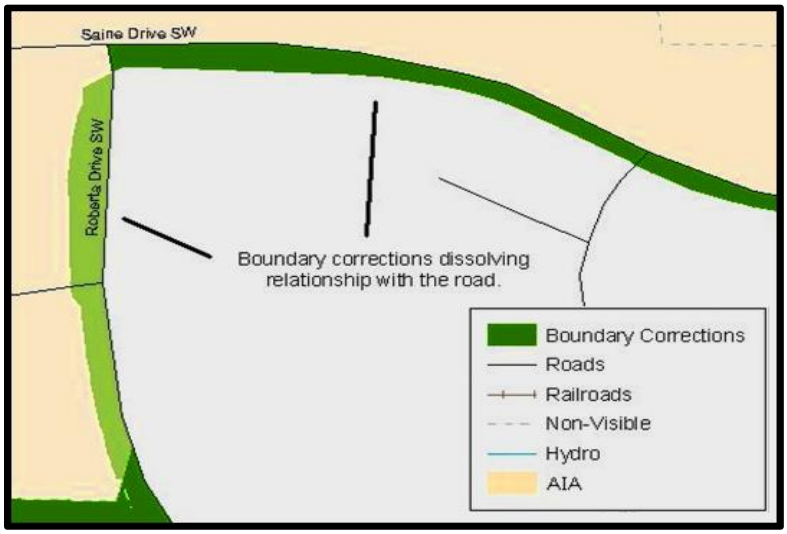


Figure 14. Small Spatial Correction Not Accepted

Small spatial boundary corrections would dissolve the boundary-to-feature relationship with multiple streets have been created. Incorporating these changes would affect the population counts for the area. Therefore, the Census Bureau will not accept these small boundary corrections.

5.6.2 Large Boundary Corrections

The Census Bureau will not accept large boundary corrections to a government without the appropriate legal documentation (such as Trust Deed, Executive Order, new legal opinion, Act of Congress or Federal Register Notice) and effective dates. These large boundary corrections may be legal boundary changes that occurred in the past and were never reported to the Census Bureau. Please submit the appropriate legal documentation number and effective date so that the changes may be incorporated into the MAF/TIGER system.

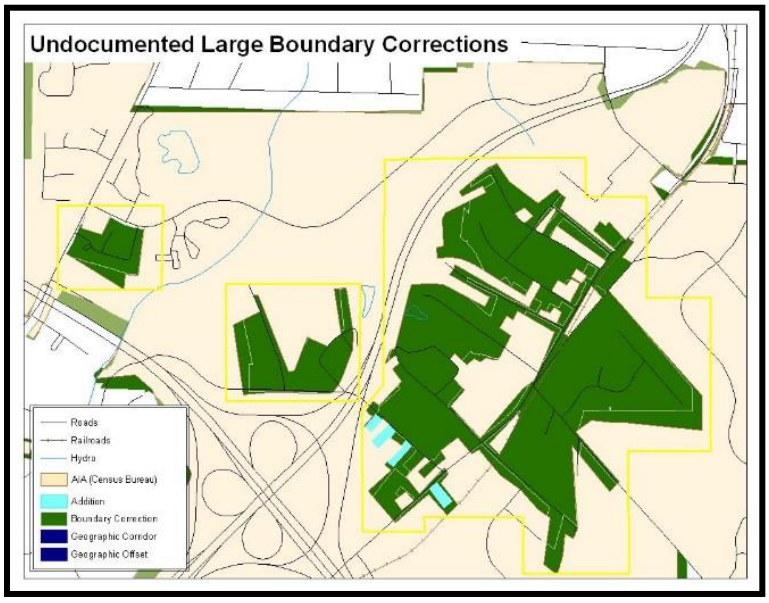


Figure 15. Large Boundary Corrections

Without the appropriate documentation, the Census Bureau will not accept large boundary corrections.

Note: There may be a few instances when large boundary corrections need to be made because of incorrect digitizing or where the boundary appears in the incorrect location due to other Census Bureau activities.

5.6.3 Required Attribute Information

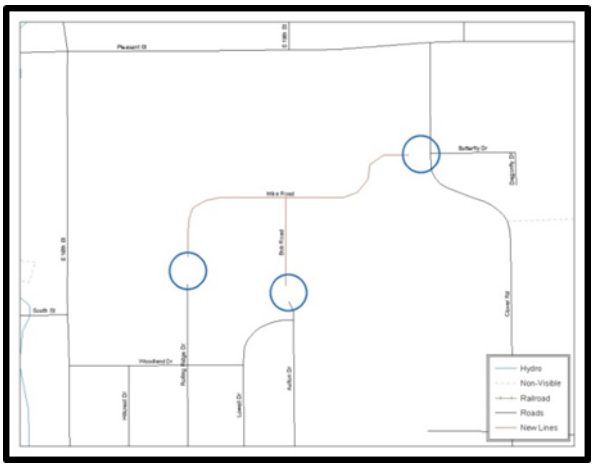
It is important to review each change polygon and confirm that the correct attribute information is included. Without the correct attribute information, the Census Bureau will be unable to process and incorporate the changes into the MAF/TIGER system. See **Section 5.3, Boundary Changes** for the required attribute information and corresponding change type codes.

5.6.4 Appropriate Projection Information

It is important that the appropriate projection information is included. Each update layer submitted should contain a correct *.prj file so that the Census Bureau can convert the projection back to GCS_NAD83. If the GIS being used cannot create a *.prj file, include the projection information in metadata. This is critical for the Census Bureau to be able to process the file and incorporate the updates into the MAF/TIGER system.

5.6.5 Linear Feature Updates

Please review linear feature changes to ensure that they align with the features currently in the MAF/TIGER system. If linear feature changes do not align with current MAF/TIGER linear features, the Census Bureau may not incorporate the submitted updates.



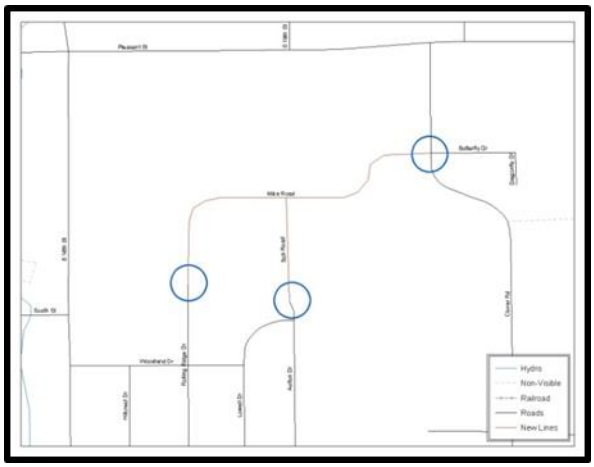


Figure 16. New Road Features, Not Added to Existing Road

Figure 17. New Road Features, Correctly Added

The image on the left (Figure 16) shows new road features added to the existing feature network, but not connected to existing road features. The image on the right (Figure 17) shows the correction connecting the new roads to the existing road features.

5.7 Additional Information Review

The Census Bureau will not make any boundary change that affect adjacent legal governments without the appropriate documentation. Please review any change polygons that affect adjacent governments to determine if they are intentional legal changes.

Note: The Census Bureau will snap any addition, deletion, or boundary correction to a MAF/TIGER feature when it exists within thirty feet of that feature. This helps maintain the boundary-to-feature relationships in the MAF/TIGER system and will ensure correct housing tabulation counts for governments.

5.7.1 Submitting Acceptable Documentation

The Census Bureau is responsible for depicting reservation and off-reservation trust land boundaries but because the Census Bureau is not the authority on the boundaries, it requires documentation to update reservation and off-reservation trust land boundaries.

The following changes require documentation:

- New off-reservation trust land.
- New reservation land.
- Changes from off-reservation trust land to reservation land and changes from reservation land to off-reservation trust land.
- Large changes to existing off-reservation trust land.
- Large changes to existing reservation land.
- Boundary corrections to off-reservation trust land or reservation land that do not follow the general shape of the boundary.

For off-reservation trust land, the most common documentation is a trust deed or a letter from the Bureau of Indian Affairs (BIA). Documents should state that the land is "in trust" for the tribe.

For reservation land, documentation examples include (but are not limited to) federal register notice, Act of Congress, Executive Order, or a new legal opinion issued by the BIA. When submitting large boundary corrections to an existing reservation, please submit the reservation document.

If no documentation is available, please contact the tribe's regional BIA office to obtain documentation. The Census Bureau will treat legal opinions issued in writing from the BIA as documentation since the BIA is the authority on reservation and off-reservation trust land boundaries. If the Census Bureau cannot interpret a document, such as a treaty, the Census Bureau will contact the BIA for assistance.

For questions about documentation, please call the Census Bureau at **1-800-972-5651** or email geo.bas@census.gov. To contact the BIA, please reach out to the nearest regional office, see <http://www.bia.gov/WhoWeAre/RegionalOffices/index.htm>.

5.7.2 Submitting Digital Data

Participants reporting changes to the BAS are required to submit at least the change polygon shapefile. The total number of shapefiles submitted depends on what types of changes are reported. The following is a list of change files that *may* needed:

1. **Change Polygon Layers** (AIA, tribal subdivisions, Hawaiian homelands)
   - These layers consist of the changes that the Census Bureau needs to make.
   - A layer of change polygons should be created for each level of geography (AIA, tribal subdivisions, etc.) for which polygons are being submitted.
2. **Whole Modified Entity Layers** (AIA, tribal subdivisions, and Hawaiian Homelands)
   - These layers should only contain the complete and current boundary for the government being updated.
   - A whole entity layer should be created for each level of geography for which change polygons are being created.
3. **Tribal Feature Network, Parcel, and Boundary Layers** *(optional)*
   - These layers will help the Census Bureau resolve any questionable change polygons and establish the correct boundary-to-feature relationships.
4. **Feature Update Layers** (only if there are feature (road, river, railroad, etc.) additions, deletions, name changes, recodes, or address range updates)
   - Include a linear feature update layer with only feature segments requiring a correction.
5. **Area Landmarks/Hydrographic Areas Update Layers**
   - An area landmark/hydrographic area update layer should be submitted only if there are area landmark and/or hydrographic area updates.
6. **Point Landmark Update Layers**
   - A point landmark update layer should be submitted only if there are point landmark updates.
7. **BAS Contact Text File** (if the BAS point of contact (the person that receives the BAS Annual Response Email) has changed).
   - This can be updated online at: <http://www.census.gov/geo/partnerships/bas/bas_ar_form.html>.
   - This BAS Contact update should include the following information:
     - First Name.
     - Last Name.
     - Department.
     - Position.
     - Shipping Address.
     - City.
     - State.
     - ZIP Code.
     - Phone: xxx-xxx-xxxx.
     - Fax: xxx-xxx-xxxx.
     - Email.
     - Tribal Chair Term Expires: mm/yyyy.
     - Tribal Chair Term Length: x years.

5.7.3 Change Polygon Layer Naming Conventions

The following table provides change polygon naming conventions for AIAs and Hawaiian Homelands. The <basID> in the change polygon layer naming conventions represents the BAS ID, found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 14: Change Polygons

Participant	Changes Submitted For:	Shapefile Naming Conventions
AIA	AIA	bas20_<basID>_changes_aiannh
AIA	Tribal Subdivisions	bas20_<basID>_changes_tribalsub
Hawaiian Homelands	Hawaiian Homelands	bas20_<basID>_changes_hhl

5.7.4 Whole Entity Polygon Layer Naming Conventions

The following table provides the whole entity polygon naming conventions for AIAs and Hawaiian Homelands. The <basID> in the whole entity polygon layer naming conventions represents the participant's BAS ID, found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 15: Whole Entity Polygon Naming Conventions

Participant	Changes Submitted For:	Shapefile Naming Conventions
AIA	AIA	bas20_<basID>_WholeEntity_aiannh
AIA	Tribal Subdivision	bas20_<basID>_WholeEntity_trialsub
Hawaiian Homelands	Hawaiian Homelands	bas20_<basID>_WholeEntity_hhl

5.7.5 Linear Feature, Area Landmark/Hydrographic Area, and Point Landmark Updates

The following table provides the update layer naming conventions for the edges, area landmark, and point landmark update layers (not required). The <basID> in the naming conventions for the edges, area landmark, and point landmark update layers represents the participant's BAS ID found on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Table 16: Optional Files

Participant	Changes Submitted For:	Shapefile Naming Conventions
All Participants	Edges	bas20_<basID>_LN_Changes
All Participants	Area Landmarks / Hydrographic Areas	bas20_<basID>_Alndk_Changes
All Participants	Point Landmarks	bas20_<basID>_Plndk_Changes

5.7.6 Compressing the Digital Files

The Census Bureau requires participants to submit all BAS returns through SWIM as compressed (zipped) files. Please compress **ALL** update materials (including change polygon shapefiles, whole entity shapefiles, linear feature updates, landmark updates, local government feature network and boundary layers, any supporting documentation (e.g., trust deeds), and the text or other file with the participant's updated BAS contact information) as zipped files.

Note: Centerline files or any additional information that may be helpful for the Census Bureau to process the participant's file is optional. One example where this would be helpful is if a particular polygon was not snapped to a river or road because the boundary does not follow the river or road.

Refer to **Figure 18** and the steps listed below to compress digital files:

1. Navigate to the directory with the shapefiles.
2. Select all files and right click on the selection.
3. Select WinZip, and then Add to ZIP file.

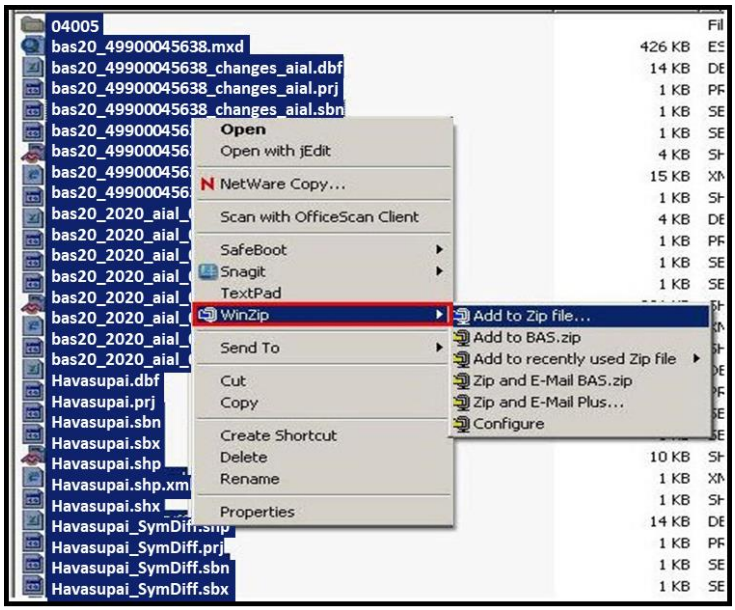


Figure 18. Selecting and Zipping Return Files

Note: Versions of WinZip may vary so the interface may be slightly different. Software other than WinZip (e.g., 7zip) may be used to zip the return files.

4. In the Add window, in the Add to archive field, type the filename in the proper naming convention: bas20_<basID>_return and then click Add.

Note: Look for the BAS ID number on the BAS Annual Response email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

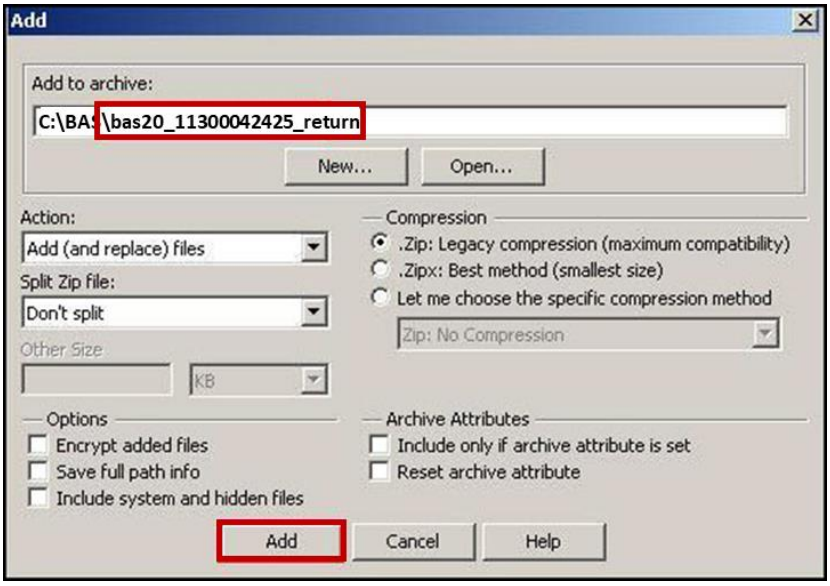


Figure 19. Naming the ZIP File

5. Check the folder where the ZIP file was saved to verify that it was created properly. If the ZIP file is correct, then the return file is ready for submission.

Note: If assistance is required in preparing or zipping the BAS return files, please call the Census Bureau at **1-800-972-5651** or email <geo.bas@census.gov>.

5.7.7 Submitting Digital Files through SWIM

SWIM is a one-stop location for submitting geographic program files to the Census Bureau. The Census Bureau now requires that all BAS participants use the Census Bureau's SWIM for submitting update materials.

Do not send submissions as an email attachment, as the Census Bureau cannot accept them due to security policy.

The Census Bureau will email the BAS contact a SWIM registration token and digital submission instructions five days after the BAS contact responds to the BAS Annual Response indicating that they have changes to report. To respond online, please fill out the online form at <http://www.census.gov/geo/partnerships/bas/bas_ar_form.html>. The five-day waiting period will give the Census Bureau staff time to update the BAS contact record if necessary so that the email reaches the right person.

This token is good for one personal account within the SWIM. Once participants have registered for an account in SWIM, they will no longer need the token to login into the system. If participants require additional individual SWIM accounts within their organization, please contact the Census Bureau at **1-800-972-5651** or email geo.bas@census.gov.

Current SWIM Users

If participants are participating in other Census Bureau partnership programs, or have participated in previous BAS years, and already have SWIM accounts, they may use their current account to submit files for BAS. They do not need to set up a new account.

Participants will **not** be able to upload a file larger than **250 MB**.

SWIM **blocks** participants from uploading a ZIP file that contains another ZIP file.

Follow the instructions listed below:

1. In a web browser, navigate to <https://respond.census.gov/swim>.
2. Login:
3. **New Users**: Participants must have a registration token to create a new account. (Please see above). Once participants have their token, they should sign-up by clicking the 'Register Account' button. Registration is self-serve, but does require the new user to enter a registration token to validate their rights to the system.

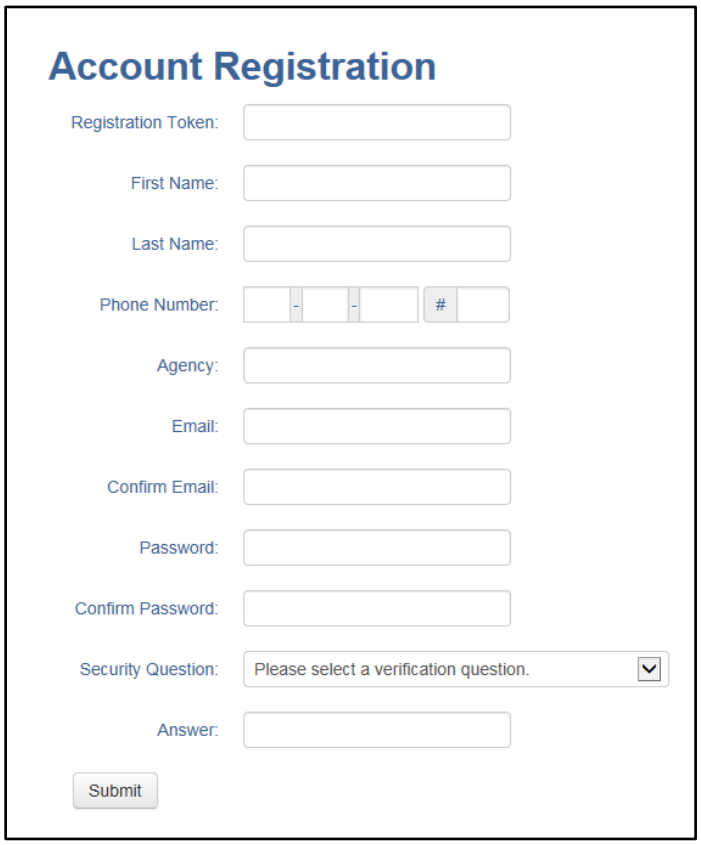


Figure 20. SWIM Account Registration

4. **Existing Users**: If participants already have a registered account from a previous BAS year, they should login with their user credentials.

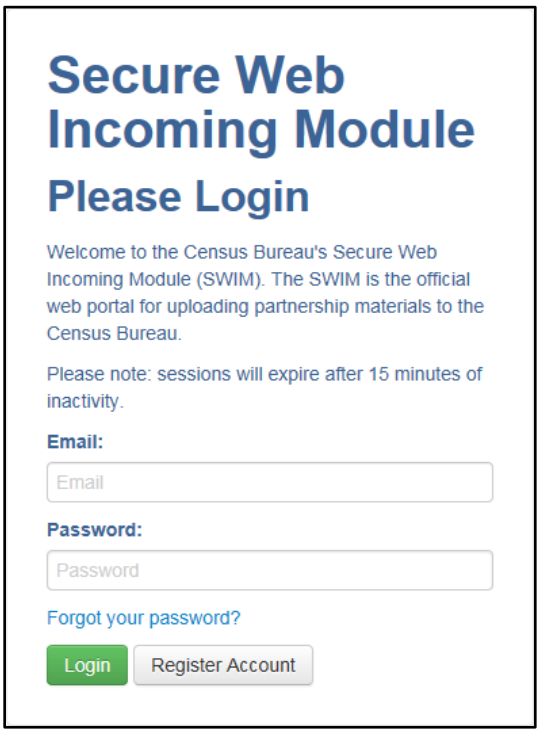


Figure 21. SWIM Login Window

5. If participants have submitted files before, SWIM lists them on the startup screen upon login. Click 'Start New Upload' to continue.

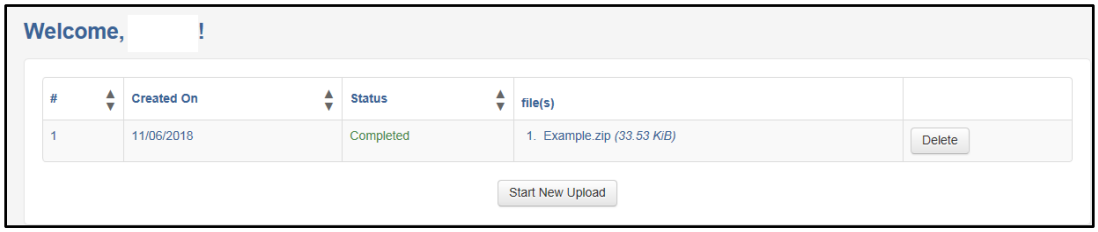


Figure 22. Welcome Screen with Upload History

6. On the next screen, select the "Boundary Annexation Survey (BAS)" option as the geographic partnership program, and click 'Next' to continue.

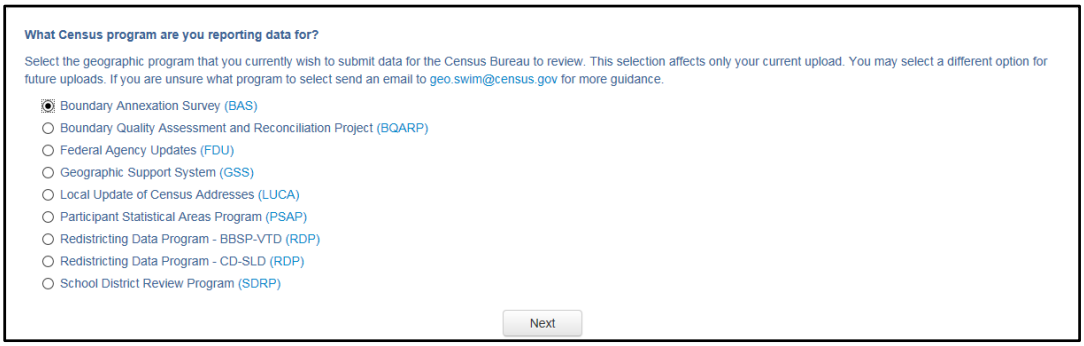


Figure 23. Geographic Partnership Program Selection Window

7. On this screen, participants will select a geographic level. This is the geography type of their agency. Select ‘Tribal Area’. Click 'Next' to continue.

Figure 24. Geographic Level Selection Window

8. Participants will find the name of their government using the drop-down selectors. These options dynamically update based on the geography type selected from the previous screen. Click ‘Next’ to continue.

Figure 25. Government Selection Window

9. On the file upload screen, please click on the ‘+ Add file', and a file browser dialog will appear.

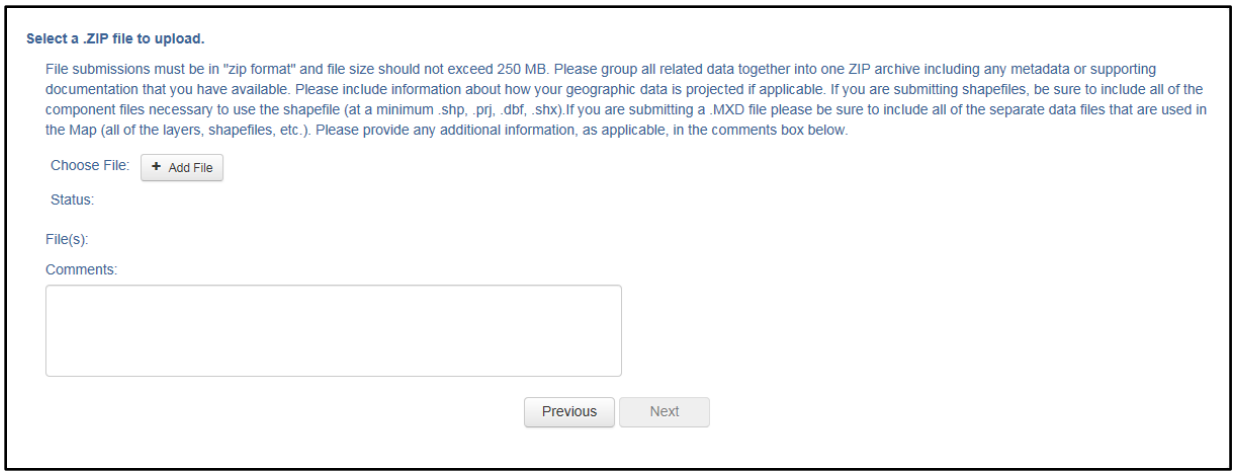


Figure 26. File Upload Screen

10. In the file browser dialog box, select the ZIP file that is to be uploaded. Please be aware that the SWIM website only accepts ZIP files. Click 'Open' to continue.

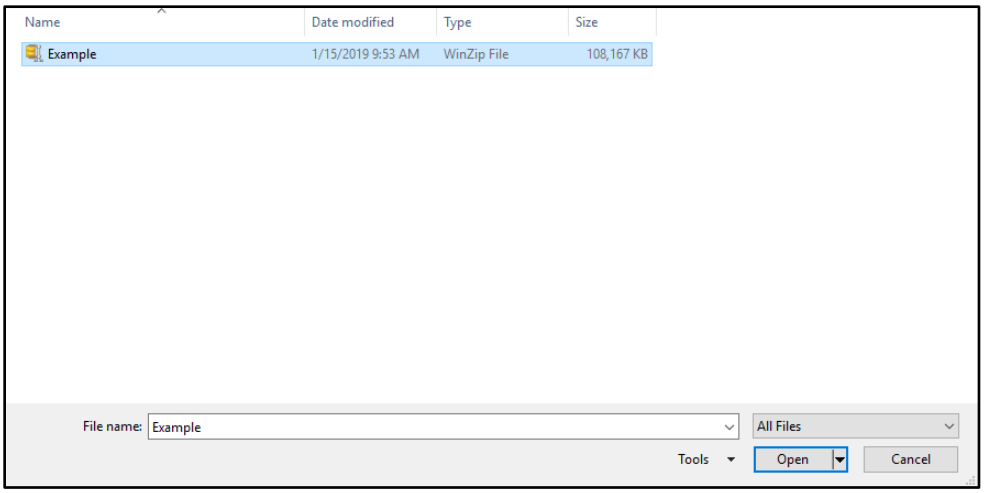


Figure 27. File Browser Dialog Box

11. At this time, participants may enter any comments that they wish to include with their file. Click 'Next' to upload the submission.

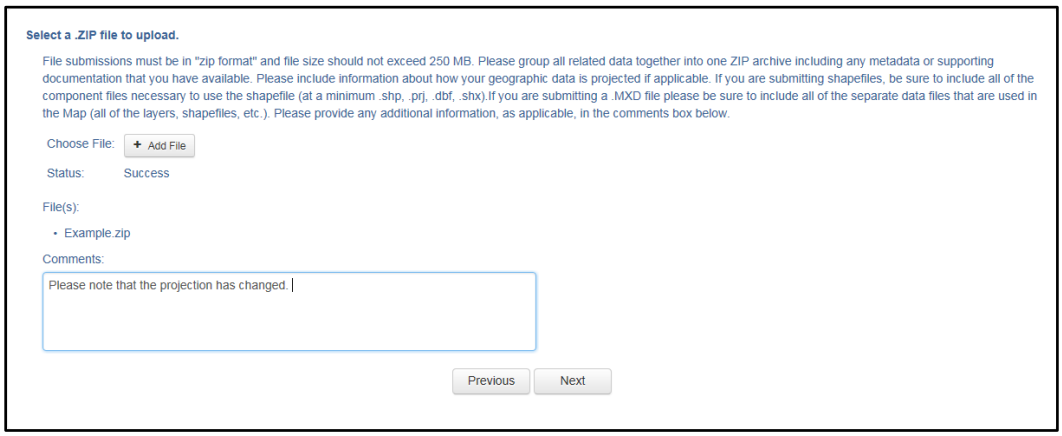


Figure 28. Entering Comments into the File Upload Window

12. The final screen will be a 'Thank You' screen confirming receipt of the file submission. If this screen does not appear, or issues occur during this upload process, please contact the Census Bureau at **1-800-972-5651** or geo.bas@census.gov>.

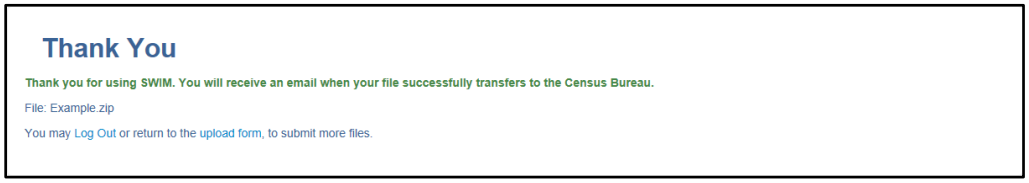


Figure 29. Thank You Screen

APPENDICES

This page intentionally left blank.

APPENDIX A DATA DICTIONARY

Table 17: American Indian Areas - Legal (AIAL) Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
AIANNHCE	4	String	Census AIANNH Code
COMPTYP	1	String	Indicates if Reservation, Trust Land, or both are Present
AIANNHFSR	1	String	Flag Indicating Level of Recognition of an AIA
NAMELSAD	100	String	Name with Translated LSAD
AIANNHNS	8	String	ANSI numeric identifier for AIA areas
LSAD	2	String	Legal / Statistical Area Description
FUNCSTAT	1	String	Functional Status
CLASSFP	2	String	FIPS 55 Class Code Describing an Entity
PARTFLG	1	String	Part Flag Indicator
CHNG_TYPE	2	String	Type of Area Update
AUTHTYPE	1	String	Authorization Type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
EFF_DATE	8	Date	Effective Date
DOCU	120	String	Supporting Documentation
RECORD_ID	4	String	(GUPS Only)
AREA	10	Double	Acreage of Area Update
RELATE	120	String	Relationship Description
JUSTIFY	150	String	Justification of Change
NAME	100	String	AIA name
VINTAGE	2	String	Vintage of the Data

Table 18: American Indian Tribal Subdivisions (AITS) Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
AIANNHCE	4	String	Census AIANNH Code
TRIBALSUBCE	3	String	Census Tribal Subdivision Code
NAMELSAD	100	String	Name with translated LSAD
AIANNHNS	8	String	ANSI Numeric Identifier for AIANNH Areas
LSAD	2	String	Legal / Statistical Area Description
FUNCSTAT	1	String	Functional Status
CLASSFP	2	String	FIPS 55 Class Code Describing an Entity
PARTFLG	1	String	Part Flag Indicator
CHNG_TYPE	2	String	Type of Area Update
EFF_DATE	8	Date	Effective Date

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
AUTHTYPE	1	String	Authorization Type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting Documentation
RECORD_ID	4	String	(GUPS Only)
AREA	10	Double	Acreage of Area Update
RELATE	120	String	Relationship Description
JUSTIFY	150	String	Justification of Change
NAME	100	String	Tribal subdivision name
VINTAGE	2	String	Vintage of the Data
AIANNHFSR	1	String	Flag Indicating Level of Recognition of an AIA

Table 19: Edges Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
TLID	10	Double	Permanent edge ID
TFIDL	10	Double	Permanent face ID (left)
TFIDR	10	Double	Permanent face ID (right)
MTFCC	5	String	MAF/TIGER Feature Class Code
FIDELITY	1	String	Indication to a respondent when their government boundary has changed through spatial enhancement
FULLNAME	40	String	Decoded feature name with abbreviated qualifier, direction, and feature type
SMID	22	String	Spatial Theta ID
SMIDTYPE	1	String	SMIDTYPE Code
BBSPFLG	1	String	Redistricting data project participant's submitted request of an EDGE for selection as a block boundary
CBBFLG	1	String	Indicates the status of an EDGE for a selection as a block boundary
BBSP_2020	1	String	New BBSP flag
CHNG_TYPE	4	String	Type of linear feature update
JUSTIFY	150	String	Justification of change
LTOADD	10	String	Left To Address
RTOADD	10	String	Right To Address
LFROMADD	10	String	Left From Address
RFROMADD	10	String	Right From Address
ZIPL	5	String	Left ZIP Code
ZIPR	5	String	Right ZIP Code
EXTTYP	1	Char	Extension type
MTUPDATE	10	Date	Date of last update to the edge

Table 20: Area Landmark Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Area landmark name
PARTFLG	1	String	Indicates if only part of a feature is represented
AREAID	22	String	Object ID
ANSICODE	8	String	ANSI code for area landmarks
CHNG_TYPE	2	String	Type of area landmark update
EFF_DATE	8	Date	Effective date or vintage
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
BAG	3	String	Block area grouping

Table 21: Hydrographic Area Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
ANSICODE	8	String	ANSI code for hydrography area
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Hydro landmark name
CHNG_TYPE	2	String	Type of hydrographic area update
HYDROID	22	String	Object ID
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change

Table 22: Point Landmark Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
POINTID	22	String	Object ID
ANSICODE	8	String	ANSI code for point landmarks
MTFCC	5	String	MAF/TIGER Feature Class Code
FULLNAME	120	String	Point landmark name
CHNG_TYPE	2	String	Type of point landmark update
JUSTIFY	150	String	Justification of change

Table 23: Geographic Offset Shapefile

ATTRIBUTE FIELD	LENGTH	TYPE	DESCRIPTION
TFID	20	Integer	Permanent Face ID
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code
OFFSET	1	String	Geographic Offset / Corridor Flag
ADDEXCLUDE	1	String	Address Exclusion Indicator
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change

APPENDIX B 2020 DIGITAL BAS EXAMPLE PROCESS 1

The 2020 Digital BAS Example Process 1 provides step-by-step instructions for using the BAS Partnership Toolbox to facilitate the updating process. For best results, use the toolbox in ArcGIS 10.0 and higher.

B1 How to Use the BAS Partnership Toolbox

In an effort to ease the burden of creating BAS updates, a toolbox was developed for ArcGIS. This toolbox simplifies the updating process by automating the downloading of data, creating changes, removing slivers, formatting and checking attribution, and preparing/exporting files for submission. Before running these tools, users will need the following:

- The BAS Partnership Toolbox, which can be downloaded at: <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html>.
- The BAS ID for the government being processed. This can be found on the BAS Annual Response email or online at: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.
- A shapefile or feature class showing the legal boundary of the government.
  - Data in this layer should have data including the name of the government being processed formatted to agree with the Census Bureau's naming convention for the same government as found in the NAME field or the NAMELSAD field for Minor Civil Division (MCD) and American Indian / Alaska Native / Native Hawaiian (AIANNH).
- The 2020 BAS Partnership Shapefiles located at: <https://www.census.gov/geographies/mapping-files/2019/geo/bas/2019-bas-shapefiles.html>.

B2 Toolbox Tools Setup

These Toolbox tools were designed primarily for use in ArcCatalog though they run in ArcMap as well. The instructions for most steps are assuming use in ArcCatalog.

1. Unzip the **Digital BAS Partnership Tools.zip** to the C: drive or other preferred working folder. The folder location does not matter as long as it can be accessed from ArcCatalog. Inside there will be a folder called DBAS, containing all the files to work with for a government. Open ArcCatalog and connect to the DBAS folder. When expanded, the following should be visible:

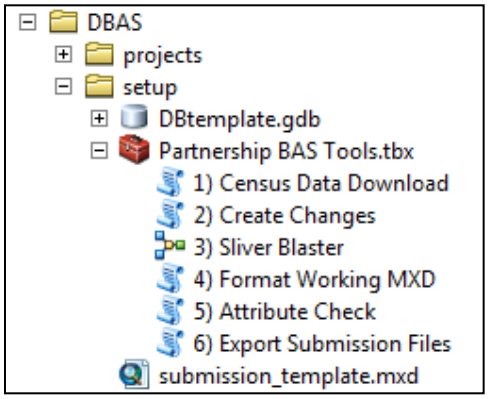


Figure 30. Partnership BAS Tools Menu

Note: To connect to a folder in ArcCatalog, click on the Connect to Folder button on the Standard Toolbar, find the DBAS folder, and then click OK.

B3 Census Data Download Tool

The Census Data Download tool will gather all the partnership shapefile data needed to create changes from the Census Bureau website. If the data is on a Census Bureau provided disc, this tool will also work but only if the data is loaded to the computer before running the tool. This tool can also use the ZIP files downloaded from the 2020 BAS Partnership Shapefiles site: <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> and outlined in **Chapter 3**. Please follow the steps below to run the Census Data Download tool.

1. Expand the **DBAS folder** and the **setup subfolder**. In the setup folder, find the **Partnership Toolbox**. Expand the toolbox and double click on the **1) Census Data Download** tool.

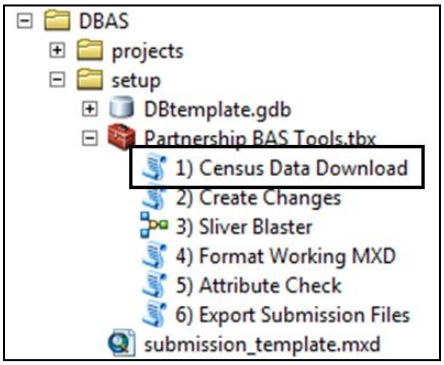


Figure 31. Partnership BAS Tools Menu with Census Data Download Selected

2. There are two ways to use this tool: one that downloads the data from the Census Bureau for the user and one that takes in a folder with the Census Bureau data already downloaded.

   - Enter the 11-digit BAS ID in the **User's BAS ID** field.
   - Select Yes or No under the **Use Data Downloader?** field. If you select No, you must enter a path to the already downloaded partnership shapefiles in the next field.
   - Navigate or drag the folder into **Path to ZIP files** field. Make sure the folder only contains the Census Bureau ZIP files to ensure there are no future data issues.

This example shows how a user would complete the fields to have data downloaded for them.

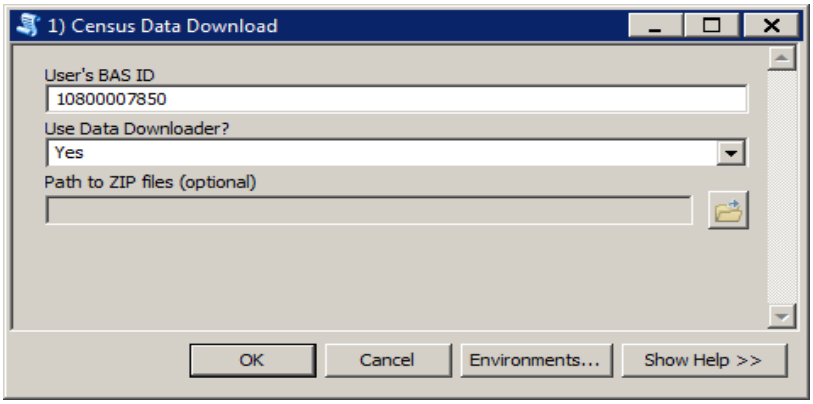


Figure 32. The Census Data Download Window with 'Yes' in the Use Data Downloader Field

This example shows how a user would complete the fields if they already have the partnership shapefiles downloaded and saved on their computer.

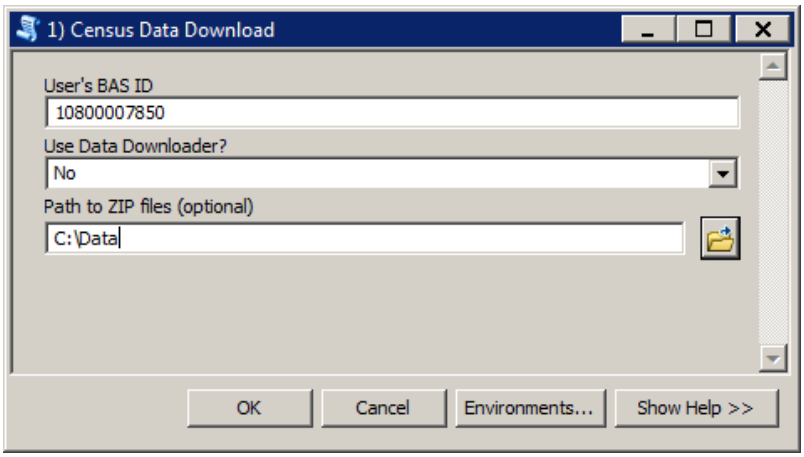


Figure 33. The Census Data Download Window with 'No' in the Use Data Downloader Field

3. Click **OK** to run.
4. When this tool is complete, there should now be a folder for the BAS ID in the projects folder. Inside that folder, there will be a geodatabase with reference data in it and an archive folder.

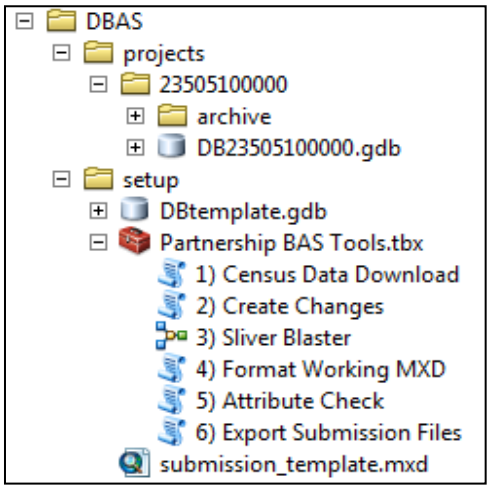


Figure 34. Partnership Tools Menu Showing a Folder for the BAS ID in the Projects Folder

Note: The archive folder contains other Census Bureau data that may be useful as well.

B4 Create Changes Tool

Once the necessary Census Bureau data is obtained, run the **2) Create Changes** tool to create the change polygons. Before this tool can successfully complete, there must be an attribute field in the local boundary layer that contains the name of the government or governments as they appear in Census Bureau records (**Figure 35**). This includes matching capitalization, spacing, and in the case of MCDs a descriptor of the geography (e.g. township, village, borough, etc.) which can be found in the NAMELSAD field of the bas_cousub layer in the reference feature dataset (**Figure 36**). If it is a new entity or the legal name is changing, it does not need to agree though other attribution must be updated to reflect this change.

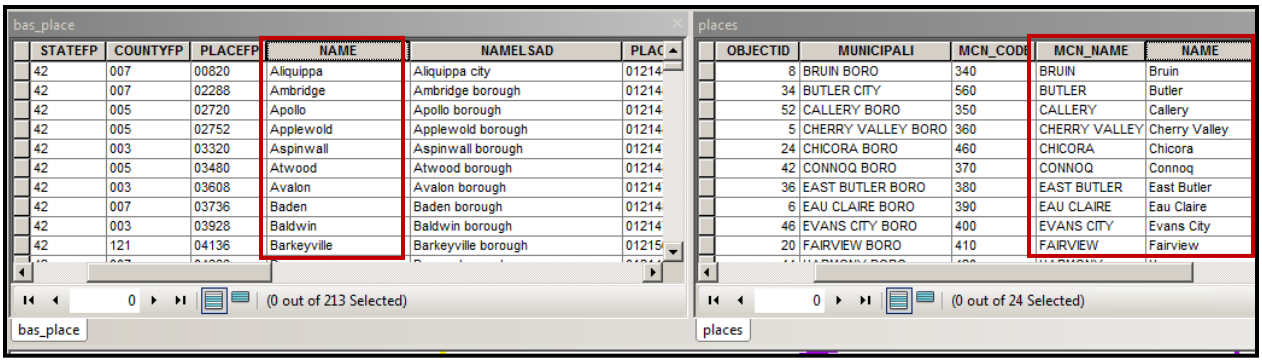


Figure 35. NAME Field in Census Data vs Local Boundary Data

The bas_place layer on the left shows how the Census Bureau NAME field is populated for all the places in Butler County, PA while the local places data shows how local data may need to be manipulated to agree with the Census Bureau NAME field.

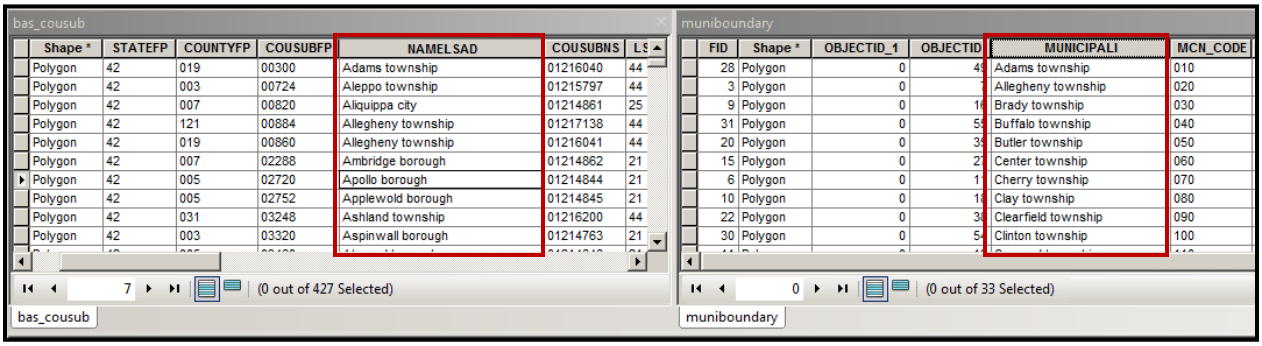


Figure 36. Appropriate Attribution for COUSUB or AIANNH Changes

The bas_cousub attribution on the left in the NAMELSAD field shows how the local MUNICIPALI field on the right should be formatted to ensure that the Create Changes tool works for the MCD changes in Butler County, PA.

1. Double click on **2) Create Changes** tool.

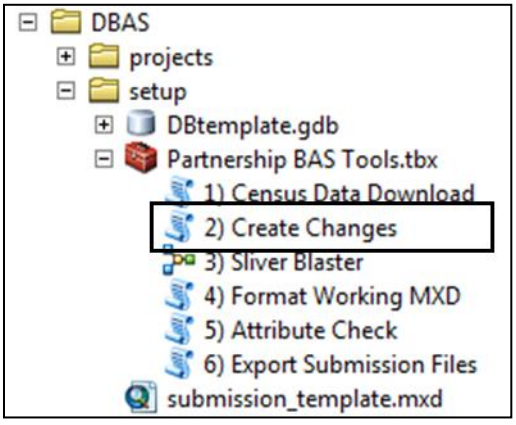


Figure 37. Partnership Tools Menu with Create Changes Tool Selected

2. In the **Create Changes** window:

   - In the **Local Boundary File** field, enter the path or navigate to the full boundary polygon.
   - Enter the 11-digit BAS ID in the **BAS ID** field.
   - Under **Changes Being Processed**, choose the type of changes to create from the dropdown options:
     a. Incplace (incorporated place).
     b. County.
     c. Cousub (MCDs).
     d. AIANNH (Tribal areas).

   - For the **Name Field in Local Data**, the boundary file may need to be modified to agree with a field in the Census Bureau's data. Type the name of the field (as it appears in ArcCatalog) containing the information matching the Census Bureau's NAME field. If processing an MCD or AIANNH file where the Census Bureau NAME field contains duplicates, match the Census Bureau's NAMELSAD.

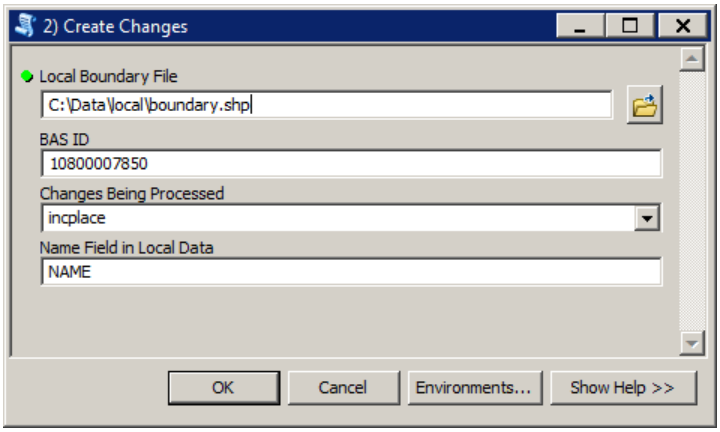


Figure 38. Create Changes Window

3. Click **OK** to run the tool.
4. Once the tool is complete, the output will be placed in the geodatabase under the submission feature dataset.

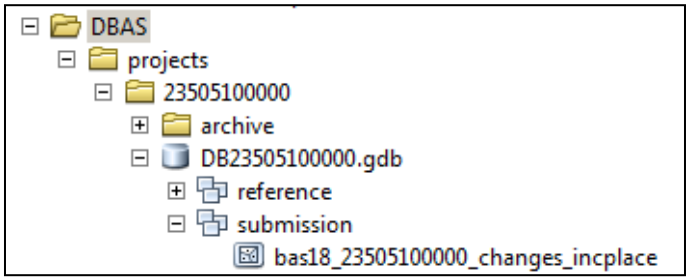


Figure 39. Partnership Tools Menu with Geodatabase

5. Repeat steps for any other levels of geography that need changes created.

B5 Sliver Blaster Tool (Optional)

The Sliver Blaster tool is useful for governments that have numerous very small change polygons that are time consuming to manually parse through for deletion. Since the Census Bureau cannot guarantee inclusion of changes under 30 feet, use this tool to remove changes that are lower than that threshold. Participants can also change the tolerance for slivers if they know there are small changes that need to be included. This automated tool will vary in processing time depending on the number of features in the entity.

1. Double click on the **3) Sliver Blaster** tool.

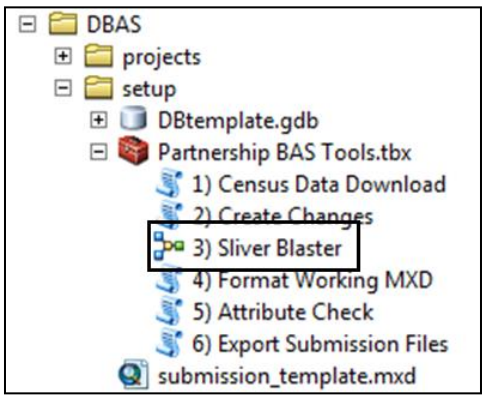


Figure 40. Partnership Tools Menu with Sliver Blaster Selected

2. In the **Sliver Blaster** tool window:
   - The **Changes File** refers to the file created in the previous step, found in the submission feature dataset.
   - The **Census Edges** feature class is found in the benchmark feature dataset and is called bas_edges.
   - The **Buffer Distance** field is set to 30 feet by default, but this can be adjusted to accommodate smaller changes.
3. Click **OK** to run.

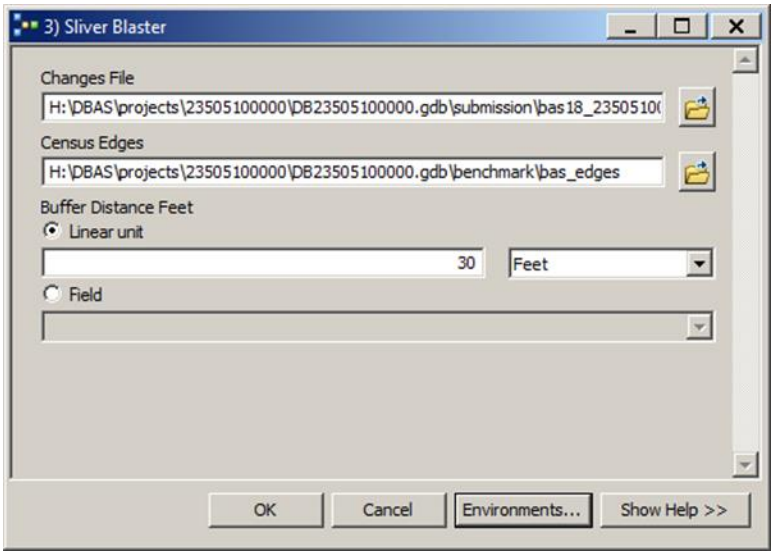


Figure 41. Sliver Blaster Window

B6 Format Working MXD Tool (Optional)

The intent of this tool is to create a map document (.mxd) for users containing their change file and all of the reference layers they will need to finalize a submission. If users would prefer to use their own .mxd, this step is not required.

1. Double click on the **4) Format Working MXD** tool.

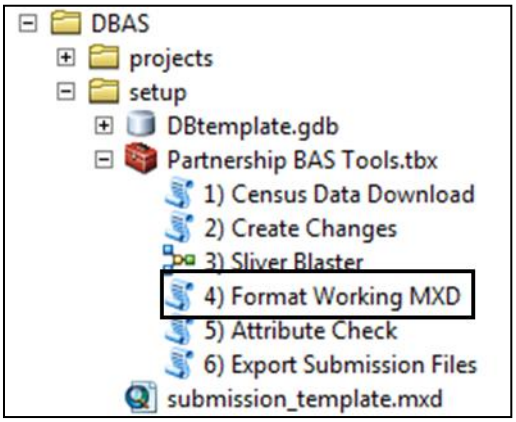


Figure 42. Partnership Tools Menu with Format Working MXD Selected

2. The only input for this tool is the **Working Folder**, which is the folder with the governments BAS ID as its name.

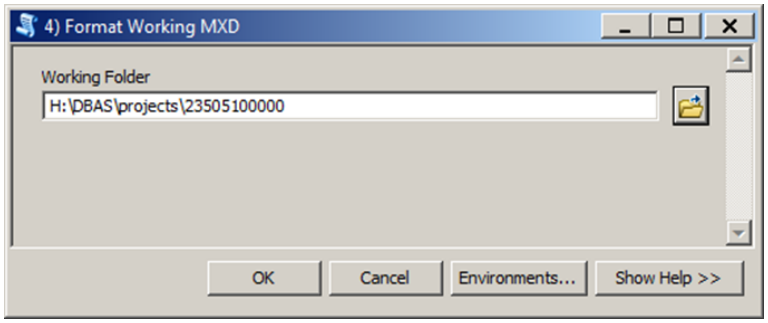


Figure 43. Format Working MXD Window

3. Click **OK** to run the tool.
4. Open the new .mxd and begin working with the change polygons.

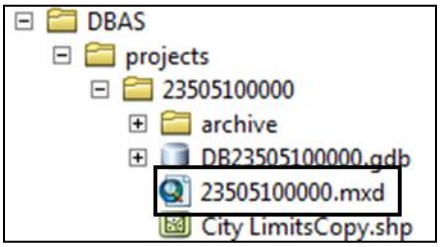


Figure 44. Projects Submenu with mxd file Selected

B7 Attribute Check Tool

This tool is used to verify that there are no inconsistencies with the data included in the submission. Run this tool during or after change polygons have been reviewed for spatial accuracy to produce a report of attribution errors (see **Section Error! Reference source not found.** for guidance on conducting a spatial review). It may also run for all levels of geography that have changes since it is run on each individual change file.

1. Double click on the **5) Attribute Check** tool**.**

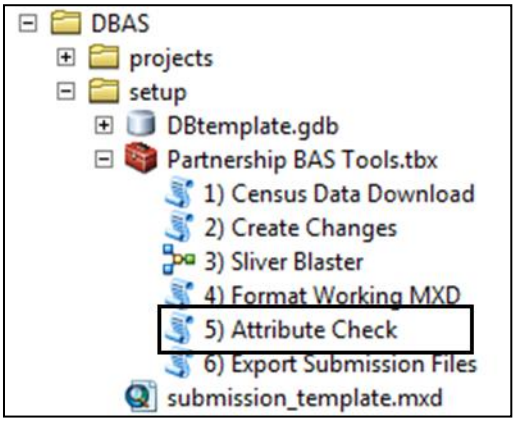


Figure 45. Partnership Tools Menu with Attribute Check Selected

2. In the **Attribute Check** window:

   - The **Change File** should be the change file created in tool **2) Create Changes** for which to generate a report.
   - In **Geography Type**, chose the type of geography being worked on from the dropdown. The same options as the Create Changes tool are available here.
   - The last input is the optional check box for **Includes Changes in Georgia**. This box only needs to be checked if responding in the state of Georgia.

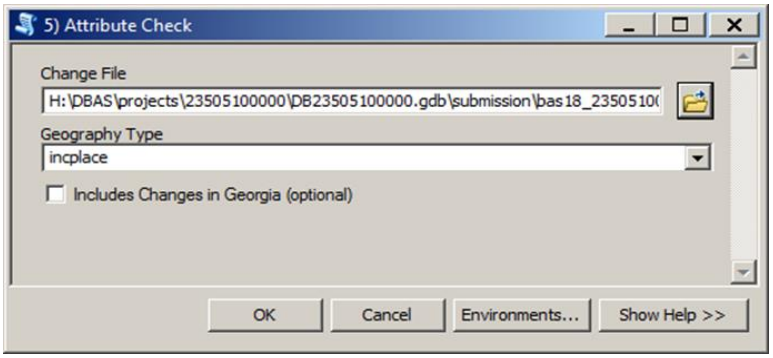


Figure 46. Attribute Check Window

3. Click **OK** to run the tool.
4. There should now be a text file in the working folder called **attribute_check_<geogtype>.txt** containing all the discrepancies identified in the change file that still need to be fixed.

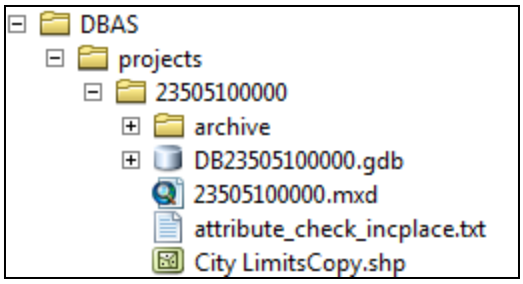


Figure 47. Projects Submenu Showing an attribute_check Text File

B8 Export Submission Tool

Upon review of the changes file and the attribute error report, the finalized changes can be exported for submission to the Census Bureau. This tool can also be used to provide updated contact information with the submission.

1. Double click on the **6) Export Submission Files** tool.

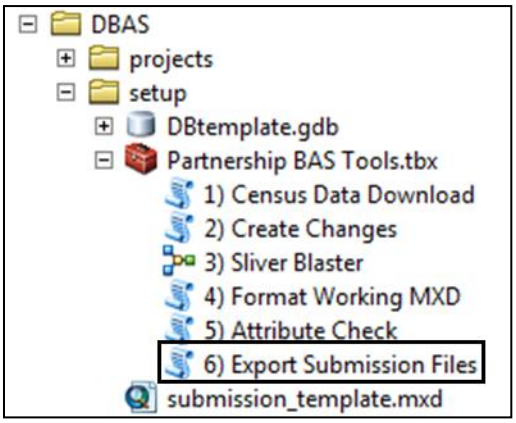


Figure 48. Partnership Tools Menu with Export Submission Files Selected

2. In the Export Submission Files tool window:

   - Enter the 11-digit BAS ID in the **BAS ID** field.
   - Under **Additional Files**, drag in or navigate to any additional files to be included in the submission. This can include parcel data, legal documentation, or any other helpful supporting data. This is an optional field so it can also be left blank. There is no need to add the changes layers here as the tool will handle those already based on the BAS ID.
   - For **BAS Contact**, **Entity Name**, **Contact Title or Department Name**, **Address**, **Email**, and **Phone Number**, please include any or all contact information updates that are to be sent to the Census Bureau. These fields can be left blank if there are no updates, though if someone other than the BAS Contact prepared the submission, include the contact information.

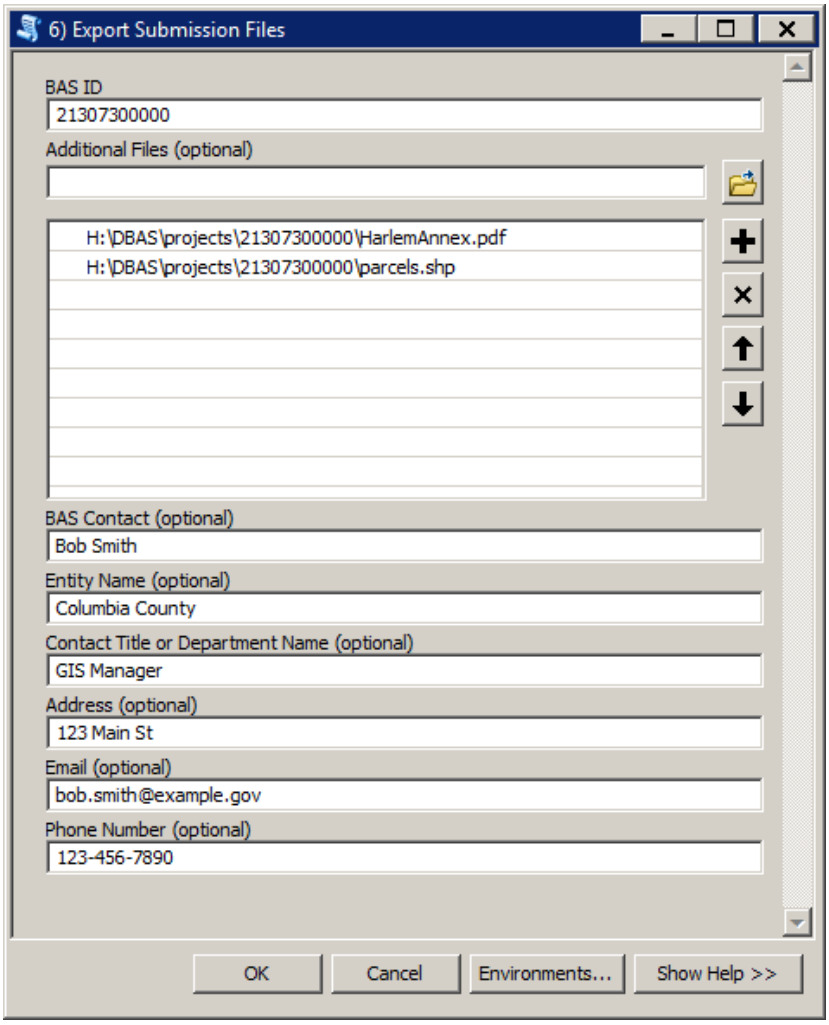


Figure 49. Export Submission Files Window

3. Click **OK** to run the tool.

B9 Submitting through the Secure Web Incoming Module (SWIM)

The Census Bureau requires participants to submit updated BAS materials as ZIP files using the Census Bureau's **SWIM** site. Please submit only the ZIP file(s). **SWIM** is located at <https://respond.census.gov/swim>. For instructions on how to use SWIM, see **Section 5.7.7, Submitting Digital Files through SWIM**.

APPENDIX C 2020 DIGITAL BAS EXAMPLE PROCESS 2

The 2020 Digital BAS Example Process 2 provides step-by-step instructions for participants creating their own change shapefiles using ArcGIS.

C1 Required Census Bureau Shapefiles

When downloading shapefiles for the 2020 BAS, shapefiles will begin with the prefix **PVS** (e.g., **PVS_19_v2_edges_<ssccc>.shp**). Throughout this guide, Census Bureau uses the prefix of **bas_2020**, but the **PVS files** are exactly the same.

Copy the data to a hard drive/server and unzip the data to ensure that the correct data was downloaded. For an AIA, these layers are critical:

- PVS_19_v2_aial_<ssccc>.shp
- PVS_19_v2_edges_<ssccc>.shp

Note: <ssccc> represents the two-digit state code and three-digit county code.

The shapefiles should include the home county for all reservations and off-reservation trust lands as well as all adjacent counties (if necessary).

Note: The Census Bureau suggests that participants make an extra copy of the data as an emergency backup.

C2 Tribal Data

The minimum data necessary is a jurisdiction polygon shapefile showing only the outer boundary or boundaries. Local parcel files are not acceptable for this method. If each jurisdiction's boundaries are contiguous, the file should contain only one polygon for each government; if some of the governments within the jurisdiction are non-contiguous, they may be saved as a multi-part polygon or consist of one polygon for each disjointed part. Other local data layers that may be helpful, if available, include centerline data, hydrographic, railroad or other linear feature data, and imagery.

C3 Symbolizing Layers in ArcGIS

The following are suggestions for symbolizing Census Bureau data in ArcGIS. For the Edges layer, symbolize the linear features by grouping like MTFCC codes (codes sharing the same first character). See **Table 24**.

Table 24: Suggested MTFCC Symbolization

MTFCC 1st Character	Linear Feature Type	Symbol
H	Hydrographic	
P	Non-Visible Feature (boundary)	
R	Railroad	
S	Road	

C4 Symbolizing Geographic Areas

Symbolize the AIAL layer by "COMPTYP" field to show reservation and off-reservation trust land.

Note: AIA participants working on changes for tribal subdivisions may want to use different colors to distinguish one from another.

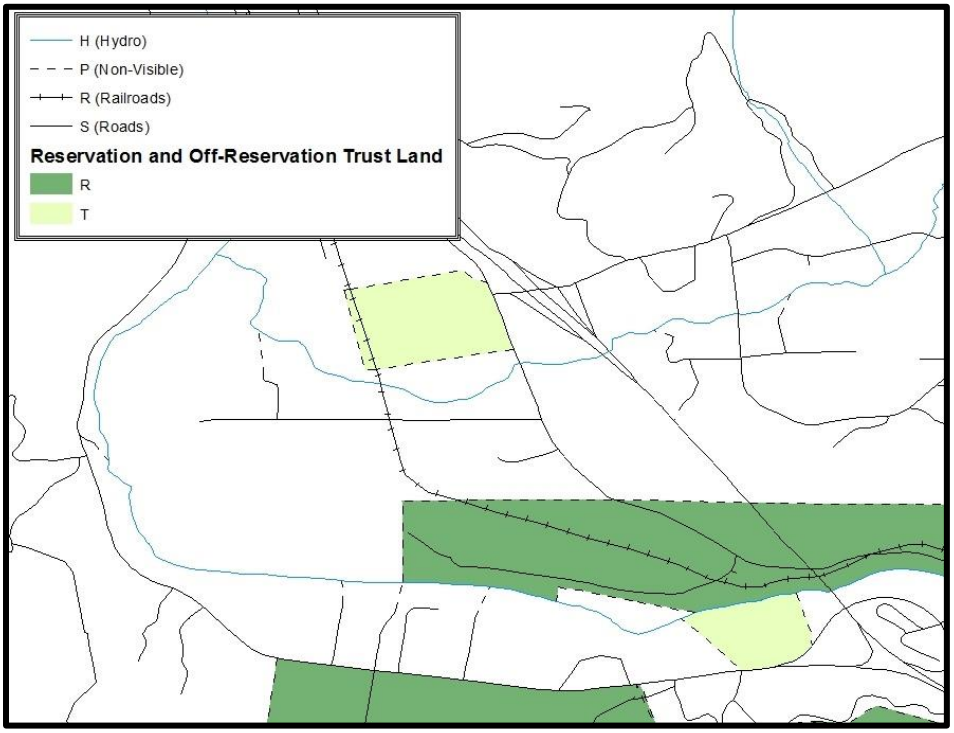


Figure 50. Suggested Map Symbolization

C5 Extracting AIA Data from Census Bureau Shapefiles

C5.1 Filtering the Data

1. In ArcMap, click **Selection** and then click **Select by Attributes.**
2. In the **Select By Attributes** window:
   - From the Layer dropdown, select PVS_19_v2_aial_<ssccc>.shp.
   - Double click "**NAME.**"
   - Left click the **=** button.
   - Click the **Get Unique Values** button.
   - In the list, locate and double click the name of the government (It will appear in the formula).
   - Click **OK.**

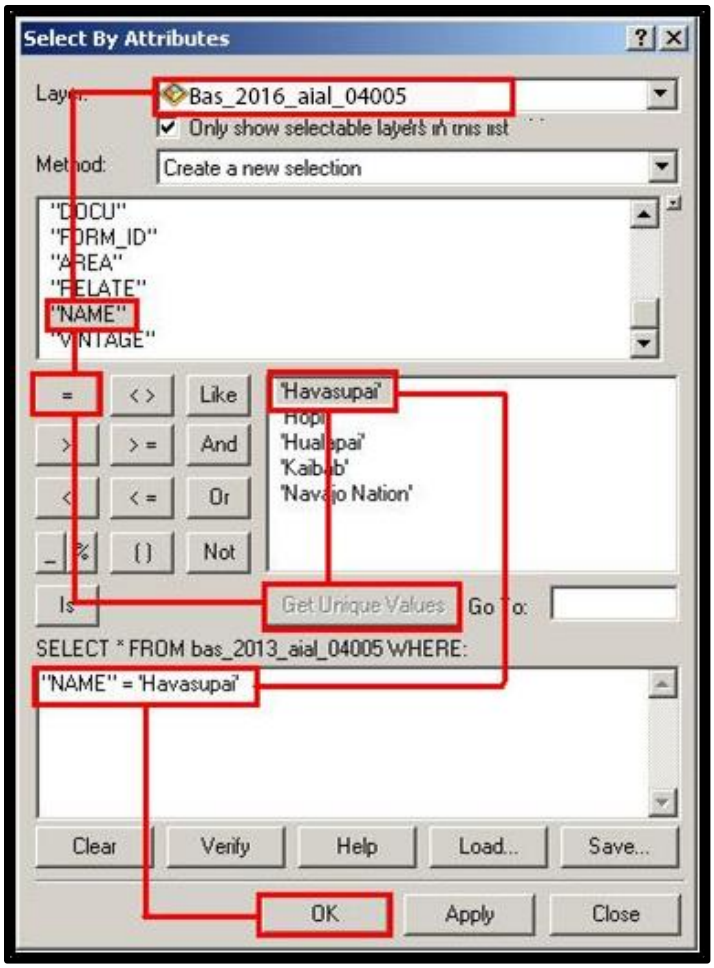


Figure 51. Filtering Data

C5.2 Exporting the Data to a New Shapefile

1. In the **Table of Contents** right click the **AIA layer**, select **Data**, and then click **Export Data**.
2. In the **Export Data** window:
   - From the **Export** dropdown, choose **Selected Features**.
   - In the **Output shapefile or feature class** field, enter a location to save the shapefile.
   - Click **OK**.

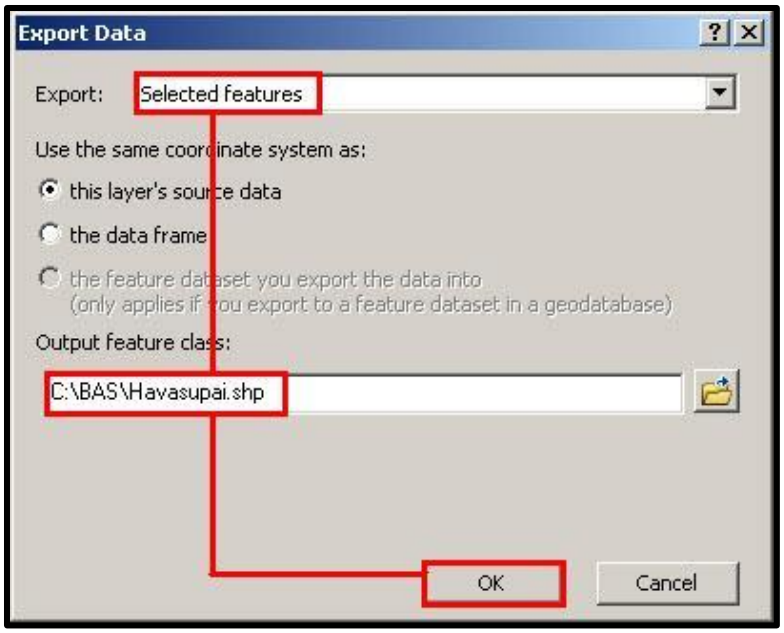


Figure 52. Export Data Window

Note: If the AIA spans more than one county, it will need to be exported from each county's AIA shapefile and merged. Follow the instructions in **Section C6.1, Creating Change Polygons Using Symmetrical Difference** if the AIA needs to be merged, otherwise skip to **Section C6.2, Creating Change Polygons Using Union**. There are two methods used for creating change polygons. Symmetrical Difference is the recommended method for single geographic areas and those with an approvpriate ArcGIS license. Steps for using a symmetrical difference are outlined in **Section C6.1, Creating Change Polygons Using Symmetrical Difference**. Otherwise the Union method is acceptable and outlined in **Section C6.2, Creating Change Polygons Using Union**.

1. In **ArcToolbox**, double-click **Data Management Tools**, then double-click **General**, and then double-click **Merge**.
2. In the **Merge** window:
   - Next to the **Input Datasets** field, click the arrow and select each layer. (or use the Browse button to the right of the field to find the layers.)
   - In the **Output Dataset** field, browse to and select a location to save the shapefile.
   - Name the shapefile **Export_Output_Final or Merged**, or anything easy to find/remember.
   - Click **OK.**

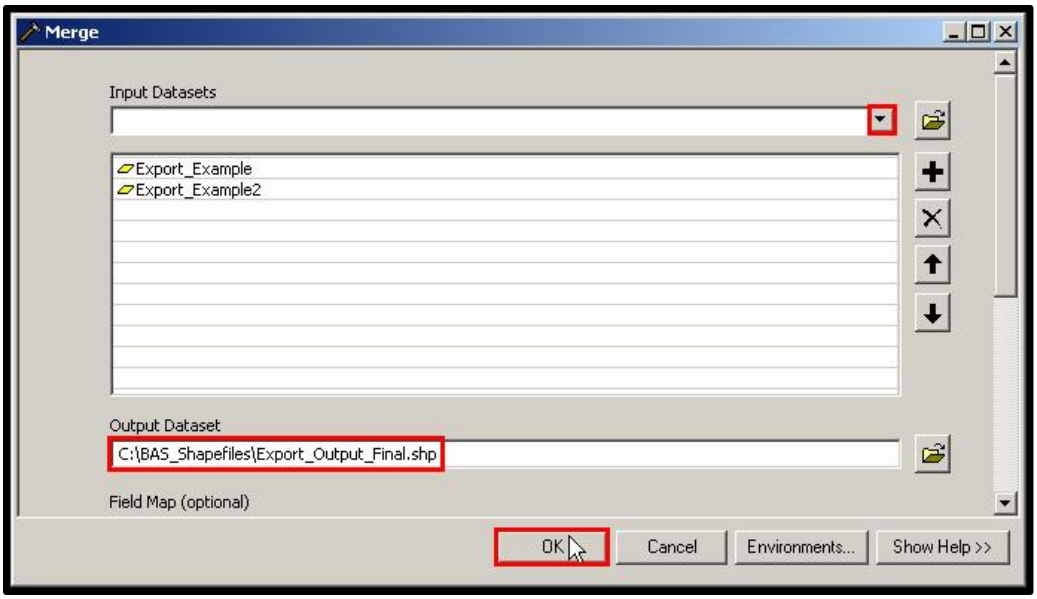


Figure 53. Finalizing the Merge Process

C6 Creating Change Polygons

There are two methods used for creating change polygons. Symmetrical Difference is the recommended method for single geographic areas and those with an appropriate ArcGIS license. Steps for using a symmetrical difference are outlined in **Section C6.1, Creating Change Polygons Using Symmetrical Difference**. Otherwise the Union method is acceptable and outlined in **Section C6.2, Creating Change Polygons Using Union**.

C6.1 Creating Change Polygons Using Symmetrical Difference

1. In **ArcToolbox**, double-click **Analysis Tools**, then double-click **Overlay**, and then double-click **Symmetrical Difference**.
2. In the Symmetrical Difference window:
   - In the **Input Features** field, click the arrow (or browse) and select the layer created in **Section C5, Extracting AIA Data from Census Bureau Shapefiles**.
   - In the **Update Features** field, click the arrow (or browse) and select the tribal government boundary layer (the participant's data).
   - In the **Output Feature Class** field, browse to and select a location to save the shapefile.
   - Name the shapefile **Differences_between_BAS_tribal, Differences1**, or anything easy to find/remember.
   - Click **OK**.

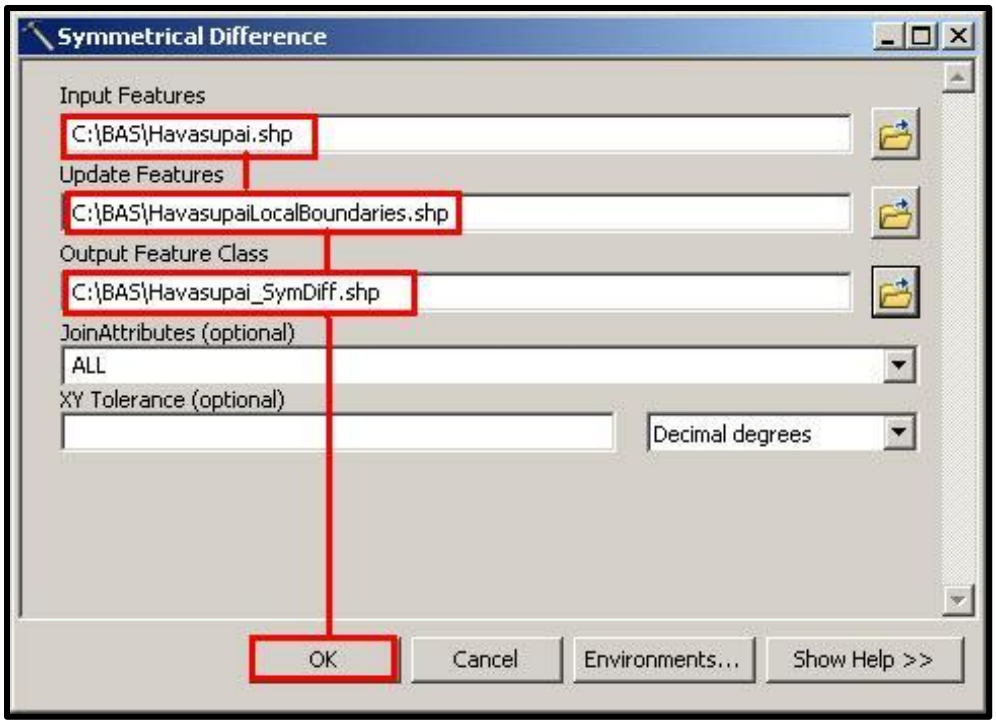


Figure 54. Finalizing the Symmetrical Difference Process

Note: This process creates a layer that contains all of the differences between Census Bureau and local tribal boundaries. However, the Symmetrical Difference tool creates multipart polygons that need to be broken up and individually coded.

3. Turn on Editing (using the **Editing** dropdown in the **Editor** toolbar). Select all of the records in the layer that was created in the Symmetrical Difference step.
4. On the **Advanced Editing** toolbar, click the **Explode** tool . The layer will now contain a separate record for each change.

The created layer shows individual change polygons representing the differences between the Census Bureau and tribal government boundaries. Please review these differences and code them appropriately.

Skip to **Section C7, Reviewing and Attributing Change Polygons**.

C6.2 Creating Change Polygons Using Union

1. In **ArcToolbox**, double-click **Analysis Tools**, then double-click **Overlay**, and then double-click **Union**.
2. In the **Union** window:
   - In the **Input Features** field, click the arrow (or browse) and select **PVS_19_v2_aial_<ssccc>**, and the tribe's own layer.
   - In the **Output Feature Class**, browse to and select a location to save the shapefile.
     - Name the shapefile **Export_Output_union**, or **Union**, or anything easy to find/remember.
   - Click **OK**.

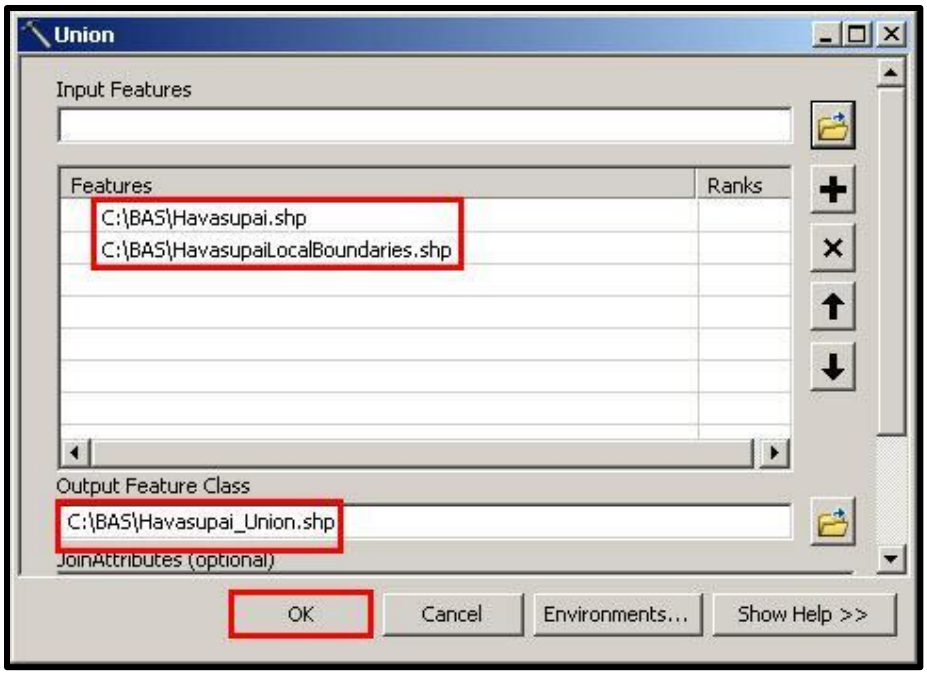


Figure 55. Finalizing the Union Process

The union operation will create records that contain differences as well as areas that are in common between the Census Bureau and local tribal boundary layers.

The next step is selecting and deleting the areas in common between the Census Bureau and local tribal boundary layers.

1. On the **Editor** toolbar, click **Editor**, and then click **Start Editing**.
2. If a **Start Editing** window opens, in the top pane, click to highlight the **union** shapefile, and then click **OK**.

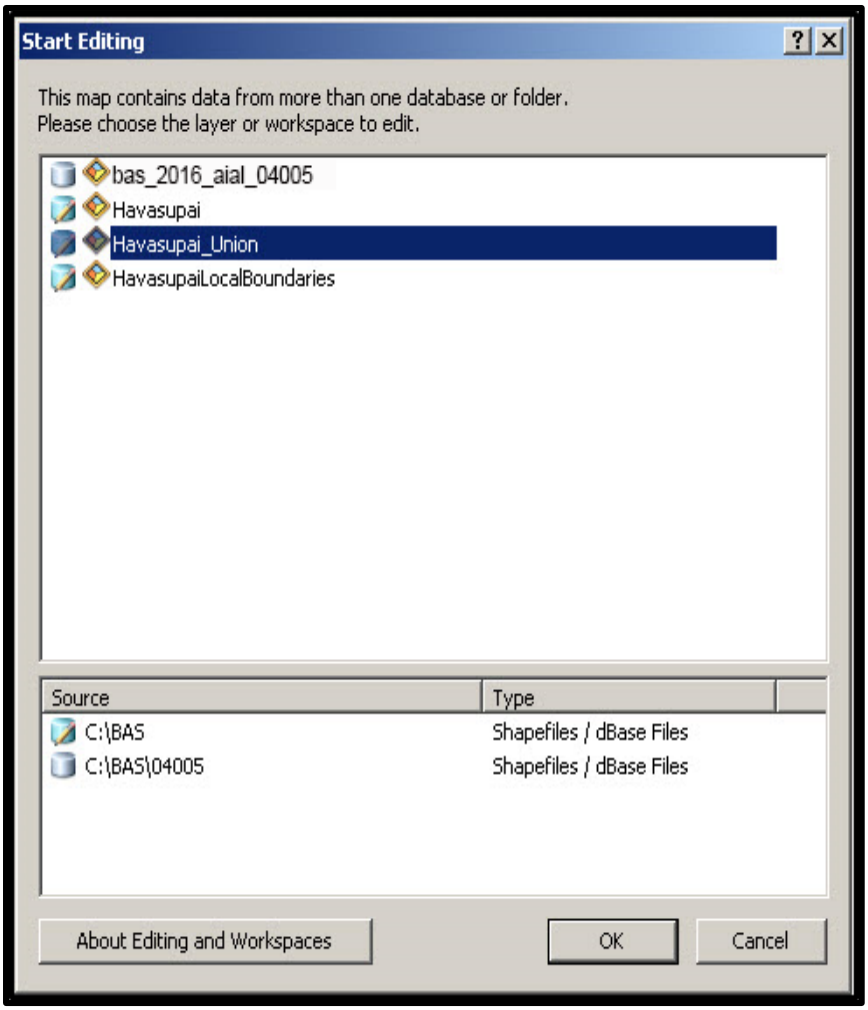


Figure 56. Locating the Union Shapefile

1. In **ArcMap**, in the **Tools** toolbar, click the **Select Features** button.
   - Locate features on the map that the Census Bureau and the tribal layers have in common.
   - Select each feature individually, or click and hold the left mouse button and drag a box to highlight the common features.
   - Press **Delete**.
   - Repeat these steps until only the features that have changed are left in the map.
2. Once all of the areas in common have been removed from the union shapefile, on the **Editor** toolbar, click **Editor**, and then click **Save Edits**.
3. Select all of the remaining records in the layer that was created in the Union step.
4. On the **Advanced Editing** toolbar, click the **Explode** tool. The layer will now contain a separate record for each change.

The new layer shows individual change polygons representing the differences between the Census Bureau and the tribal government's representation of the boundaries. Please review these differences make sure they are coded appropriately. Continue to the next section for instructions on reviewing and coding change polygons.

C7 Reviewing and Attributing Change Polygons

After the individual change polygons have been created, each must be reviewed and appropriately coded. When reviewing the polygons, please refer to **Section 5.3, Boundary Changes** in the main part of this guide to look for polygons that should be deleted from the submission, as well as those that should be snapped to nearby visible features to maintain boundary-to-feature relationships.

C7.1 Examples

These examples show very small sliver polygons that should be deleted during review as they eliminate boundary-to-feature relationships with a river (left) and a road (right). Furthermore, these boundary corrections also are not located near legal changes or corridor/offset changes (type 'A', 'D', 'C', 'F'), so they should be removed from consideration.

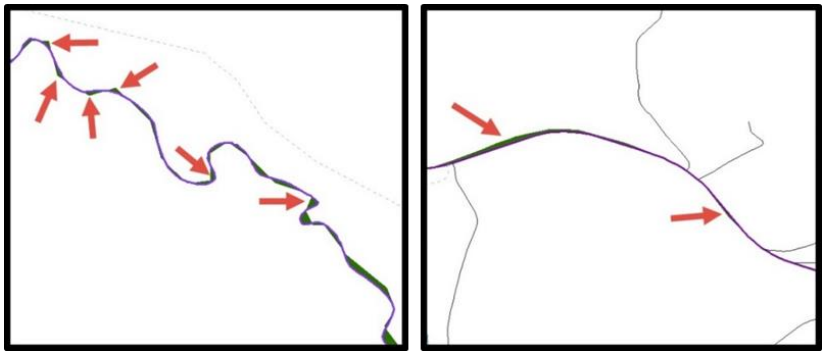


Figure 57. Small Slivers That Should Be Deleted

Figure 57 shows examples of small slivers that should be deleted along rivers (left) or roads (right).

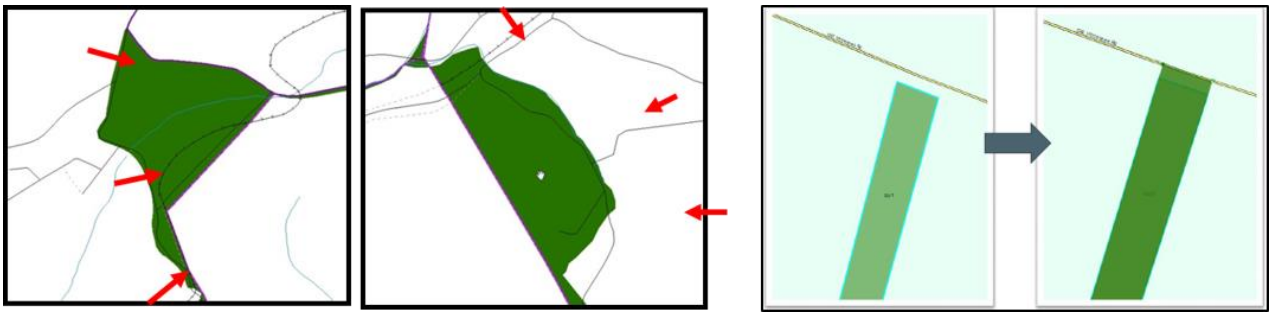


Figure 58. Polygons (Before and After) Snapped to Roads or Rivers

The two examples one the left show polygons that should be snapped to rivers (left) or roads (right). The two examples on the right show how a snapped area will look.

C8 Attribute Information

Note: All updates MUST be attributed. **Table 3**, **Table 4**, and **Table 5** in **Section 5.3, Boundary Changes** cover the required attributes.

C8.1 To Begin Updating Attributes for Additions

- On the **Editor Toolbar**, click **Editor**, and then click **Start Editing**.
- On the **Editor Toolbar**, click the **Edit Tool** button and select the addition polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for an addition:
  - NAME, CHNG_TYPE, AUTHTYPE, DOCU and EFF_DATE.
  - The **CHNG_TYPE** for an addition is **A**.

C8.2 To Begin Updating Attributes for Deletions

- On the **Editor Toolbar**, click the **Edit Tool** button and select the deletion polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a deletion:
  - **NAME**, **CHNG_TYPE**, **AUTHTYPE**, **DOCU** and **EFF_DATE**.
  - The **CHNG_TYPE** for a deletion is **D**.

C8.3 To Begin Updating Attributes for Geographic Corridors

- On the **Editor Toolbar**, click the **Edit Tool** button and select the corridor polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a corridor:
  - NAME, **CHNG_TYPE**, **RELATE**.
  - The **CHNG_TYPE** for a corridor changes is **C**.
  - In the **RELATE** field, enter **IN** if the change is adding corridor area to the place or **OUT** if the change is removing corridor area.

C8.4 To Begin Updating Attributes for Geographic Offsets

- On the **Editor Toolbar**, click the **Edit Tool** button and select the offset polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for an offset:
  - NAME, CHNG_TYPE, RELATE.
  - The **CHNG_TYP**E for an offset change is **F**.
  - In the **RELATE** field, enter **IN** if the change is adding offset area to the place or **OUT** if the change is removing offset area.

C8.5 To Finish Updating Attributes

- Once all of the attribute changes have been made, in the **ArcMap** menu, click **Editor**, and then click **Stop Editing**. (In the **Save** window, click **Yes**.)

C9 Renaming and Finalizing Change Polygons

After creating and coding all change polygons, please rename the change polygon layer prior to its submission to the Census Bureau. This process must be completed for each level of geography (AIA, tribal subdivision) that has changes.

C9.1 Renaming the shapefile:

1. In **ArcMap**, open the **ArcCatalog**

tab.
2. In **ArcCatalog**, navigate to shapefile, right-click and select **Rename**.
3. Save the output shapefile in the proper naming convention: **bas20_<basID>_changes_<entity_type>**.

Note: The BAS ID numbers can be found on the BAS Annual Response Email or online from this link: <https://www.census.gov/programs-surveys/bas/technical-documentation/code-lists.html>.

Note: See Section **5.7.6, Compressing the Digital Files** for instructions on zipping updates.

C9.2 Submitting the shapefile:

The Census Bureau requires participants submit BAS return ZIP files using the Census Bureau's **SWIM** site. Please submit only the ZIP file. The **SWIM** is located at <https://respond.census.gov/swim>. For instructions on how to use SWIM, see **Section 5.7.7, Submitting Digital Files through SWIM** of this respondent guide

C9.3 To Begin Updating Attributes for Boundary Corrections

- On the **Editor Toolbar**, click the **Edit Tool** button and select the boundary correction polygon.
- On the **Editor Toolbar**, click the **Attributes** button.
- In the **Attributes** window, fill out the mandatory fields required for a boundary correction:
  - NAME, CHNG_TYPE, RELATE.
  - The **CHNG_TYPE** for a boundary correction is **B**.
  - In the **RELATE** field, enter **IN** if the boundary correction is adding area or **OUT** if the boundary correction is removing area.

Note: If a boundary correction to one tribal subdivision affects or takes land from another, use RELATE = IN and NAME = <entity being added to>. This is due to the fact that RELATE = OUT leaves a question as to whether or not there should be a gap between the two governments.

.

APPENDIX D MTFCC DESCRIPTIONS

The MAF/TIGER Feature Classification Code (MTFCC) is a 5-digit code assigned by the Census Bureau to classify and describe geographic objects or features in Census Bureau MAF/TIGER products.

Table 25: MTFCC Code/Class/Decsription

MTFCC	Feature Class	Feature Class Description
C3022	Mountain Peak or Summit	A prominent elevation rising above the surrounding level of the Earth's surface.
C3023	Island	An area of dry or relatively dry land surrounded by water or low wetland [including archipelago, atoll, cay, hammock, hummock, isla, isle, key, moku and rock].
C3024	Levee	An embankment flanking a stream or other flowing water feature to prevent overflow.
C3026	Quarry (not water-filled), Open Pit Mine or Mine	An area from which commercial minerals are or were removed from the Earth; not including an oilfield or gas field.
C3027	Dam	A barrier built across the course of a stream to impound water and/or control water flow.
C3061	Cul-de-sac	An expanded paved area at the end of a street used by vehicles for turning around. For mapping purposes, the Census Bureau maps it only as a point feature.
C3062	Traffic Circle	A circular intersection allowing for continuous movement of traffic at the meeting of roadways.
C3066	Gate	A movable barrier across a road.
C3067	Toll Booth	A structure or barrier where a fee is collected for using a road.
C3071	Lookout Tower	A manmade structure, higher than its diameter, used for observation.
C3074	Lighthouse Beacon	A manmade structure, higher than its diameter, used for transmission of light and possibly sound generally to aid in navigation.
C3075	Tank/Tank Farm	One or more manmade structures, each higher than its diameter, used for liquid (other than water) or gas storage or for distribution activities.
C3076	Windmill Farm	One or more manmade structures used to generate power from the wind.
C3077	Solar Farm	One or more manmade structures used to generate power from the sun.
C3078	Monument or Memorial	A manmade structure to educate, commemorate, or memorialize an event, person, or feature.
C3079	Boundary Monument Point	A material object placed on or near a boundary line to preserve and identify the location of the boundary line on the ground.
C3080	Survey Control Point	A point on the ground whose position (horizontal or vertical) is known and can be used as a base for additional survey work.
C3081	Locality Point	A point that identifies the location and name of an unbounded locality (e.g., crossroad, community, populated place or locale).
C3085	Alaska Native Village Official Point	A point that serves as the core of an Alaska Native village and is used in defining Alaska Native village statistical areas.
G2100	American Indian Area	A legally defined state- or federally recognized reservation and/or off-reservation trust land (excludes statistical American Indian areas).
G2120	Hawaiian Home Land	A legal area held in trust for the benefit of Native Hawaiians.
G2130	Alaska Native Village Statistical Area	A statistical geographic entity that represents the residences, permanent and/or seasonal, for Alaska Natives who are members of or receiving governmental services from the defining legal Alaska Native Village corporation.

MTFCC	Feature Class	Feature Class Description
G2140	Oklahoma Tribal Statistical Area	A statistical entity identified and delineated by the Census Bureau in consultation with federally recognized American Indian tribes that have no current reservation, but had a former reservation in Oklahoma.
G2150	State-designated Tribal Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a state-appointed liaison for a state-recognized American Indian tribe that does not currently have a reservation and/or lands in trust.
G2160	Tribal Designated Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a federally recognized American Indian tribe that does not currently have a reservation and/or off-reservation trust land.
G2170	American Indian Joint Use Area	An area administered jointly and/or claimed by two or more American Indian tribes.
G2200	Alaska Native Regional Corporation	Corporate entities established to conduct both business and nonprofit affairs of Alaska Natives pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). There are twelve geographically defined ANRCs and they are all within and cover most of the State of Alaska (the Annette Island Reserve-an American Indian reservation-is excluded from any ANRC). The boundaries of ANRCs have been legally established.
G2300	Tribal Subdivision	Administrative subdivisions of federally recognized American Indian reservations, off-reservation trust lands, or Oklahoma tribal statistical areas (OTSAs). These entities are internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations, off-reservation trust lands, or OTSAs.
G2400	Tribal Census Tract	A relatively small and permanent statistical subdivision of a federally recognized American Indian reservation and/or off-reservation trust land, delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G2410	Tribal Block Group	A cluster of census blocks within a single tribal census tract delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G3100	Combined Statistical Area	A grouping of adjacent metropolitan and/or micropolitan statistical areas that have a degree of economic and social integration, as measured by commuting.
G3110	Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using whole counties and equivalents.
G3120	Metropolitan Division	A county or grouping of counties that is a subdivision of a Metropolitan Statistical Area containing an urbanized area with a population of 2.5 million or more.
G3200	Combined New England City and Town Area	A grouping of adjacent New England city and town areas that have a degree of economic and social integration, as measured by commuting.
G3210	New England City and Town Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using Minor Civil Divisions (MCDs) in New England.
G3220	New England City and Town Division	A grouping of cities and towns in New England that is a subdivision of a New England City and Town Area containing an urbanized area with a population of 2.5 million or more.

MTFCC	Feature Class	Feature Class Description
G3500	Urban Area	Densely settled territory that contains at least 2,500 people. The subtypes of this feature are Urbanized Area (UA), which consists of 50,000 + people and Urban Cluster, which ranges between 2,500 and 49,999 people.
G4000	State or Equivalent Feature	The primary governmental divisions of the United States. The District of Columbia is treated as a statistical equivalent of a state for census purposes, as is Puerto Rico.
G4020	County or Equivalent Feature	The primary division of a state or state equivalent area. The primary divisions of 48 states are termed County, but other terms are used such as Borough in Alaska, Parish in Louisiana, and Municipio in Puerto Rico. This feature includes independent cities, which are incorporated places that are not part of any county.
G4040	County Subdivision	The primary divisions of counties and equivalent features for the reporting of Census Bureau data. The subtypes of this feature are Minor Civil Division, Census County Division/Census Subarea, and Unorganized Territory. This feature includes independent places, which are incorporated places that are not part of any county subdivision.
G4050	Estate	Estates are subdivisions of the three major islands in the United States Virgin Islands (USVI).
G4060	Subbarrio (Subminor Civil Division)	Legally defined divisions (subbarrios) of minor civil divisions (barrios-pueblo and barrios) in Puerto Rico.
G4110	Incorporated Place	A legal entity incorporated under state law to provide general-purpose governmental services to a concentration of population. Incorporated places are generally designated as a city, borough, municipality, town, village, or, in a few instances, have no legal description.
G4120	Consolidated City	An incorporated place that has merged governmentally with a county or minor civil division, but one or more of the incorporated places continues to function within the consolidation. It is a place that contains additional separately incorporated places.
G4210	Census Designated Place	A statistical area defined for a named concentration of population and the statistical counterpart of an incorporated place.
G4300	Economic Census Place	The lowest level of geographic area for presentation of some types of Economic Census data. It includes incorporated places, consolidated cities, census designated places (CDPs), minor civil divisions (MCDs) in selected states, and balances of MCDs or counties. An incorporated place, CDP, MCD, or balance of MCD qualifies as an economic census place if it contains 5,000 or more residents, or 5,000 or more jobs, according to the most current data available.
G5020	Census Tract	Relatively permanent statistical subdivisions of a County or equivalent feature delineated by local participants as part of the Census Bureau's Participant Statistical Areas Program.
G5030	Block Group	A cluster of census blocks having the same first digit of their four-digit identifying numbers within a Census Tract. For example, block group 3 (BG 3) within a Census Tract includes all blocks numbered from 3000 to 3999.
G5035	Block Area Grouping	A user-defined group of islands forming a single census tabulation block. A BAG must: (1) consist of two or more islands, (2) have a perimeter entirely over water, (3) not overlap, and (4) not cross the boundary of other tabulation geographies, such as county or incorporated place boundaries.

MTFCC	Feature Class	Feature Class Description
G5040	Tabulation Block	The lowest-order census defined statistical area. It is an area, such as a city block, bounded primarily by physical features but sometimes by invisible city or property boundaries. A tabulation block boundary does not cross the boundary of any other geographic area for which the Census Bureau tabulates data. The subtypes of this feature are Count Question Resolution (CQR), current, and census.
G5200	Congressional District	The 435 areas from which people are elected to the U.S. House of Representatives. Additional equivalent features exist for state equivalents with nonvoting delegates or no representative. The subtypes of this feature are 106th, 107th, 108th, 109th, and 111th Congressional Districts, plus subsequent Congresses.
G5210	State Legislative District (Upper Chamber	Areas established by a state or equivalent government from which members are elected to the upper or unicameral chamber of a state governing body. The upper chamber is the senate in a bicameral legislature, and the unicameral case is a single house legislature (Nebraska).
G5220	State Legislative District (Lower Chamber)	Areas established by a state or equivalent government from which members are elected to the lower chamber of a state governing body. The lower chamber is the House of Representatives in a bicameral legislature.
G5240	Voting District	The generic name for the geographic features, such as precincts, wards, and election districts, established by state, local, and tribal governments for the purpose of conducting elections.
G5400	Elementary School District	A geographic area within which officials provide public elementary grade-level educational services for residents.
G5410	Secondary School District	A geographic area within which officials provide public secondary grade-level educational services for residents.
G5420	Unified School District	A geographic area within which officials provide public educational services for all grade levels for residents.
G6120	Public-Use Microdata Area	A decennial census area with a population of at least 100,000 or more persons for which the Census Bureau provides selected extracts of household-level data that are screened to protect confidentiality.
G6300	Traffic Analysis District	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data. A Traffic Analysis District (TAD) consists of one or more Traffic Analysis Zones (TAZs).
G6320	Traffic Analysis Zone	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data.
G6330	Urban Growth Area	An area defined under state authority to manage urbanization that the Census Bureau includes in the MAF/TIGER® System in agreement with the state.
G6350	ZIP Code Tabulation Area (Five-Digit)	An approximate statistical-area representation of a U.S. Postal Service (USPS) 5-digit ZIP Code service area.
G6400	Commercial Region	For the purpose of presenting economic statistical data, municipios in Puerto Rico are grouped into commercial regions.
H1100	Connector	A known, but nonspecific, hydrographic connection between two nonadjacent water features.
H2025	Swamp/Marsh	A poorly drained wetland, fresh or saltwater, wooded or grassy, possibly covered with open water [includes bog, cienega, marais and pocosin].
H2030	Lake/Pond	A standing body of water that is surrounded by land.
H2040	Reservoir	An artificially impounded body of water.

MTFCC	Feature Class	Feature Class Description
H2041	Treatment Pond	An artificial body of water built to treat fouled water.
H2051	Bay/Estuary/Gulf/Sound	A body of water partly surrounded by land [includes arm, bight, cove and inlet].
H2053	Ocean/Sea	The great body of salt water that covers much of the earth.
H2060	Gravel Pit/Quarry filled with water	A body of water in a place or area from which commercial minerals were removed from the Earth.
H2081	Glacier	A body of ice moving outward and down slope from an area of accumulation; an area of relatively permanent snow or ice on the top or side of a mountain or mountainous area [includes ice field and ice patch].
H3010	Stream/River	A natural flowing waterway [includes anabranch, awawa, branch, brook, creek, distributary, fork, kill, pup, rio, and run].
H3013	Braided Stream	A natural flowing waterway with an intricate network of interlacing channels.
H3020	Canal, Ditch or Aqueduct	An artificial waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft [includes lateral].
K1225	Crew-of-Vessel Location	A point or area in which the population of military or merchant marine vessels at sea are assigned, usually being at or near the home port pier.
K1231	Hospital/Hospice/Urgent Care Facility	One or more structures where the sick or injured may receive medical or surgical attention [including infirmary].
K1235	Juvenile Institution	A facility (correctional and non-correctional) where groups of juveniles reside; this includes training schools, detention centers, residential treatment centers and orphanages.
K1236	Local Jail or Detention Center	One or more structures that serve as a place for the confinement of adult persons in lawful detention, administered by a local (county, municipal, etc.) government.
K1237	Federal Penitentiary, State Prison, or Prison Farm	An institution that serves as a place for the confinement of adult persons in lawful detention, administered by the federal government or a state government.
K1238	Other Correctional Institution	One or more structures that serve as a place for the confinement of adult persons in lawful detention, not elsewhere classified or administered by a government of unknown jurisdiction.
K1239	Convent, Monastery, Rectory, Other Religious Group Quarters	One or more structures intended for use as a residence for those having a religious vocation.
K1246	Community Center	Community Center.
K2110	Military Installation	An area owned and/or occupied by the Department of Defense for use by a branch of the armed forces (such as the Army, Navy, Air Force, Marines, or Coast Guard), or a state owned area for the use of the National Guard.
K2165	Government Center	A place used by members of government (either federal, state, local, or tribal) for administration and public business.
K2167	Convention Center	An exhibition hall or conference center with enough open space to host public and private business and social events.
K2180	Park	Parkland defined and administered by federal, state, and local governments.
K2181	National Park Service Land	Area—National parks, National Monuments, and so forth—under the jurisdiction of the National Park Service.
K2182	National Forest or Other Federal Land	Land under the management and jurisdiction of the federal government, specifically including areas designated as National Forest, and excluding areas under the jurisdiction of the National Park Service.

MTFCC	Feature Class	Feature Class Description
K2183	Tribal Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of an American Indian tribe.
K2184	State Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a state government.
K2185	Regional Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a regional government.
K2186	County Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a county government.
K2187	County Subdivision Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a minor civil division (town/township) government.
K2188	Incorporated Place Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a municipal government.
K2189	Private Park, Forest, or Recreation Area	A privately owned place or area set aside for recreation or preservation of a cultural or natural resource.
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of some other type of government or agency such as an independent park authority or commission.
K2191	Post Office	An official facility of the U.S. Postal Service used for processing and distributing mail and other postal material.
K2193	Fire Department	Fire Department.
K2194	Police Station	Police Station.
K2195	Library	Library.
K2196	City/Town Hall	City/Town Hall.
K2400	Transportation Terminal	A facility where one or more modes of transportation can be accessed by people or for the shipment of goods; examples of such a facility include marine terminal, bus station, train station, airport and truck warehouse.
K2424	Marina	A place where privately owned, light-craft are moored.
K2432	Pier/Dock	A platform built out from the shore into the water and supported by piles. This platform may provide access to ships and boats, or it may be used for recreational purposes.
K2451	Airport or Airfield	A manmade facility maintained for the use of aircraft [including airstrip, landing field and landing strip].
K2452	Train Station, Trolley or Mass Transit Rail Station	A place where travelers can board and exit rail transit lines, including associated ticketing, freight, and other commercial offices.
K2453	Bus Terminal	A place where travelers can board and exit mass motor vehicle transit, including associated ticketing, freight, and other commercial offices.
K2454	Marine Terminal	A place where travelers can board and exit water transit or where cargo is handled, including associated ticketing, freight, and other commercial offices.
K2455	Seaplane Anchorage	A place where an airplane equipped with floats for landing on or taking off from a body of water can debark and load.
K2456	Airport—Intermodal Transportation Hub/Terminal	A major air transportation facility where travelers can board and exit airplanes and connect with other (i.e. non-air) modes of transportation.
K2457	Airport—Statistical Representation	The area of an airport adjusted to include whole 2000 census blocks used for the delineation of urban areas

MTFCC	Feature Class	Feature Class Description
K2458	Park and Ride Facility/Parking Lot	A place where motorists can park their cars and transfer to other modes of transportation.
K2459	Runway/Taxiway	A fairly level and usually paved expanse used by airplanes for taking off and landing at an airport.
K2460	Helicopter Landing Pad	A fairly level and usually paved expanse used by helicopters for taking off and landing.
K2540	University or College	A building or group of buildings used as an institution for post-secondary study, teaching, and learning [including seminary].
K2543	School or Academy	A building or group of buildings used as an institution for preschool, elementary or secondary study, teaching, and learning [including elementary school and high school].
K2545	Museum, Visitor Center, Cultural Center, or Tourist Attraction	An attraction of historical, cultural, educational or other interest that provides information or displays artifacts.
K2561	Golf Course	A place designed for playing golf.
K2582	Cemetery	A place or area for burying the dead [including burying ground and memorial garden].
K2586	Zoo	A facility in which terrestrial and/or marine animals are confined within enclosures and displayed to the public for educational, preservation, and research purposes.
K3544	Place of Worship	A sanctified place or structure where people gather for religious worship; examples include church, synagogue, temple, and mosque.
L4010	Pipeline	A long tubular conduit or series of pipes, often underground, with pumps and valves for flow control, used to transport fluid (e.g., crude oil, natural gas), especially over great distances.
L4020	Powerline	One or more wires, often on elevated towers, used for conducting high-voltage electric power.
L4031	Aerial Tramway/Ski Lift	A conveyance that transports passengers or freight in carriers suspended from cables and supported by a series of towers.
L4110	Fence Line	A man-made barrier enclosing or bordering a field, yard, etc., usually made of posts and wire or wood, used to prevent entrance, to confine, or to mark a boundary.
L4121	Ridge Line	The line of highest elevation along a ridge.
L4125	Cliff/Escarpment	A very steep or vertical slope [including bluff, crag, head, headland, nose, palisades, precipice, promontory, rim and rimrock].
L4130	Point-to-Point Line	A line defined as beginning at one location point and ending at another, both of which are in sight.
L4140	Property/Parcel Line (Including PLSS)	This feature class may denote a nonvisible boundary of either public or private lands (e.g., a park boundary) or it may denote a Public Land Survey System or equivalent survey line.
L4150	Coastline	The line that separates either land or Inland water from Coastal, Territorial or Great Lakes water. Where land directly borders Coastal, Territorial or Great Lakes water, the shoreline represents the Coastline. Where Inland water (such as a river) flows into Coastal, Territorial or Great Lakes water, the closure line separating the Inland water from the other class of water represents the Coastline.
L4165	Ferry Crossing	The route used to carry or convey people or cargo back and forth over a waterbody in a boat.
P0001	Nonvisible Linear Legal/Statistical Boundary	A legal/statistical boundary line that does not correspond to a shoreline or other visible feature on the ground.
P0002	Perennial Shoreline	The more-or-less permanent boundary between land and water for a water feature that exists year-round.

MTFCC	Feature Class	Feature Class Description
P0003	Intermittent Shoreline	The boundary between land and water (when water is present) for a water feature that does not exist year-round.
P0004	Other non-visible bounding Edge (e.g., Census water boundary, boundary of an aerial feature)	A bounding Edge that does not represent a legal/statistical boundary, and does not correspond to a shoreline or other visible feature on the ground. Many such Edges bound area landmarks, while many others separate water features from each other (e.g., where a bay meets the ocean).
R1011	Railroad Feature (Main, Spur, or Yard)	A line of fixed rails or tracks that carries mainstream railroad traffic. Such a rail line can be a main line or spur line, or part of a rail yard.
R1051	Carline, Streetcar Track, Monorail, Other Mass Transit	Mass transit rail lines (including lines for rapid transit, monorails, streetcars, light rail, etc.) that are typically inaccessible to mainstream railroad traffic and whose tracks are not part of a road right-of-way.
R1052	Cog Rail Line, Incline Rail Line, Tram	A special purpose rail line for climbing steep grades that is typically inaccessible to mainstream railroad traffic. Note that aerial tramways and streetcars (which may also be called “trams”) are accounted for by other MTFCCs and do not belong in R1052.
S1100	Primary Road	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
S1200	Secondary Road	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.
S1400	Local Neighborhood Road, Rural Road, City Street	Generally, a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.
S1500	Vehicular Trail (4WD)	An unpaved dirt trail where a four-wheel drive vehicle is required. These vehicular trails are found almost exclusively in very rural areas. Minor, unpaved roads usable by ordinary cars and trucks belong in the S1400 category.
S1630	Ramp	A road that allows controlled access from adjacent roads onto a limited access highway, often in the form of a cloverleaf interchange. These roads are unaddressable and do not carry a name in the MAF/TIGER System.
S1640	Service Drive usually along a limited access highway	A road, usually paralleling a limited access highway, that provides access to structures along the highway. These roads can be named and may intersect with other roads.
S1710	Walkway/Pedestrian Trail	A path that is used for walking, being either too narrow for or legally restricted from vehicular traffic.
S1720	Stairway	A pedestrian passageway from one level to another by a series of steps.
S1730	Alley	A service road that does not generally have associated addressed structures and is usually unnamed. It is located at the rear of buildings and properties and is used for deliveries.
S1740	Private Road for service vehicles (logging, oil fields, ranches, etc.)	A road within private property that is privately maintained for service, extractive, or other purposes. These roads are often unnamed.
S1750	Internal U.S. Census Bureau use	Internal U.S. Census Bureau use.

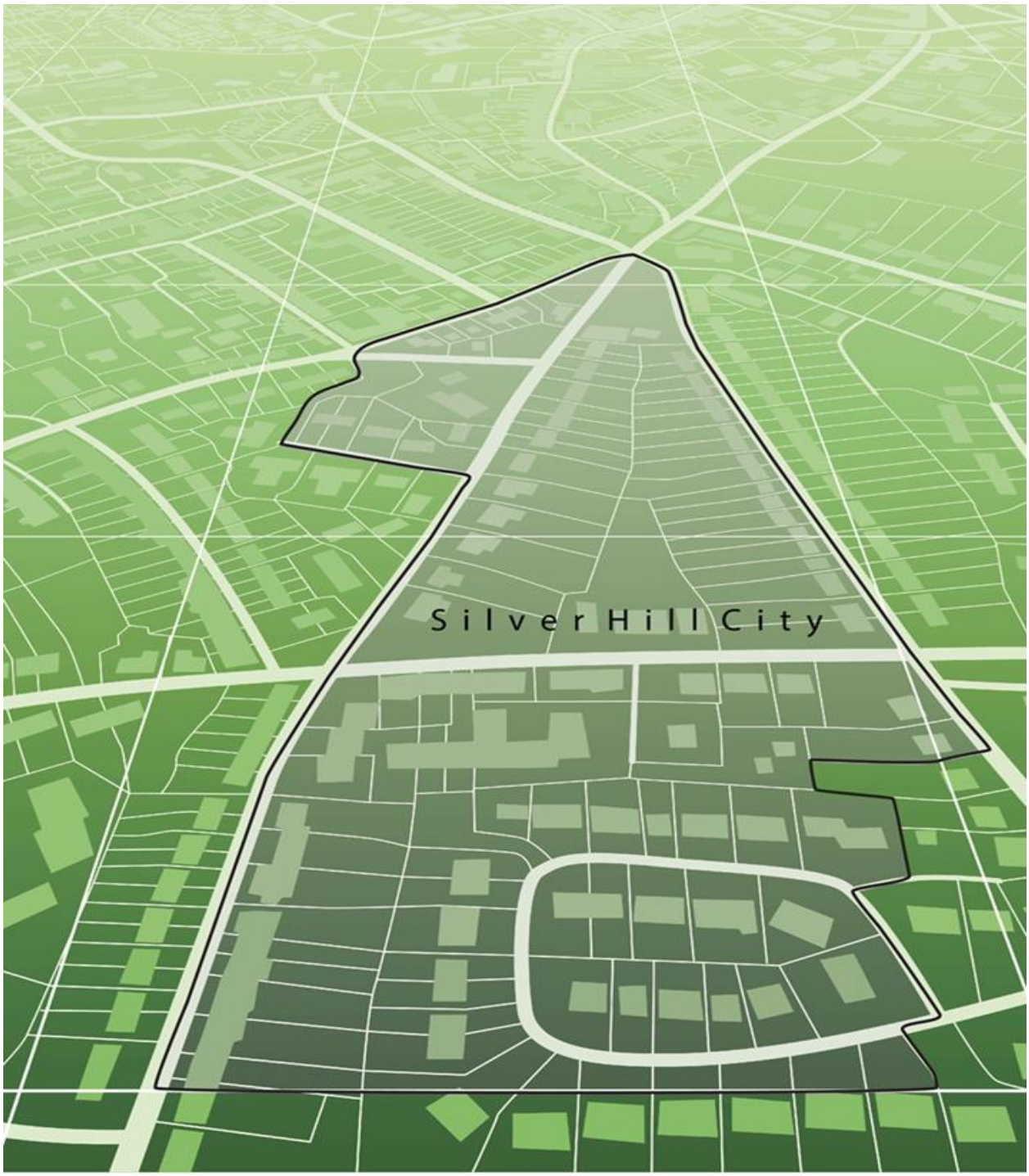
MTFCC	Feature Class	Feature Class Description
S1780	Parking Lot Road	The main travel route for vehicles through a paved parking area.
S1820	Bike Path or Trail	A path that is used for manual or small, motorized bicycles, being either too narrow for or legally restricted from vehicular traffic.
S1830	Bridle Path	A path that is used for horses, being either too narrow for or legally restricted from vehicular traffic.
S2000	Road Median	The unpaved area or barrier between the carriageways of a divided road.

Note: The information in this table was last updated in November 2017.

Boundary and Annexation Survey (BAS) Respondent Guide: GUPS

Instructions for Using the Geographic Update Partnership Software (GUPS)

Revised as of October 15, 2019



United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

This page intentionally left blank

TABLE OF CONTENTS

Introduction ix

A. The Boundary and Annexation Survey ix
B. What's New for 2020 BAS? ix
C. Key Dates for BAS Respondents x
D. BAS State Agreements x
E. Legal Disputes x
F. Respondent Guide Organization x

Section 1: Process and Workflow 1

1.1 Receiving the GUPS Application and Shapefiles 1
1.2 Getting Help 2
1.2.1 GUPS Help 2
1.2.2 BAS Help 2

Section 2: Reviewing BAS Data 1

2.1 Boundary Corrections 1
2.2 Legal Boundary Changes 1
2.3 Reviewing Legal Boundaries 1
2.4 Requirements for Legal Boundary Changes 2
2.4.1 Boundary Changes to Legal Government 2
2.4.2 Boundary Changes to Legal Governments in Georgia and Indiana 3
2.5 Reviewing Linear Features 3
2.6 Reviewing Area Landmarks and Hydrographic Areas 4
2.7 Reviewing Point Landmarks 5

Section 3: Quality Control and File Submission 7

3.1 Validating Updates 7
3.2 Submitting Files through the Secure Web Incoming Module (SWIM) 7
3.3 Submitting Files on DVD 8

Section 4: Requirements and Installation 9

4.1 Getting Started 9
4.2 How to Install GUPS 10

Section 5: Using GUPS (Basics and Map Management) 17

5.1 How to Access BAS Shapefiles 17
5.2 Import Data from the Census Bureau's BAS Website 18
5.3 Download Shapefiles from the BAS Website 28
5.4 Download Shapefiles from the Census Bureau ftp2 Site 31

5.5 Using the GUPS Interface 33
5.5.1 GUPS Main Page 33
5.5.2 Layers Panel and Map View 36
5.5.3 Managing the Map View from Within the Layers Panel 37
5.5.3.1 Manage Layer Visibility 37
5.5.3.2 Reorder Data Layers 38
5.5.3.3 Expand/Contract Layers Panel Menus 38
5.6 Menu & Toolbars 39
5.6.1 Menu Tabs 39
5.6.2 Standard Toolbar Buttons 45
5.6.2.1 Identify a Feature Using the Identify Features Button 47
5.6.2.2 Select/Deselect Features Using the Select Features and Deselect Features Buttons 49
5.6.2.3 Select Features by Querying the Attribute Table 52
5.6.2.4 View an Attribute Table for a Layer on the Map 55
5.6.2.5 Determine Distance, Area, and Angles on the Map 56
5.6.2.6 Save Locations on a Map Using the Bookmark Button 58
5.6.3 BAS Toolbar Buttons 59
5.6.4 Status Bar 60
5.7 How to Import User-Provided Data into GUPS 61
5.7.1 The Add Data Toolbar 61
5.7.2 How to Upload User-Provided Data Layers 62
5.7.3 How to Import a Shared ZIP Shapefile 64
Section 6: Making BAS Updates in GUPS 66
6.1 How to Update Legal Boundaries 66
6.1.1 Recording an Annexation 66
6.1.2 Recording a Deannexation 72
6.1.3 Adding a New Legal Government (New Incorporation) 77
6.1.4 Deleting a Government (Disincorporation) 83
6.1.5 Making a Boundary Update on a County Line 85
6.1.6 Making a Legal Boundary Change for a Consolidated City 92
6.1.7 Making a Boundary Correction (Add Area/Remove Area) 92
6.1.8 Adding a Geographic Corridor 95
6.1.9 Adding a Geographic Offset 102
6.2 How to Update Linear Features 103
6.2.1 Adding a Linear Feature 103
6.2.2 Deleting a Linear Feature 105
6.2.3 Restoring a Deleted Linear Feature 106
6.2.4 Changing the Attributes of a Linear Feature 106

6.3 How to Update Area Landmarks and Hydrographic Areas 108
6.3.1 Adding a New Area Landmark/Hydrographic Area 108
6.3.2 Deleting an Area Landmark/Hydrographic Area 112
6.3.3 Adding Area to an Area Landmark or Hydrographic Area 114
6.3.4 Removing Area from an Area Landmark/Hydrographic Area 116
6.4 How to Update Point Landmarks 118
6.4.1 Adding a Point Landmark 118
6.4.2 Deleting a Point Landmark 120
6.4.3 Changing the Attributes of a Point Landmark 120
6.5 How to Use GUPS Review and Validation Tools 121
6.5.1 Geography Review Tool 121
6.5.2 Review Change Polygons Tool 125
6.6 Exporting a Printable Map 133
6.6.1 How to Export ZIP Files to Share/Submit 136
6.6.2 Exporting a File to Share 136
6.6.3 Exporting a File to Submit to the Census Bureau 138
Section 7: Submitting Files to the Census Bureau through SWIM 141
Appendices 147
Appendix A BAS Contact Information and Resources A-1
Appendix B Terms B-1
Appendix C MTFCC Descriptions C-1
Appendix D Standard Street Type Abbreviations D-1
Appendix E GUPS Tools E-1
E.1 Set Layer Symbology E-1
E.2 Change Label Display E-3
E.3 Restoring Default Label Display Settings E-5
E.4 Using the Layers Panel Toolbar to Manage Layers E-6
Appendix F MAF/TIGER Feature Classification F-1
Appendix G Shapefile Names G-1
Appendix H Shapefile Layouts H-1

LIST OF FIGURES

Figure 1. BAS Workflow 1
Figure 2. GUPS Main Page Layout 34
Figure 3. Close Layers Panel 36
Figure 4. Restore the Layers Panel 37
Figure 5. Managing Layer Visibility 38
Figure 6. Menu and Toolbars 39
Figure 7. Manage Layer Toolbar 39
Figure 8. Standard Toolbar 45
Figure 9. Sub-tool Markers 45
Figure 10. BAS Toolbar 59
Figure 11. Status Bar 60
Figure 12. Add Data Toolbar 61
Figure 13. Annexed Area Corridor and Unincorporated Area B-2
Figure 14. Incorporated Area and Unincorporated Area B-2
Figure 15. Participant Responses B-3
Figure 16. A Cadastral (Parcel-Based) Boundary Map B-3
Figure 17. How a Boundary Should be Represented When Sent to the Census Bureau B-4
Figure 18. Place Boundary – Front-Lot-Line B-4
Figure 19. Place Boundary – Rear-Lot-Line B-4
Figure 20. Layers Panel Toolbar E-6

LIST OF TABLES

Table 1: Available Change Types by Government Type 2
Table 2: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas 4
Table 3: Restricted Point Landmark MTFCCs 6
Table 4: GUPS Hardware and Software Requirements 10
Table 5: Install the GUPS Application 11
Table 6: Start a New Project Using Shapefiles from the BAS website 18
Table 7: Download Shapefiles from the BAS Website 29
Table 8: Download Shapefiles from ftp2 Site to a Hard Drive (State Users) 31
Table 9: GUPS Main Page Elements 34
Table 10: Menu Tabs and Their Functions 40
Table 11: Adjust Snapping Tolerances 43
Table 12: Standard Toolbar Buttons 46
Table 13: Identify a Feature on the Map 47
Table 14: Select/Deselect Features on the Map 49
Table 15: Select Features by Querying the Attribute Table 52
Table 16: View Layer Attributes Using the Attributes Table 55
Table 17: Measure Distances, Area, and Angles on a Map 56
Table 18: Bookmark Locations on a Map 58
Table 19: BAS Toolbar Buttons 59
Table 20: Status Bar Elements 60
Table 21: Add Data Toolbar Buttons 61
Table 22: Load Shapefiles/Geodatabase Layers 62
Table 23: Load Data from a Web Mapping Service 63
Table 24: Add Imagery Files 64
Table 25: Import a ZIP File Shared by Another User 64
Table 26: Record an Annexation 66

Table 27: Recording a Deannexation 72
Table 28: Adding a New Legal Government 77
Table 29: Record a Disincorporation 83
Table 30: Record an Annexation in an Adjacent County 85
Table 31: Making a Boundary Correction 92
Table 32: Adding a Geographic Corridor 95
Table 33: Adding a Linear Feature 103
Table 34: Deleting a Linear Feature 105
Table 35: Restoring a Deleted Linear Feature 106
Table 36: Changing the Attributes of a Linear Feature 106
Table 37: Creating a New Area Landmark/Hydrographic Area 109
Table 38: Deleting an Area Landmark/Hydrographic Area 112
Table 39: Adding Area to an Area Landmark/Hydrographic Area 114
Table 40: Removing Area from an Area Landmark/Hydrographic Area 116
Table 41: Adding a Point Landmark 118
Table 42: Deleting a Point Landmark 120
Table 43: Changing the Attributes of a Point Landmark 120
Table 44: Using the Geography Review Tool 121
Table 45: Reviewing Change Polygons 126
Table 46: Export a Printable Map 133
Table 47: Exporting Files to Share with Another User 136
Table 48: Exporting Files for Submission to the Census Bureau 138
Table 49: Transmitting Files to the Census Bureau Using SWIM 141
Table 50: BAS Contact Information and Resources A-1
Table 51: MTFCC Descriptions C-1
Table 52: Standard Street Type Abbreviations D-1
Table 53: Reset Layer Symbology E-1
Table 54: Change Default Labeling E-3

Table 55: Restoring Default Labeling E-5
Table 56: Layers Panel Toolbar Buttons E-6
Table 57: MAF/TIGER Feature Classification F-1
Table 58: State Shapefiles Names G-1
Table 59: County Shapefiles Names G-2
Table 60: Edges Shapefile (PVS_19_v2_edges) H-1
Table 61: Address Ranges Attribute File (PVS_19_v2_addr) H-1
Table 62: Census Block Shapefile (PVS_19_v2_tabblock2010) H-2
Table 63: Census Tract Shapefile (PVS_19_v2_curtracts) H-3
Table 64: American Indian Areas Shapefile (PVS_19_v2_aial) H-3
Table 65: County and Equivalent Areas Shapefile (PVS_19_v2_county) H-4
Table 66: County Subdivisions Shapefile (PVS_19_v2_mcd) H-5
Table 67: Incorporated Place Shapefile (PVS_19_v2_place) H-5

INTRODUCTION

A. The Boundary and Annexation Survey

The U.S. Census Bureau conducts the Boundary and Annexation Survey (BAS) annually to collect information about selected legally defined geographic areas, such as counties (and equivalent areas), incorporated places, minor civil divisions (MCDs), federally recognized American Indian Areas (AIAs) — including reservations, off-reservation trust lands and tribal subdivisions, and Hawaiian Homelands. BAS also provides an opportunity for participants to review the names and geographic relationships for these areas. Title 13, Section 6, United States Code authorizes this survey.

The Census Bureau uses the boundary information collected during BAS to tabulate data for the decennial and economic censuses, and to support the yearly delivery of the Population Estimates Program (PEP) and the American Community Survey (ACS) data. Maintaining correct boundaries and boundary-to-feature relationships through BAS helps ensure that the Census Bureau assigns the appropriate housing and population counts to each government.

In compliance with the Office of Management and Budget Circular A-16, BAS supports the Census Bureau's spatial data steward responsibilities for the Federal Geographic Data Committee (FGDC) and the Geospatial One-Stop by updating the inventory and boundaries of governments.

In addition, BAS is the source of up-to-date information on changes to the boundaries, codes and names of incorporated places, MCDs, counties (and equivalent areas), Hawaiian Homelands, and federally recognized AIAs, which include reservations and off-reservation trust lands used by the U.S. Geological Survey (USGS), the National Map, and the Geographic Names Information System (GNIS). Please visit the BAS program website at <https://www.census.gov/programs-surveys/bas.html>.

For more information on BAS, please view the BAS video series on the Census Bureau's BAS website at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

B. What's New for 2020 BAS?

1. The Boundary Validation Program (BVP) runs in parallel with 2020 BAS. The BVP provides Tribal Chairs (TCs) and Highest Elected Officials (HEOs), for tribal, state, and local governments, the opportunity to review the Census Bureau's boundary data to ensure the Census Bureau has the correct legal boundary, name, and status information for eligible governments across the United States. For more information on the BVP, please visit the BVP website at: <https://www.census.gov/programs-surveys/bas/information/bvp.html>.
2. The 2020 BAS is the final opportunity for tribal, state, and local governments to provide legal boundary, name, and status information updates prior to 2020 Census data tabulation.
3. The Census Bureau developed a BAS Partnership Toolbox for ArcGIS users. This toolbox is designed to simplify and standardize the BAS updating process. The toolbox and additional information can be found at <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html>.

C. Key Dates for BAS Respondents

January 1, 2020—Boundary updates must be legally in effect on or before this date to be reported in the current survey year and to be used for the 2020 Census data tabulations. Boundary updates effective after this date will be held until the following BAS cycle.

March 1, 2020—Boundary updates returned by this date will be reflected in the 2020 Census, the Final BVP materials, and in next year's BAS materials.

May 31, 2020—Boundary updates returned by this date will be reflected in the 2020 Census and in next year's BAS materials.

D. BAS State Agreements

The Census Bureau has established a number of agreements with states for reporting boundary changes. Please visit the BAS State Agreements webpage within the BAS program website at <https://www.census.gov/programs-surveys/bas/information/state-agreements.html> or call **1-800-972-5651** for information regarding state agreements.

Note: The Census Bureau can only establish BAS state agreements for states that require local governments to report boundary changes to a state agency.

E. Legal Disputes

If the Census Bureau discovers that an area of land is in dispute between two or more jurisdictions, the Census Bureau will not make any boundary corrections until the parties come to a written agreement, or there is a documented final court decision regarding the dispute. To learn more, please contact the Census Bureau Legal Office at **1-301-763-9844**.

For disputes involving tribal areas, the Census Bureau must defer to the Office of the Solicitor at the Department of the Interior for a legal opinion. Often complicated land issues require an extended period of time for resolution, and in those cases, the Census Bureau will retain the current boundary in the database until a legal opinion is issued by the Solicitor's office.

F. Respondent Guide Organization

This guide was created for those who choose to participate in the survey using GUPS. Those using their own GIS should consult the *Boundary and Annexation Survey Respondent Guide: Digital* available on the BAS website: <https://www.census.gov/programs-surveys/bas/information/response-methods.Digital_BAS.html>. Those using paper maps should consult the *Boundary and Annexation Survey Respondent Guide: Paper* available on the BAS website:<https://www.census.gov/programs-surveys/bas/information/response-methods.Paper_BAS.html>. This guide is equipped with shortcuts to subjects that respondents may want to jump to directly. To move directly to one of these sections, click on the linked text.

This guide contains two parts:

Part 1: Provides an overview of BAS. It specifies the:

- **Process and Workflow**.
- **Reviewing BAS Data** (Information specific to the review and update of each type of geographic area).
- **Quality Control and File Submission**.
- **Submitting Files through the Secure Web Incoming Module (SWIM)**.
- **Submitting Files on DVD**.

Part 2: Describes GUPS and gives step-by-step instructions (Action/*Result* in table format*)* for:

- **Requirements and Installation**.
- **How to Install GUPS**.
- **Using GUPS (Basics and Map Management)**.
- **How to Access BAS Shapefiles**.
- **Import Data from the Census Bureau's BAS Website**.
- **Download Shapefiles from the BAS Website**.
- **Download Shapefiles from the Census Bureau ftp2 Site**.
- **How to Import User-Provided Data into GUPS**.
- **How to Import a Shared ZIP Shapefile**.
- **Making BAS Updates in GUPS**.
- **How to Update Legal Boundaries**.
- **How to Update Linear Features**.
- **How to Use GUPS Review and Validation Tools**.
- **Exporting a Printable Map**.
- **How to Export ZIP Files to Share/Submit**.
- **Submitting Files to the Census Bureau through SWIM**.

Note: In all the Action/*Result* tables, the action is usually a command or action the participant needs to perform and the Result(s) of the action will be shown in *italics*. For example: if the participant clicks the GUPS icon on their desktop, *the software should begin to run automatically.*

PART 1: BAS OVERVIEW

SECTION 1: PROCESS AND WORKFLOW

Figure 1 below illustrates the three phases of the work to be completed for BAS. The first section of the diagram includes initial steps. The second section indicates the types of geographic data that should be reviewed and updated. The final section lists the final steps to validate and submit changes.

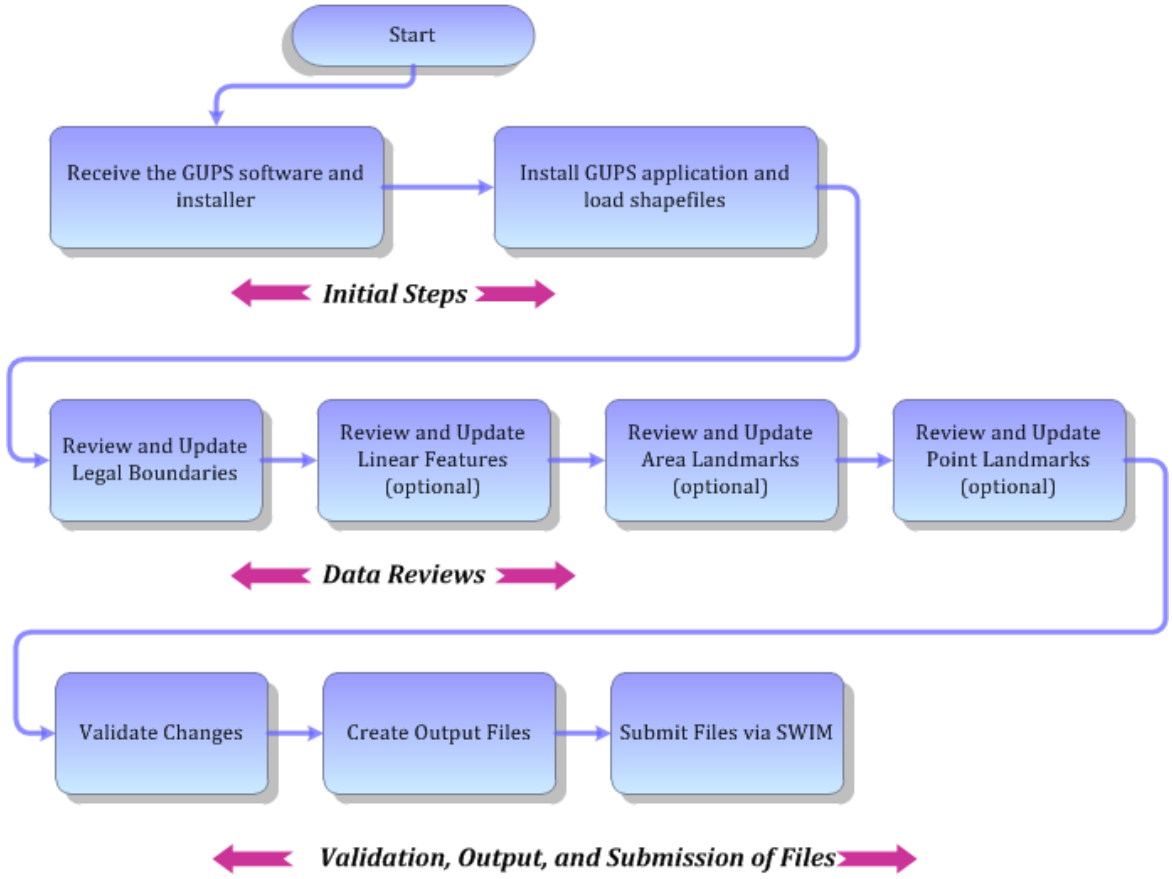


Figure 1. BAS Workflow

The sections of this guide are organized around the topical areas in the diagram and provide needed program information and procedures, as well as relevant deadlines.

See **Appendix A** for a list of contacts and helpful program links.

1.1 Receiving the GUPS Application and Shapefiles

GUPS is available for installation two ways. GUPS software is available for download directly from the BAS website <https://www.census.gov/programs-surveys/bas/technical-documentation/gups-instructions.html>. Participants can also request to receive GUPS software on DVD, which will be shipped in a package that includes a DVD containing GUPS, this respondent guide in portable document format (.pdf), and a read me text (.txt) file.

PART 1: BAS OVERVIEW

Once GUPS is installed, BAS shapefiles can be imported from the BAS website directly to the GUPS application. Instructions on how to load data into GUPS appears in **Section 5.2, Import Data from the Census Bureau's BAS Website**. If a participant does not have internet access, they may request shapefiles on DVD. To request a data DVD, call **1-800-972-5651** or email geo.bas@census.gov.

1.2 Getting Help

Part 2: How to Use GUPS of this guide contains directions for how to use the tools available within the GUPS application, as well as step-by-step instructions for how to carry out specific shapefile updates (e.g., annexations and deannexations, adding and deleting features and landmarks, etc.).

1.2.1 GUPS Help

Training videos for help with using GUPS are available on the BAS website <https://www.census.gov/programs-surveys/bas/library/videos.html>. In addition, a 508-compliant version of this guide is available at <https://www.census.gov/programs-surveys/bas/information/respondent-guides.html>.

For supplemental information on functions within GUPS that are specific to QGIS, a QGIS user's manual can be found at <http://docs.qgis.org/3.4/en/docs/user_manual/index.html>. The QGIS manual offers particularly helpful information on several activities that are touched on in this guide, but not described in detail, including working with user-provided data layers, creating search expressions for attribute tables, and creating customized coordinate systems. For questions concerning technical problems with the GUPS application, user support is available via telephone at **1-800-972-5651** and by email at geo.bas@census.gov.

1.2.2 BAS Help

BAS participants may find the *Boundary and Annexation Survey Respondent Guide: Digital* helpful. Although designed for experienced GIS users, it provides important information on geocoding, topological relationships, and spatial accuracy relevant to Census Bureau shapefiles. This guide can be downloaded at: <https://www.census.gov/programs-surveys/bas/information/response-methods.Digital_BAS.html>.

PART 1: BAS OVERVIEW

SECTION 2: REVIEWING BAS DATA

The Census Bureau requests that participants review and update all legal governments and boundaries within their jurisdiction, including the new incorporation or disincorporation of legal governments, legal boundary changes, and boundary corrections. They may also update linear features and landmarks, including area landmarks, hydrographic areas, and point landmarks, although review of these is optional.

To help conduct their review, the GUPS application allows participants to import and overlay their own geospatial data layers with the Census Bureau shapefiles. Image files may be imported from web mapping services, geodatabases, and other file types. Steps to import the most common types of user-provided data are provided in **Section 5.7 How to Import User-Provided Data into GUPS.**

2.1 Boundary Corrections

A boundary correction is the adjustment of a boundary to correct an error in how the Census Bureau depicts an existing boundary. Boundary corrections should follow the general shape of the existing boundary. Legal documentation is not required when submitting a boundary correction to the Census Bureau.

2.2 Legal Boundary Changes

Legal boundary changes are the result of legal actions (e.g., annexations), and documenting such changes is the primary goal of BAS. AIA Legal documentation (e.g., statute, federal court decision, trust deed) must accompany all AIA legal boundary changes, while legal boundary change submissions from incorporated places, MCDs, and counties must provide an authorization number, such as a resolution or ordinance number.

2.3 Reviewing Legal Boundaries

When reviewing legal boundaries, participants should examine the Census Bureau shapefiles for all legal governments within their jurisdiction. These include:

- Incorporated places.
- Minor Civil Divisions (MCDs) such as towns, boroughs, and townships.
- Counties (and county equivalents).
- Consolidated cities.

Table 1 shows the specific changes allowed for each legal government type.

PART 1: BAS OVERVIEW

Table 1: Available Change Types by Government Type

Entity Type	Available Change Types
Incorporated Place	• New Entity (New incorporation) • Deleted Entity (Disincorporation) • Addition or Annexation • Deletion or Deannexation • Boundary Correction (add) • Boundary Correction (remove) • Geographic Corridor • Geographic Offset
Minor Civil Division (MCD)	• New Entity • Deleted Entity • Addition or Annexation • Deletion or Deannexation • Boundary Correction (add) • Boundary Correction (remove) • Geographic Corridor • Geographic Offset
County	• New Entity (New incorporation of place and MCD) • Deleted Entity (Disincorporation of place and MCD) • Addition or Annexation • Deletion or Deannexation • Boundary Correction (add) • Boundary Correction (remove) • Geographic Corridor • Geographic Offset
Consolidated City	• New Entity (New incorporation of place and MCD) • Deleted Entity (Disincorporation of place and MCD) • Addition or Annexation • Deletion or Deannexation • Boundary Correction (add) • Boundary Correction (remove) • Geographic Corridor • Geographic Offset

2.4 Requirements for Legal Boundary Changes

2.4.1 Boundary Changes to Legal Government

For a boundary change to an existing legal government (or the new incorporation or disincorporation of a legal government) to be processed as a legal change, participants must provide the legal documentation number (e.g., law or ordinance number), effective date, and authorization type. They are not required to submit paperwork documenting the change.

Note: Although additional documentation is not required, the Census Bureau strongly encourages attaching supporting paperwork to submissions (this may be done directly in GUPS). The paperwork will expedite the Census Bureau's ability to reconcile and process any legal updates.

2.4.2 Boundary Changes to Legal Governments in Georgia and Indiana

For questions about required documentation for a particular jurisdiction, contact the Geography Division by phone at **1-800-972-5651** or by email at geo.bas@census.gov.

Georgia: Any legal boundary change made to an incorporated place in the state of Georgia must include: (1) the effective date and (2) the acreage of the new government. In addition, before entering the change, ensure that all annexation/deannexation information has been reported to the Department of Community Affairs (DCA). The DCA provides the Census Bureau a list of the governments that reported boundary changes each year. Any legal boundary changes to incorporated places not on this list will not be placed in the Master Address File and Topologically Integrated Geographic Encoding and Reference (MAF/TIGER) System. For additional information, see: <https://www.census.gov/programs-surveys/bas/technical-documentation/methodology/state-agreements.html>.

Indiana: Per Indiana state law, counties must provide the legal boundary updates for townships. For more information, refer to Indiana Code 36-6 Government of Townships at <http://iga.in.gov/legislative/laws/2017/ic/titles/001>.

2.5 Reviewing Linear Features

It is important that Census Bureau data reflects the most recent linear features to ensure that new or previously missed housing units located along these features are identified and located. When reviewing linear features (edges layer) on the Census Bureau shapefiles, first determine whether any features are missing or need to be deleted. Pay particular attention to areas that have experienced recent population growth or construction activities, as these are the most likely to possess new or altered linear features (e.g., new subdivisions, traffic circles converted to straight ways, or privately maintained roads that serve as public streets, but exclude private driveways).

Attribute updates (e.g., name, class code, and address ranges) may also be added for selected features. For a complete list of MAF/TIGER Feature Class Codes (MTFCC), refer to **Appendix C**.

To aid in the review of linear features, GUPS allows users to import local street centerline files, hydrographic layers, imagery, and other user-provided geospatial data for reference and comparison against the Census Bureau data.

In the review, please note:

- **S1100 and S1200**—If adding road features with an MTFCC of S1100 (Primary Road) or S1200 (Secondary Road), users must supply a feature name. As is the case for all road features, the feature name should be a proper name or route number.
- **Spatial Inaccuracies**—The Census Bureau will not process the wholesale spatial realignment of features to enhance spatial accuracy. If a feature is in the incorrect location, delete the feature and add it in the correct location. Take this action only if the feature is exceedingly spatially inaccurate and/or the current location (with respect to other features and boundaries) affects the tabulation of housing units to the correct geography, such as legal governments, census tracts, and census blocks.

- **Address Range Changes**—The Census Bureau accepts address range data as part of the linear feature update layer. As with other linear feature updates, the required attributes and corresponding change type for the update must be supplied. In addition, because existing address ranges are not shown in the Census Bureau's outgoing shapefiles, it is recommended that participants only add address ranges to new features.

2.6 Reviewing Area Landmarks and Hydrographic Areas

The Census Bureau accepts updates to area landmarks and hydrographic areas in a similar manner to legal boundary changes. However, area landmarks and hydrographic areas are not legal governments, so no documentation or effective dates are required.

Allowable updates for area landmarks and hydrographic areas are:

- Add new area landmark or hydrographic area.
- Remove area landmark or hydrographic area.
- Change or add landmark name.
- Boundary corrections (add and remove area).

If ***adding*** a new area landmark or hydrographic area, please add only:

- Water bodies.
- Glaciers.
- Airports.
- Cemeteries.
- Golf courses.
- Parks.

The Census Bureau cannot add other types of area landmark/hydrographic areas to the MAF/TIGER System at this time (even though others may already exist in the database). **Table 2** shows the acceptable MTFCCs for new area landmarks or hydrographic areas.

Table 2: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas

MTFCC	Description
H2030	Lake/Pond
H2040	Reservoir
H2041	Treatment Pond
H2051	Bay/Estuary/Gulf/Sound
H2081	Glacier
C3023	Island
K1231	Hospital/Hospice/Urgent Care Facility
K1235	Juvenile Institution
K1236	Local Jail or Detention Center
K1237	Federal Penitentiary, State Prison, or Prison Farm
K2110	Military Installation

MTFCC	Description
K2180	Park
K2181	National Park Service Land
K2182	National Forest or Other Federal Land
K2183	Tribal Park, Forest, or Recreation Area
K2184	State Park, Forest, or Recreation Area
K2185	Regional Park, Forest, or Recreation Area
K2186	County Park, Forest, or Recreation Area
K2187	County Subdivision Park, Forest, or Recreation Area
K2188	Incorporated Place Park, Forest, or Recreation Area
K2189	Private Park, Forest, or Recreation Area
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)
K2424	Marina
K2540	University or College
K2457	Airport – Area Representation
K2561	Golf Course
K2582	Cemetery

Note: If adding an MTFCC K2457 (Airport – Area Representation) area landmark, please limit the updates to major airports (major regional and international airports). The feature should show the full extent of the airport facility, that is, do not limit the addition to simply the landing strips.

Area Landmark/Hydrographic Area Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating area landmark and hydrographic area changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

2.7 Reviewing Point Landmarks

Because many of the point landmarks contained in the Census Bureau's MAF/TIGER System originate from the USGS Geographic Names Information System (GNIS), which is the official gazetteer of point landmark names for the Federal Government, point landmark updates are limited in BAS. The Census Bureau cannot modify any point landmark imported from the GNIS database. Thus, be aware that name changes or deletions submitted for the following types of landmarks may be left unchanged:

- K2451 (Airport or Airfield).
- K2582 (Cemetery).
- C3022 (Summit or Pillar).
- C3081 (Locale or Populated Place).

Also, due to Title 13 privacy concerns, any landmark with an MTFCC shown in **Table 3** below cannot be added to the MAF/TIGER System as a point landmark. The MAF/TIGER System no longer maintains any point landmarks with these MTFCCs. Point landmarks with these codes could identify a residence or private business. Thus, it is also important *not* to add any of the point landmark types shown in the table using alternative MTFCCs.

Table 3: Restricted Point Landmark MTFCCs

MTFCC	Description
K1100	Housing Unit Location
K1121	Apartment Building or Complex
K1122	Rooming or Boarding House
K1223	Trailer Court or Mobile Home Park
K1226	Housing Facility/Dormitory for Workers
K1227	Hotel, Motel, Resort, Spa, Hostel, YMCA, or YWCA
K1228	Campground
K1229	Shelter or Mission
K1232	Halfway House/Group Home
K1233	Nursing Home, Retirement Home, or Home for the Aged
K1234	County Home or Poor Farm
K1235	Juvenile Institution
K1241	Sorority, Fraternity, or College Dormitory
K1251	Military Group Quarters
K1299	Other Group Quarters Location
K2100	Governmental
K2197	Mixed Use/Other Non-residential
K2300	Commercial Workplace
K2361	Shopping Center or Major Retail Center
K2362	Industrial Building or Industrial Park
K2363	Office Building or Office Park
K2364	Farm/Vineyard/Winery/Orchard
K2366	Other Employment Center
K2424	Marina
K2500	Other Workplace
K2564	Amusement Center

Point Landmark Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating point landmark changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

PART 1: BAS OVERVIEW

SECTION 3: QUALITY CONTROL AND FILE SUBMISSION

3.1 Validating Updates

Once BAS updates are complete, please conduct a review of the change polygons to ensure that:

1. The polygons have no unintended holes (e.g., several faces were annexed but missing a traffic circle or small pond).
2. All boundary corrections meet a minimum size threshold (very small corrections cannot be processed).

Validate Often

Validation tools in GUPS can be accessed at any time while working in the application. For best results, utilize the tools often while working to identify errors early and avoid extensive rework. Steps to use the Geographic Review tool and the Review Change Polygons tool are included in **Section 6.5, How to Use GUPS Review and Validation Tools**.

3.2 Submitting Files through the Secure Web Incoming Module (SWIM)

Prompt submission of updates is appreciated. It benefits the Census Bureau—allowing the BAS team to review the files early, provide feedback, and avoid backups in file processing—and the participant—guaranteeing their updates are recorded accurately and are reflected in the latest releases of Census Bureau data products.

For those with Internet access, all BAS submissions must be made via SWIM. Due to security reasons, the Census Bureau cannot accept files sent via email or through its alternate File Transfer Protocol (FTP) sites. For those without Internet access, see **Section 3.3, Submitting Files on DVD**.

If participants indicated on their BAS Annual Response Form that they wished to receive or use the GUPS application, they will automatically receive the SWIM URL and a registration token via email. The email should arrive five days after the Annual Response is completed online (or five business days after the Census Bureau receives the paper form).

The registration token allows users to establish personal SWIM accounts. If a SWIM token does not arrive after the amount of time specified, email geo.bas@census.gov or call **1-800-972-5651**. Once registered, the token will no longer be necessary to log into the system.

Current SWIM Users

If a participant is in another Census Bureau partnership program, or participated in a previous BAS year and already has a SWIM account, they may use their current account to submit files for BAS. They do not need to set up a new account.

Note: Participants will not be able to upload a file larger than 250 MB, and SWIM will block participants from uploading a zip file that contains another zip file.

For step-by-step instructions to submit files through SWIM, refer to **Table 49**.

3.3 Submitting Files on DVD

If internet access is unavailable, please copy the ZIP file(s) to DVD for submission. The DVD should be mailed to:

U.S. Census Bureau
National Processing Center
ATTN: BAS Returns, Bldg 63E
1201 East 10th Street
Jeffersonville, IN 47132

PART 2: HOW TO USE GUPS

SECTION 4: REQUIREMENTS AND INSTALLATION

This section includes information needed to use GUPS. It offers a description of the GUPS application and gives specific instructions (in the form of Step/*Action* tables) for how to use GUPS to make BAS updates. Reminder: this guide is equipped with shortcuts to subjects that respondents may want to jump to directly. To move directly to one of these sections, click on the **linked** text.

Section 4: Requirements and Installation

- **Getting Started** - Lists the hardware and software requirements for GUPS and SWIM.
- **How to Install GUPS** - Provides instructions for installing the application.

Section 5: Using GUPS (Basics and Map Management)

- **How to Access BAS Shapefiles** - Provides instructions to load shapefiles.
- **Import Data from the Census Bureau's BAS Website**.
- **Download Shapefiles from the BAS Website**.
- **Download Shapefiles from the Census Bureau ftp2 Site**.
- **Using the GUPS Interface** - Including the Menu, Toolbars, Layers Panel or Map Legend, and the Map View area.
- **Menu & Toolbars** - Offers instructions for using the tools available through the menu and toolbars.
- **How to Import User-Provided Data into GUPS**.

Section 6: Making BAS Updates in GUPS

- **How to Update Legal Boundaries** - Gives instructions to make required and optional updates in the application.
- **How to Update Linear Features**.
- **How to Update Area Landmarks and Hydrographic Areas**.
- **How to Update Point Landmarks.**
- **How to Use GUPS Review and Validation Tools**.
- **Exporting a Printable Map**.

Section 7: Submitting Files to the Census Bureau through SWIM - Provides instructions to submit files to the Census Bureau through SWIM.

4.1 Getting Started

Download GUPS from the BAS website at: <https://www.census.gov/programs-surveys/bas/technical-documentation/gups-instructions.html>. If the GUPS package was requested, it should include a DVD containing the GUPS software, respondent guides, and a readme text file.

PART 2: HOW TO USE GUPS

Before beginning the installation, please verify the computer has the capabilities needed to run GUPS (using **Table 4)**.

GUPS is based on QGIS (formerly known as Quantum GIS), a free and open-source desktop geographic information system application. To learn more about QGIS, visit their website at <http://www.qgis.org/en/site/>. The GUPS application was developed for use in a desktop PC or a network environment.

Table 4 lists the hardware and software requirements to install and run GUPS. Also included are the software requirements to submit files through the SWIM website.

Table 4: GUPS Hardware and Software Requirements

Hardware	Operating System	Supported Browser
Disk Space Needed to Run GUPS: 4 GB ***Disk Space Needed to Store Shapefiles:*** Shapefile sizes vary. To view the size of the shapefiles, right-click, and choose **Properties** in the drop-down menu. *The **Files Properties** box opens and displays the folder size.* Select multiple files/folders in the list to view their properties via the same method. **RAM:** 4 GB minimum, 8 GB or more recommended for optimal performance.	**Windows®:** To run GUPS, Windows users need one of the following operating systems: • Windows 7® • Windows 8® • Windows 10® ***Apple®:*** Mac OS X® users must secure a license for Microsoft Windows and use a Windows bridge. The suggested bridge software is Boot Camp®, which comes pre-installed on all Mac computers. Locate instructions for using Boot Camp at: <https://www.apple.com/support/bootcamp/getstarted/>. **IMPORTANT:** Since Boot Camp requires a restart of the computer to set up the bridge, be sure to print the instructions provided at the URL above before beginning installation.	**SWIM runs on the two most recent versions of each of these major browsers:** • Internet Explorer® • Google Chrome® • Mozilla Firefox® • Apple Safari®

Depending on the Windows OS version, the GUPS dialog boxes may have a different appearance than the screenshots contained in the user guide, although the content is the same.

Note: GUPS continues to evolve through updates and revisions. As a result, some discrepancies between the appearance of individual screens or buttons in this guide may differ from the actual software received with the feedback materials. Other variations in color or styles may also exist.

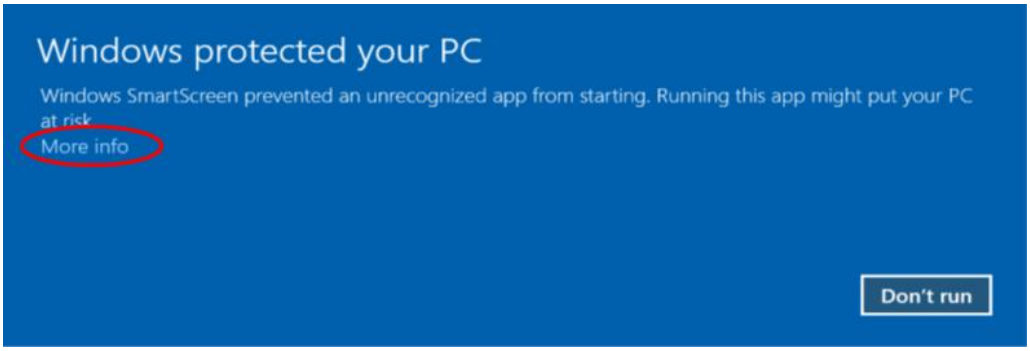
4.2 How to Install GUPS

To install the GUPS application users must have Administrator privileges for their computer. If a version of GUPS is already installed, please check that it is the correct version for this year's BAS. The easiest way to verify the correct version is to check the sub-program and make sure it

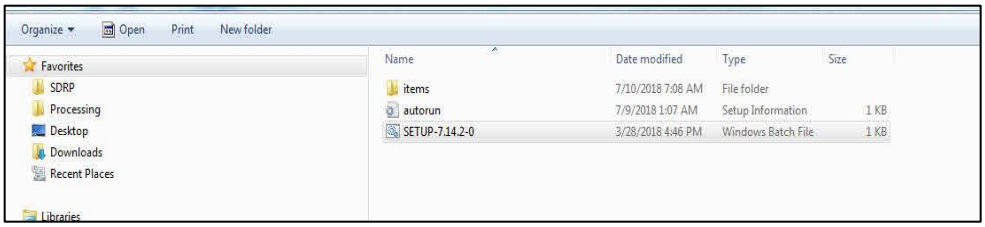
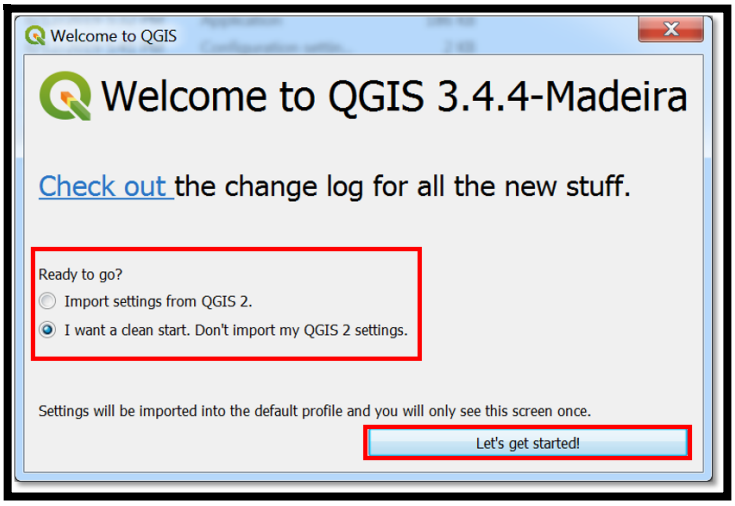
PART 2: HOW TO USE GUPS

reads the current BAS year (e.g., 2020 Boundary Annexation Survey). If the sub-program is not the current BAS year, download the most recent version and follow the setup instructions. Alternatively, compare the currently installed version (use the About GUPS menu option) with the one provided on the Census Bureau's installation DVD to ensure the latest version. To complete the installation, follow the steps in **Table 5: Install the GUPS Application**.

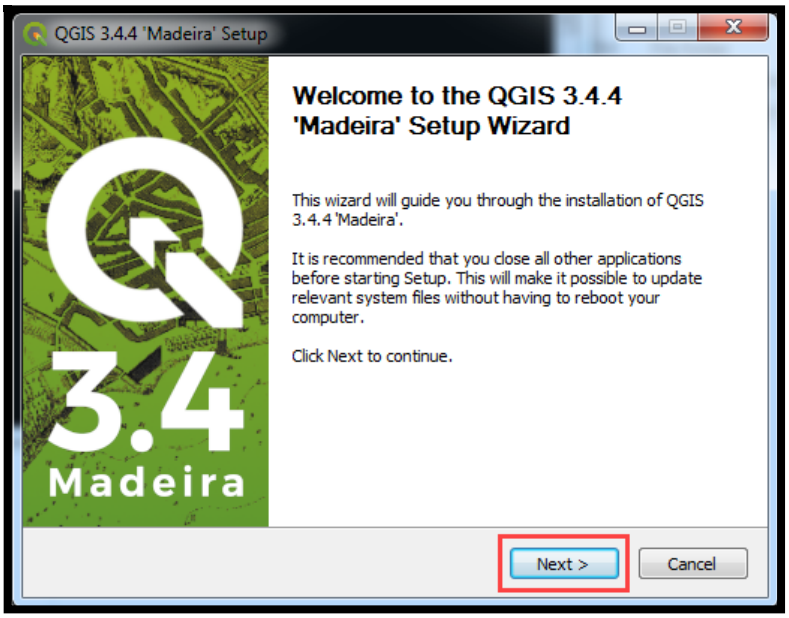
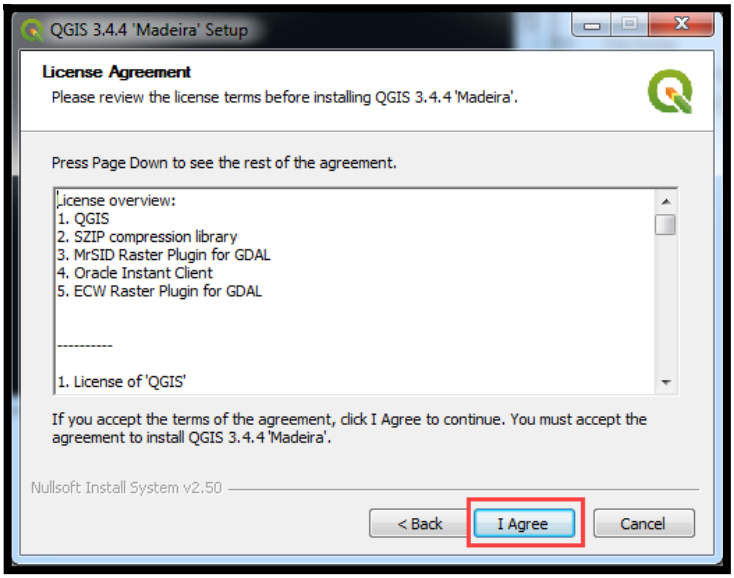
Table 5: Install the GUPS Application

Step	Action and *Result*
Step 1	Click the direct download link <https://www2.census.gov/geo/pvs/gups/gups.zip> or place the installation DVD into the computer's DVD drive. *For some users, a **Windows protected your PC** pop-up box may appear.*  To continue, click '**More info**', then select '**Run anyway?**'.
Step 2	Other users may receive a user account control pop-up that asks, "Do you want to run this file?", "Do you want to allow the following program from an unknown publisher to make changes to this computer?", or a similar query. See an example below. If this pop-up occurs, click Run, Yes, Allow, or an option that allows the installation to proceed. *The software should begin to run automatically.*

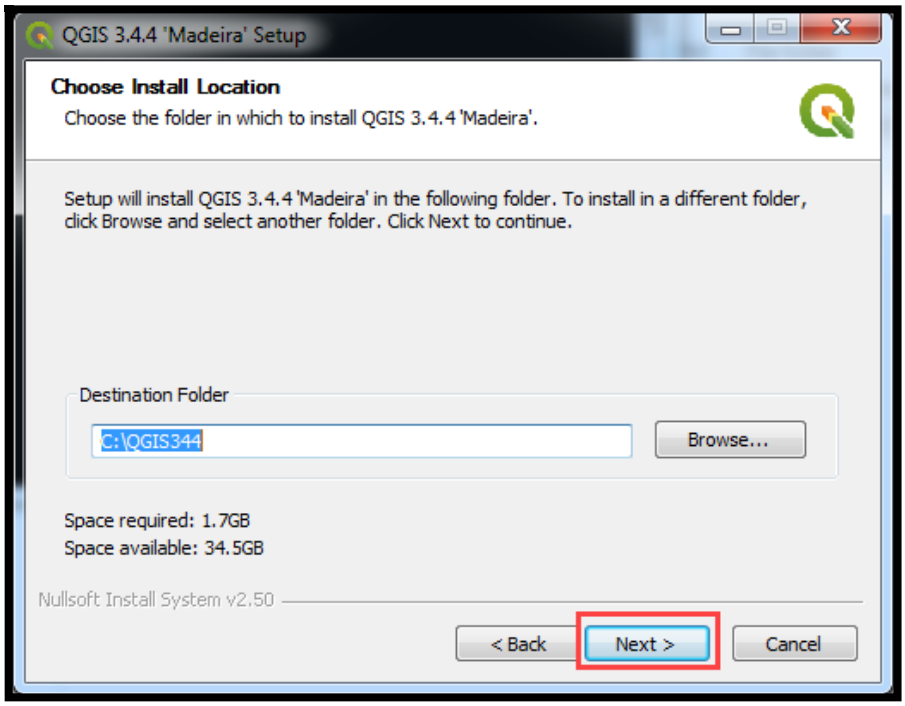
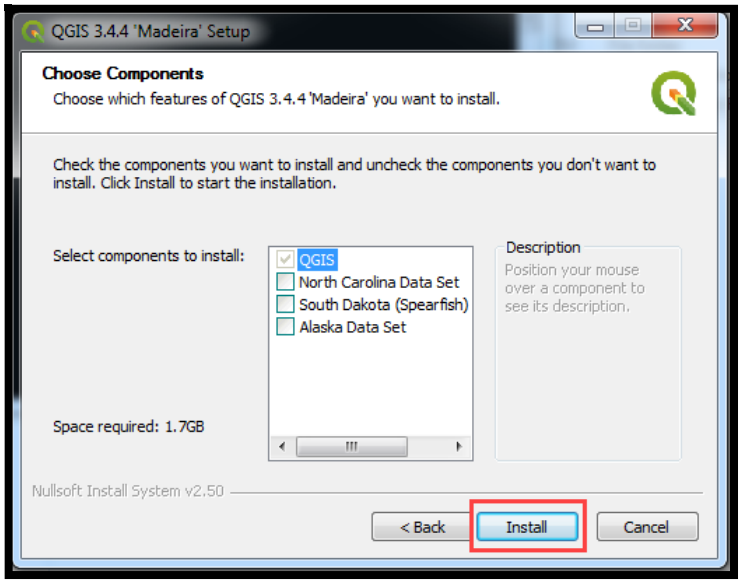
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	If the software does not run automatically, open Windows Explorer, navigate to the DVD drive, and double-click on the ***Setup<current version number>*.bat** file. **Note:** The name of this file will vary depending on the current GUPS version number, but it will be the only setup **.bat** file available.  If the software still does not run properly, contact the local System Administrator for assistance.
Step 4	A ***Welcome to QGIS 3.4.4-Madeira*** window pops up allowing users to import previous settings used into the default profile. Users may choose to import their settings or to have a clean start. Select the desired options and click "Let's get started". .  Before proceeding, close all other programs or applications. Once other programs and applications are closed, click the **Next** button.

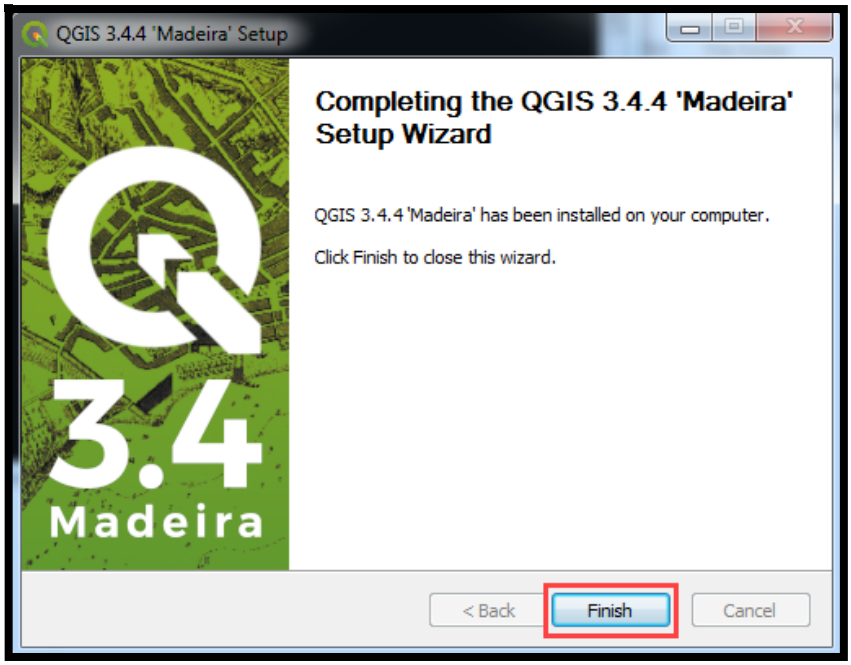
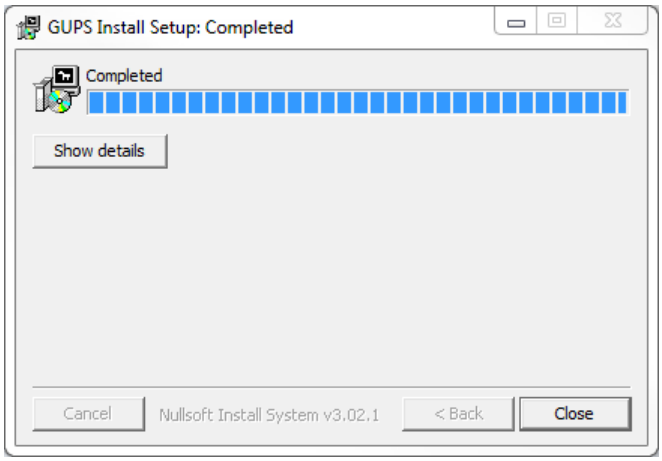
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	When the installer opens, the ***Welcome to the QGIS 3.4.4 'Madeira' Setup Wizard*** *screen appears*.  **Note**: The version needed for2020 BAS is QGIS 3.f4.4 Madeira. If the exact same version of QGIS exists on the computer, an instruction to uninstall and reinstall appears. Participants may retain other versions of QGIS that may be in use for other programs, but must reinstall if the same version exists on the computer to ensure installation of the latest update. Before proceeding with installation, close all other programs or applications. Once other programs and applications are closed, click the **Next** button.
Step 6	*The* ***License Agreement*** *screen appears*.  Read the **License Agreement** and click the **I Agree** button to continue.

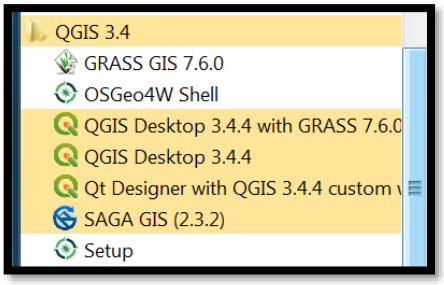
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	*The **Choose Install Location** screen opens.*  The Browse button on this screen allows participants to browse the local computer for an installation location. The Census Bureau recommends the installation of the GUPS application to the default location: (e.g., C:\QGIS344) to prevent installation errors or issues. To begin the installation, click the **Next** button.
Step 8	*The **Choose Components** screen opens.*  '☑QGIS' in the **Select components to install** field is checked and grayed out since it is the default. Simply click **Install** to continue.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	To review a previous screen or reread the license agreement, click the **Back** button (each screen contains this button). *This returns the screen to the previous page*.
Step 9	The software should take between 5 and 10 minutes to install. *When it is finished, the **Completing the QGIS GUPS Setup Wizard** screen opens.*  Click the **Finish** button.
Step 10	*The **GUPS Install Setup: Completed** screen opens showing the status of the installation of GUPS.* When completed, click the **Close** button on the following screen. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 11	To complete the installation, click the **Close** button at the bottom of the **GUPS Install Setup: Completed Setup Wizard** screen. *Once the application installs, QGIS will be added to the All Programs Start Menu list.* 

PART 2: HOW TO USE GUPS

SECTION 5: USING GUPS (BASICS AND MAP MANAGEMENT)

After successfully installing GUPS, participants are ready to start their BAS updates. There are three ways to retrieve shapefiles when starting a new project:

- From the Census Bureau website (loads directly into GUPS).
- From DVD (if one was requested).
- From My Computer (if the files have been downloaded to the hard drive).

Table 6 shows the steps to open GUPS and start a new project using the Census Bureau website. **Table 7** shows the same steps to open GUPS, but starts a new project using the Census Bureau provided DVD or My Computer (downloaded Census Bureau shapefiles saved to the hard drive).

5.1 How to Access BAS Shapefiles

BAS shapefiles from the BAS website can be pulled directly into the application when working in GUPS by choosing the Census Web option during project setup. Users can load the shapefiles as needed or load multiple county files at once. This is the preferred method for loading the Census Bureau's BAS shapefiles into GUPS as it ensures that required files are placed in the correct location for the application to access.

Another option for loading files is to download the shapefiles from the BAS website (or from the Census Bureau ftp2 site), then import them into GUPS. BAS shapefiles are available for download from the BAS website here: <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html>. Instructions for how to download Census Bureau shapefiles appear in **Table 6** and **Table 7**. Downloading files to the hard drive is not the preferred method when working in GUPS, and should be used only when necessary (e.g., if additional data layers that GUPS does not automatically load need to be pulled in as user-provided data).

If the shapefiles were received as part of the GUPS package on a DVD, the files can be loaded directly into GUPS from the DVD. Instructions for how to load shapefiles are contained in **Table 7, Step 8.**

Whether the files are pulled from the BAS website or from the DVD, the GUPS application unzips them and places them into a pre-established folder created on the computer's home directory during the installation process (C:\GUPSGIS\gupsdata\BAS2020\shape). It then displays them in the application and manages the files. There is no need to take any further action.

CAUTION!

Regardless of the source of the shapefiles, it is important **NOT TO CHANGE** any shapefile or folder name. The files and folders must have the ***exact*** names given for the GUPS application to recognize and load them.

PART 2: HOW TO USE GUPS

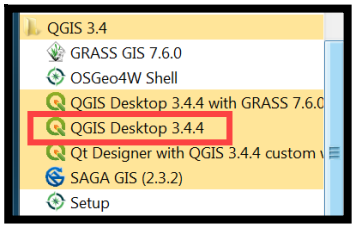
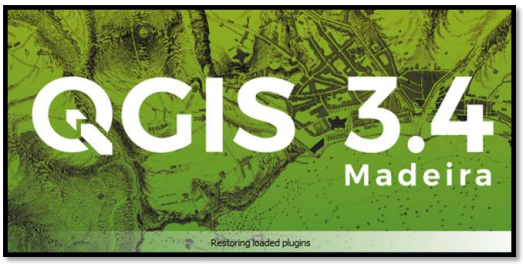
5.2 Import Data from the Census Bureau's BAS Website

To open the GUPS application and begin BAS updates, follow the steps in **Table 6**. Before beginning, note that:

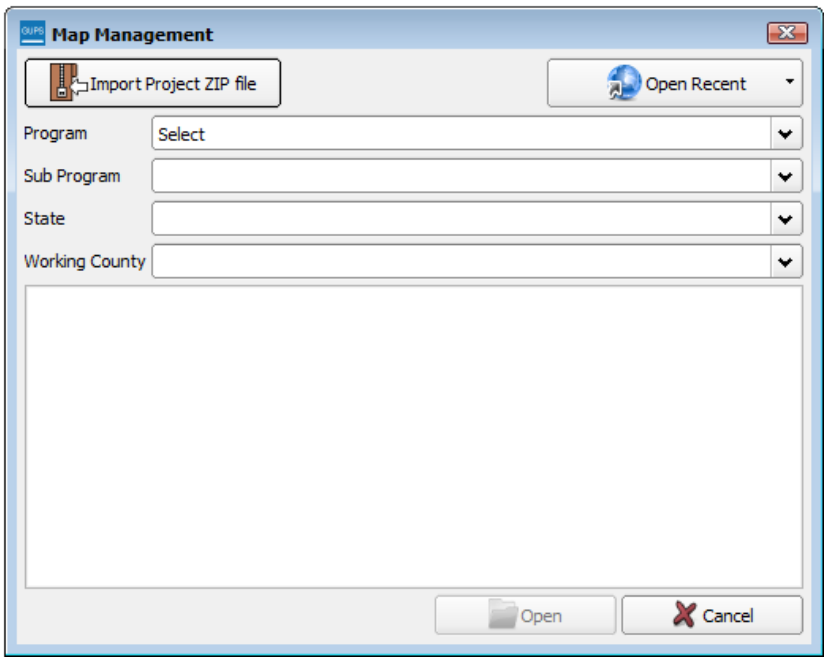
1. To practice using GUPS without committing the changes, simply exit the system without saving. Before the system closes, it will give the option to discard the changes.
2. If comfortable with the system, but not all changes are completed in one session, simply save the changes, then close the system. When opening GUPS later, reopen the project and continue working.

Note: In all the Action/*Result* tables, the action is usually a command or action to be performed and the *Result(s)* of the action will be shown in italics. For example: click the QGIS icon on the desktop, *the software should begin to run automatically.*

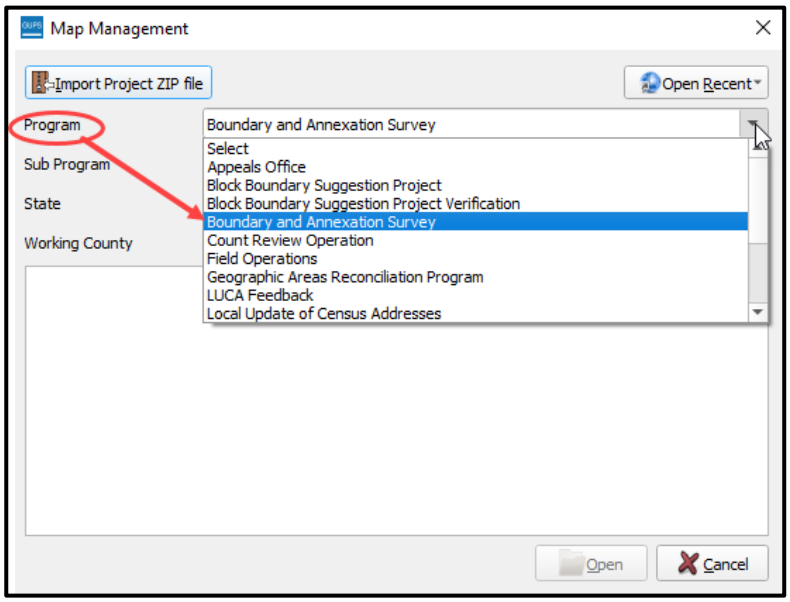
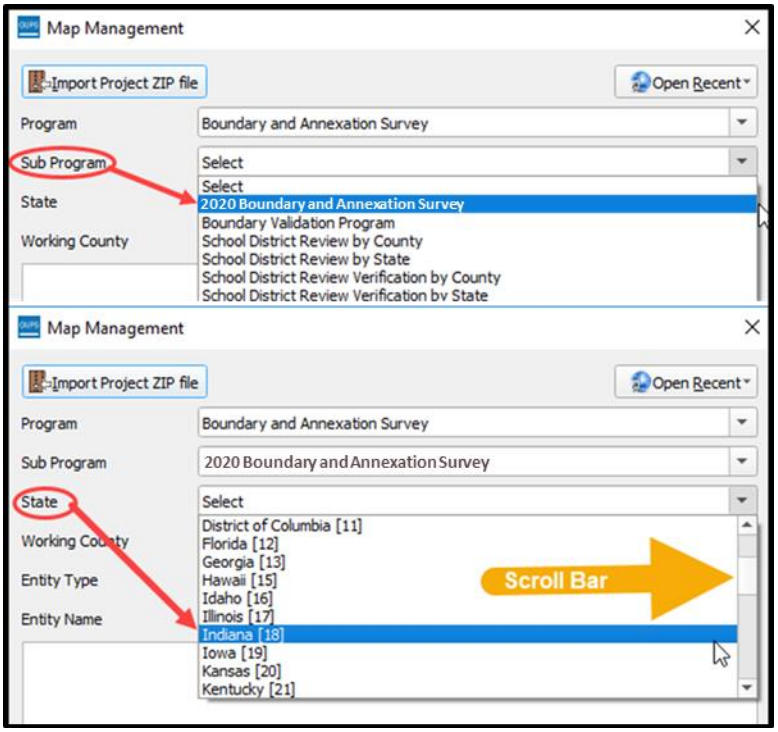
Table 6: Start a New Project Using Shapefiles from the BAS website

Step	Action and *Result*
Step 1	Select **QGIS Desktop** 3.4.4 from the All Programs list in the Start Menu.  *The QGIS splash screen appears*. **(Note:** QGIS is the open-source platform for building GUPS.) 

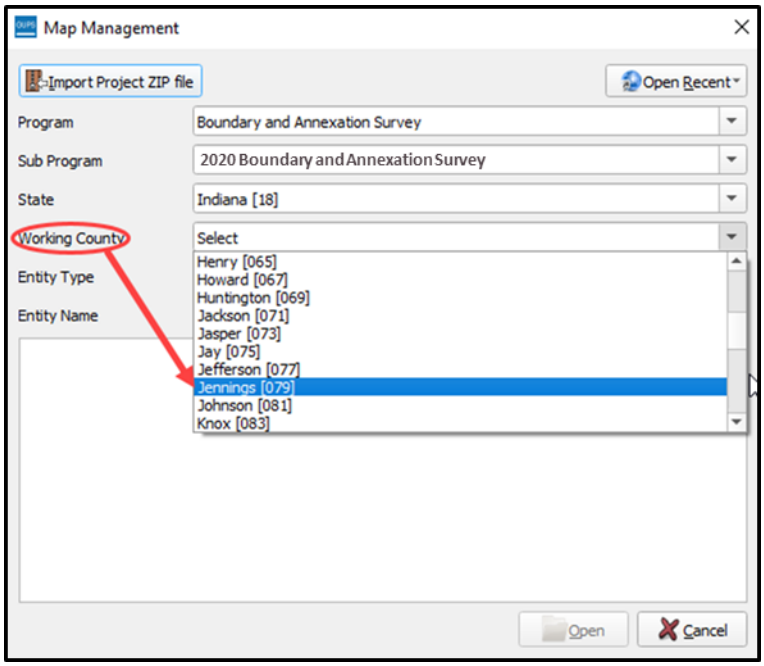
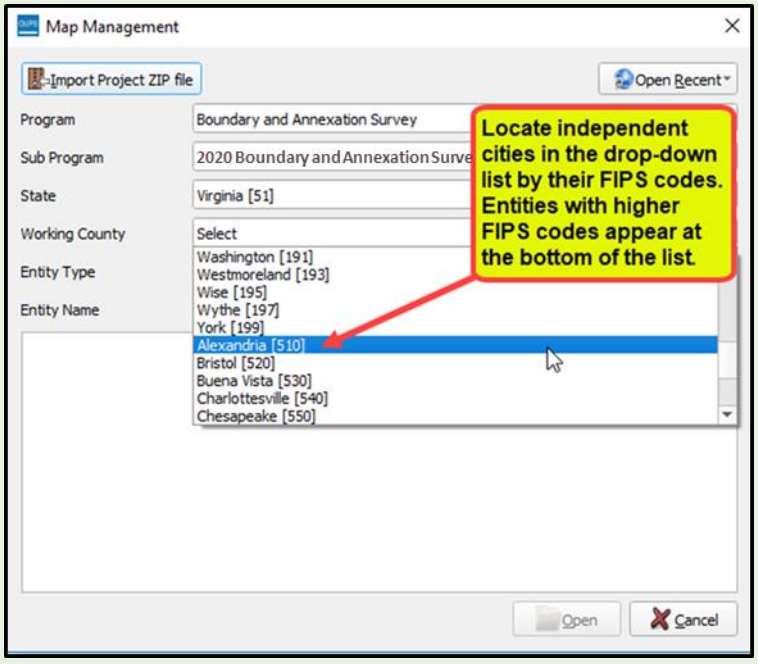
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Wait until the application loads (this may require a few minutes on older computers). *When the GUPS application has loaded, the GUPS main page opens and the QGIS Tips! box appears*. **Note:** Since GUPS was built on the QGIS open-source platform, there will be references to QGIS in several locations within the GUPS application.
Step 3	To view QGIS system tips, click the **Next** button to read the first tip. Thereafter use the **Previous** and **Next** buttons to navigate within tips. To no longer see the tips on startup, click the checkbox in the bottom left-hand corner that reads 'I've had enough tips, don't show this on start up any more!'
Step 4	To begin a GUPS project, close the **QGIS Tips! box** by clicking the **OK** button. *The box closes and the **Map Management** dialog box opens, as shown below*. 

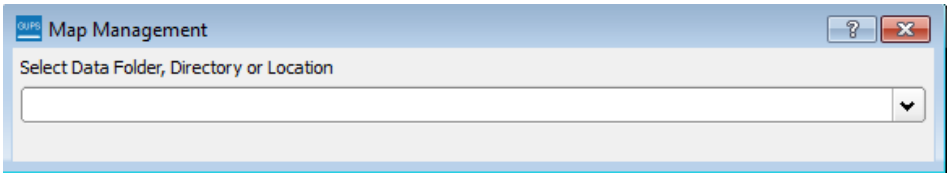
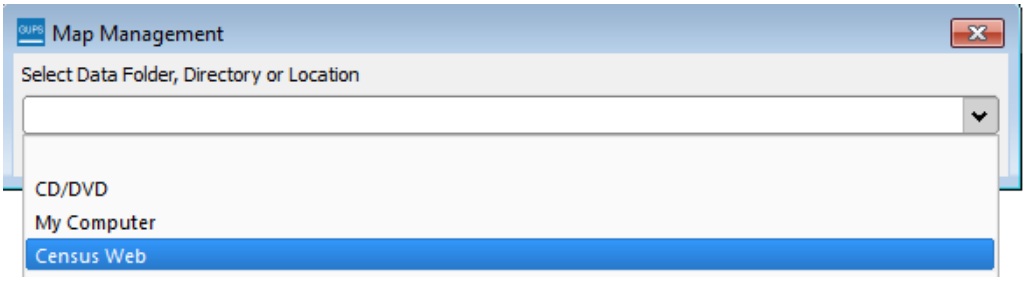
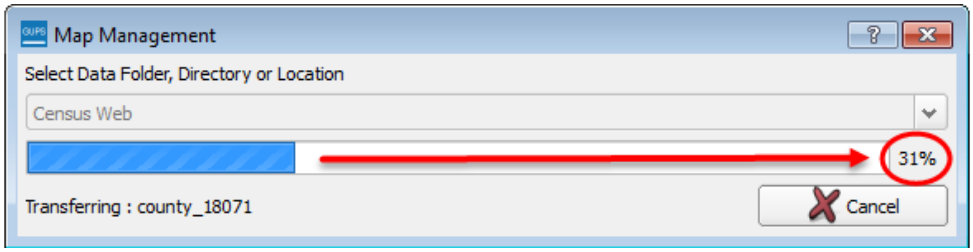
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	In the **Map Management** dialog box, use the drop-down menu next to the **Program** field to select the program, '**Boundary and Annexation Survey**'. '*Boundary and Annexation Survey' populates the field*. 
Step 6	In the **Sub Program** field, select '**Boundary and Annexation Survey**'. In the **State** field, use the drop-down menu to select a state. The scroll bar to the right allows the user to move up and down the list of states.  This example uses Indiana.

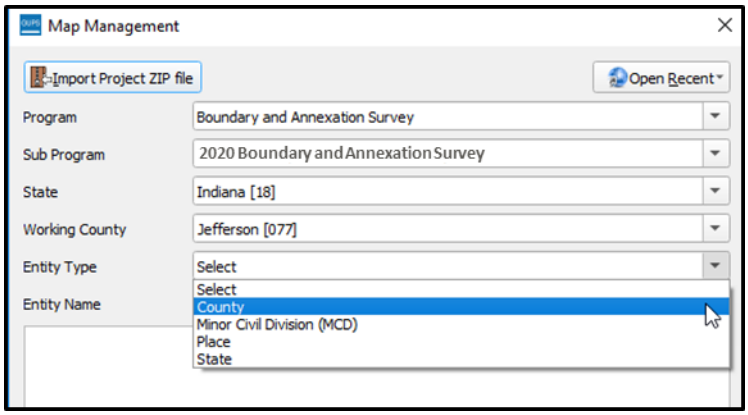
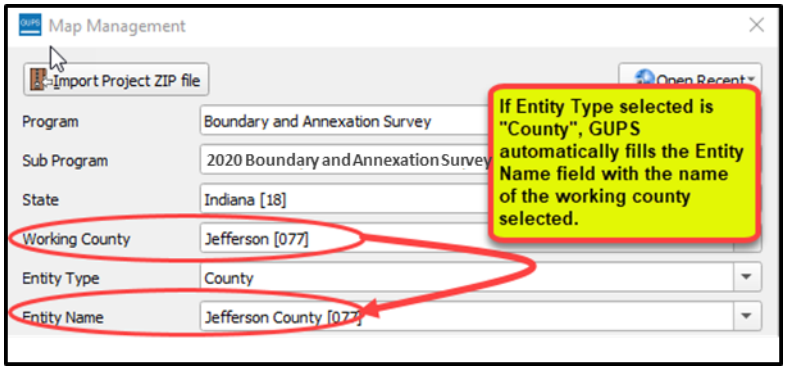
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	In the **Working County** field, use the drop-down menu to select the county to make updates. This example uses Jennings County, Indiana. 
	Independent City Users Note that the **Working County** drop-down menu is sorted by FIPS code. Search for the city's code rather than assuming it will appear alphabetically. A portion of the **Working County** drop-down list (the State of Virginia was used for this example) appears below, showing independent cities near the end of the list because their FIPS codes are higher. 

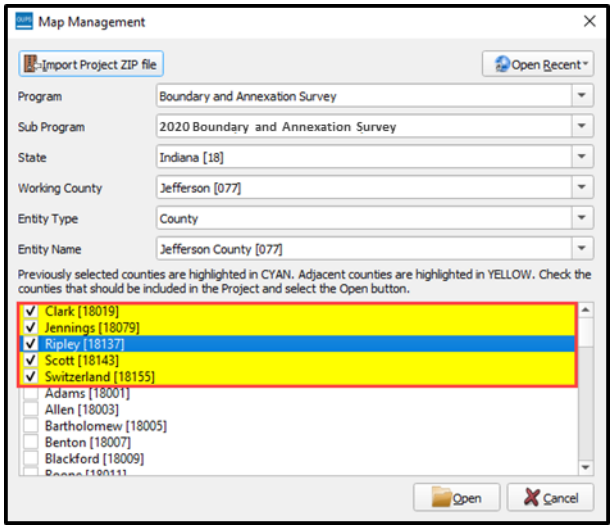
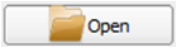
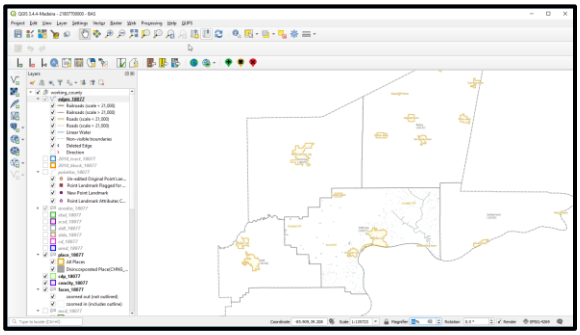
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 8	After selecting the working county, GUPS will prompt the participant for a location from which to import the county's (or county equivalent's) shapefiles. *The **Select Data Folder, Directory or Location** box opens*. 
	GUPS only asks to specify a data download location once per project. When a project has been closed and reopened, the shapefiles automatically load, even if no changes were made during the first session.
Step 9	In the **Select Data Folder, Directory or Location** box drop-down menu, select a data download location. This example assumes the user is pulling the data from the BAS website, so click on **Census Web** in the drop-down menu. 
Step 10	When **Census Web** is chosen, *the shapefile for the county begins to load and progress is displayed by a blue striped bar (color may vary), with the percentage of the upload completed displayed to the right.* 
Step 11	As GUPS loads the data, it unzips and copies the files to a folder in the home directory created during the installation process. The data is then loaded into the GUPS application.
Step 12	*After the files load, GUPS returns to the **Map Management** screen*. In the **Entity Type** field drop-down menu, select the type of entity to be updated. The options are 'Consolidated City', County', 'Minor Civil Division (MCD)', 'Place', and 'State'. **Note:** The options may vary, depending on the entity types the state contains. Independent city users should select 'Place'.

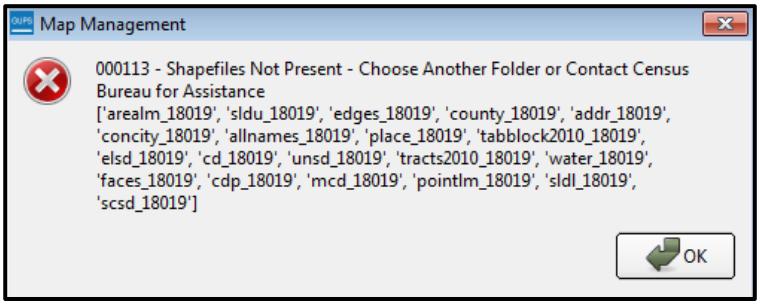
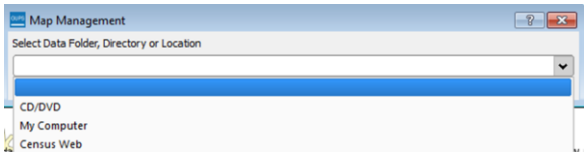
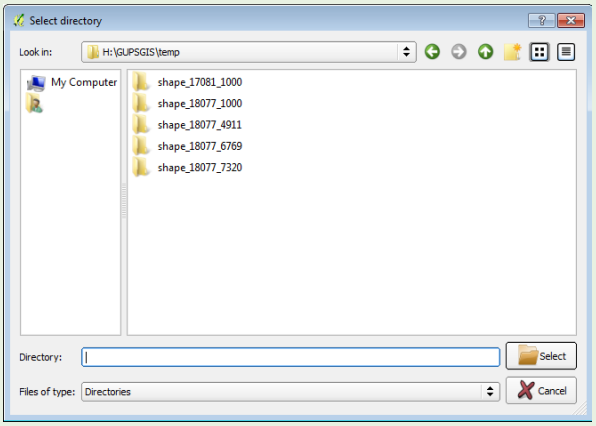
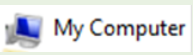
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	This example assumes a 'County' user. 
Step 13	*Since the entity type 'County' was selected, and Jefferson County was previously named as the working county, GUPS automatically fills the **Entity Name** field with 'Jefferson County.'* 
	*If 'Consolidated City' was selected as the **Entity Type,** the name of the consolidated city-county government automatically fills the **Entity Name** field.* *If 'Place' was selected as the **Entity Type**, the **Entity Name** field is blank. A drop-down menu, which lists all incorporated places within the working county, allows selection of the correct entity.* *If 'State' was selected as the entity type, the state selected in the **State** field automatically fills the **Entity Name** field.*

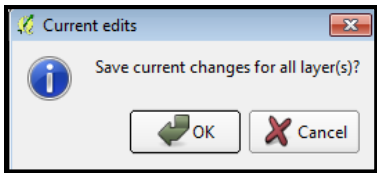
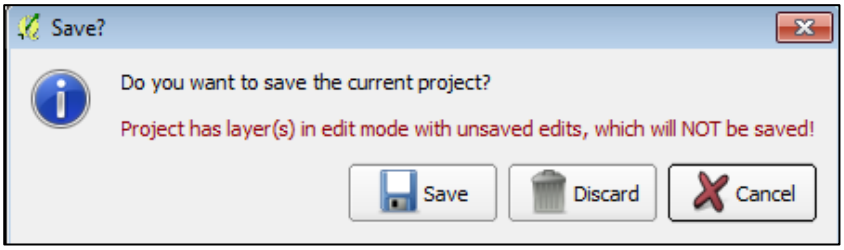
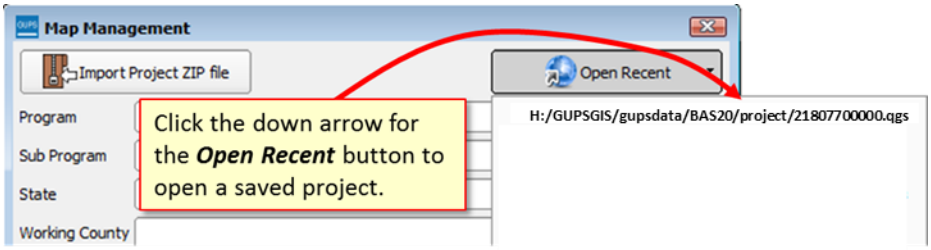
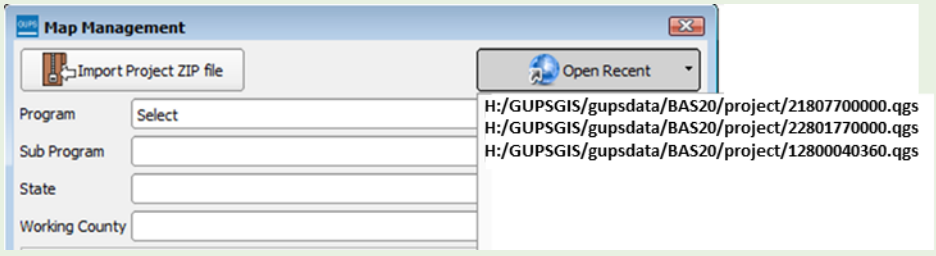
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 14	*In all cases, a list of the counties in the state appears at the bottom of the **Map Management** dialog box.* *Adjacent counties (counties whose borders touch the working county) are highlighted in yellow, and may be checked if necessary.* 
Step 15	All checked counties will display in the **Map View**. Uncheck the box for any county in order to not display it. To select additional counties to display (**up to a total of 10** may be chosen at once), check the checkboxes next to them. Scroll down using the scroll bar to the right to see the full list of counties.
Step 16	For this example, neighboring Clark and Jennings Counties are selected. Check the checkboxes next to these counties, then click the **Open**  button at the bottom of the **Map Management** dialog box.
Step 18	*GUPS unzips and copies the files to the GUPS home directory then loads them into the application. The map management screen, with all selections grayed out, will show while the project is loading followed by a progress bar with the message "Starting GUPS."* *The data layers for Jefferson County appear in the **Layers Panel** and the maps for the selected adjacent (or other selected counties) appear next to that for the working county in **Map View**. In our example, as shown below, **Map View** displays the maps for Jennings and Clark Counties next to that for Jefferson County.* 

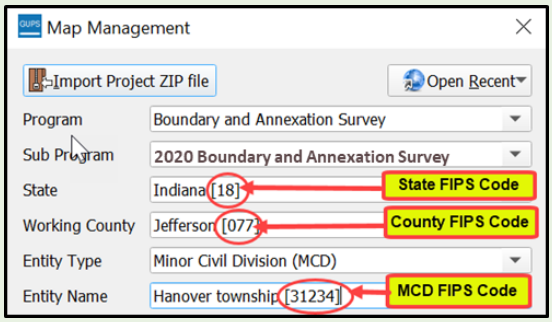
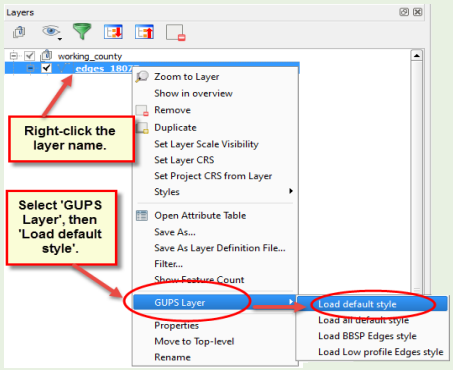
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 19	If for any reason shapefiles are missing from the chosen location in the **Select Data Folder, Directory or Location** drop-down menu, or the files are corrupted and cannot be loaded, an error message will display. 
Step 20	Click **OK** to return to the **Map Management** dialog box and then close **Map Management**. Reopen **Map Management** from the **Standard Toolbar**.
Step 21	Try loading the file(s) from another location. After reopening map management, reselect the desired working county and pick another option for loading the files. 
	If loading shapefiles using the 'Census Web' and 'CD/DVD' options is not successful, follow the instructions in **Table 7** or **Table 8** to download the files from the BAS website or Census Bureau's ftp2 site. Then pull them into GUPS using the 'My Computer' option in the **Select Data Folder, Directory or Location** drop-down menu. *When 'My Computer' is selected, the **Select directory** screen opens*.  On this screen, click on the **My Computer** icon in the left-hand corner.  Navigate to the location of the files to load, select the files, and then click on the **Select** button at the bottom of the **Select directory** screen. *GUPS unzips and loads the files, then moves them to the pre-established folder in the home directory*.

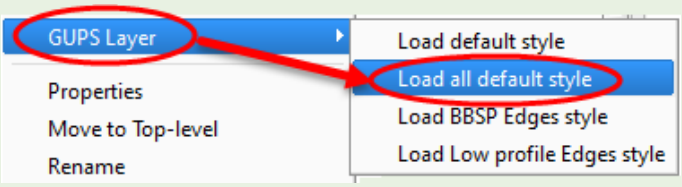
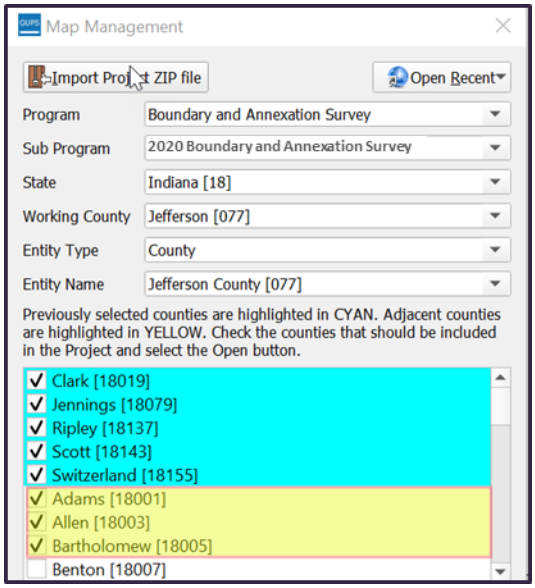
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 22	After working on a project, be sure to save before exiting. Otherwise unsaved edits will be lost. To save, click the **Save** icon on the **Standard toolbar**. *The **Current edits** pop-up box asks to save the changes for all layer(s).*  Click **OK**. *The changes are saved*.
Step 23	Close the application to discard any changes (click the red X in the upper right-hand corner of the main GUPS page). *A **Save?** pop-up warning prompts to save, discard, or cancel*.  Click **Discard** to not save the current project.
Step 24	To reopen a saved project, in the **Map Management** dialog box, click the down arrow next to the **Open Recent** button. *The drop-down menu opens with a list of current projects.* 
	If sharing a computer with other GUPS users, multiple project files may appear in the drop-down menu, as shown below. Here three separate users in Mississippi have created projects on the same computer. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	To identify which of the entries in the list represents a particular project, look at its number string. This string comprises a BAS ID. Each BAS ID is 11 digits. The first digit indicates the Entity Type (i.e., the user type) (0 = consolidated city; 1 = incorporated place; 2 = county; 3 = MCD; and 7 = state). The next two digits are the state FIPS code. The following three digits are the FIPS code for the working county (these digits are '000' for incorporated places). The final five digits are the FIPS code for the specific incorporated place, consolidated city, or MCD that created the project (for counties, these digits are '00000' since the county is already identified in the string). The number string, 12800040360.qgs reflects a project created by a Place user (for the City of Lena) in Mississippi, where 1 = incorporated place; 28 = Mississippi FIPS code; 000 = placeholder number for non-county entities (if the user were a county user this number would be the FIPS code for Chickasaw County, or 155); and 40360 = the place FIPS code for Lena. The BAS ID information for a particular geography is available within the **Map Management** dialog box. Below is an example for Hanover Township, an MCD in Jefferson County, Indiana. 
Step 25	After identifying the correct file to reopen, select it from the list. *The map for the project automatically loads and the layers show in the **Layers Panel**.*
	Census Bureau-defined default layers and view settings are loaded each time a new project is started in GUPS. If these default settings have been changed and then are saved during a project, reopening the project will load these saved changes rather than the Census Bureau-defined default layers and view setting. To restore the default settings for a layer: • Click on the layer in the **Layers Panel**. *A drop-down menu opens*. • In the drop-down menu, select '**GUPS Layer**'. *A submenu opens*. • In the submenu, select '**Load default style**' (see illustration below). 

PART 2: HOW TO USE GUPS

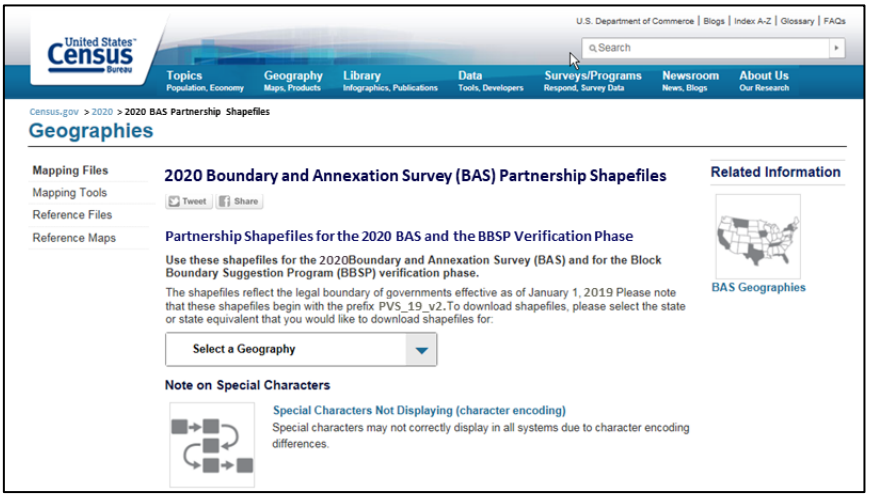
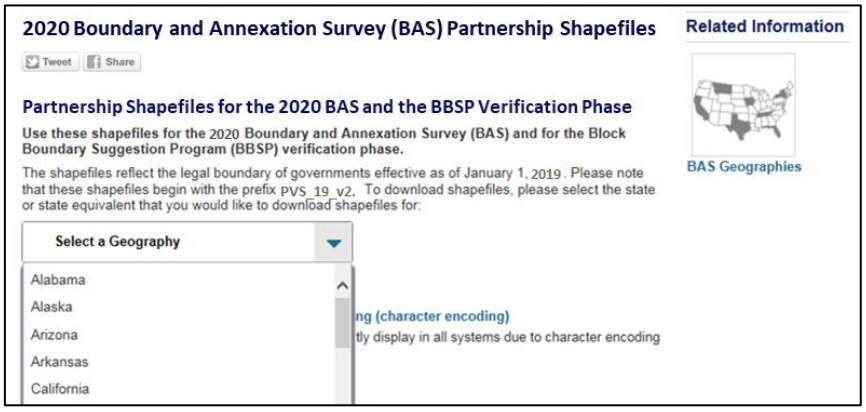
Step	Action and *Result*
	To reset the default settings for all layers, select '**Load all default style.**' 
Step 26	When a project is opened in Map Management, any previously selected adjacent (or other selected) counties may appear in cyan and remain checked. Other adjacent counties that have not previously been selected may appear in yellow and are also checked, as shown below.  Additional counties may be loaded at this point.
	Loading Multiple Files at Once The limit to how many county datasets can be loaded at once is 11 (the working county plus 10 other counties). To load shapefiles for additional counties, after the first 10 are loaded: • Leave the same working county selected in the **Working County** field. • Uncheck the already loaded counties in the **Map Management** dialog box list. • Check the checkboxes for the additional counties (up to 10) to be added. Click the **Open** button and after the **Select Data Folder, Directory or Location** box opens, use the drop-down menu to select the source of the files. Repeat this process as many times as needed.

5.3 Download Shapefiles from the BAS Website

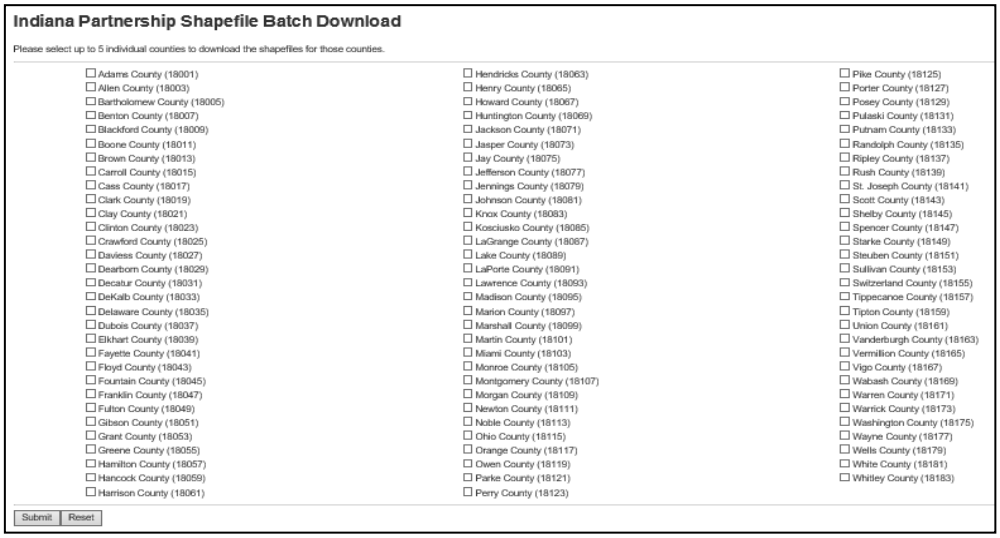
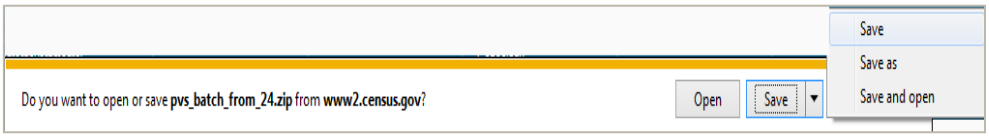
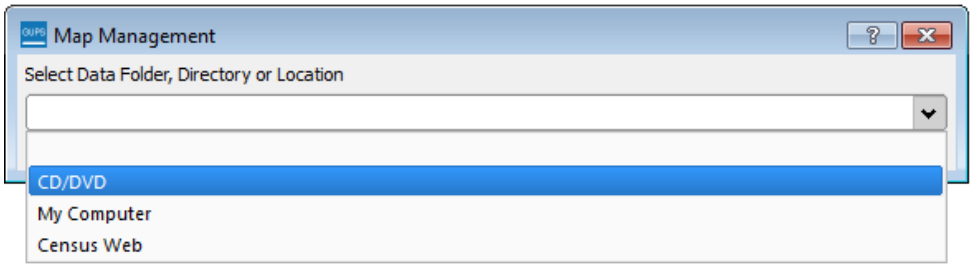
Follow the steps in **Table 7** to download the files from the BAS website to the hard drive. Please note that images may vary slightly as website updates are made after this document is published.

PART 2: HOW TO USE GUPS

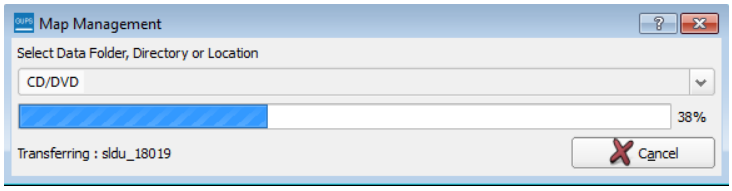
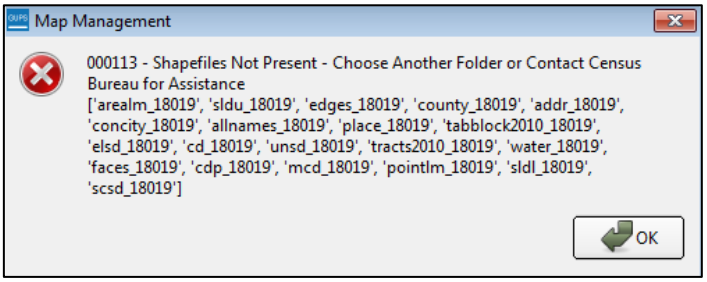
Table 7: Download Shapefiles from the BAS Website

Step	Action and *Result*
Step 1	Enter the URL <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> into a web browser. *The **Boundary and Annexation Survey (BAS) Partnership Shapefiles** page opens*. 
Step 2	Under '2020 Partnership Shapefiles', in the '**Select a Geography**' drop-down box, select the name of the state in which the entity is located from the drop-down list. *The **[State Name] Partnership Shapefile Batch Download** page opens*. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	To select the county(ies) or county equivalent(s) needed, click the box next to it. Up to five (5) counties may selected at a time. Once the counties are selected, click the **Submit** button at the bottom left hand side of the page.  **Indiana Partnership Shapefile Batch Download** Please select up to 5 individual counties to download the shapefiles for those counties. ☐ Adams County (18001) ☐ Allen County (18003) ☐ Bartholomew County (18005) ☐ Benton County (18007) ☐ Blackford County (18009) ☐ Boone County (18011) ☐ Brown County (18013) ☐ Carroll County (18015) ☐ Cass County (18017) ☐ Clark County (18019) ☐ Clay County (18021) ☐ Clinton County (18023) ☐ Crawford County (18025) ☐ Daviess County (18027) ☐ Dearborn County (18029) ☐ Decatur County (18031) ☐ DeKalb County (18033) ☐ Delaware County (18035) ☐ Dubois County (18037) ☐ Elkhart County (18039) ☐ Fayette County (18041) ☐ Floyd County (18043) ☐ Fountain County (18045) ☐ Franklin County (18047) ☐ Fulton County (18049) ☐ Gibson County (18051) ☐ Grant County (18053) ☐ Greene County (18055) ☐ Hamilton County (18057) ☐ Hancock County (18059) ☐ Harrison County (18061) ☐ Hendricks County (18063) ☐ Henry County (18065) ☐ Howard County (18067) ☐ Huntington County (18069) ☐ Jackson County (18071) ☐ Jasper County (18073) ☐ Jay County (18075) ☐ Jefferson County (18077) ☐ Jennings County (18079) ☐ Johnson County (18081) ☐ Knox County (18083) ☐ Kosciusko County (18085) ☐ LaGrange County (18087) ☐ Lake County (18089) ☐ LaPorte County (18091) ☐ Lawrence County (18093) ☐ Madison County (18095) ☐ Marion County (18097) ☐ Marshall County (18099) ☐ Martin County (18101) ☐ Miami County (18103) ☐ Monroe County (18105) ☐ Montgomery County (18107) ☐ Morgan County (18109) ☐ Newton County (18111) ☐ Noble County (18113) ☐ Ohio County (18115) ☐ Orange County (18117) ☐ Owen County (18119) ☐ Parke County (18121) ☐ Perry County (18123) ☐ Pike County (18125) ☐ Porter County (18127) ☐ Posey County (18129) ☐ Pulaski County (18131) ☐ Putnam County (18133) ☐ Randolph County (18135) ☐ Ripley County (18137) ☐ Rush County (18139) ☐ St. Joseph County (18141) ☐ Scott County (18143) ☐ Shelby County (18145) ☐ Spencer County (18147) ☐ Starke County (18149) ☐ Steuben County (18151) ☐ Sullivan County (18153) ☐ Switzerland County (18155) ☐ Tippecanoe County (18157) ☐ Tipton County (18159) ☐ Union County (18161) ☐ Vanderburgh County (18163) ☐ Vermillion County (18165) ☐ Vigo County (18167) ☐ Wabash County (18169) ☐ Warren County (18171) ☐ Warrick County (18173) ☐ Washington County (18175) ☐ Wayne County (18177) ☐ Wells County (18179) ☐ White County (18181) ☐ Whitley County (18183) Submit Reset *A prompt to save the file(s) appears*.  Do you want to open or save **pvs_batch_from_24.zip** from **www2.census.gov**? Open Save Save as Save and open
Step 4	Click the down arrow next to **Save** and select 'Save As' in the drop-down list. *The **Save As** dialog box appears, with the file appearing in the **File Name** field. If more than one county was selected, a single ZIP file containing the selected counties is saved*.
Step 5	In the **Save As** dialog box, select a location in the home directory to save the files.
Step 6	Click the **Save** button. *The file(s) are saved in the selected location*.
Step 7	To obtain shapefiles for additional counties, repeat the download process as needed.
Step 8	When the **Select Data Folder, Directory or Location** box opens, use the drop-down menu to select the location from which to pull the shapefiles. In this instance, **this example loads them from a Census Bureau-provided DVD**. To do so, insert the DVD into the DVD drive, then select 'CD/DVD', as shown below.  Map Management Select Data Folder, Directory or Location CD/DVD My Computer Census Web

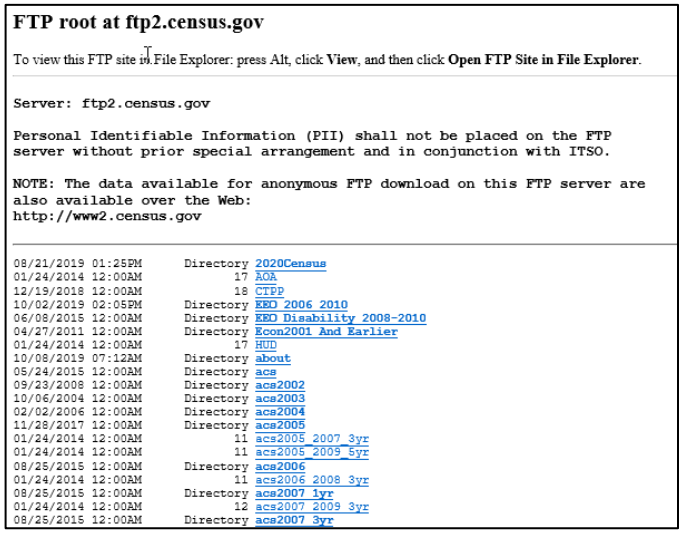
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	The files for Clark and Jennings Counties begin to load and progress is displayed by the blue striped bar (color may vary), with the progress percentage noted to the right. 
Step 9	If for any reason shapefiles are missing from the location chosen in the **Select Data Folder, Directory or Location** drop-down menu, or the files are corrupted and cannot be loaded, an error message such as the one shown below will display. 

5.4 Download Shapefiles from the Census Bureau ftp2 Site

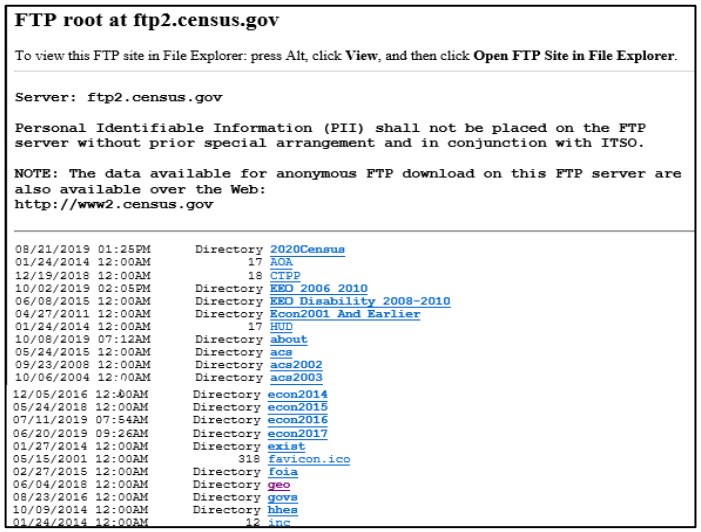
If using GUPS at the state level, or if downloading shapefiles for several counties at one time, follow the steps in **Table 8**.

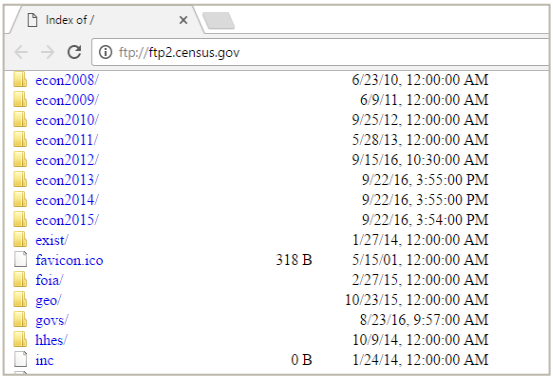
Table 8: Download Shapefiles from ftp2 Site to a Hard Drive (State Users)

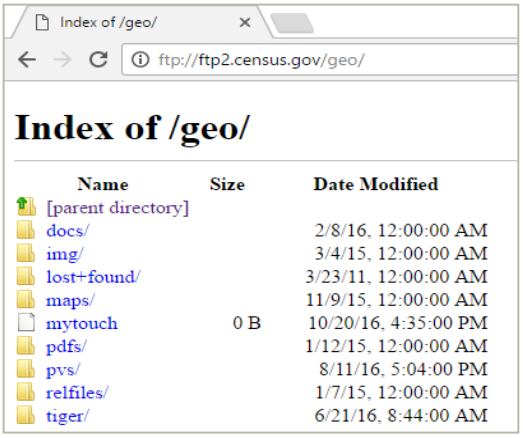
Step	Action and *Result*
Step 1	Using Internet Explorer (IE) or another web browser navigate to <ftp://ftp2.census.gov/>. *The **ftp root at ftp2.census.gov** main page opens.* 

PART 2: HOW TO USE GUPS

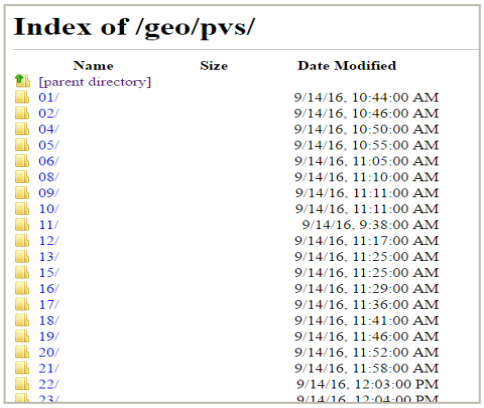
Step	Action and *Result*
Step 2	To open the Census Bureau File Transfer Protocol (FTP) site in Windows Explorer (sometimes called file explorer), press '**Alt**' and click the '**View**' tab on the browser menu and select "**Open FTP site in File Explorer**". If using Windows Explorer to access the ftp2 site, no login information is required.
Step 3	After the Census Bureau FTP site has been opened in file explorer, click the '**geo**' folder.







PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 4	Within the '**geo**' folder, click the '**pvs**' folder (**p**artnership **v**erification **s**hapefiles).  **Index of /geo/pvs/** Name Size Date Modified [parent directory] 01/ 9/14/16, 10:44:00 AM 02/ 9/14/16, 10:46:00 AM 04/ 9/14/16, 10:50:00 AM 05/ 9/14/16, 10:55:00 AM 06/ 9/14/16, 11:05:00 AM 08/ 9/14/16, 11:10:00 AM 09/ 9/14/16, 11:11:00 AM 10/ 9/14/16, 11:11:00 AM 11/ 9/14/16, 9:38:00 AM 12/ 9/14/16, 11:17:00 AM 13/ 9/14/16, 11:25:00 AM 15/ 9/14/16, 11:25:00 AM 16/ 9/14/16, 11:29:00 AM 17/ 9/14/16, 11:36:00 AM 18/ 9/14/16, 11:41:00 AM 19/ 9/14/16, 11:46:00 AM 20/ 9/14/16, 11:52:00 AM 21/ 9/14/16, 11:58:00 AM 22/ 9/14/16, 12:03:00 PM 23/ 9/14/16, 12:04:00 PM
Step 5	Select the state folder that contains the county or counties for which data is downloading. The state folders are represented using two-digit state FIPS codes.
Step 6	There are several sets of shapefiles within each state directory. Download the most recent partnership shapefiles. These shapefiles are contained within a zip file with the prefix **partnership_shapefiles_19v2**. Each zip file ends with a five-digit state-county FIPS code (e.g., 08051) which represents the county data being downloaded. **Make sure to choose the filename with "19v2", because the "19v1" files are sometimes also available in the folders**.
Step 7	Select the county or counties that are to be downloaded to the local drive. These files may be copied to any desired location. When selecting a geography in GUPS, the application asks to specify the location ('CD/DVD', 'My Computer', or 'Census Web') of the files. When 'My Computer' is selected, GUPS asks to select a directory. Navigate to the location where the files will be saved and select those that are to be uploaded. *GUPS unzips and loads the files, then moves them to the pre-established folder on the designated home directory*.
	If using an FTP client software such as winscp or FileZilla (or other), <ftp://ftp2.census.gov/> may be connected to without a password. Participants should enter 'anonymous' as the user name and their email address as the password.

5.5 Using the GUPS Interface

5.5.1 GUPS Main Page

Figure 2 shows the layout of the main GUPS page. This page contains all the tools needed for making BAS updates. All work is completed from this page. Shown in the figure are the main page elements. These include the:

1. Menu.
2. Layers.
3. Map View (where the data displays).
4. Toolbars (Standard toolbar, BAS toolbar, and Add Layers toolbar).
5. Status Bar (at bottom of page).

PART 2: HOW TO USE GUPS

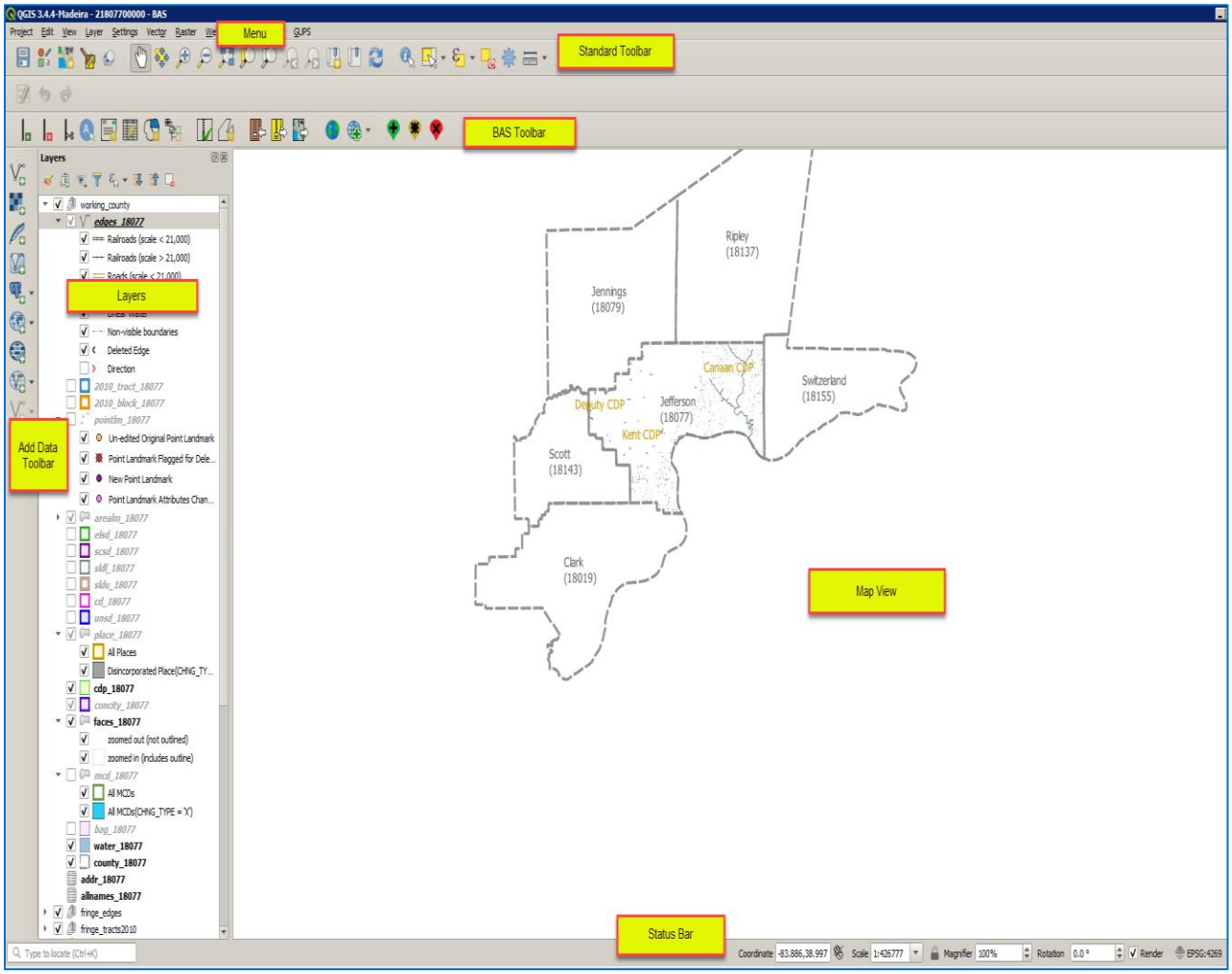


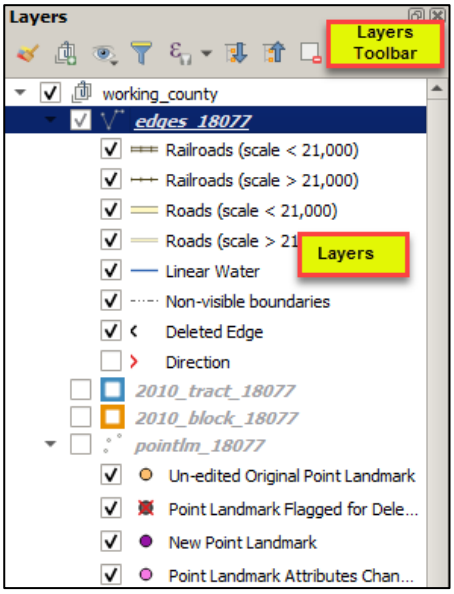
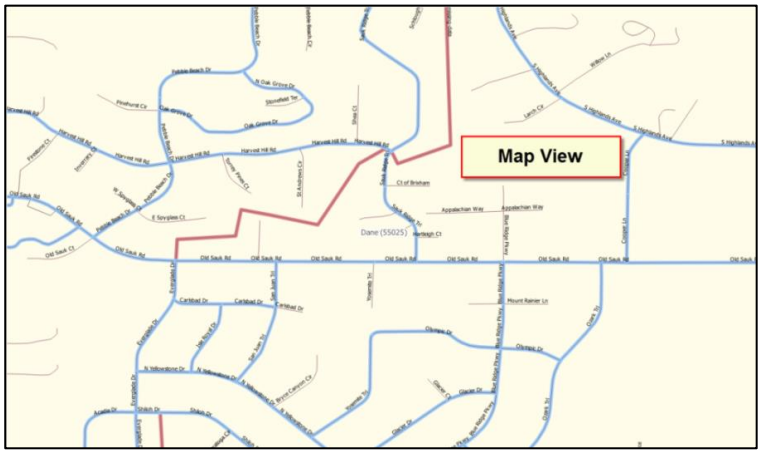
Figure 2. GUPS Main Page Layout

The purpose for each element on the main GUPS page is explained in **Section 5.5.1** through **Section 5.7.1** describing in detail the individual components and specific functions of each element.

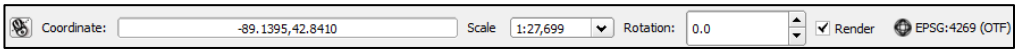
Table 9: GUPS Main Page Elements

Page Element	General Function
Menu	The menu offers basic features such as **Settings** and **Help**; tools to manage the map view and import user-provided data; important calculation, measurement, and geoprocessing tools; and tools needed to make shapefile updates. Note that almost all of the functions available from the **Menu** are also available in the application's more conveniently located toolbars. Project Edit View Layer Settings Vector Raster Web Processing Help GUPS

PART 2: HOW TO USE GUPS

Page Element	General Function
Layers	The **Layers** Panel shows the layers on the map for the county selected. Layers (or groups) can be removed, layer visibility managed, and legend content filtered through the Layers toolbar. 
Map View	The **Map View** displays the data for the county selected in the **Map Management** dialog box. 
Standard Toolbar	Provides the navigation and other tools needed to interact with the map and layers' attribute tables.
BAS Toolbar	Gives the specific tools needed to make BAS updates, view linear feature attributes, review and validate changes, import and export zipped files, and print maps.

PART 2: HOW TO USE GUPS

Page Element	General Function
Manage Layers Toolbar	Offers tools to import non-Census data. Map layers may be superimposed in GUPS to compare the features on the users' maps with those on the Census Bureau shapefiles. Note: although shown horizontally here, this toolbar appears aligned vertically to the left of the Layers Panel in the GUPS application.
Status Bar	Displays information on the map scale, projection, and coordinates and allows the user to adjust the display. 

5.5.2 Layers Panel and Map View

When choosing a program and geography in the **Map Management** dialog box, GUPS automatically loads a set of default data layers (and default layer groups) defined by the Census Bureau for the program selected. As the map opens in **Map View**, the list of the preset layers (already grouped) appears in the **Layers Panel**.

Use the **Layers Panel** and the small **toolbar** appearing at its top to manage the map view. Note that the **Layers Panel** and the **Map View** windows are interdependent. Selections made in the **Layers Panel** are immediately reflected on the map display.

Close the **Layers Panel** at any time to see more of the map (just click on the small '**x**' in the upper right-hand corner).

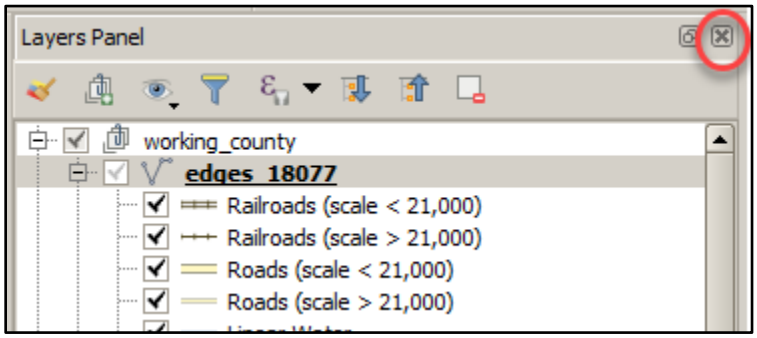


Figure 3. Close Layers Panel

PART 2: HOW TO USE GUPS

To restore the **Layers Panel**, click the View tab on the Menu, select '**Panels**' in the drop-down menu, click the arrow next to '**Panel**' to open the submenu, then click on '**Layers**'.

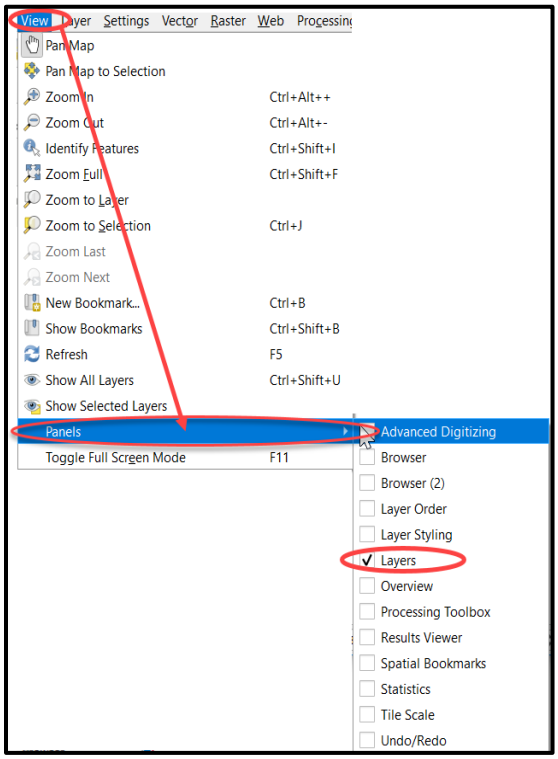


Figure 4. Restore the Layers Panel

The **Layers Panel** will then reopen and display in its default position on the page.

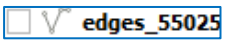
5.5.3 Managing the Map View from Within the Layers Panel

Within the **Layers Panel**, layer visibility can be managed (i.e., determine what layers display on the map), data layers reordered, and new layer symbology set.

5.5.3.1 Manage Layer Visibility

To add or remove layers from the map view:

- Click the checkbox next to a layer to turn it on in the map view.

- Uncheck the checkbox next to a layer to turn it off in the map view. 

Note: To remove a layer from the map document right-click the name of the layer and select '**Remove Layer**' in the drop-down menu. The layer will be removed from the map document. After removal, the layer would need to be re-added if needed again.

PART 2: HOW TO USE GUPS

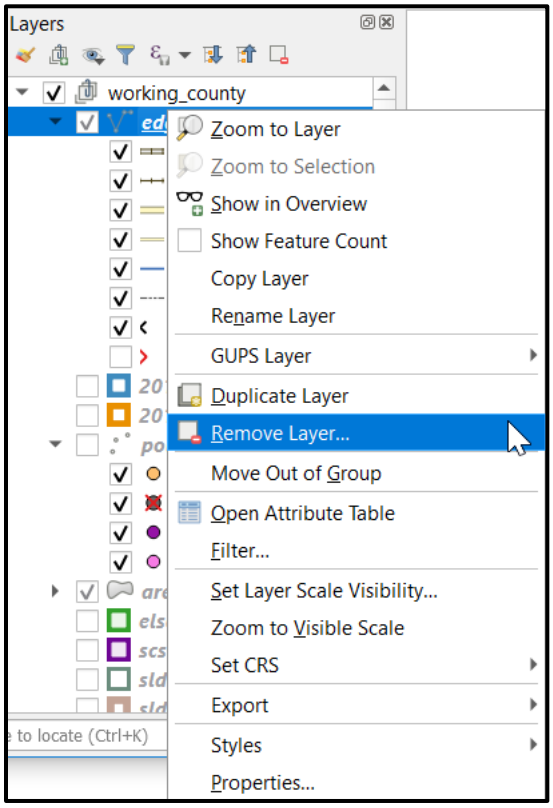


Figure 5. Managing Layer Visibility

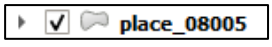
5.5.3.2 Reorder Data Layers

In the **Layers Panel**, the order in which the layers are listed determines how the layers display on the map. The layers at the top display on top of those below them. To change the display order:

1. Left-click on the layer name.
2. Hold down the mouse button and drag the layer to the desired position in the list.
3. Release the mouse button to place the layer in its new position. The map display will then reflect the new layer order in the **Layers Panel**.

5.5.3.3 Expand/Contract Layers Panel Menus

To expand or contract the menu for a layer or layer group:

- Click on the ' ▸ ' sign to *expand the group*. When the box shows a check mark next to the layer name 

, the layer's submenu opens:

- Click on the box and uncheck next to the layer to *close the submenu(s).*

PART 2: HOW TO USE GUPS

5.6 Menu & Toolbars

The main **Menu**, the **Standard toolbar**, and the **BAS toolbar** are located at the top of the GUPS page. These toolbars offer general GIS and system tools used to make BAS updates.

Figure 6. Menu and Toolbars

The **Manage Layer toolbar**, the vertical toolbar located to the left of the **Layers Panel** (shown here in a horizontal position) allows the importing of user-provided data.

Figure 7. Manage Layer Toolbar

Note: Although the **Menu** is always located at the top of the page and cannot be moved, the toolbars may be moved the toolbars to a more convenient location. For example, drag the **Add Data toolbar** to the top of the page to expand the area available for the **Layers Panel** and **Map View**.

While working with the toolbars, hover the mouse over any toolbar button to see the name of the tool it represents. Resize and reposition the toolbars by dragging them.

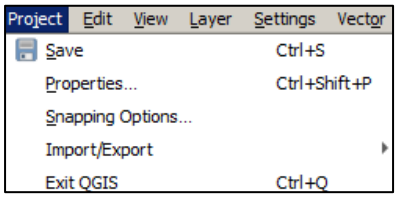
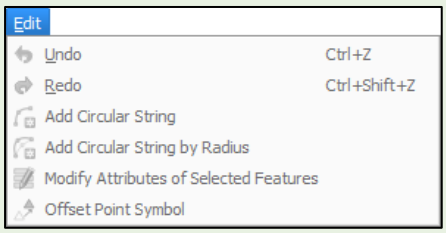
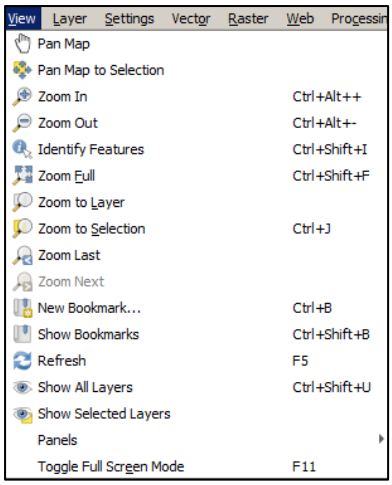
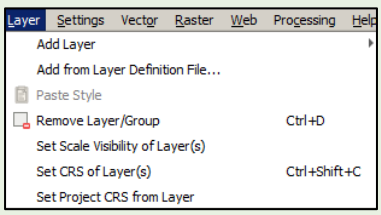
The Menu, the Standard toolbar, and the BAS toolbar are described in the section below. The Add Data toolbar is discussed in **Section 5.7, How to Import User-Provided Data into GUPS**.

5.6.1 Menu Tabs

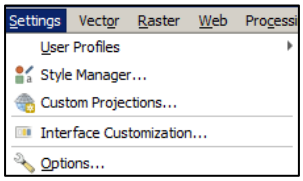
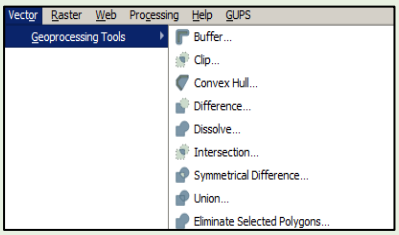
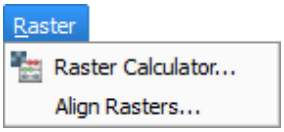
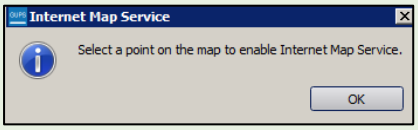
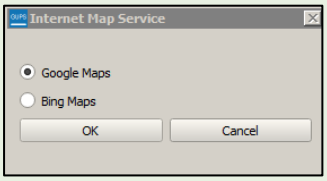
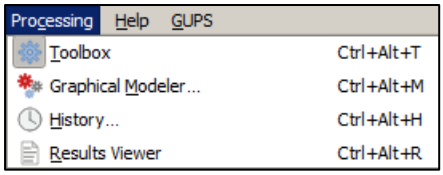
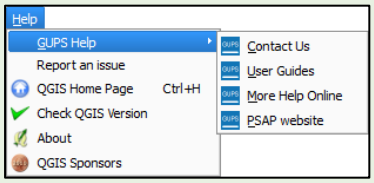
Table 10 below defines each of the tabs on the main **Menu**, provides an image of the drop-down options for each, and describes each tab's function.

PART 2: HOW TO USE GUPS

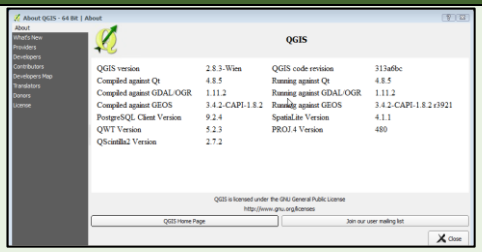
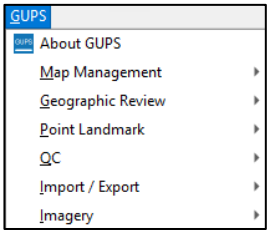
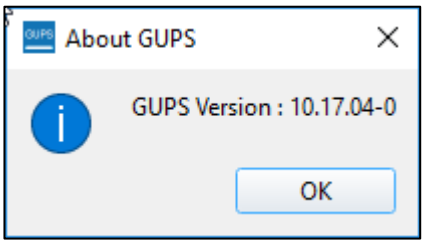
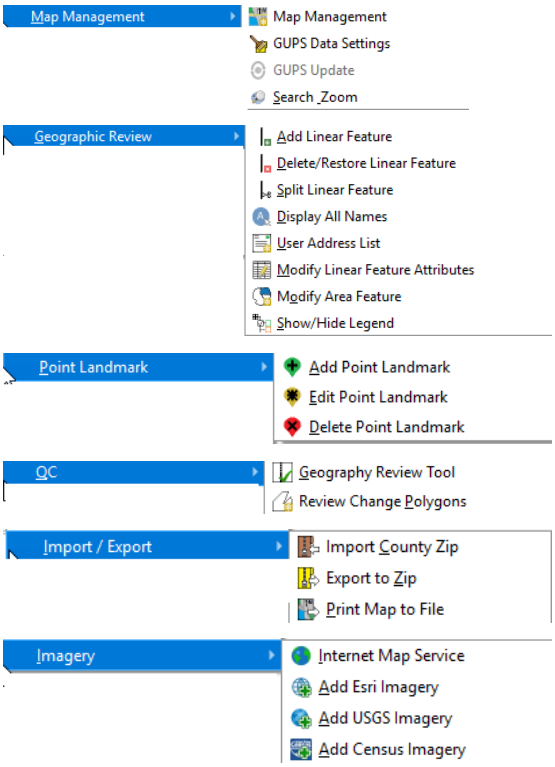
Table 10: Menu Tabs and Their Functions

Tab	Drop-down Menu	Function/Description
Project		From the **Project** tab, click on 'Save' to save the project, click on '**Import/Export**' to create an image file of the map in **Map View**, or exit the application. When using '**Export Map to Image'** sub-menu under **'Import/Export'**, GUPS provides various image file type formats when exporting a map view (.png, .jpg, .tif, etc.).
Edit		From the **Edit** tab, click 'Undo' to undo the last action or 'Redo' to redo an undone action. **Note:** For '**Undo**' to work, the correct layer must be selected in the **Layers Panel**. For example, if a linear feature is added to the **Edges** layer, then the layer is deselected by selecting the **Area Landmarks** layer, '**Undo**' will not delete the linear feature. The **Edges** layer must be selected to undo the linear feature's addition. **Note:** Multiple actions can be undone on a single layer (e.g., the addition of several linear features) if the project has not been saved. If the project is saved, the Undo option is disabled until more changes are made.
View		The **View** tab is used to complete several actions also available on the **Standard toolbar**. Included are options for navigating the map, identifying feature attributes, measuring distance, and creating spatial bookmarks to return to the same map view later. This location also provides a way to: • Set what toolbars display. • Restore the **Layers Panel** if it has been closed it (click '**Panels**' in the drop-down menu, click the right arrow, click '**Layers**' in the Layers down-menu). • Refresh the map to restore it to the original map extent.
Layer		The **Layer** tab provides access to adding and removing layers from the map, opening the layer's attribute table, setting the map projection, or Coordinate Reference System (CRS), and displaying or hide layers. **Note:** Many of these same functions are more conveniently located on the **Add Layers toolbar** and the small toolbar that sits at the top of the **Layers Panel.**

PART 2: HOW TO USE GUPS

Tab	Drop-down Menu	Function/Description
Settings		The **Settings** tab provides access to custom CRS and map display options, and can be used to set snapping tolerances (see instructions below this table).
Vector		The **Vector** tab provides access to several Geoprocessing Tools, used to create buffers around features, overlay areas to create an intersection, union, or symmetrical difference, merge features, and perform other common geoprocessing actions.
Raster		The **Raster** tab provides access to a Raster Calculator, which performs calculations on the basis of existing raster pixel values. It includes a Georeferencer tool, which can be used to assign coordinates to the raster, and access to the Terrain Analysis, Projection, Conversion, Extraction, Analysis, and Miscellaneous Tools to assist in drawing land detail
Web	 	Clicking on the Web tab will create a pop up which will display either “Select a point on the map to enable Internet Map Services” or the Internet Map Service window giving the option to view the maps in either Google Maps or Bing Maps.
Processing		Although available to GUPS users, the options under the **Processing** tab are not needed for Census Bureau geographic program participation. The items under this tab pertain to algorithms, creating models, viewing the results of algorithms executed, and history.
Help		The **Help** tab provides tools for understanding QGIS (the open-source platform on which GUPS was developed) and the GUPS application itself. It also contains BAS contact information, access to the online version of this guide, training videos, and other information. Clicking the **About** option will bring up the latest version of GUPS installed on the computer.

PART 2: HOW TO USE GUPS

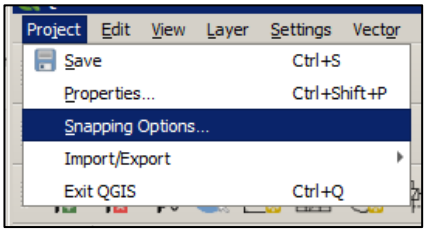
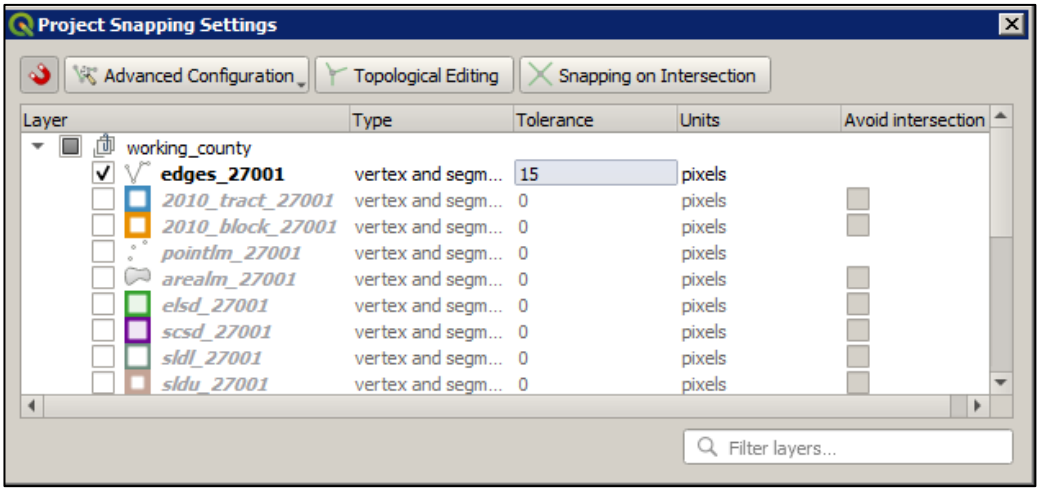
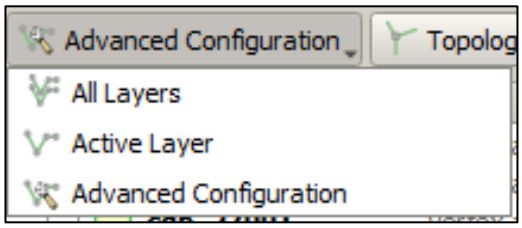
Tab	Drop-down Menu	Function/Description
		
GUPS	 Click the **About GUPS** option in the drop-down menu to find the GUPS version number. This number will be required if technical assistant is needed. Here the version number is 10.17.04-0. The number that appears may be more recent based on the user's computer and software. 	The **GUPS** tab provides quick access to Map Management, Geographic Review, Point Landmark, Quality Control (QC), Import/Export, and Imagery drop-down screens. 

Note on Snapping Tolerances

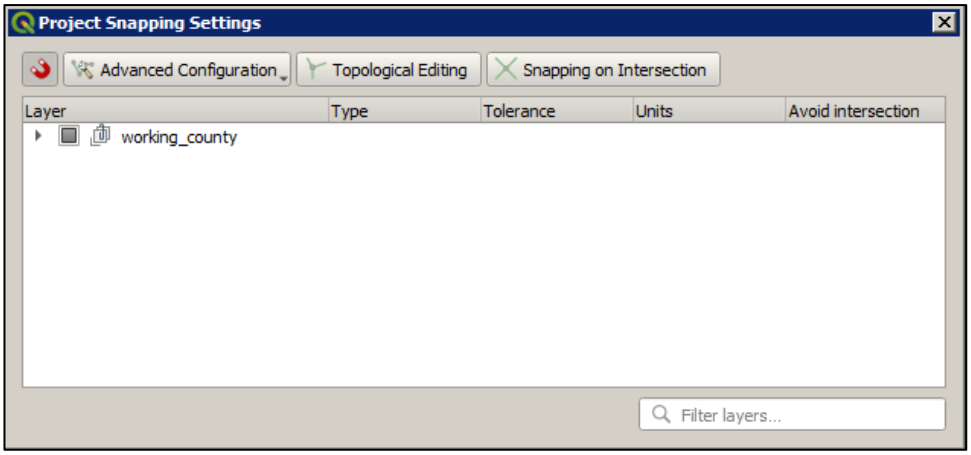
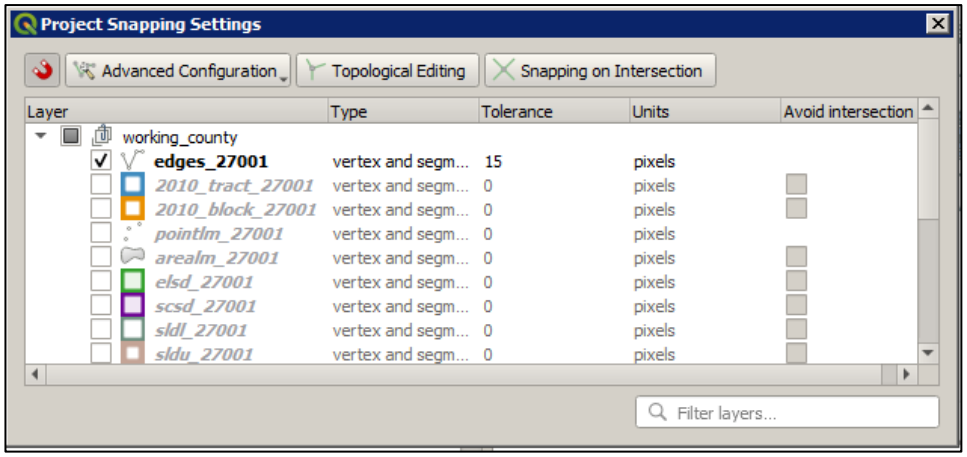
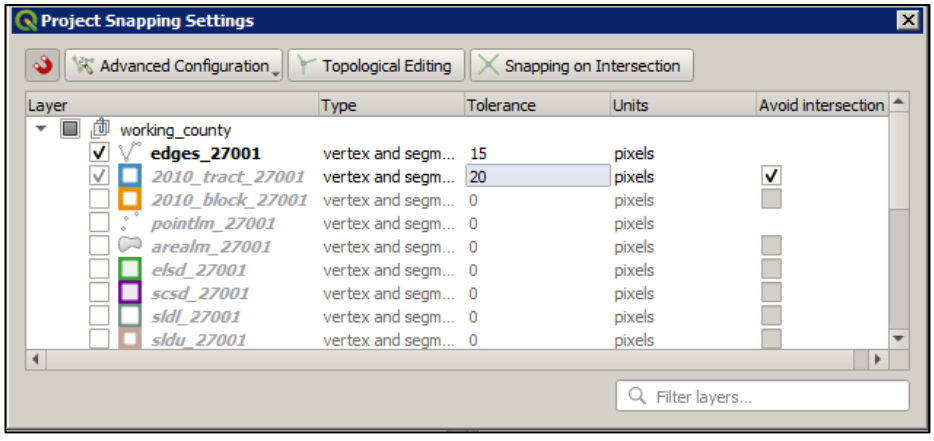
Snapping tolerances in GUPS are pre-defined by layer (e.g., the default tolerance for edges is set to 15 pixels). When making boundary corrections, it may be beneficial to adjust the snapping tolerances for a layer or layers. To do this, follow the steps in the table below.

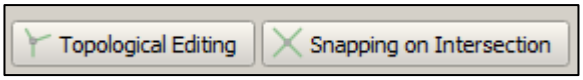
PART 2: HOW TO USE GUPS

Table 11: Adjust Snapping Tolerances

Step	Action and *Result*
Step 1	In the **Project** tab drop-down menu, click on '**Snapping Options**'.  *The **Snapping Setting** dialog box opens.* 
Step 2	From the **Advanced Configuration** drop-down menu, select whether to apply the tolerance adjustment to the current layer only or to all layers. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	Within the Layer window, you will need to expand the layer menu to see all the layers  
Step 4	Check the box next to each layer to snap. From the **Tolerance** drop-down menu, use the up and down arrows to select the value, and then select the units (map units or pixels) in the drop-down to the right and also whether to avoid intersection. 

Step	Action and *Result*
Step 5	To enable topological editing and/or snapping on an intersection, select either box. 
Step 6	Exit out of the window. *The new snapping tolerances are set.*

5.6.2 Standard Toolbar Buttons

The **Standard toolbar** provides the navigation tools to interact with the map and layers' attribute tables.

Figure 8. Standard Toolbar

The **Standard toolbar** actually includes several smaller toolbars. Each sub-toolbar is identified by a series of small parallel lines that precede it.

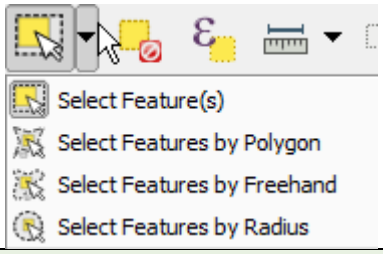
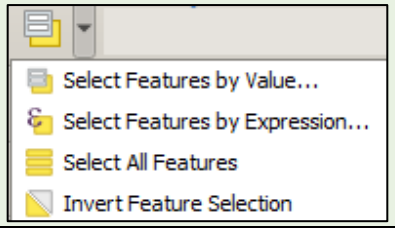
Figure 9. Sub-tool Markers

The first sub-toolbar contains the **Save** button, **Style Management** button, **Map Management** button (opens the **Map Management** dialog box), the **GUPS Data Settings** button (used to safely remove old GUPS project files), and the **Search Zoom** button. The second sub-toolbar provides tools for viewing and navigating the map in **Map View**, and the third sub-toolbar allows a user to identify, select, and deselect features on the map, make measurements, create spatial bookmarks, and work with the layers' attribute tables.

It is possible to move the location of the sub-toolbars. Simply left-click the parallel lines preceding the sub-toolbar and while holding down the mouse, drag the sub-toolbar to the desired location. Each button on the Standard toolbar and its purpose is defined in the **Table 12**.

Table 12: Standard Toolbar Buttons

Button	Name	Function/Description
	Save	Saves the current GUPS project, including any user changes to layer properties, projection, last viewed extent, and layers added.
	Style Manager	Allows customization of map symbology.
	Map Management	Chooses a geographic participant program in GUPS and access the automatically loaded default map display layers based on the program chosen.
	GUPS Data Settings	**Warning! This tool deletes files and folders permanently!** Change GUPSGIS data working directory and clean GUPS project data.
	Search Zoom	Searches the map by place, landmark, or street name and zoom automatically to the feature.
	Pan Map	Shifts the map in **Map View** without changing the map scale. Click the button, then click a location on the map to re-center the map to the clicked location.
	Pan Map to Selection	Shifts the map in **Map View** to the rows selected in the attribute table for a selected feature. After selecting a feature(s), click the button to re-center the map based on the selected feature(s).
	Zoom In	Displays the map in **Map View** at a larger scale. Click the button, then click on the map at the location to be zoomed to.
	Zoom Out	Displays the map in **Map View** at a smaller scale.
	Zoom Full	Displays the map in **Map View** at a smaller scale and zooms the map view to the full extent of the county.
	Zoom to Selection	Zooms the **Map View** to the rows selected by query in the attribute table for a feature(s). After selecting a feature(s) on the map, click the button to view the feature(s) at a greater map scale.
	Zoom to Layer	Zooms the **Map View** to the layer selected in the **Layers Panel**. After selecting the layer, click the button to zoom to the layer's extent.
	Zoom Last	Zooms the **Map View** to the previous map extent.
	Zoom Next	Zooms the **Map View** forward to the next map extent (if it was viewed previously).
	New Bookmark	Creates and names a spatial bookmark of the current map view.
	Show Bookmarks	Displays all bookmarks created by the user.
	Refresh	Displays **Map View** to initial full display.
	Identify Features	Identifies geographic features. Click the button, then click on a feature on the map to identify the feature at the location.

Button	Name	Function/Description
	Select Features by Area or Single Click	Allows the user to select layer features in the map window with a single click, by dragging the cursor, or by drawing graphics on the screen. 
	Select Features by Value	Allows selection of features by value or expression. 
	Deselect Features from All Layers	Deselects selected features from all layers.
	Processing Toolbox	Displays list of processing tools available.
	Measure	Provides options to measure linear distance, area, and angles on the map.

Most of the sub-toolbar buttons defined above are straight-forward. Those related to features, however, require further explanation. These buttons are used to identify and select/deselect features on the map and to view feature attributes. They are also used to make measurements and create spatial bookmarks.

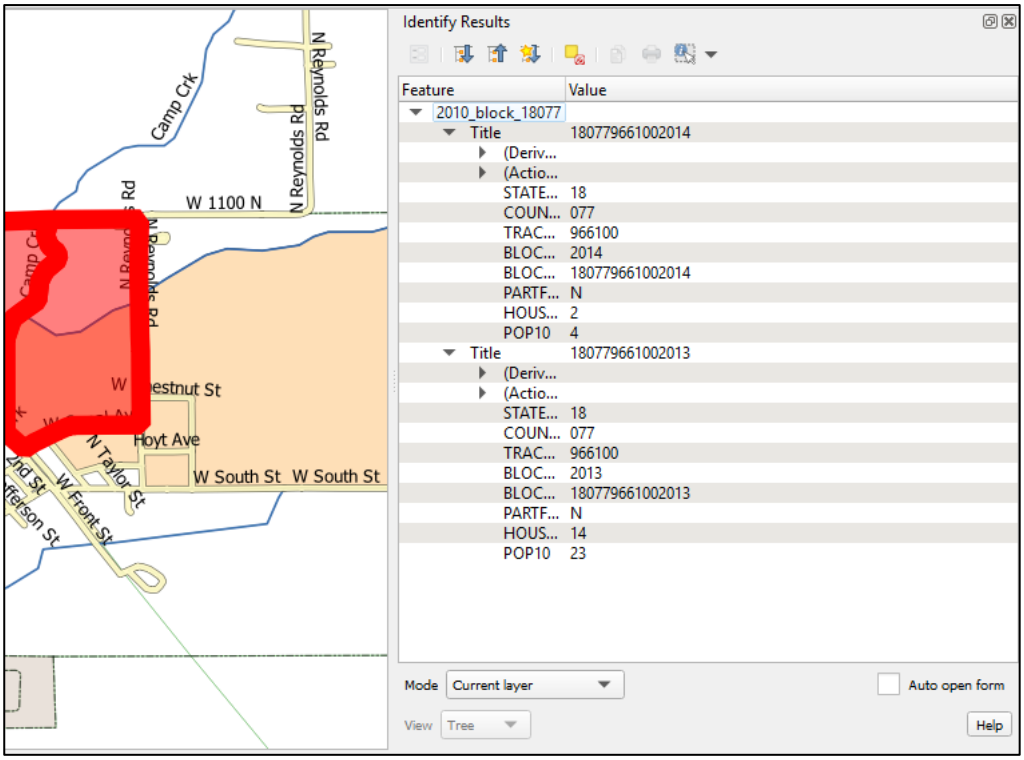
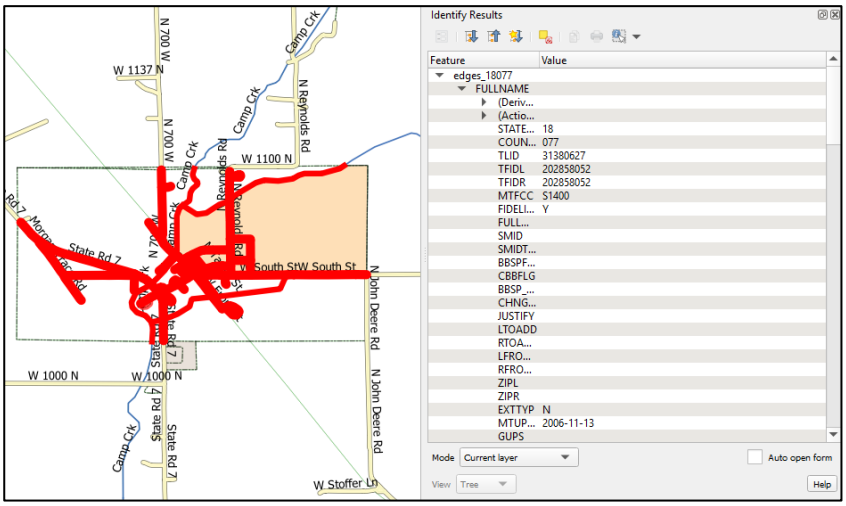
5.6.2.1 Identify a Feature Using the Identify Features Button

To identify a feature on the map, follow the steps in **Table 13**.

Table 13: Identify a Feature on the Map

Step	Action and *Result*
Step 1	Click the **Identify** button on the **Standard toolbar**.

PART 2: HOW TO USE GUPS

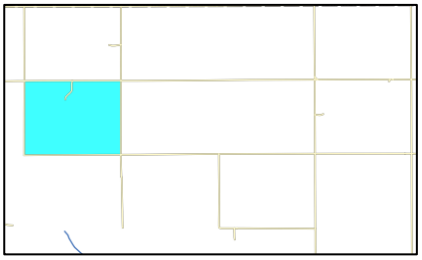
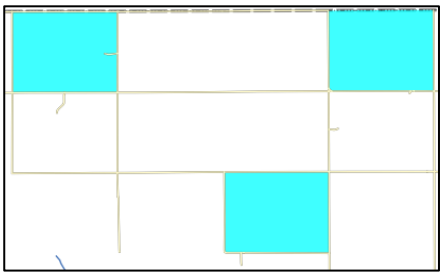
Step	Action and *Result*
Step 2	Then right-click on the feature. *The results will display in drop-down menus on the map*.  To see all attributes for the feature, select Identify all' in the **faces** drop-down menu.
Step 3	Alternately, click the **Identify** button, then left-click on the feature. *The feature turns red (color may vary) and the **Identify Results** screen opens under the **Layers Panel**, showing the feature attributes*. (Note that here the screen has been dragged from beneath the **Layers Panel** so that it sits over the map.) 

5.6.2.2 Select/Deselect Features Using the Select Features and Deselect Features Buttons

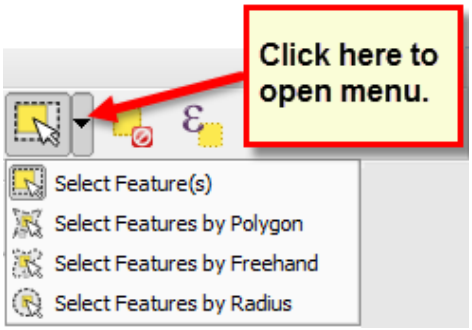
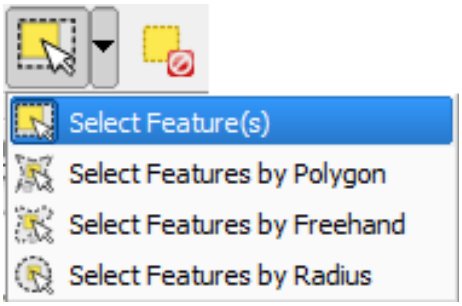
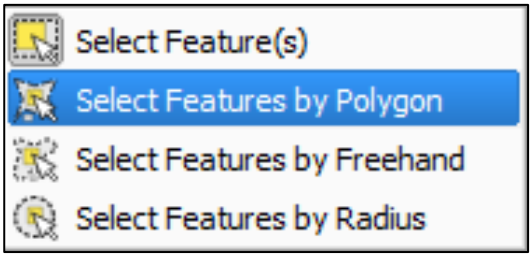
The **Select Features** button provides several ways to select features on the map. The **Deselect Features from All Layers** button allows users to deselect previously selected features.

Table 14 describes each of the feature selection methods, discusses when one might be preferable over another, and explains how to deselect features.

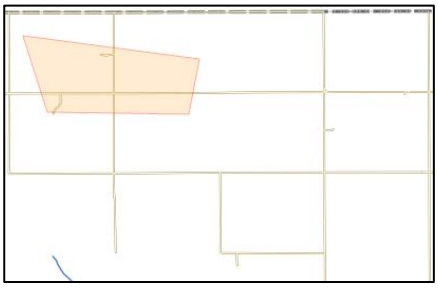
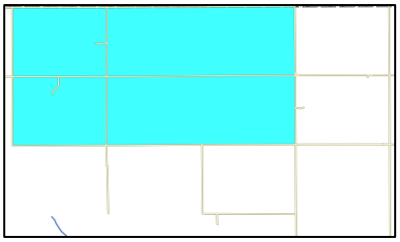
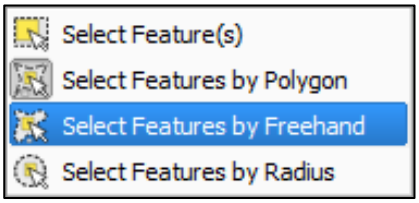
Table 14: Select/Deselect Features on the Map

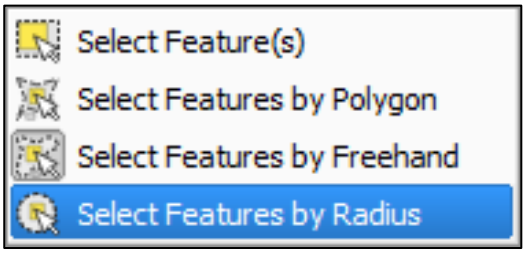
Step	Action and *Result*
Step 1	To begin, click on a layer name in the **Layers Panel**. For example, to select a linear feature, click on the 'edges' layer. To select faces, click on the 'faces' layer.
Step 2	Click once on the **Select Features** button on the **Standard Toolbar**.
Step 3	To select an edge or face on the map, click on it. In this example, select 'faces' in the **Layers Panel** and click on a face. *The face selected turns cyan*. 
Step 4	To select more than one face, hold down the **CTRL** key while clicking on the additional face(s). This method is useful when selecting noncontiguous faces, as shown below. 
	To select multiple features, click the **Select** Feature button, then drag the cursor over the features on the map. This method is useful when selecting a large number of contiguous faces or a large number of nearby linear features without having to click each feature one by one.
	A Note on GUPS Tools GUPS tools remain active until a different tool is selected. For example, if the **Select Features** tool is used to choose faces for a new area landmark, then in order to add a new linear feature instead, the **Add Linear Feature** tool must be clicked before clicking on the map again. If not, the **Select Features** tool, still active, selects a face.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	To open other **Select Features** options, click on the down arrow to the right of the **Select Features** button. *The **Select Features** drop-down menu opens*.  Note that when a menu option is selected, the button's appearance changes.
Step 6	The first option in the menu, '**Select Feature(s)**', duplicates the functions made available in the Select Features button on the toolbar. 
Step 7	The second option, '**Select Features by Polygon**', selects features via a polygon drawn on the map. To use this feature select it in the drop-down menu, then follow the steps below. 

PART 2: HOW TO USE GUPS

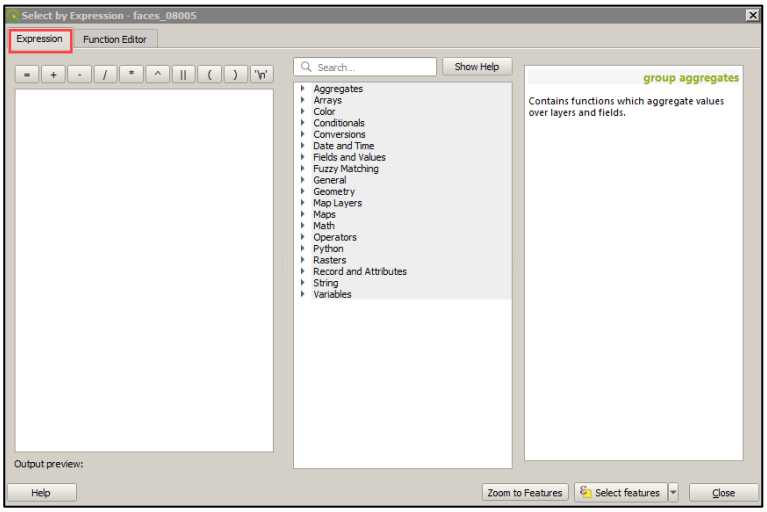
Step	Action and *Result*
Step 8	Left-click on the map to begin the polygon. Drag the cursor to extend the line, left-click, and then extend the line in a new direction. Finish by closing the polygon, as shown below. 
Step 9	To complete the selection, right-click. *All faces with an edge appearing within the polygon are highlighted in cyan*. 
Step 10	The third option, '**Select Features by Freehand**', selects features based on user-defined shapes drawn on the map.  To use this option, click on the map and use the cursor to draw any shape (polygon, triangle, circle, etc.). *If the shape does not cross any edges, the single face in which the shape is drawn is selected and turns cyan. If the shape crosses several faces, all faces whose edges are crossed are selected and turn cyan*. **Note:** This method is particularly useful when attempting to select a very small face. For example, draw a tiny triangle within a face to select it.

Step	Action and *Result*
Step 11	The final option, '**Select Features by Radius,**' selects features by defining a circle around the features to select.  To use this tool, left-click on the map, then hold down the mouse and drag the cursor outward to expand the circle. Release the mouse when done. *The feature(s) selected is (are) highlighted in cyan*.
Step 12	Polygons can be deselected by holding and using the same selection option to select by holding **CTRL** and retracing over the polygons, or deselect a feature or features automatically by clicking the **Deselect Features from All Layers** button once. *The selected features in all layers are deselected.*

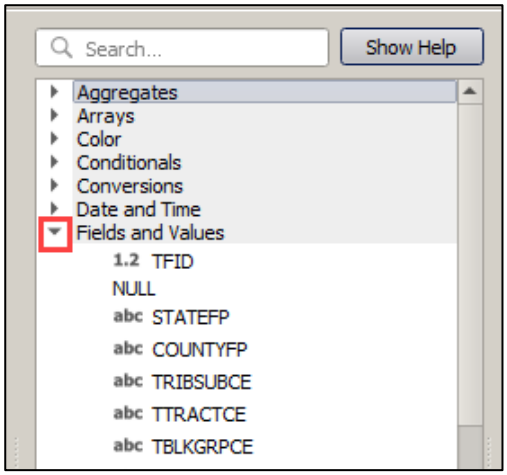
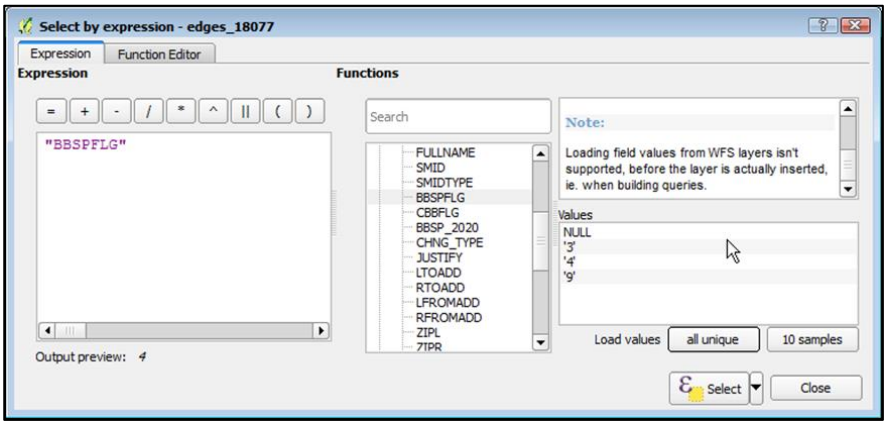
5.6.2.3 Select Features by Querying the Attribute Table

Another method to select features is by querying the attribute table. To do so, follow the steps in **Table 15**. In this example, the attribute table is being queried for the edges layer to locate and select all linear features flagged as edges for block boundaries.

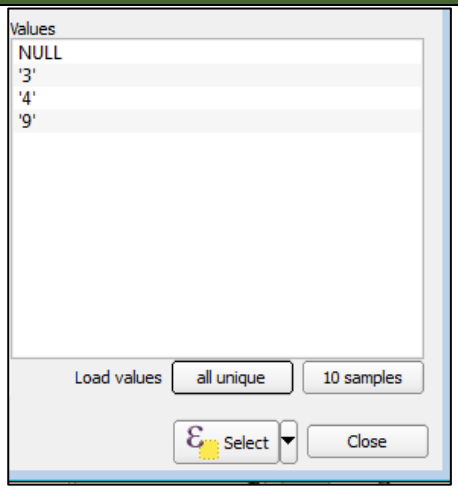
Table 15: Select Features by Querying the Attribute Table

Step	Action and *Result*
Step 1	Click the **Select Features by Value** button on the **Standard toolbar**. *In the drop down menu, **Select by Expression** window opens. The window has two tabs: **Expression** and **Function Editor**.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Under the **Expressions** tab, click the ' ▸ ' symbol next to the items in the **Functions** field to display their submenus. 
Step 3	To build a query, click the '**+**' sign next to '**Fields and Values**' to open the list of choices and then double-click on a field name. In this example, the '**BBSP Flag**' is selected to search for all features flagged as edges for block boundaries. *Once selected, "**BBSP Flag**" appears in the expression pane, and a **Load values** field is added to the **Fields** pane at the bottom far-right corner.* 
Step 4	Select an operator from a full list by clicking the '**+**' sign next to "Operators" in the **Functions** pane. **OR**, if one needs a commonly used operator such as equals, plus, or minus, click its corresponding button in the row of buttons at the top of the **Expression** pane.
Step 5	In this example, the operator for equals is needed. Double-click the '**=**' operator button. *The expression in the Expression pane now reads "BBSP Flag" =.*
Step 6	To select a specific value for the field "BBSP Flag", click either the **all unique** or **10 samples** button in the **Load values** field. *The **Values** field above the buttons populates with all allowed values*.

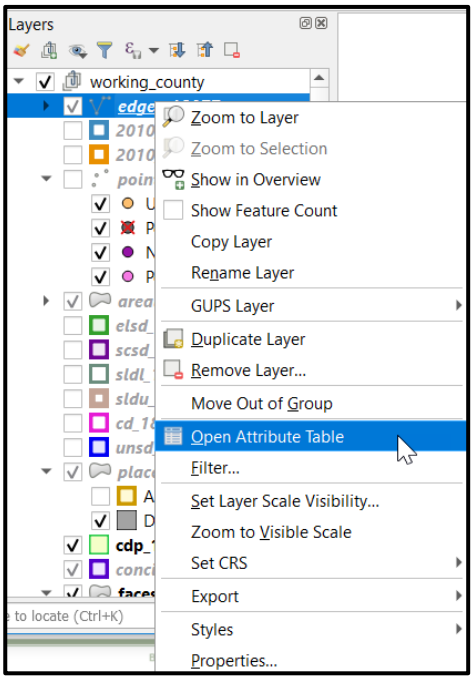
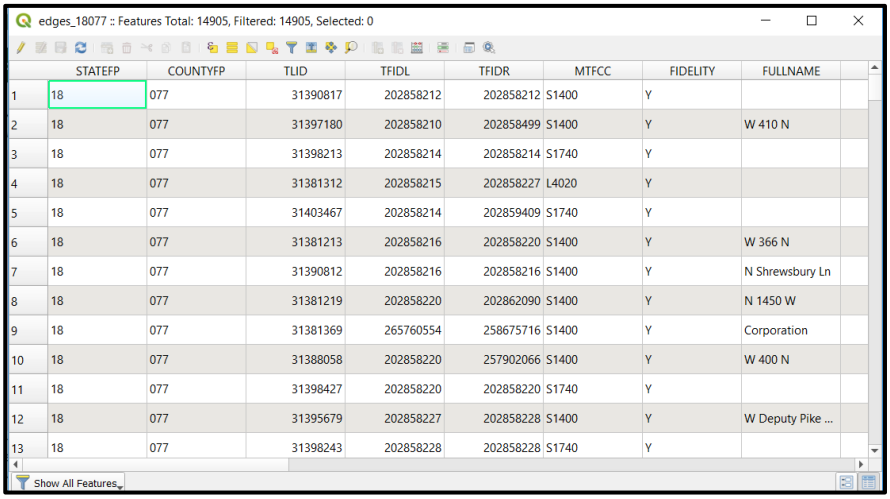
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	
Step 7	Select a value. Then select '**4**' by double-clicking on it in the **Values** field list. The expression changes to "BBSP Flag" = '4'.
Step 8	Click the **Select by Expression** button just below the **Load values** field. Then click **Close**. *All edges marked with a BBSP Flag with a value of '**4**' turn cyan on the map.*

5.6.2.4 View an Attribute Table for a Layer on the Map

To view an attribute table for a map layer, follow the steps in **Table 16**.

Table 16: View Layer Attributes Using the Attributes Table

Step	Action and *Result*
Step 1	Right-click the layer in the **Layers Panel**. *The drop-down menu opens.* 
Step 2	Click the '**Open Attribute Table**' option in the drop-down menu. *The Attribute table opens showing all features in the layer and their attributes (e.g., name, MTFCCs, etc.). Each column represents a separate attribute and each row an individual feature.* 

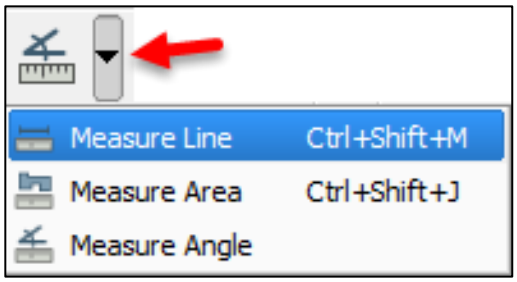
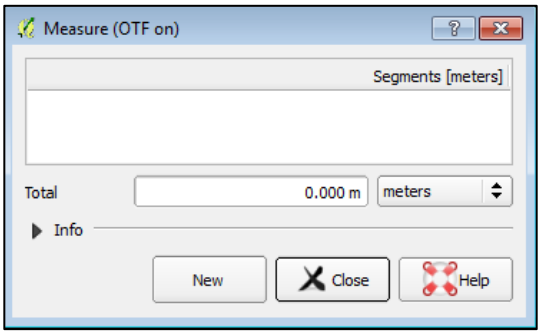
	STATEFP	COUNTYFP	TLID	TFIDL	TFIDR	MTFCC	FIDELITY	FULLNAME
1	18	077	31390817	202858212	202858212	S1400	Y	
2	18	077	31397180	202858210	202858499	S1400	Y	W 410 N
3	18	077	31398213	202858214	202858214	S1740	Y	
4	18	077	31381312	202858215	202858227	L4020	Y	
5	18	077	31403467	202858214	202859409	S1740	Y	
6	18	077	31381213	202858216	202858220	S1400	Y	W 366 N
7	18	077	31390812	202858216	202858216	S1400	Y	N Shrewsbury Ln
8	18	077	31381219	202858220	202862090	S1400	Y	N 1450 W
9	18	077	31381369	265760554	258675716	S1400	Y	Corporation
10	18	077	31388058	202858220	257902066	S1400	Y	W 400 N
11	18	077	31398427	202858220	202858220	S1740	Y	
12	18	077	31395679	202858227	202858228	S1400	Y	W Deputy Pike ...
13	18	077	31398243	202858228	202858228	S1740	Y	

Step	Action and *Result*
Step 3	To select a feature to view, click on the number on the far left of the row. To select multiple features, click on the number of the row for the first feature one wants to select, then press the **CTRL** key. While holding the **CTRL** key down, click on the numbers for the other individual rows one wants to select. To select a range of features, click on the number for the row showing the first feature one wants to select, then press the **SHIFT** key. While holding down the **SHIFT** key, click on the number for the last row one wants to select.

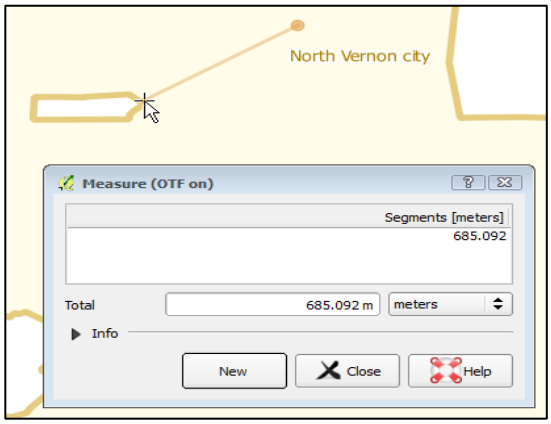
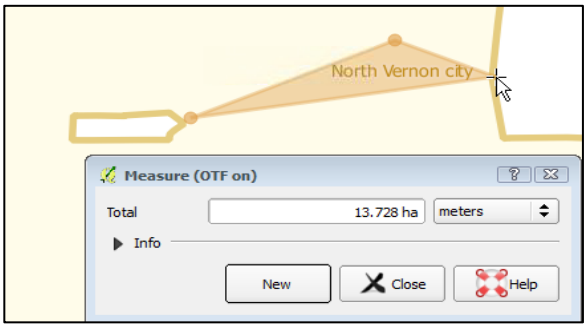
5.6.2.5 Determine Distance, Area, and Angles on the Map

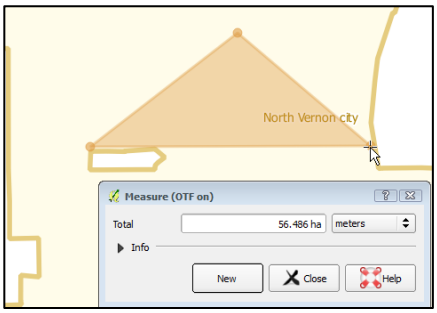
To measure the distance between two or more points, area, or an angle on a map, follow the steps in **Table 17**.

Table 17: Measure Distances, Area, and Angles on a Map

Step	Action and *Result*
Step 1	Click the **Measure** button on the **Standard toolbar**. *The **Measure** button drop-down menu opens.* 
Step 2	To measure the distance between two points on the map, select '**Measure Line**' in the drop-down menu. *The **Measure** box opens*. 

PART 2: HOW TO USE GUPS

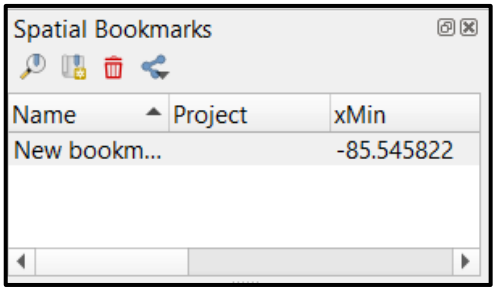
Step	Action and *Result*
Step 3	Zoom to the map location to be measured. Then click on the beginning point on the map and continue clicking on points until one reaches the final point. Right-click when done. *The length of each segment of the line drawn, as well as the total length of the line between the beginning point and the ending point, appear in the **Measure** box*. 
Step 4	To measure area on the map, select '**Measure Area**' in the drop-down menu. *The **Measure** box opens*. When the box opens, left-click on the map to begin drawing a polygon around the area one wants to measure. Left-click when each vertex of the polygon is reached. When finished, right-click. *The area polygon encompasses appears in the **Total** field. Use the drop-down to the right to see the area in other units of measure.*  To begin a new measurement, click the **New** button.

Step	Action and *Result*
Step 5	To measure an angle on the map, first select the '**Measure Angle**' option in the drop-down menu. Then left-click on the map to begin drawing the angle. Drag the mouse (but do not hold down the mouse button) to create the first side of the angle. Then left-click. Drag the mouse again (again without holding down the mouse button) to draw the second leg. *The **Angle** box opens showing the angle measurement*. 

5.6.2.6 Save Locations on a Map Using the Bookmark Button

To save geographic locations on the map and view them later, follow the steps in **Table 18**.

Table 18: Bookmark Locations on a Map

Step	Action and *Result*
Step 1	Zoom to the location on the map in **Map View** to be bookmark and click on the **New Bookmark** button on the **Standard toolbar**. *The **Spatial Bookmarks** box opens*. 
Step 2	Click on the row named '**New bookmark**'. Then backspace over '**New bookmark**' and type in a descriptive name for the bookmark (255-character limit). *The bookmark is added*.
Step 3	To view and manage spatial bookmarks, click on the **Show Bookmarks** button on the **Standard toolbar**. *The **Spatial Bookmarks** dialog box again opens*. To zoom to a bookmark, click on a bookmark name in the dialog box and then click the **Zoom to bookmark** button. To delete a bookmark, click on the bookmark name, then press the **Delete bookmark** button.
	Bookmark names and coordinates can be edited from the **Geospatial Bookmarks** dialog box.

PART 2: HOW TO USE GUPS

5.6.3 BAS Toolbar Buttons

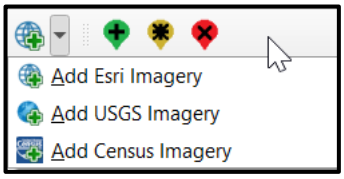
The **BAS toolbar** provides BAS-specific functions needed to complete a participant's review and update activities, as well as to import and export zipped shapefiles.

Figure 10. BAS Toolbar

Each toolbar button is described in **Table 19** below.

Table 19: BAS Toolbar Buttons

Button	Name	Function/Description
	Add Linear Feature	Add a new linear feature.
	Delete/Restore Linear Feature	Delete an existing linear feature.
	Split Linear Feature	Split a linear feature. One may need to split a linear feature to accurately reflect an entity's location. This feature "splits" the original into two.
	Display All Names	Displays all names for a street with multiple names assigned in the MAF/TIGER System.
	User Address List	Import an address list (.csv, .txt, etc.) into GUPS.
	Modify Linear Feature Attributes	Edit attributes of a selected linear feature.
	Modify Area Feature	Make updates to legal area (annexations, deannexations, boundary corrections, etc.).
	Show/Hide Legend	Shows or hides the layer.
	Geography Review Tool	Review the attribute table for a layer.
	Review Change Polygons	Review change polygons in a layer and make corrections (reviews change polygons for holes and minimum size).
	Import County ZIP	Import zipped GUPS project shared by another GUPS user.
	Export to ZIP	Create the ZIP file containing all required data and shapefiles to be submitted to the Census Bureau or to share with another GUPS user.
	Print Map to File	Export a printable map in *.pdf, *.png, *.tif, or *.jpeg format.

Button	Name	Function/Description
	Internet Map Service	Displays the chosen map location in an internet mapping service, such as Google or Bing Maps
	Add Esri Imagery	Displays satellite imagery overlaid on the QGIS map 
	Add Point Landmark	Add a new point landmark.
	Edit Point Landmark	Edit point landmark attributes.
	Delete Point Landmark	Delete an existing point landmark.

5.6.4 Status Bar

The **Status bar** at the bottom of the GUPS main page displays information about the map. It allows one to adjust the map scale and see the mouse cursor's coordinates on the map.

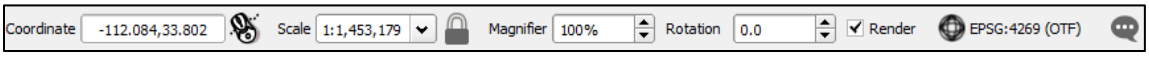


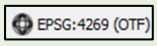
Figure 11. Status Bar

Table 20 describes each element of the Status bar.

Table 20: Status Bar Elements

Item	Description
Coordinate	Shows the current position in map coordinates (default is decimal degrees for GUPS) as the map cursor is moved across the map.
	Toggles between the coordinate position of the mouse cursor or the map view extents as the map is panned and zoomed.
Scale	Shows the current zoom level in the **Map View**. Can be changed by selecting one of the predefined levels from the drop down, by typing in a new ratio, or using the scroll wheel on the mouse.
	Locks the scale to use the magnifier to zoom in or out.
Magnifier	Allows the user to zoom without changing the scale.

PART 2: HOW TO USE GUPS

Item	Description
Rotation	Shows the map rotation.
Render	Temporarily prevents layers from drawing. Enable by clicking the checkbox immediately to the left of “Render”.
	Clicking on the icon opens the projection properties for the current map.
	Displays system messages for the QGIS session.

5.7 How to Import User-Provided Data into GUPS

5.7.1 The Add Data Toolbar

To import one’s own imagery, geodatabase, shapefiles, web mapping service, or other data layers into GUPS, use the **Add Data toolbar**.

Figure 12. Add Data Toolbar

Although shown in a horizontal position in Figure 12, the **Add Data toolbar** appears arranged vertically to the left of the **Layers Panel** in GUPS. Its buttons are described in **Table 21**.

Table 21: Add Data Toolbar Buttons

Button	Name	Function/Description
	Add Vector Layer	Add vector based shapefile and geodatabase files.
	Add Raster Layer	Add raster based shapefile and geodtabase files.
	Add SpatialLite Layer	Add data from a SpatialLite database.
	Add/Edit Virtual Layer	Add or Edit Virtual Layers.
	Add PostGIS Layer	Add PostGIS layer.
	Add WMS/WM(T)S Layer	Add Web Mapping Services and Web Mapping Tile Services. Publicly accessible and secured WMS services are supported.
	Add WCS Layer	Add Web Coverage Services, which provide access to raster data useful for client-side map rendering.

PART 2: HOW TO USE GUPS

Button	Name	Function/Description
	Add WFS Layer	Add Web Feature Services.
	New Shapefile Layer	 Add a new shapefile layer or new temporary scratch layer.

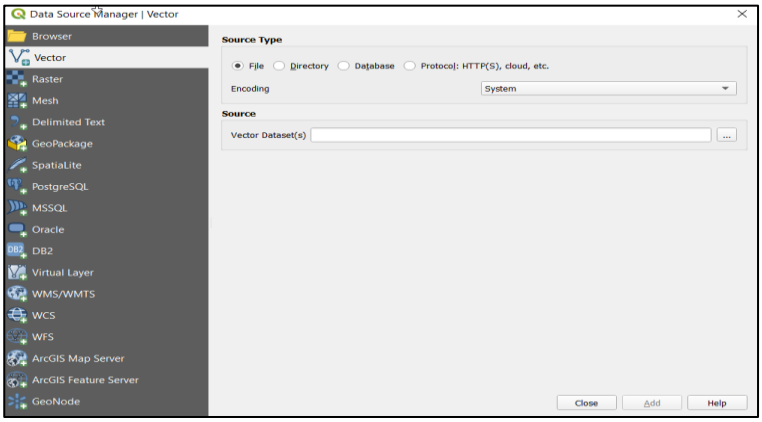
5.7.2 How to Upload User-Provided Data Layers

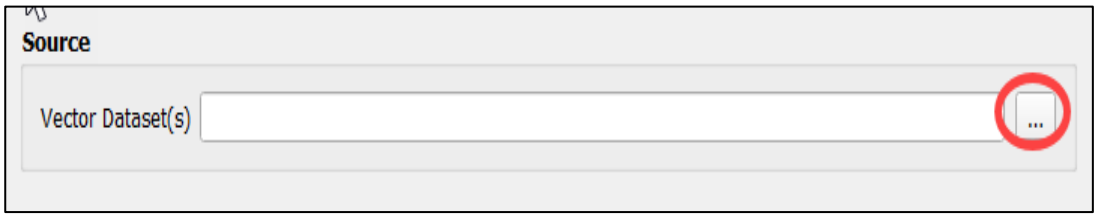
GUPS supports vector data in a number of formats, including those supported by the OGR library data provider plugin, such as Esri shapefiles, MapInfo MIF (interchange format), and MapInfo TAB (native format). It also supports PostGIS layers in a PostgreSQL database and SpatiaLite layers. Support for additional data types (e.g., delimited text) is provided by additional data provider plugins.

Below are the steps to import the most commonly used data formats. To load shapefile or geodatabase data layers into the map, follow the steps in the table below.

Note: Only one user-provided data layer may be uploaded at a time. If uploading multiple data layers, note that GUPS will only allow uploading one layer at a time.

Table 22: Load Shapefiles/Geodatabase Layers

Step	Action and *Result*
Step 1	Begin the upload. Click the **Add Vector Layer** button on the **Add Data toolbar**. *The **Data Source Manager** dialog box opens.* 
Step 2	In the **Encoding** drop-down menu, the default value is '**System**'. If an error message displays when opening a file, use the drop-down to select UTF-8. *UTF-8 populates the **Encoding** field*.

Step	Action and *Result*
Step 3	To locate the vector dataset source, click the button with ellipses and navigate to the folder where the shapefile or geodatabase is saved on the computer. 
Step 4	Left-click the file to upload, then click the **Open** button. Once the file is selected, click the Add button. *The shapefile/geodatabase is added to the **Layers Panel** and to the **Map View** window.*

To load data from a web mapping service, follow the steps in **Table 23** below.

Table 23: Load Data from a Web Mapping Service

Step	Action and *Result*
Step 1	To begin the upload, click the **Add WMS/WM(T)S Layer** button on the **Add Data toolbar**. *The **Data Source Manager** dialog box opens*.
Step 2	Select the web mapping service. Click the **Layers** tab, then click the **New** button under the tab. *The **Create a new WMS/WMTS Connection** dialog box opens*.
Step 3	In the **Name** field, type a name for the web mapping imagery service. In the **URL** field, type the URL for the service. If the service requires a user name and password, type them in the fields provided. Click **OK**. *The service will be added to the drop-down menu for web mapping services appearing just below the **Labels** tab*. **Note:** If working inside a firewall, users may be prompted to enter a user name and password to obtain resources from outside the firewall.
Step 4	Select the imagery service added in the drop-down menu. *The available layers appear in the **ID/Name/Title/Abstract** box*.
Step 5	Click on the layer to display, then click the **Add** button. *The WMS is added to the map showing in **Map View** and to the **Layers Panel***.
	When the WMS is added, it displays over the top of other layers selected for **Map View**. To make it display below these layers, click on the WMS layer and, while holding down the mouse button, drag it to the bottom of the **Layers Panel**.

If participants do not have access to a web mapping service, have a poor Internet connection, or work under a restrictive firewall, other types of imagery files may still be added to GUPS (e.g., a county or state imagery dataset). One option for adding imagery may be the National Agricultural Imagery Service (NAIP), supplied in web mapping service format by the U.S. Geological Surveyes, follow the steps in **Table 24**.

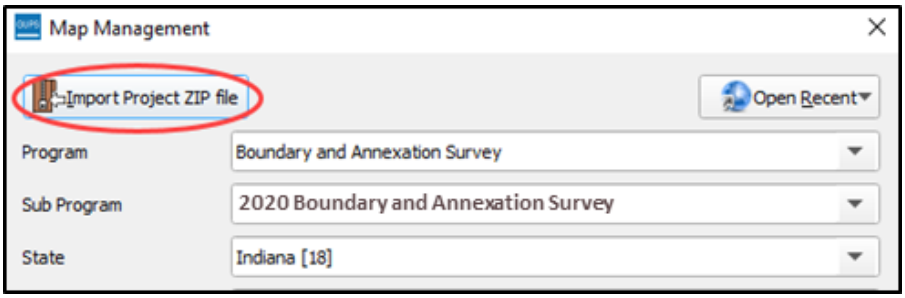
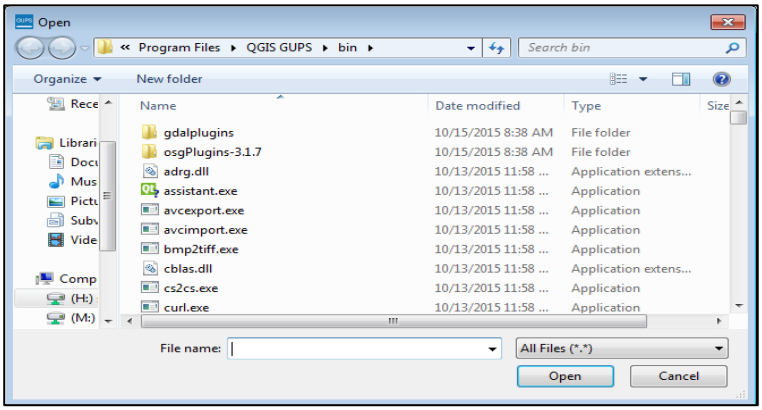
Table 24: Add Imagery Files

Step	Action and *Result*
Step 1	Click the **Add Raster Layer** button on the **Add Data toolbar**. *The **Data Source Manager** dialog box opens.*
Step 2	Navigate to the folder where the imagery file is stored.
Step 3	Select the file, click **Open and then click the Add button**. *The file loads into GUPS*.

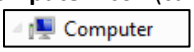
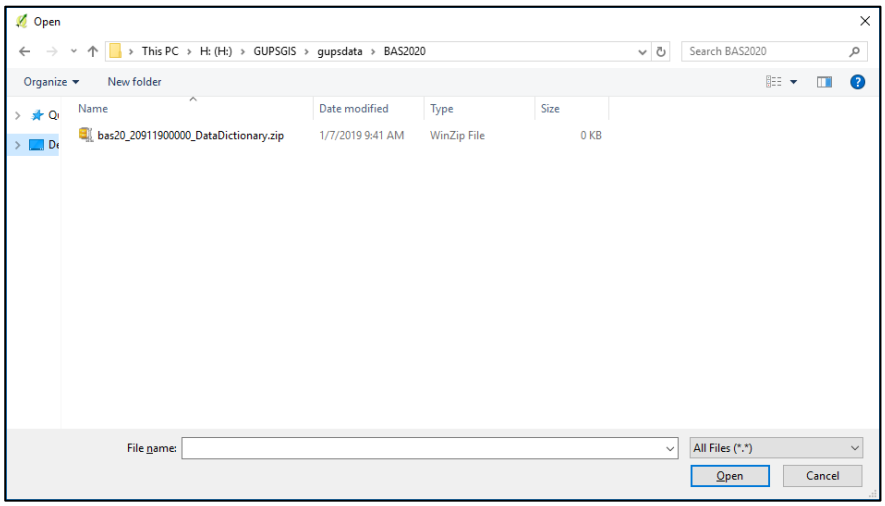
5.7.3 How to Import a Shared ZIP Shapefile

To import Census Bureau shapefiles already updated by another user, use either the **Import Project ZIP File** button in the Map Management dialog box or the **Import County ZIP** icon on the BAS toolbar, then follow the steps in **Table 25** below.

Table 25: Import a ZIP File Shared by Another User

Step	Action and *Result*
Step 1	Click the **Import Project ZIP File** button in the upper left-hand corner of the **Map Management** dialog box:  **OR** on the **BAS toolbar**:
Step 2	*The **Open** file window displays*. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	From this window, click on the '**Computer**' icon (called '**My Computer**' in some versions of Windows) located in the far-left-hand pane.  When the list of directories opens, navigate to the location where the shared ZIP file is located.
Step 4	Click once on the file, click the **Open** button.  *The file loads into **Map View**.*

PART 2: HOW TO USE GUPS

SECTION 6: MAKING BAS UPDATES IN GUPS

The tables in this section provide step-by-step instructions for making BAS updates. The examples assume participants have read and understood the directions for opening GUPS and using Map Management. If not yet comfortable with Map Management, please review the contents of **Section 5: Using GUPS (Basics and Map Management)** before making updates. It is highly recommended to use a source of imagery data when making any BAS updates.

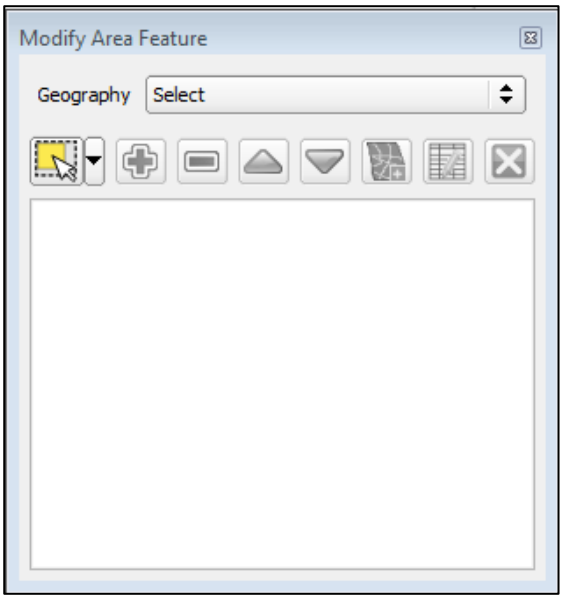
6.1 How to Update Legal Boundaries

All examples shown here, although using real data, are purely fictitious. They are employed for purposes of illustration only and do not indicate any actual geographic changes.

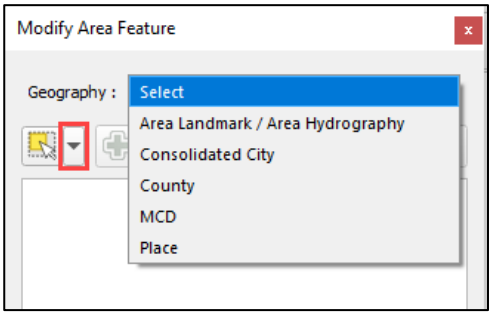
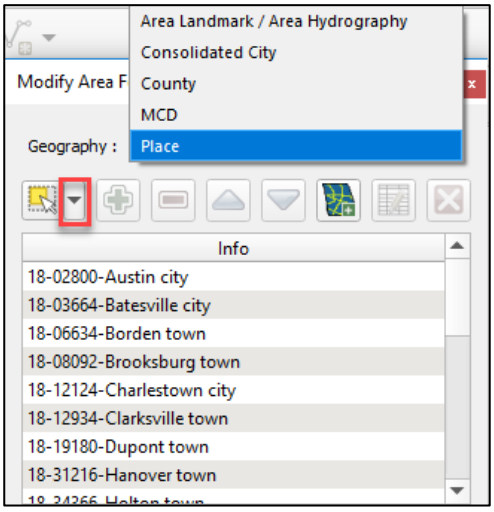
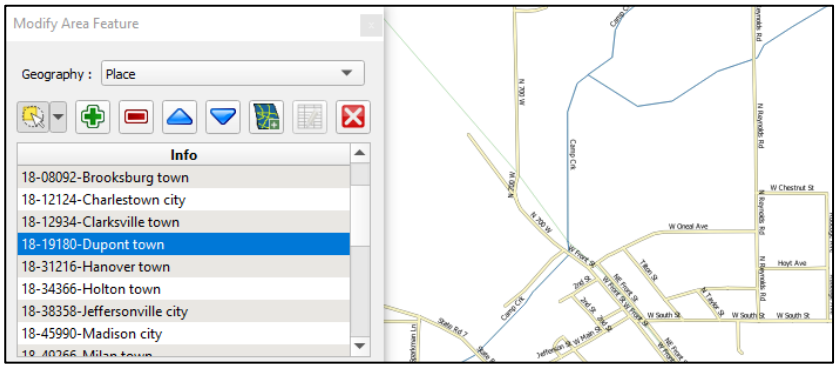
6.1.1 Recording an Annexation

Follow the steps in the **Table 26** to record an annexation. The fictitious example in this table looks at an incorporated place named Kissimmee, Florida. Kissimmee has annexed several parcels previously outside its city limits.

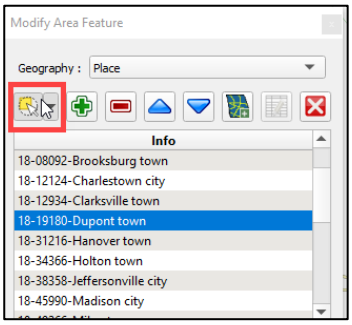
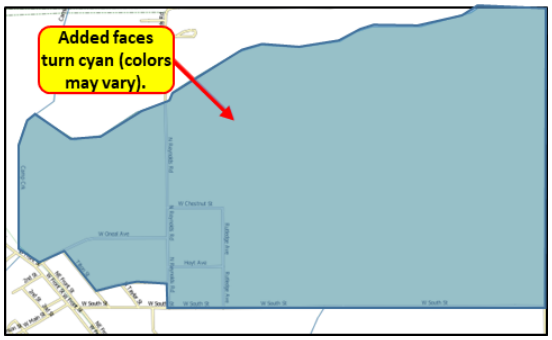
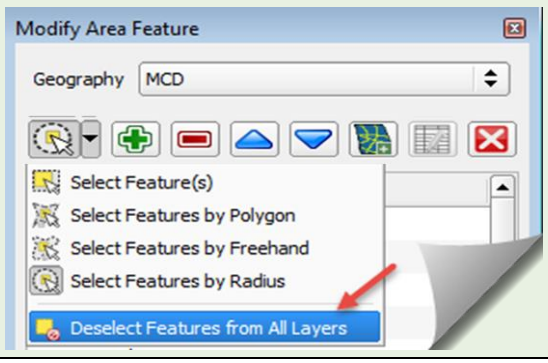
Table 26: Record an Annexation

Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the place (or other legal entity) that is annexing area. Be sure to have all layers one wants to see on the map checked in the **Layers Panel**.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens*. 

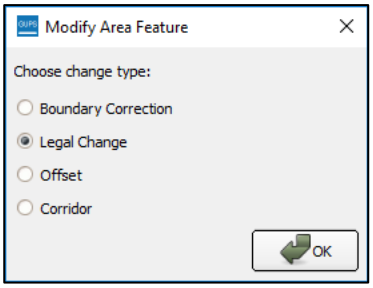
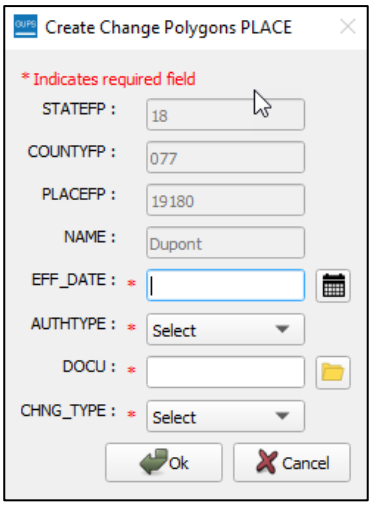
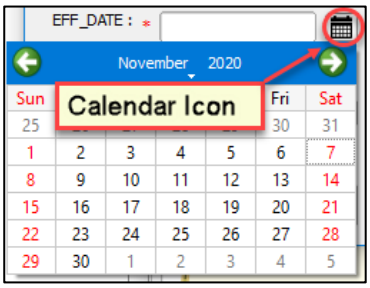
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	Click the drop-down area next to the **Geography** field, and select the entity type (here '**Place**'), from the drop-down menu. *A list of all incorporated places in the county appears in the **Info** list in the bottom portion of the dialog box.*  
Step 4	Double-click on the row in the list for the place that is making the annexation (here 'Dupont Town'). (**Note:** The list of places is short, but in some cases it can be long. Use the scroll bar to the right of the list to move up and down the list, if needed.) *Once the row is double-clicked on, the map zooms to the place selected.*  If the map does not zoom to a scale sufficient to make the changes, click on the **Zoom in** button on the **Standard toolbar**.

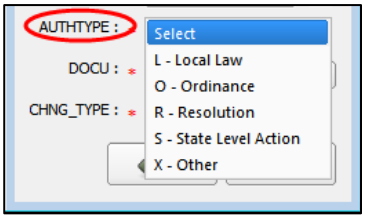
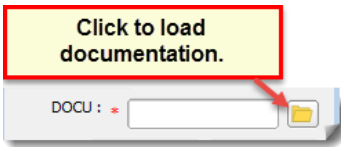
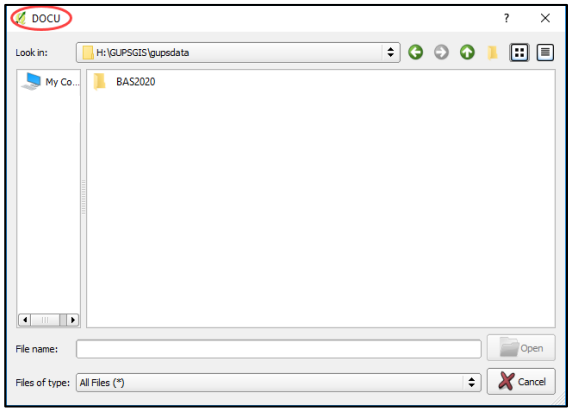
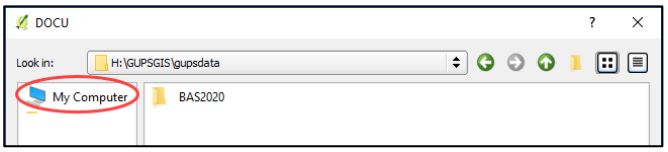
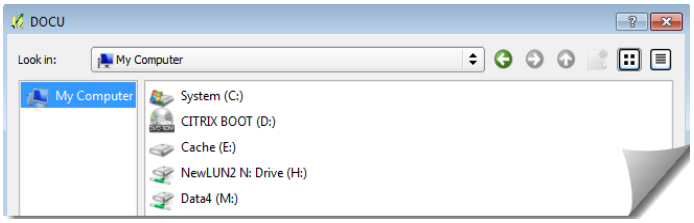
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	To select the faces to add to Dupont Town, click on the small down arrow next to the **Select Features** button on the dialog box toolbar. *The **Select Features** button drop-down menu opens*. In this example the "radius" method is used to select the faces to be added to Dupont Town. Click on '**Select Features by Radius**' in the menu. 
Step 6	Next, go to the map and place the cursor where the faces are to be added. To select a single face, simply drag the cursor outward in the center of the face. To select multiple faces, drag the cursor across the edges that separate the faces. In this example, seven faces were selected. *The faces selected turn cyan.* 
	Because all geographic areas consist of faces, one may need to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (click on **Table 33** for instructions to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. The new face can now be added to the new entity.
	If a face is accidentally selected, it can be deselected with the **Deselect Features from All Layers** option in the **Select Feature(s)** drop-down menu. 

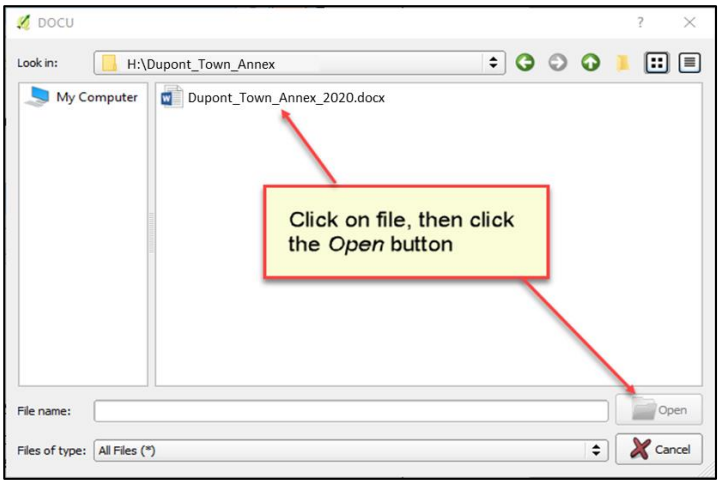
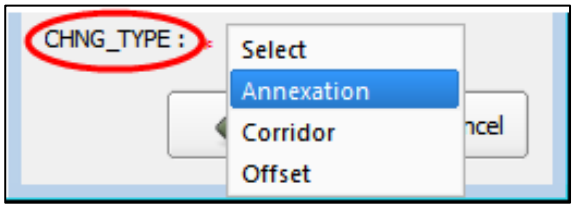
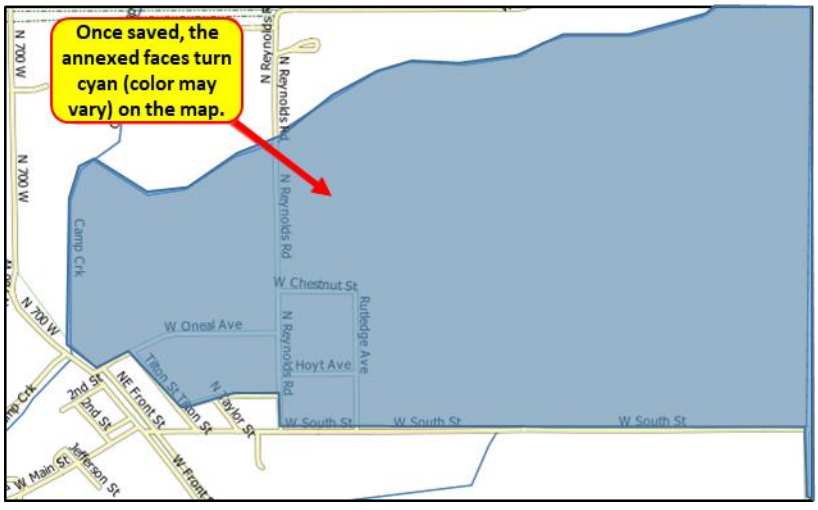
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	Click the **Add Area** button on the dialog box toolbar. *The **Modify Area Feature Choose Change Type** pop-up box appears, and asks to choose a change type.*  Since this is an annexation, click the '**Legal Change**' radio button, then click **OK**.
Step 8	The ***Create Change Polygons** dialog box opens, with the State and County FIPS codes, and the place name already populated.* 
Step 9	Click the calendar icon next to the **EFF_DATE** field to open the calendar, then click on the effective date for the annexation.  *The selected date will populate the **EFF_DATE** field.*

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 10	Select an authority type for the annexation in the **AUTHTYPE** field drop-down menu. 
Step 11	In the **DOCU** field, type in the ordinance or other legal documentation number authorizing the annexation or upload documentation for the change. To upload documentation, click the folder icon next to the **DOCU** field.  *The **DOCU** window opens*. 
Step 12	Click on the icon for '**My Computer**' (or simply '**Computer**' in some Windows versions) to open the directory where the documentation was saved.  *The directories display, as shown below*. 

PART 2: HOW TO USE GUPS

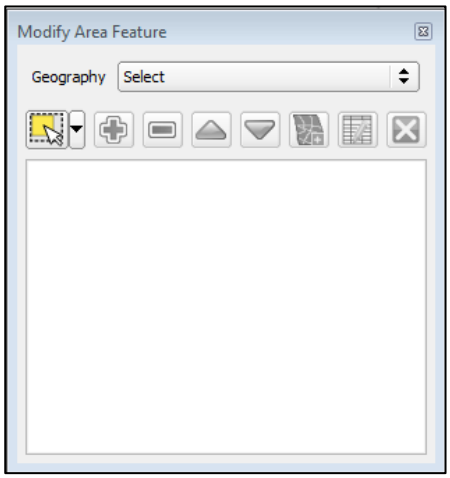
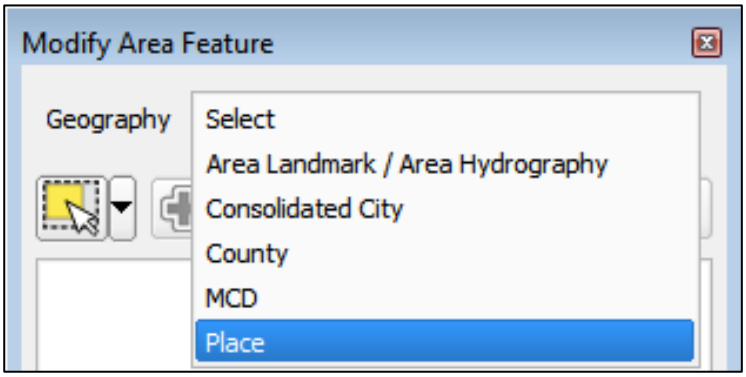
Step	Action and *Result*
Step 13	Select the appropriate directory in the list and navigate to the file to be uploaded as documentation, then click the file. *The file name appears in the **File name** field.* To upload the file, click the **Open** button.  *The name of the document populates the **DOCU** field on the dialog box.*
Step 14	Finally, select '**Annexation**' in the drop-down menu for the **CHNG_TYPE** field. 
Step 15	When finished, click **OK**. *The added faces (once saved) turn cyan in color on the map (color may vary).* 

PART 2: HOW TO USE GUPS

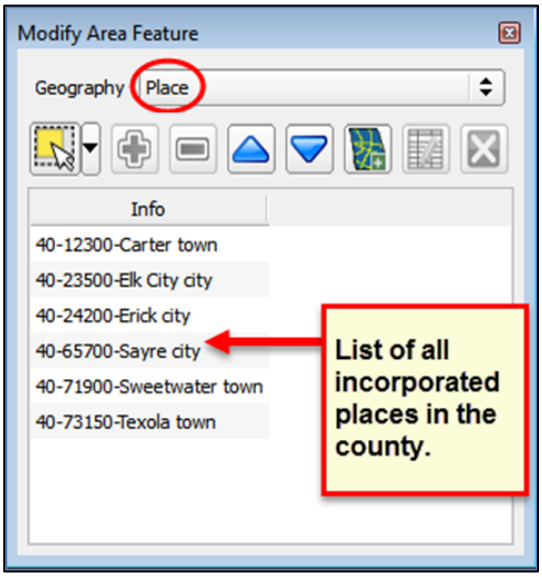
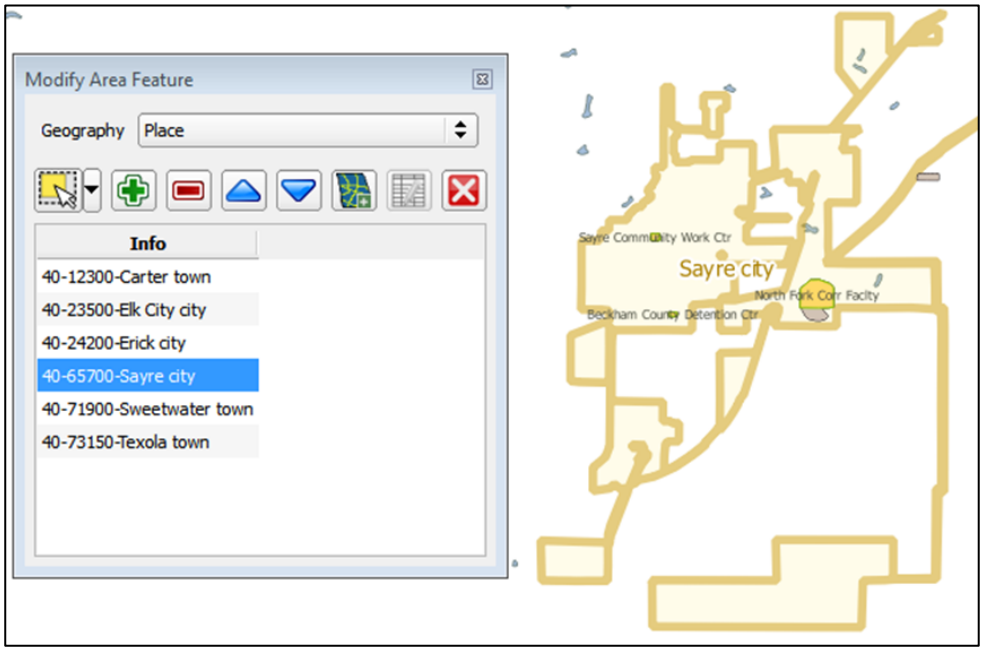
6.1.2 Recording a Deannexation

Follow the steps in **Table 27** to record a deannexation. The fictitious example in this table uses Sayre City, an incorporated place in Oklahoma.

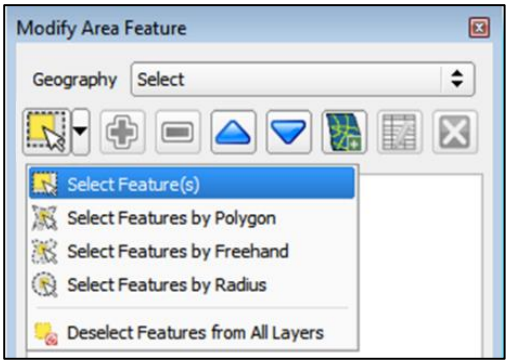
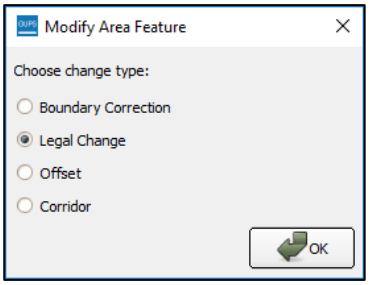
Table 27: Recording a Deannexation

Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the place (or other legal entity) that is deannexing area. Be sure that all layers needed on the map are checked in the **Layers Panel**.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The Modify Area Feature dialog box opens.* 
Step 3	Click the arrow next to the **Geography** field, and select in the drop-down menu the entity type from which to deannex area. This example is deannexing land from an incorporated place, so '**Place**' is selected. 

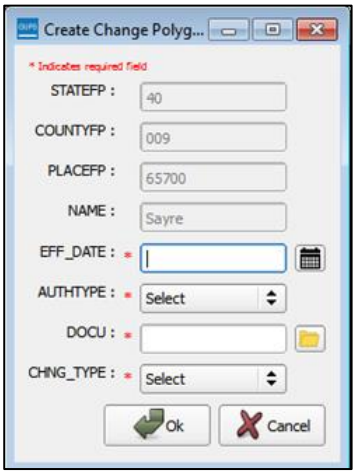
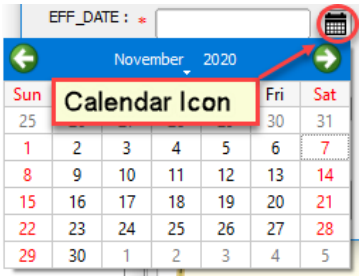
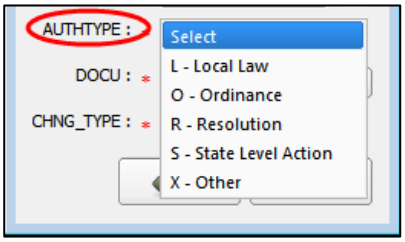
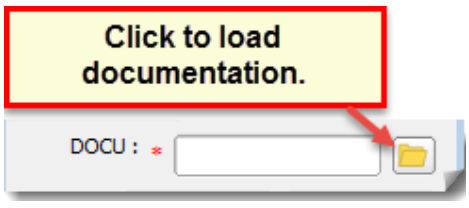
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	*Place appears in the **Geography** field and a list of all incorporated places in the county appears in the **Info** list in the bottom portion of the dialog box.* 
Step 4	Click on the place name (Sayre city) in the list. *The map zooms to Sayre*. 

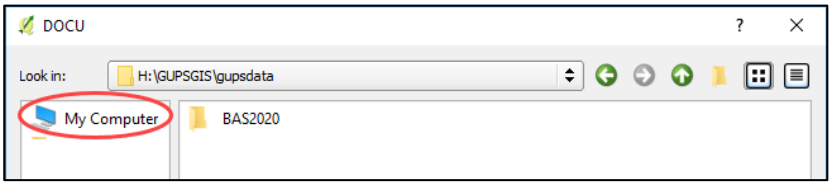
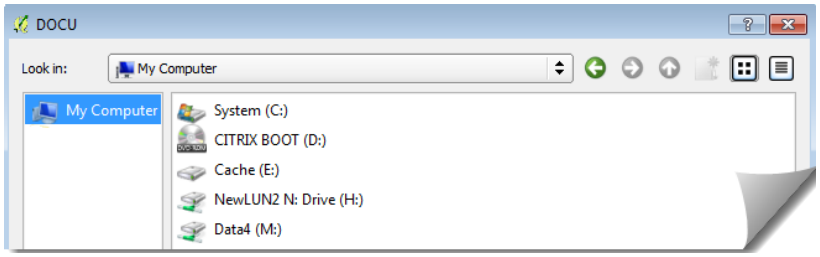
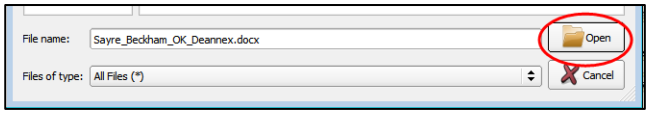
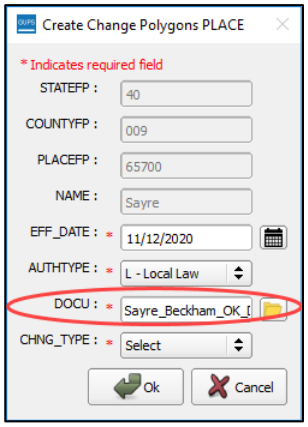
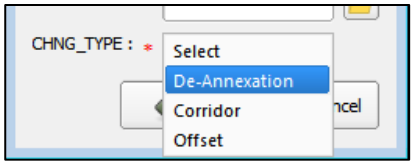
PART 2: HOW TO USE GUPS

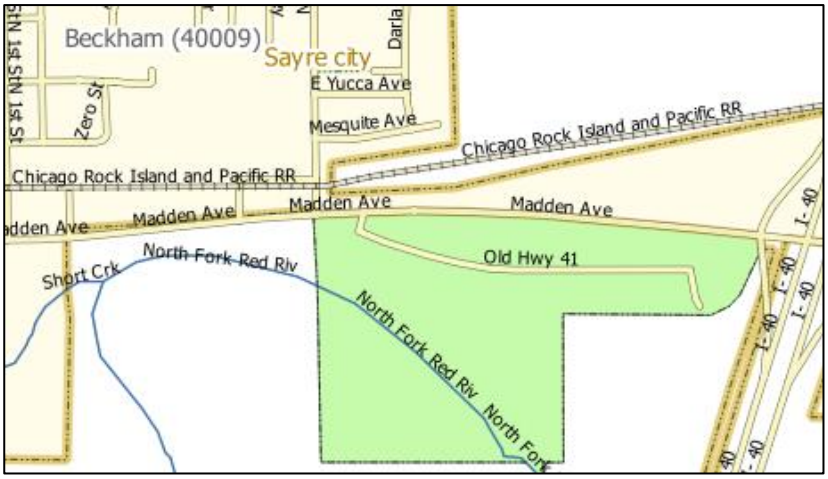
Step	Action and *Result*
Step 5	Zoom on the map to the location where the deannexation occurred. Then choose a method for selecting the faces to be deannexed. In this example, in the drop-down menu for the **Select Features** tool, click on the '**Select Feature(s)**' option. 
Step 6	Click on a face to select it. To select more than one face, depress the **CTRL** key, and while holding the **CTRL** key down, click each face to be deannexed. *The selected face(s) turn cyan.*
	Because all geographic areas consist of faces, one may need to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (click on **Table 33** for instructions to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. One can now select the face to add to the new entity.
Step 7	Click the **Remove Area** button on the dialog box toolbar. *The **Modify Area Feature Choose change type** pop-up box appears, and asks to choose a change type*. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 8	Since this is a legal deannexation, click the '**Legal Change**' radio button, then click **OK**. *The **Create Change Polygons** dialog box opens.* 
Step 9	In the **Create Change Polygons** dialog box, click the calendar icon next to the **EFF_DATE** field and, when the calendar opens, click on the date which the deannexation became effective.  *The date selected populates the **EFF_DATE** field.*
Step 10	Select an authority type for the deannexation in the **AUTHTYPE** field drop-down menu. 
Step 11	In the **DOCU** field, type in the ordinance or other legal documentation number authorizing the deannexation, or upload legal documentation for the change. To upload documentation, click the folder icon next to the **DOCU** field. 

PART 2: HOW TO USE GUPS

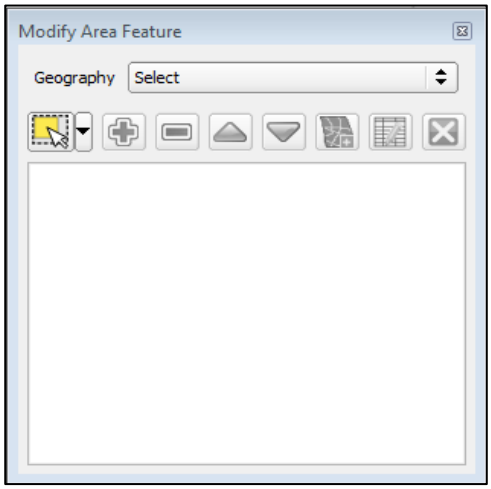
Step	Action and *Result*
	When the ***DOCU*** window opens, click on the icon for 'My Computer' (or simply 'Computer' in some Windows versions) to open the directory where the documentation had been saved.  *The directories display, as shown below*. 
Step 12	Select the appropriate directory and navigate to the file to upload. Click the file. Then click the **Open** button at the bottom of the **DOCU** window.  *GUPS uploads the file and the file name appears in the **DOCU** field in the **Create Change Polygons** dialog box*. 
Step 13	In the **CHNG_TYPE** field drop-down menu, select '**De-annexation**'. 

Step	Action and *Result*
Step 14	When finished, click **OK**. *The selected faces turn green on the map (color may vary).* 

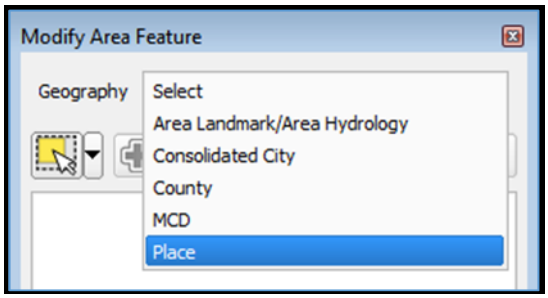
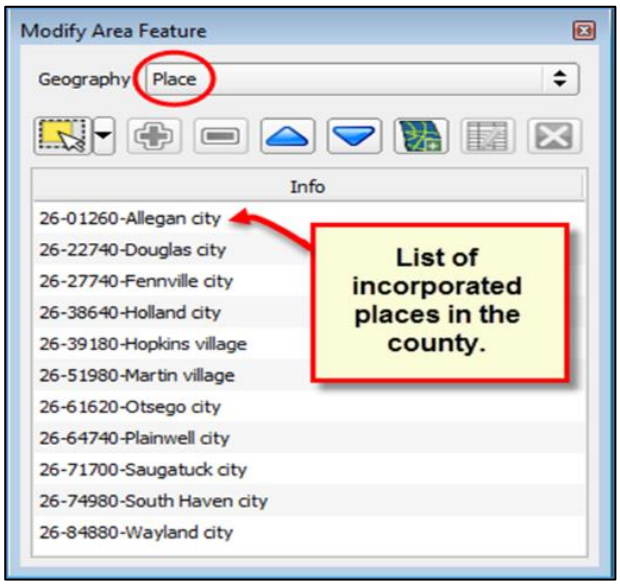
6.1.3 Adding a New Legal Government (New Incorporation)

Follow the steps **Table 28** to add a new legal government. In this example, a fictitious newly incorporated place in Michigan is being added.

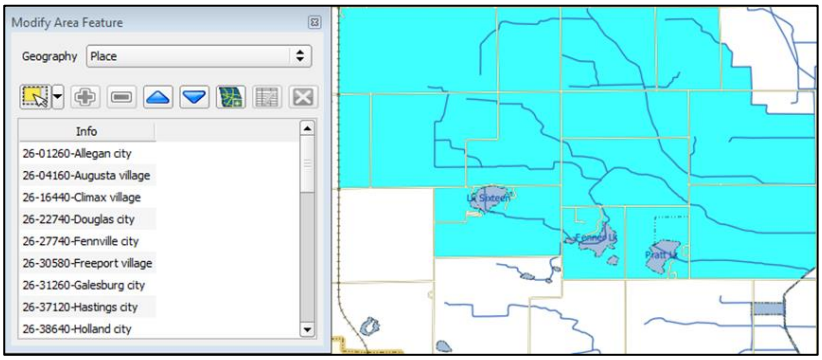
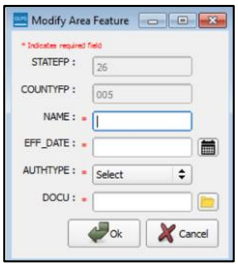
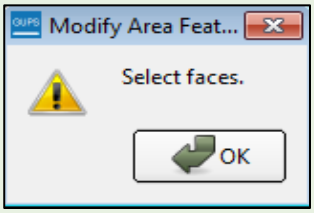
Table 28: Adding a New Legal Government

Step	Action and *Result*
Step 1	Open in **Map View** the county where one wants to add a new entity. Be sure all necessary layers are checked in the **Layers Panel**.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens*. 

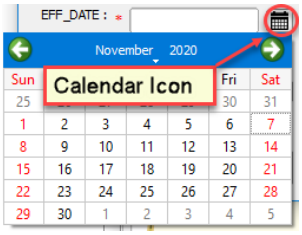
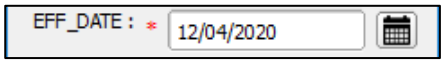
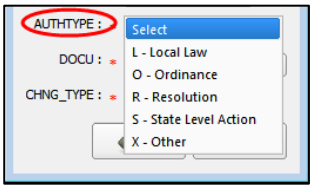
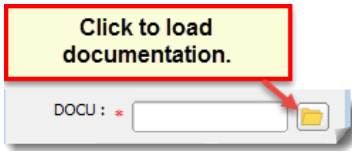
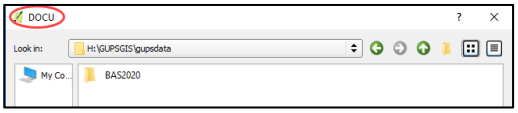
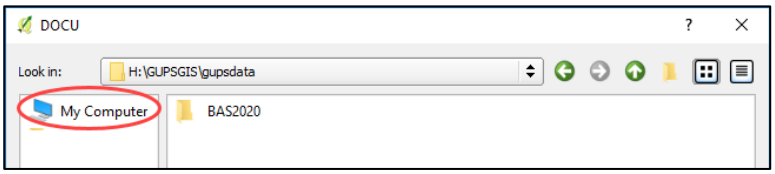
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	Click the drop-down arrow next to the **Geography** field, and select the entity type to add from the drop-down menu. In this example a newly incorporated city is added, so '**Place**' is selected.  *Place appears in the **Geography** field and a list of all incorporated places in the county appears in the **Info** list.* 
Step 4	Zoom to the location where the new entity is located. To select the faces for the entity, left-click *once* on the **Select Features** button on the dialog box toolbar.

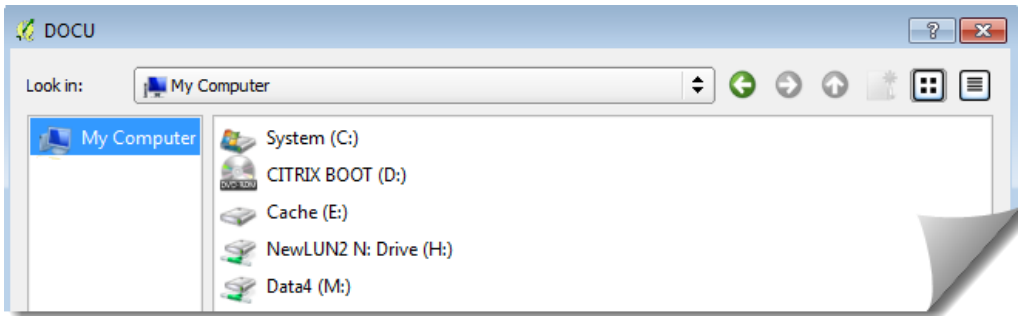
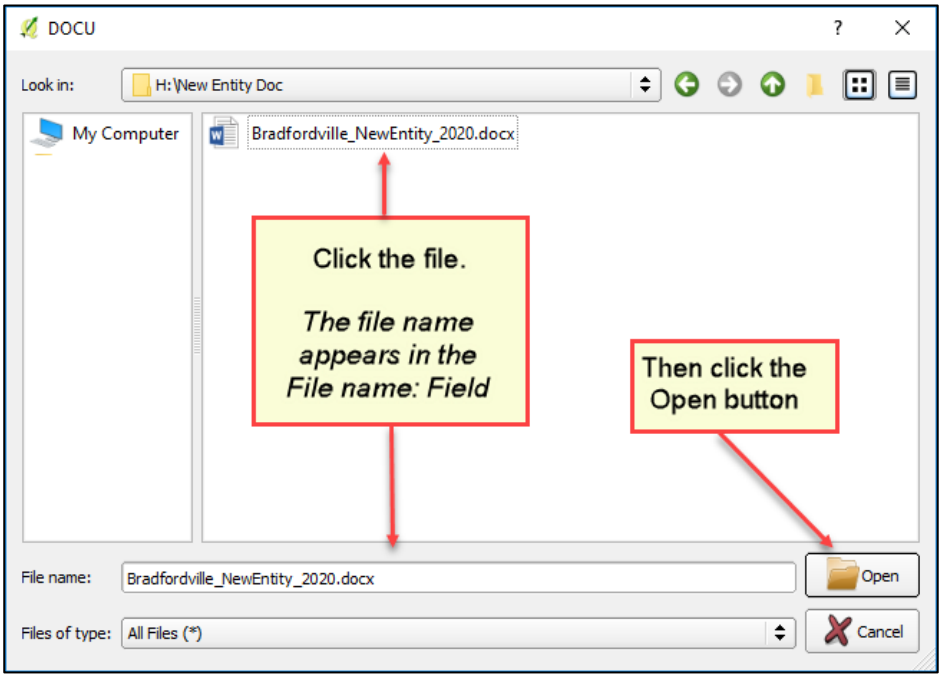
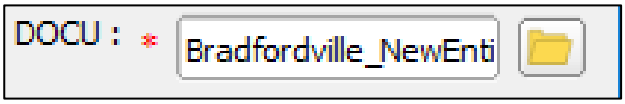
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	Then click on the map to select the face or faces. If the entity includes only a single face, simply click once on the face to select it. If the entity includes several contiguous faces, after clicking on the first face, depress the **CTRL** key and while holding it down, left-click on each additional face to be added. *The selected faces turn cyan.*  **Note:** Faces may also be selected (after clicking the **Select Features** button) by simply dragging the cursor over the edges that mark their boundaries. Additional means of selecting faces (by polygon, by freehand, and by radius) are discussed in **Table 14: Select/Deselect Features on the Map**.
	Because all geographic areas consist of faces, a participant may need to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (click on **Table 33** for instructions to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. Now select the face to add to the new entity.
Step 6	To record the new entity, click the **Add Entity** button on the dialog box toolbar. *The **Modify Area Feature** new entity dialog box opens*. 
	Note: If the **Add Entity** button is clicked before selecting the faces, a pop-up box warning will appear. Simply click **OK** and add the faces. 

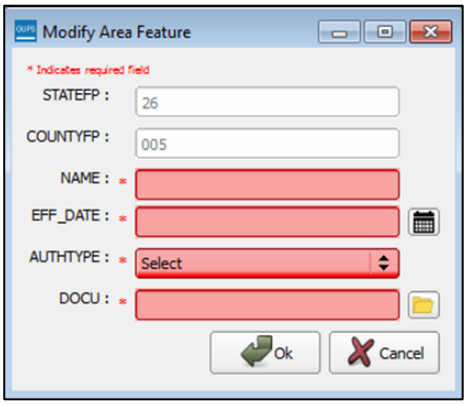
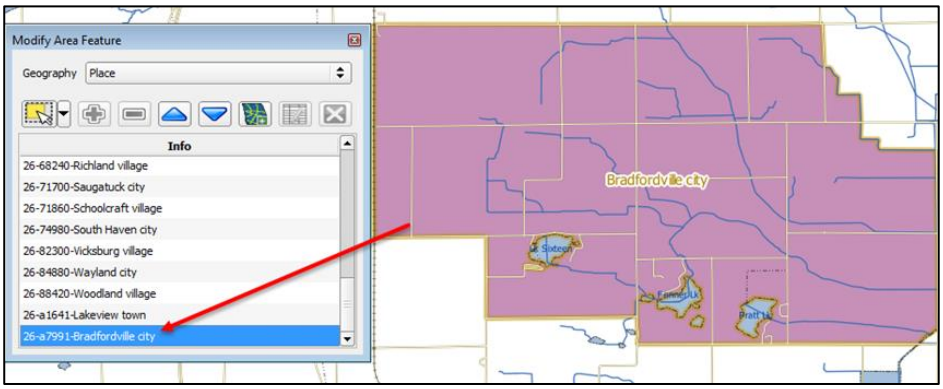
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	In the new entity dialog box, type the new legal entity name in the **Name** field.
Step 8	Next add the effective date for the legal change. Click on the calendar icon next to the **EFF_DATE** field and, when the calendar opens, click on the effective date.  *The date selected populates the **EFF_DATE** field.* 
Step 9	Next, add the authority type using the **AUTHTYPE** drop-down menu. 
Step 10	Finally, either type in the ordinance or other legal documentation number authorizing the new entity in the **DOCU** field, or upload documentation for the change. To upload documentation, click the folder icon next to the **DOCU** field.  *The **DOCU** window opens.* 
Step 11	Click on the icon for '**My Computer**' (or simply '**Computer**' in some Windows versions) to open the directory where the documentation is saved.  *The directories display, as shown below.*

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	
Step 12	Select the appropriate directory in the list and navigate to the file to upload as documentation, then click the file. *The file name appears in the **File name:** field*. To upload the file, click the **Open** button. 
Step 13	*Once the **Open** button is clicked, the name of the document appears in the **DOCU** field.* 

PART 2: HOW TO USE GUPS

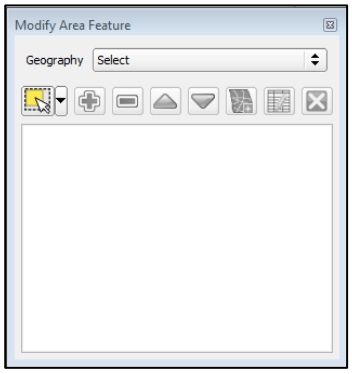
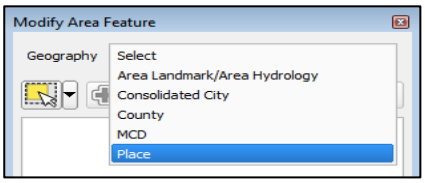
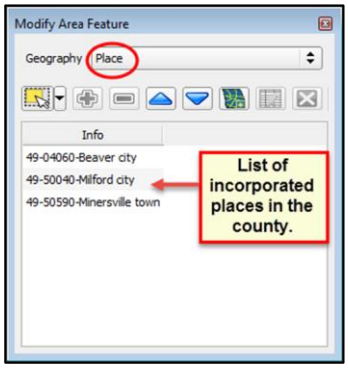
Step	Action and *Result*
Step 14	Click the **OK** button. **Note:** Red asterisks indicate required fields. Required fields must be completed to move forward. If one or more required fields are not completed and the **OK** button is clicked, GUPS will prompt the user to complete the fields. Any required field not completed will highlight in red, as shown below.  *Once all required fields are completed and the OK button clicked, the faces for the new entity turn purple on the map (colors may vary) and the name of the new entity appears in the list of incorporated places in the **Modify Area Feature** dialog box.* 
	Once the Census Bureau verifies the new entity, it will assign it a FIPS code. The code preceding the new entity name in the list is ***not*** a FIPS code, and ***should not be used for any official purpose***. It is only a placeholder until the official FIPS code can be assigned.
Step 15	To make additional changes to the map, simply make a new selection in the **Modify Area Feature** dialog box **Geography** field and continue work. Save changes as they are made or wait until all work on the map is finished. Saving as changes are completed, however, is recommended to avoid losing work in the event of a power outage or system interruption.
	New Entity that Crosses a County Boundary If the new entity crosses a county boundary, the new entity must be added in both counties separately. After making the change in the working county, return to **Map Management**, select the other county as the working county, and proceed to add the new entity in this county as well. If the added entity crosses more than one county boundary, complete the addition in each county affected.

PART 2: HOW TO USE GUPS

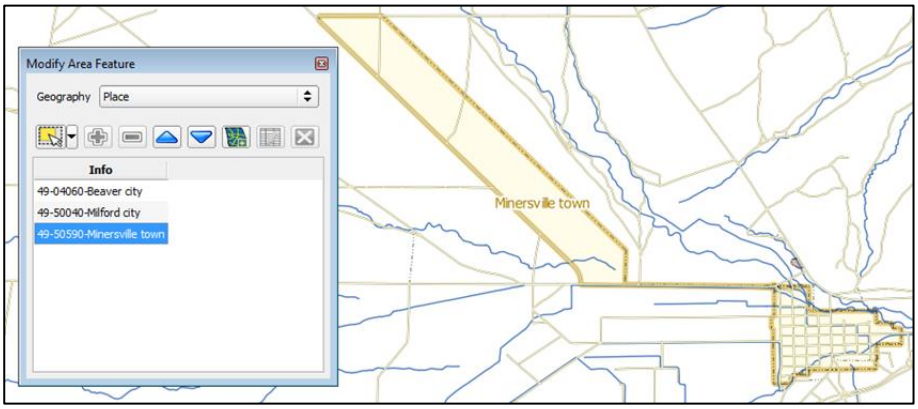
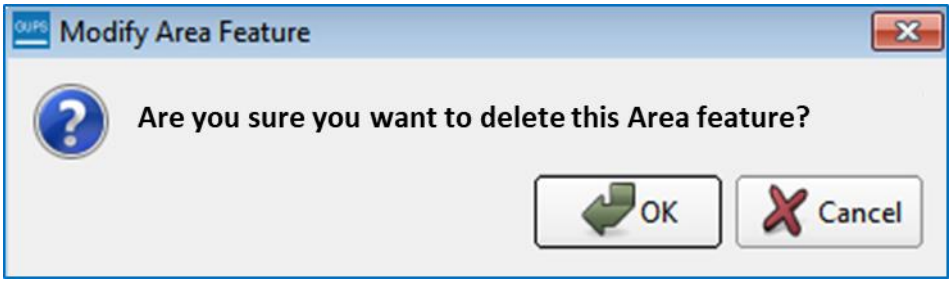
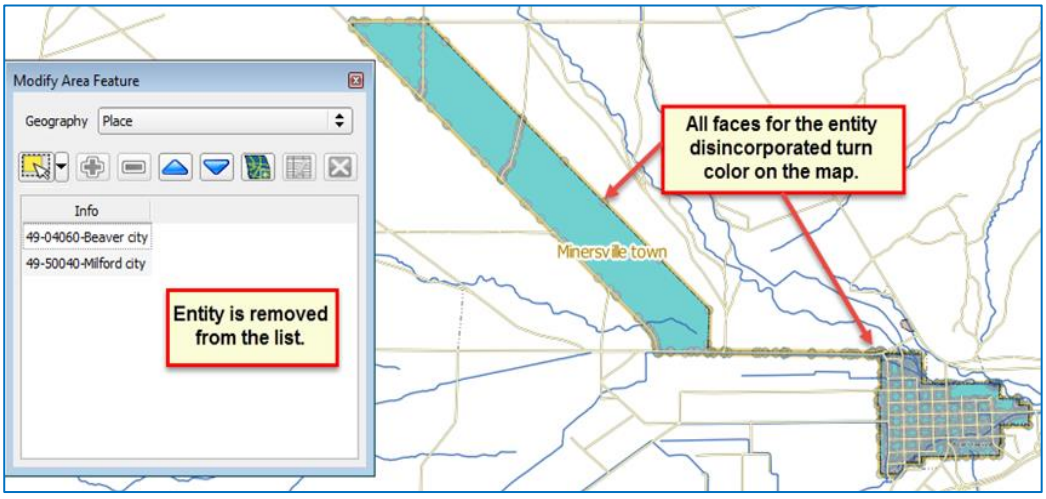
6.1.4 Deleting a Government (Disincorporation)

Follow the steps in the table below to record a disincorporation. In this example, a fictitious disincorporation for Minersville, Utah is shown.

Table 29: Record a Disincorporation

Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the entity to delete. Be sure that all layers needed are checked in the **Layers Panel**.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 
Step 3	Click the drop-down arrow next to the **Geography** field, and select '**Place**' in the drop-down menu.  *Place appears in the **Geography** field and a list of all incorporated places in the county appears in the **Info** list.* 

PART 2: HOW TO USE GUPS

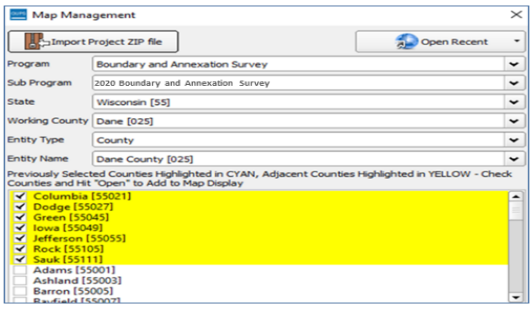
Step	Action and *Result*
Step 4	Click the entity in the list to show the disincorporation (here Minersville). *The map zooms to Minersville.* 
Step 5	Click the **Delete** button on the toolbar inside the **Modify Area Feature** dialog box. *A pop-up asks 'Are you sure you want to delete this Area feature?'* 
Step 6	Click **OK**. *The disincorporated entity turns green on the map (color may vary), and it is removed from the list of incorporated places in the county*. 

Step	Action and *Result*
Step 7	To make additional changes to the map, simply make a new selection in the **Modify Area Feature** dialog box **Geography** field and continue work.
	Deleted Entity that Crosses a County Boundary If the deleted entity crosses a county boundary, the entity must be deleted in both counties separately. After making the change in the working county, return to **Map Management**, select the other county as the working county, and proceed to delete the entity in this county as well. If the deleted entity crosses more than one county boundary, complete the deletion in each county affected.

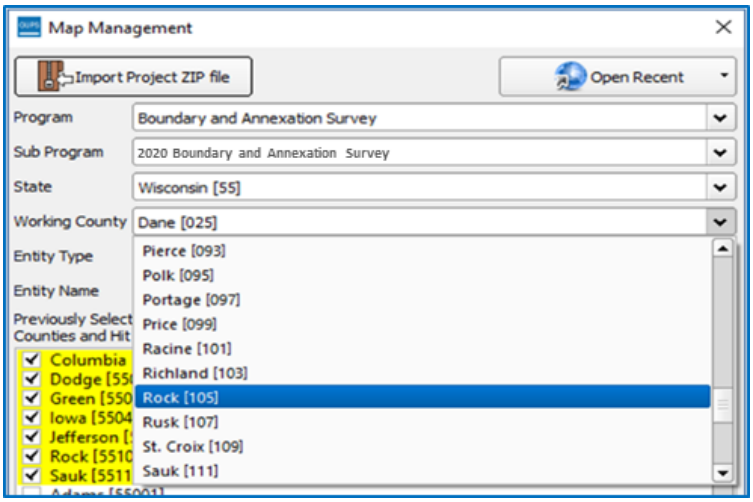
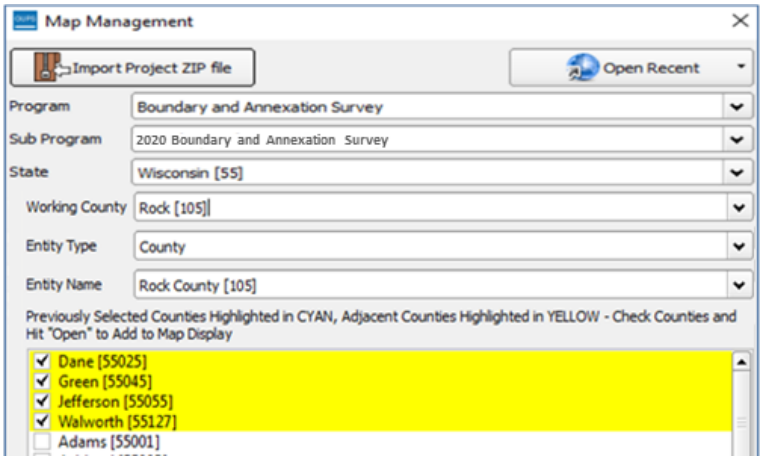
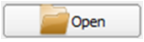
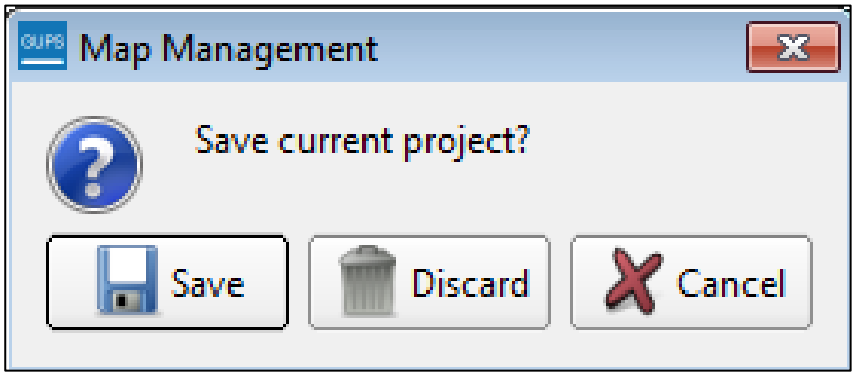
6.1.5 Making a Boundary Update on a County Line

Users reporting on behalf of an incorporated place may make changes across county boundaries for their place. The steps in **Table 30** provide an example for an annexation by a place across a county boundary. The fictitious example uses Brooklyn Village, in Dane County, Wisconsin. It has annexed land in adjacent Rock County.

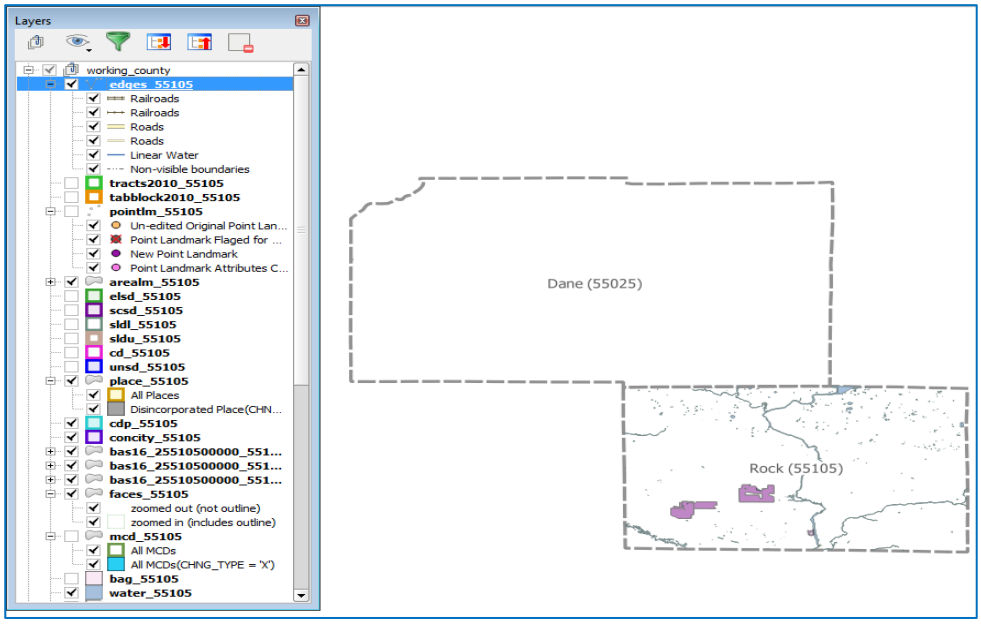
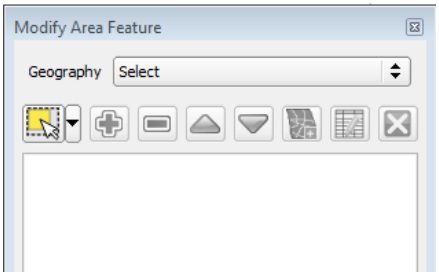
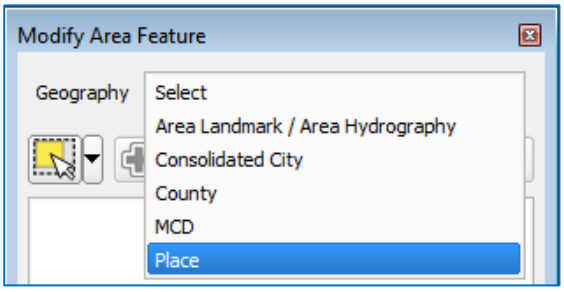
Table 30: Record an Annexation in an Adjacent County

Step	Action and *Result*
	Independent City Users: Users reporting for independent cities (cities independent of any county and treated by the Census Bureau as county equivalents) should follow the steps described below to show annexations/deannexations between the city and surrounding counties. ***County Users***: When updating a county boundary, the user must switch the working county to add/remove area located in the other county. To update a boundary, use the instructions below, but in Step 6, select County instead of Place in the Geography drop-down menu, and in Step 7, click in the **Info** list on the name of the county to add or remove the area.
Step 1	To show a boundary change that crosses a county boundary, change the working county to the county in which the added faces are located. This example assumes that Dane County is the working county and is already displayed in **Map View**. To switch the working county: Click the **Map Management** button on the **Standard toolbar**. *The **Map Management** dialog box opens showing the program, state, working county, entity type, and entity name selected earlier. A list of adjacent counties, highlighted in yellow, displays near the bottom of the dialog box.* 

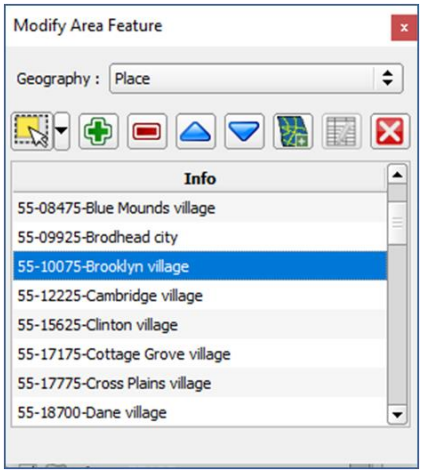
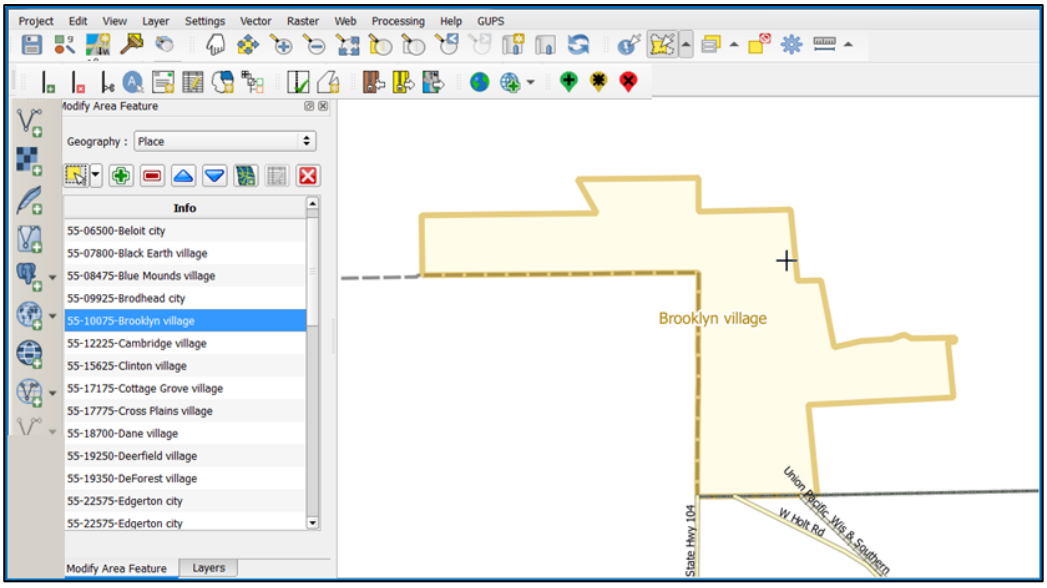
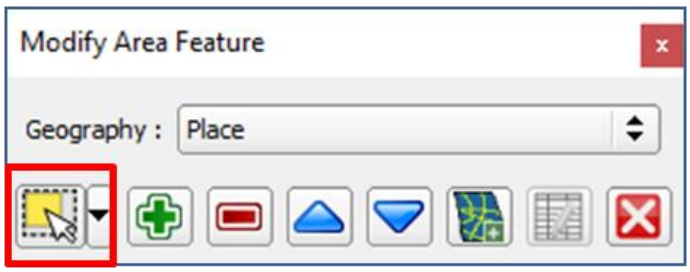
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	To change the working county, click the down arrow for the **Working County** field to open the drop-down menu and select Rock County from the list. Select County from the **Entity Type** field.  *The list of adjacent counties repopulates to show the counties adjacent to Rock County.* 
Step 3	Unclick the checkbox for all counties except Dane. Then click the **Open**  button at the bottom of the **Map Management** dialog box. *A **Save current project** pop-up box asks if the user would like to save their current project*. 

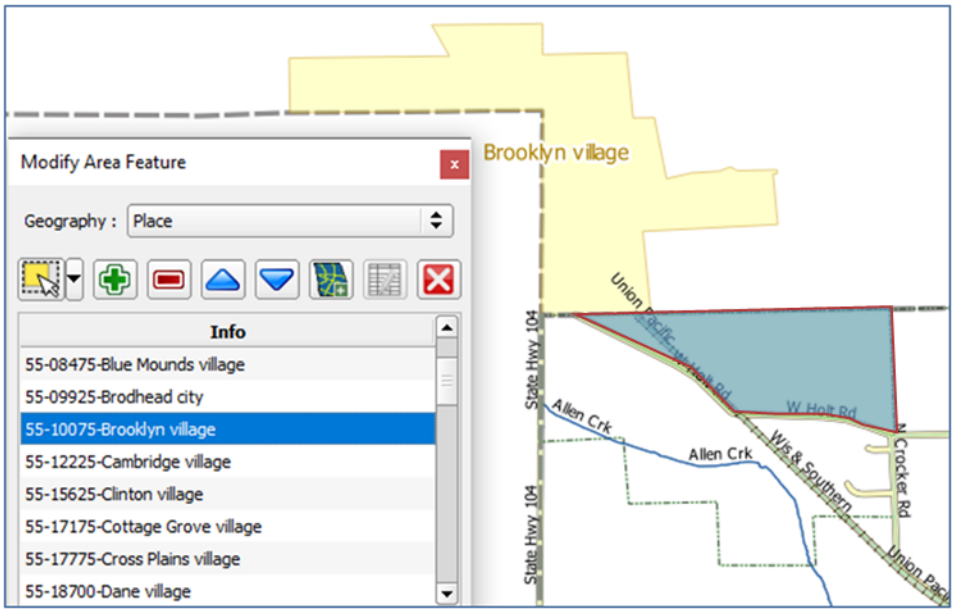
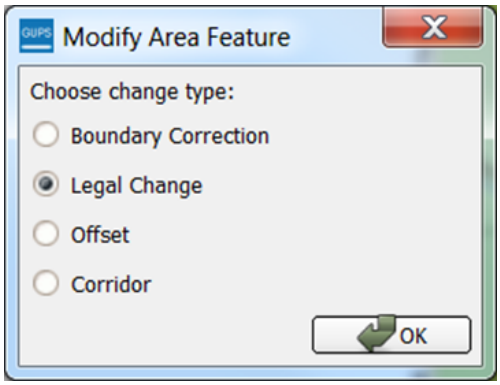
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 4	Click the **Save** button in order not to lose any previously made changes to the Dane County shapefile. *The **Map View** displays both Dane and Rock Counties and the **Layers Panel** displays the layers for the new working county (Rock County).* 
Step 5	To select the entity within Dane County to which one wants to add the area that is within Rock County, click the **Modify Area Feature** button on the **BAS toolbar.** *The **Modify Area Feature** dialog box opens*. 
Step 6	In the **Geography** field drop-down menu, select the entity type to which the annexed land should be assigned. Because Brooklyn Village is an incorporated place, select '**Place**'. 

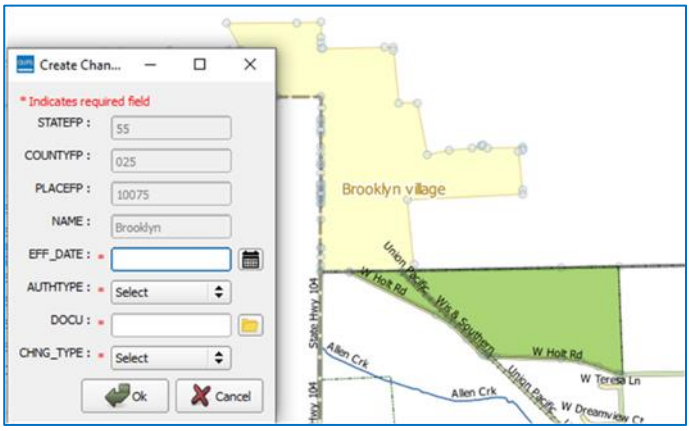
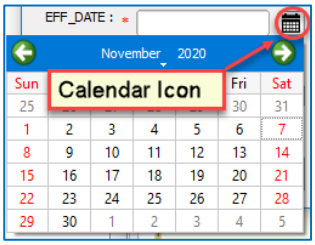
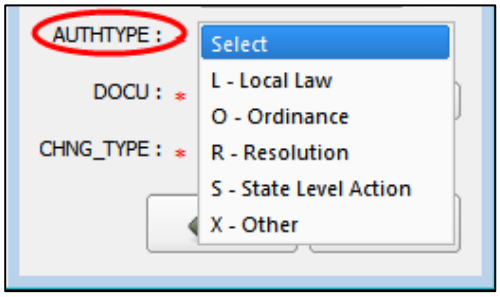
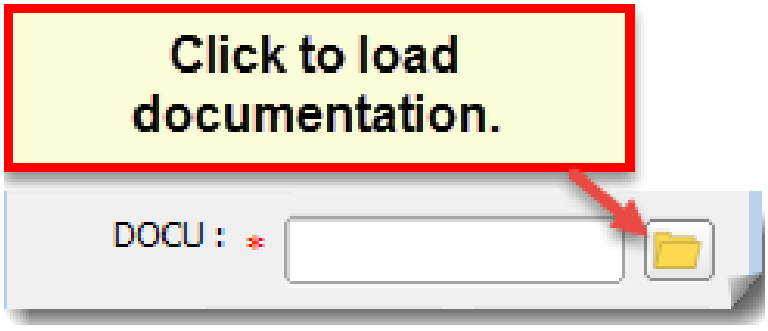
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	*A list of all incorporated places in both Rock and Dane Counties appears in the **Info** list at the bottom of the dialog box. The list includes Brooklyn Village.* 
Step 7	Scroll down the list and click the row for 'Brooklyn village'. *The map zooms to the portion of the county boundary where Brooklyn Village is located.* 
Step 8	Zoom in to the faces to be annexed, then click the **Select Features** button on the dialog box toolbar once. 

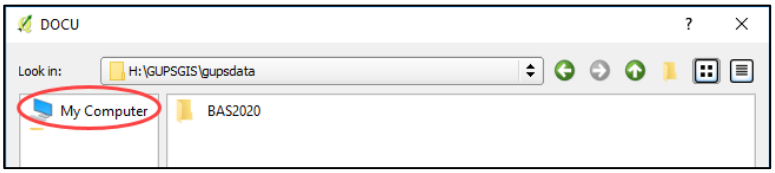
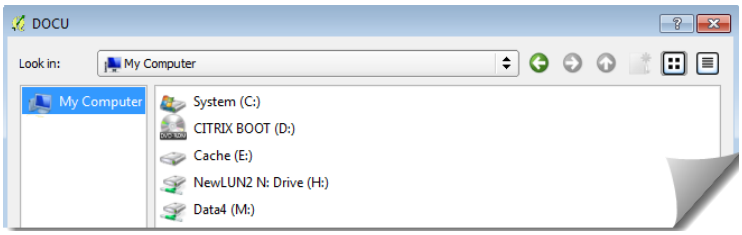
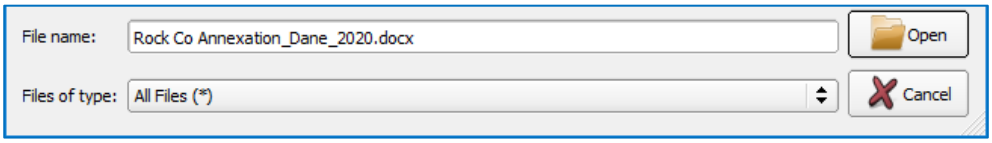
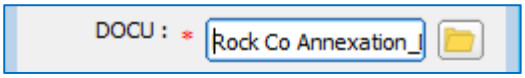
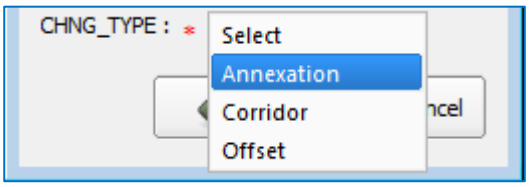
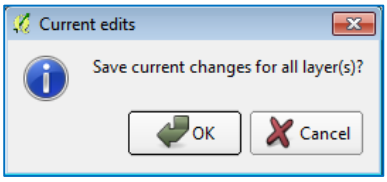
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 9	Click the face on the map to be added, if there is only one. To add additional faces, hold down the **CRTL** key and continue to click on faces until done. *The selected faces turn cyan.* 
	Because all geographic areas consist of faces, a participant may need to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (click on **Table 33** for instructions to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. The face can now be selected to add to the new entity.
Step 10	To add the faces selected within Rock County to the incorporated place Brooklyn Village, click the **Add Area** button on the dialog box toolbar. *The **Modify Area Feature Choose change type** dialog box opens*.  Click the radio button next to '**Legal Change**' to indicate that this is a legal boundary change. Then click **OK**.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 11	*The selected faces turn green (colors may vary) and the **Create Change Polygons** dialog box opens. GUPS automatically fills the FIPS codes, and name fields for Brooklyn Village.* 
Step 12	Click the calendar icon next to the **EFF_DATE** field to select an effective date for the annexation. 
Step 13	Select an authority type for the annexation in the **AUTHTYPE** field drop-down menu. 
Step 14	Type in the ordinance or other legal documentation number authorizing the change, or upload legal documentation. To upload a document, click on the folder icon to the right of the **DOCU** field. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	When the ***DOCU*** window opens, click on the icon for 'My Computer' (or simply 'Computer' in some Windows versions) to open the directory where the documentation is saved.  *The directories display, as shown below*. 
Step 15	Select the appropriate directory and navigate to the file to upload. Click the file. Then, to upload it, click the **Open** button at the bottom of the **DOCU** window.  *The file name appears in the **DOCU** field in the **Create Change Polygons** box*. 
Step 16	Finally, use the **CHNG_TYPE** drop-down menu to select the type of legal change being made, here an annexation.  Then click **OK**.
Step 17	Click the **Save** button on the **Standard toolbar**. *The **Current edits** pop-up box asks to "Save the changes for all layers? "*.  Click **OK**.

Step	Action and *Result*
	*The changes are saved and the selected faces turn brown, as shown below. (***Note:** *If the Dane County map is reopened now, the faces will appear as part of Brooklyn Village.)*

6.1.6 Making a Legal Boundary Change for a Consolidated City

Users who represent consolidated cities (i.e., cities that share a consolidated government with a county or minor civil division) should follow the steps described in **Table 30** in **Section 6.1.5, Making a Boundary Update on a County Line** to show boundary changes between the city and any county adjacent to it. To show boundary changes between the consolidated city itself and the government or governments with which it shares a government, proceed as any incorporated place user would. That is, to annex land from another government within the consolidated government area, treat it as one would any annexation within a county.

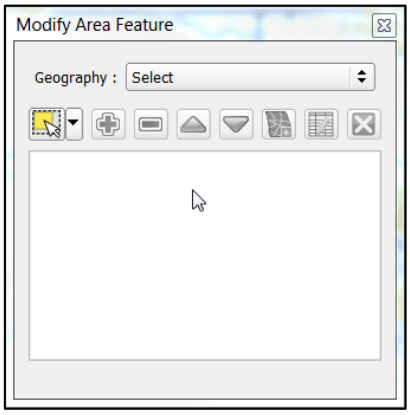
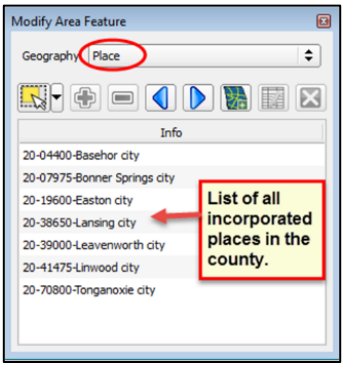
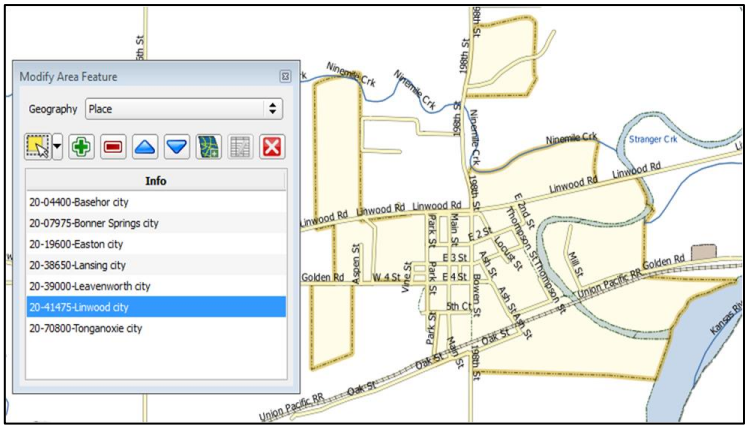
6.1.7 Making a Boundary Correction (Add Area/Remove Area)

To make a boundary correction that adds or removes area from a government, follow the steps in **Table 31**. In this fictitious example, a boundary correction is made to the city limits of Linwood, Kansas.

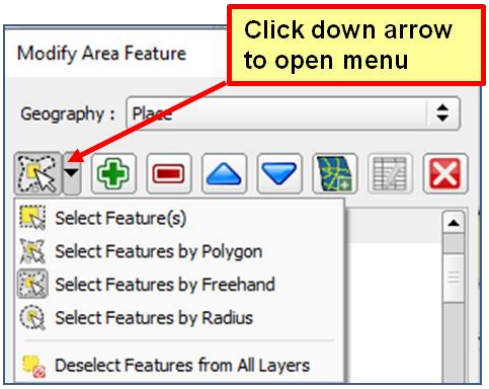
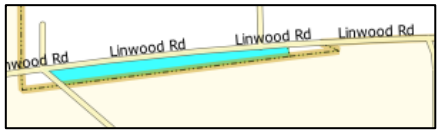
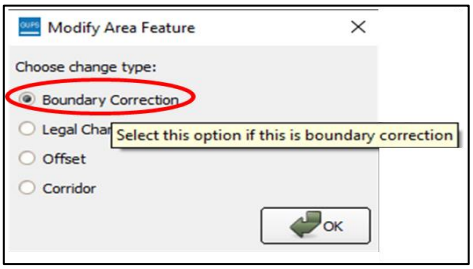
Table 31: Making a Boundary Correction

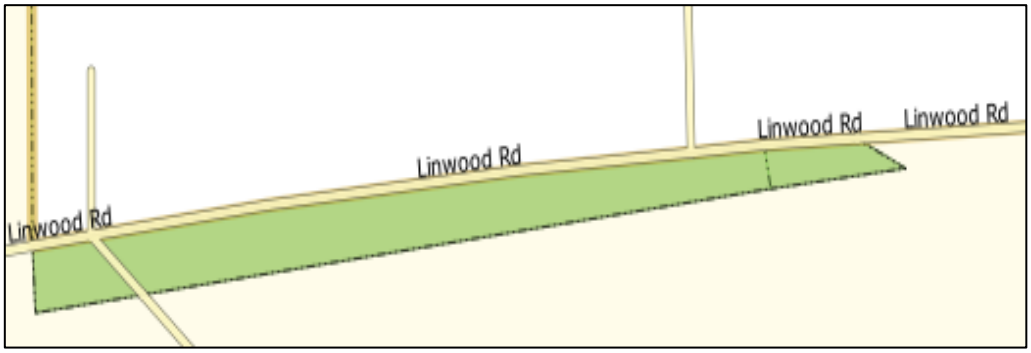
Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the legal entity to add or remove area. Be sure all layers needed on the map are checked in the **Layers Panel**.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens*. 
Step 3	Click the arrow next to the **Geography** field, and select in the drop-down menu the entity type for adding or removing area. In this example, '**Place**' is selected. *The **Info** list populates with all incorporated places in the county for the geography chosen*. 
Step 4	Click on the row in the list for the place that is adding/removing area (here Linwood). *The map zooms to the place selected.* 

PART 2: HOW TO USE GUPS

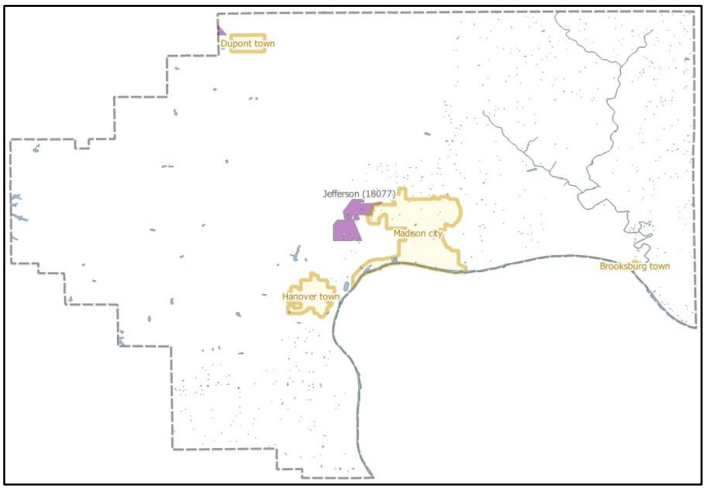
Step	Action and *Result*
Step 5	Click the down arrow next to the **Select Features** button to select the face(s) to add or remove for the boundary correction. *The **Select Features** drop-down menu opens*.  In this example, three small faces that are difficult to select are being added, so the best option is to '**Select Features by Freehand**'. This method allows placing the cursor inside the first face and drawing a tiny line. *The selected face turns cyan.*  To select the other faces, press the **CTRL** key, and while holding it down, repeat the action for the two remaining faces. *All three faces turn color.*
	Note: To add area, the area must be outside the selected place. To remove area, the area must be within the selected place.
Step 6	On the **Modify Area Feature** toolbar, click on the **Add** button (to add area to the entity) or on the **Remove** button (to remove area from the entity). *The **Modify Area Feature Choose change type** pop-up box opens, and asks to choose the change type*. 

Step	Action and *Result*
Step 7	Since this example is not making a legal boundary change, but rather a boundary correction, click the radio button next to '**Boundary Correction**'. Then click OK. *The added faces turn green on the map (color may vary) and are added to the legal entity boundary.* 
	Removing area from a boundary is conducted following the same steps, the only difference being that the **Remove** button on the **Modify Area Feature** toolbar is clicked. Once the faces are selected and the **Remove** button clicked, the same **Modify Area Feature Choose change type** pop-up box displays. Select '**Boundary Correction**' and the faces will turn green.

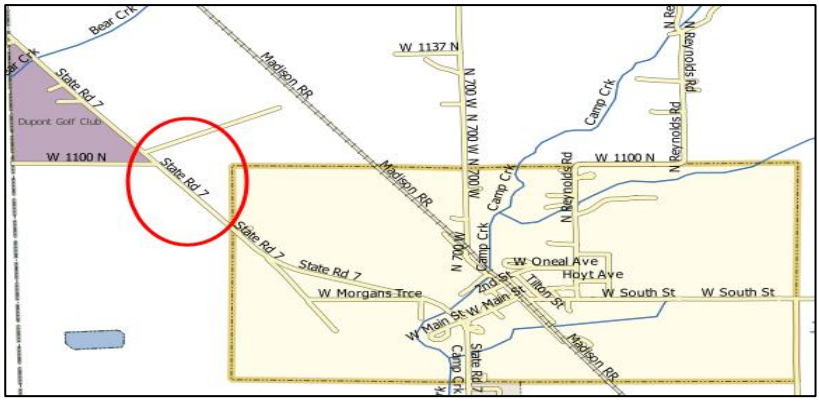
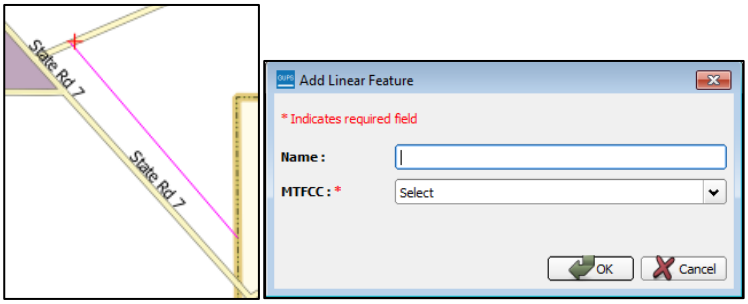
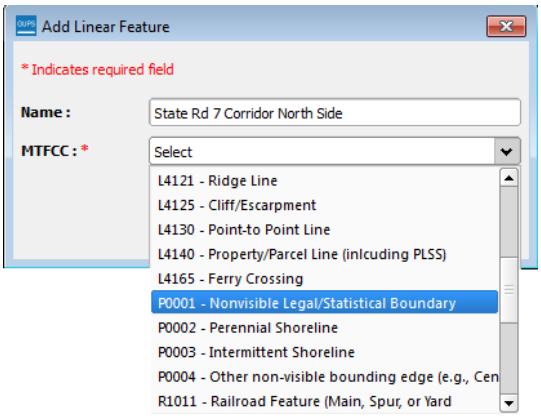
6.1.8 Adding a Geographic Corridor

The steps to add a geographic corridor are shown in the table below. The fictitious example provided uses in Dupont, Indiana. The steps in this table show how the city would mark the annexation of a geographic corridor along State Road 7, which in the example leads to a newly built golf course that is part of the town.

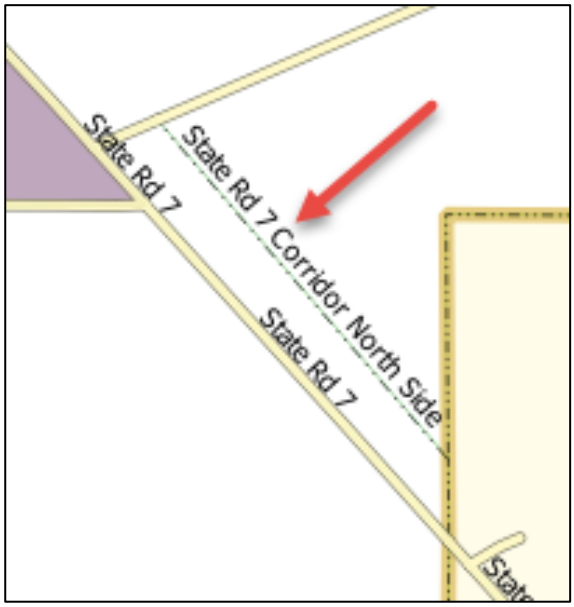
Table 32: Adding a Geographic Corridor

Step	Action and *Result*
	Creating a geographic corridor requires two actions: first split the faces on either side of the road (if edges do not already exist), then add the area.
Step 1	Load the data for the county (in this example, Jefferson County, Indiana). 

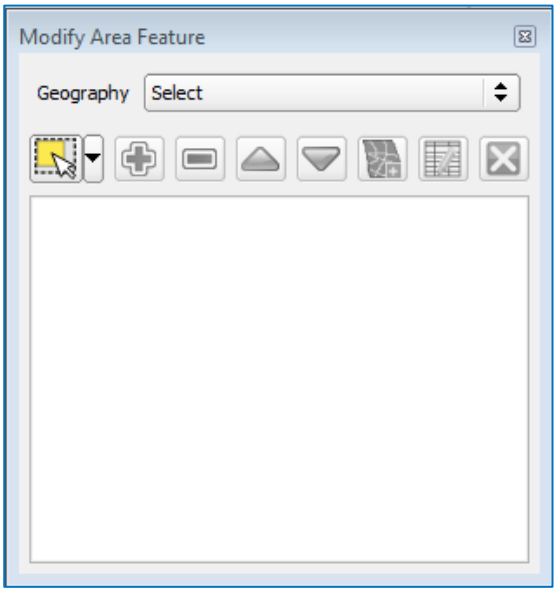
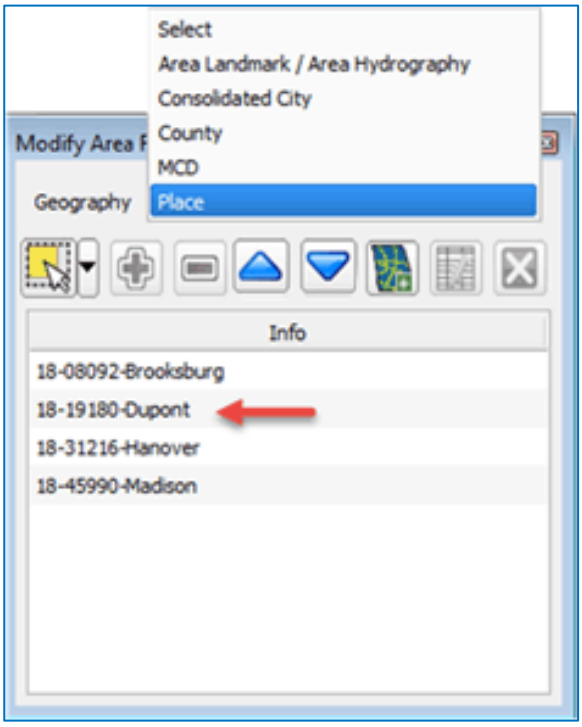
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Pan to the location of the geographic corridor (here State Road 7). 
Step 3	Click the **Add Linear Feature** button on the **BAS toolbar**.
Step 4	Left-click on the map at the beginning point of the first line and drag the cursor to create the line marking the first half of the corridor. Left-click at the end of the line, then right-click to tell GUPS one has finished drawing. *The line appears on the map, and the **Add Linear Feature** dialog box opens.* 
Step 5	Type a name if desired in the **Name** field, then select the appropriate MTFCC code in the **MTFCC** drop-down list. In this example, 'P0001 – Nonvisible Legal/Statistical Boundary' is selected.  *The **MTFCC** field populates with the selection.*

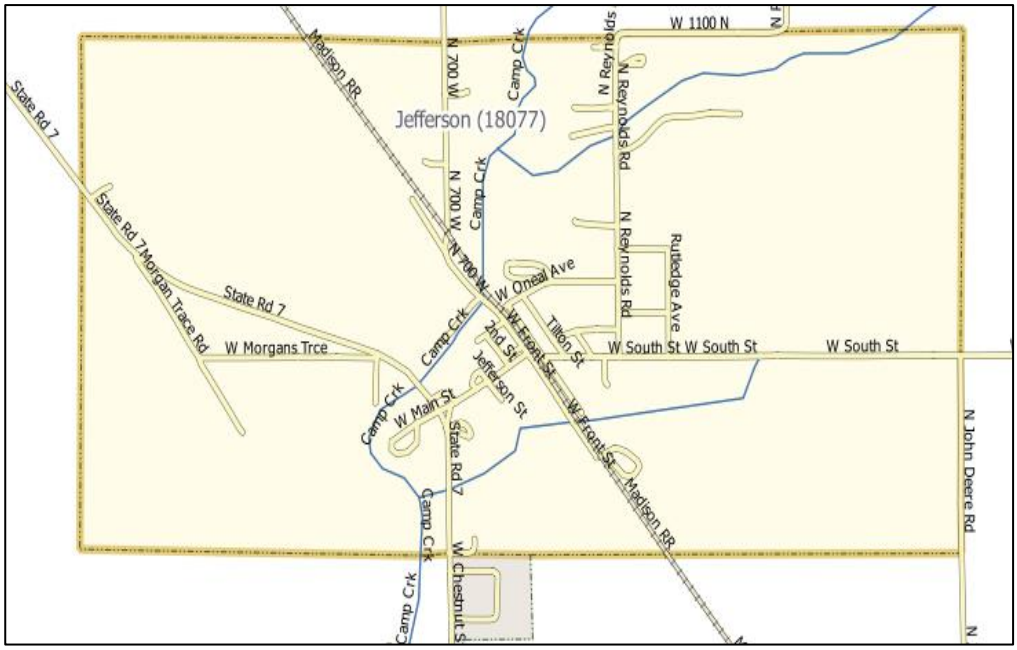
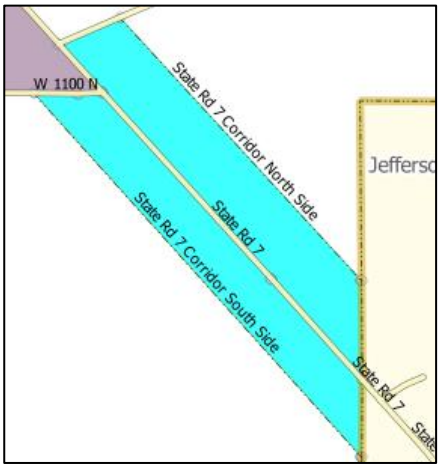
PART 2: HOW TO USE GUPS

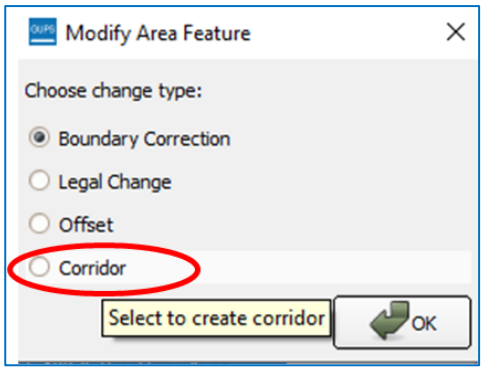
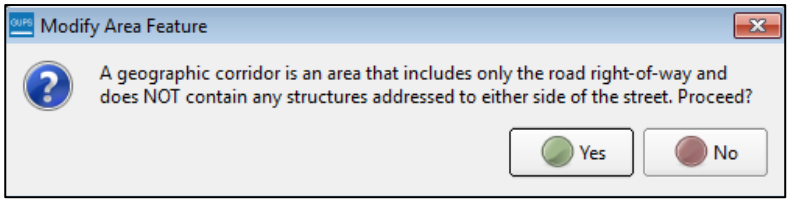
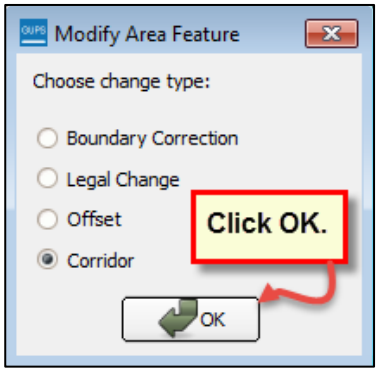
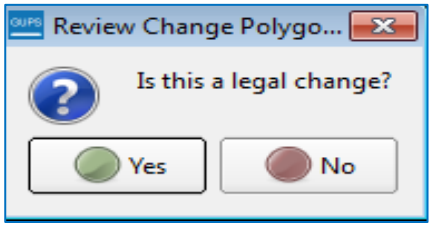
Step	Action and *Result*
Step 6	Click the **OK** button. *The line turns from purple to dark green (colors may vary) and the name, if provided, is added to the map*. 
Step 7	Add a line on the opposite side of the road using the same instructions provided in Steps 4 through 6. (**Note:** There is no need to click the **Add Linear Feature** button again; it is still active.) *When finished, the map should display the two corridor faces created, as shown below.*

PART 2: HOW TO USE GUPS

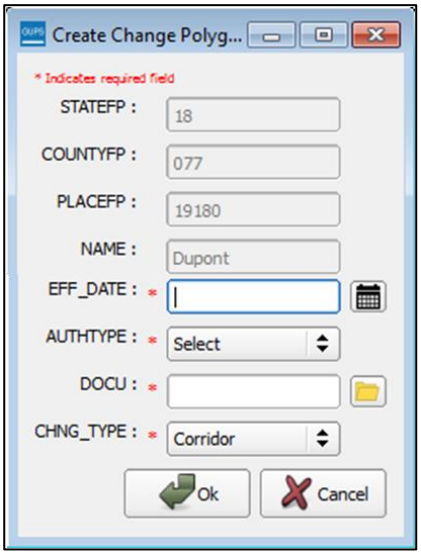
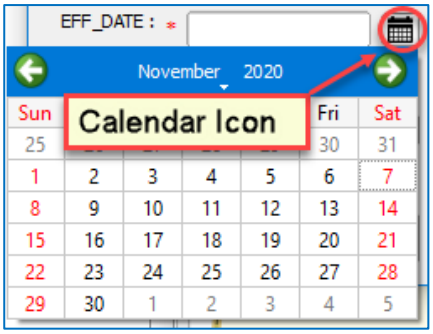
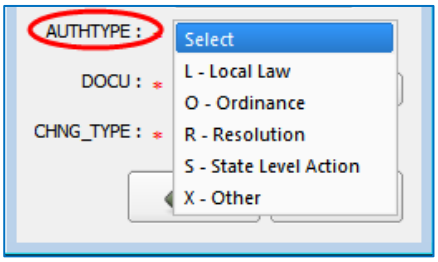
Step	Action and *Result*
Step 8	To add the area: click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 
Step 9	In the **Geography** field drop-down menu, select the entity type (in this case, 'Place'). *A list of all incorporated places in Jefferson County (including Dupont) populates the **Info** list at the bottom of the dialog box.* 

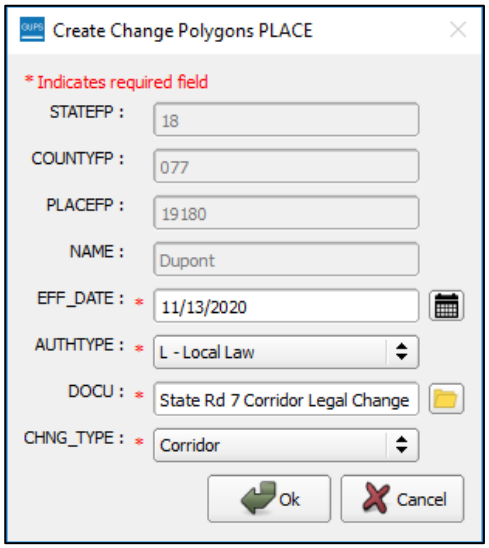
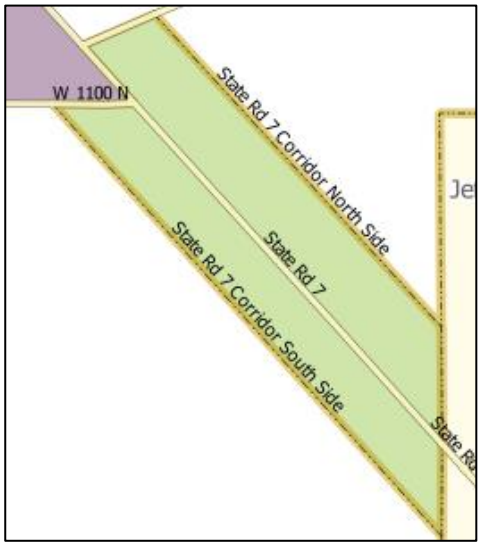
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 10	Click on the row for Dupont in the list. *The map zooms to the Town of Dupont.* 
Step 11	Pan to the location of the new corridor drawn on the map. Then click the **Select Feature(s)** button on the small toolbar near the top of the **Modify Area Feature** dialog box.
Step 12	Left-click inside one of the corridor faces, then drag the cursor across the road. *Once the cursor is released, the faces on either side of the road will have been selected and turn cyan*. 
Step 13	To record the corridor, click the **Add** button on the **Modify Area Feature** dialog box toolbar.

Step	Action and *Result*
	*The **Modify Area Feature Choose change type** dialog box opens.* 
Step 14	Click the radio button next to **Corridor**. *A box opens giving an explanation of what a geographic corridor is and asking if the user wants to proceed.* Click **Yes**. *The user is returned to the **Modify Area Feature Choose change type** box.* 
Step 15	Click the **OK** button at the bottom of the box. 
Step 16	*The **Review Change Polygons** pop-up box opens and asks whether this is a legal change.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 17	If the geographic corridor is not part of a legal change, click **No**. *The change is automatically added as a boundary correction.* If the geographic corridor is a legal change, click **Yes**. *The **Create Change Polygons** dialog box opens*. 
Step 18	Click on the calendar icon next to the **EFF_DATE** field to select an effective date for the change. 
Step 19	Use the **AUTHTYPE** drop-down menu to select an authority type. 

Step	Action and *Result*
Step 20	In the **DOCU** field, either type in the documentation number, or upload legal documentation of the change. To upload a document, click on the folder icon, navigate to the directory where the document is stored, and double-click the file. *The file uploads to GUPS and the name of the file appears in the **DOCU** field*. 
Step 21	In the **CHNG_TYPE** field, select '**Corridor**' in the drop-down list. *Corridor fills the **CHNG_TYPE** field as shown in the screenshot above*.
Step 22	Click **OK**. *The faces marking the corridor turn green on the map (color may vary). The corridor has been added*. 

6.1.9 Adding a Geographic Offset

To create a geographic offset, follow the same steps as for a corridor (**Table 32**). The only difference is that geographic offsets are only on one side of the road.

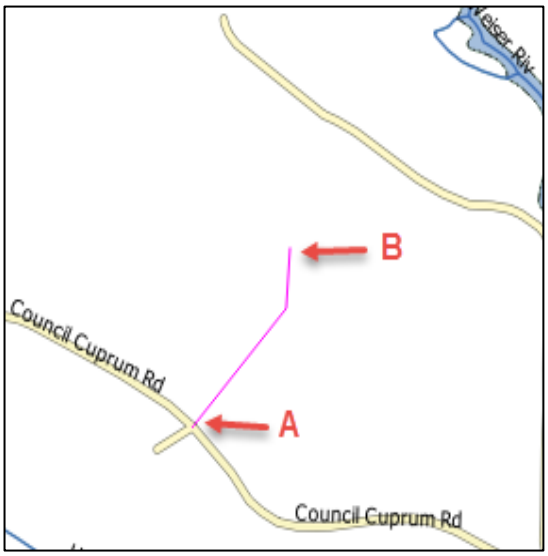
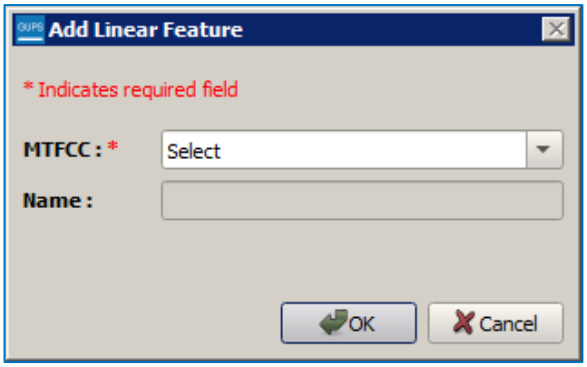
PART 2: HOW TO USE GUPS

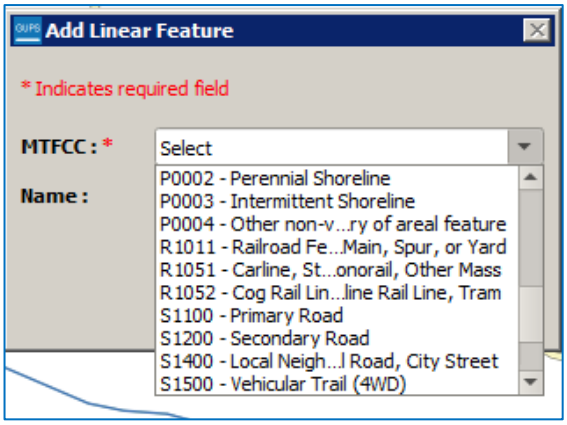
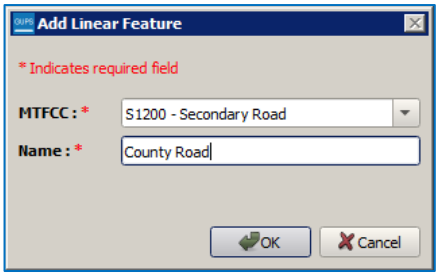
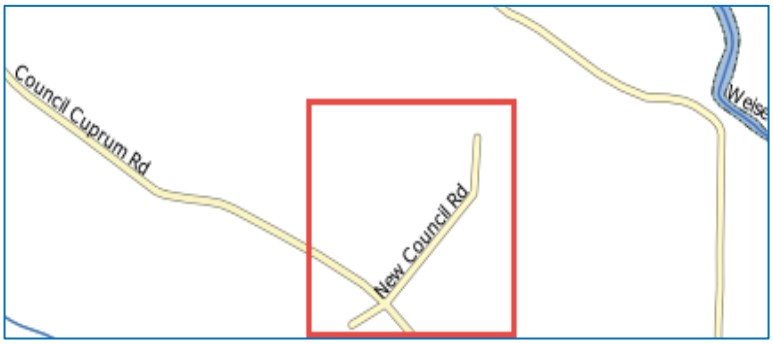
6.2 How to Update Linear Features

6.2.1 Adding a Linear Feature

Follow the steps in **Table 33** to add a linear feature.

Table 33: Adding a Linear Feature

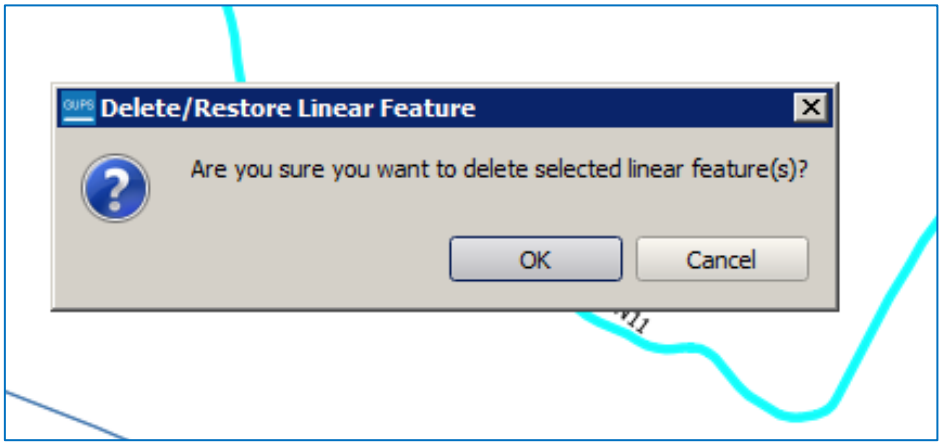
Step	Action and Result
Step 1	Open in **Map View** the county that contains the entity where a linear feature will be added. Be sure the edges layer is checked in the **Layers Panel**. Then zoom to the location on the map the feature will be added.
Step 2	Click on the **Add Linear Feature** button on the **BAS toolbar**.
Step 3	Left-click the mouse at the starting point of the line (A) and continue to left-click the mouse at each vertex (shape) point of the line. When the new line is completed, right-click the mouse (B). The right-click tells GUPS to finish drawing.  *The **Add Linear Feature** dialog box opens.* 

Step	Action and Result
Step 4	In the **MTFCC** field drop-down menu, choose the appropriate code for the feature. 
Step 5	Type the name of the new linear feature in the **Name** field if the feature is named; otherwise, leave blank. Be sure when entering the feature name either to spell out the feature type (e.g., street, road, avenue), or to select an approved abbreviation from the list provided in **Appendix D**. 
Step 6	Click the **OK** button at the bottom of the **Add Linear Feature** dialog box. *The added linear feature and the name assigned appear on the map*. 
	Adding a linear feature coincident with a boundary – GUPS will not allow one linear feature to be placed over another. For example, if attempting to add a road overlaying a legal boundary line, a pop-up box will warn 'Added Line Overlays an Existing line'. If adding a linear feature coincident with a boundary, follow the instructions for updating linear feature attributes instead (for instructions click on **Table 36**). Once a street is added on a boundary edge, update the MTFCC in the **Update Attributes** pop-up to one of the "S" class feature codes (e.g., S1400) and add a name in the **FULLNAME** field.

6.2.2 Deleting a Linear Feature

To delete a linear feature, follow the steps in **Table 34**.

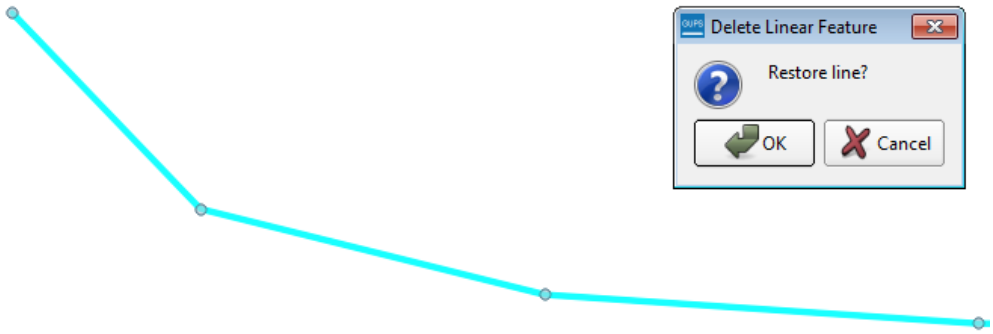
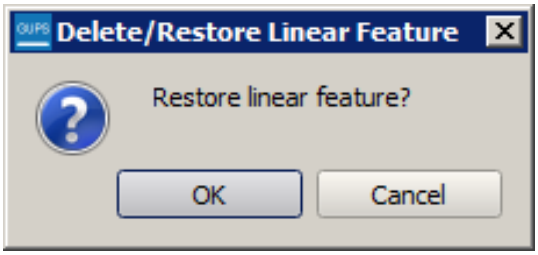
Table 34: Deleting a Linear Feature

Step	Action and *Result*
Step 1	Open in **Map View** the county containing the entity where the linear feature will be deleted. Be sure that the edges layer is checked in the **Layers Panel**. Then zoom to the location on the map where the feature will be deleted.
Step 2	Click on the **Delete/Restore Linear Feature** button on the **BAS toolbar**.
Step 3	Left-click the linear feature to be deleted. In the example below, an unnamed road was clicked. *The clicked linear feature turns cyan and the **Delete Linear Feature** pop-up box appears, asking for confirmation to delete the feature.* 
Step 4	Click **OK**. *The line is deleted in the attribute table. The cyan color is removed from the line and the line now appears with x's through it.*
	When a linear feature is deleted, it is not actually removed from the Census Bureau shapefile. GUPS assigns a Delete Line flag to the feature in the attribute table, and the feature is later processed for deletion when the Census Bureau receives the BAS file. **Note:** If there are multiple linear features to delete, click the **Delete Linear Feature** button on the toolbar once, then press **CTRL** and click each of the features to delete. GUPS will delete all of the linear features selected. The cursor can also be dragged over multiple linear features to select them.

6.2.3 Restoring a Deleted Linear Feature

To restore a deleted linear feature, follow the steps in **Table 35**.

Table 35: Restoring a Deleted Linear Feature

Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the deleted linear feature. Be sure the edges layer is checked in the **Layers Panel**. Then zoom to the location on the map where the deleted feature is located.
Step 2	Left-click on the deleted feature. *The deleted feature turns cyan and the **Delete Linear Feature** dialog box opens. The box asks to confirm restoring the linear feature*. 
Step 3	To restore the linear feature, click the **OK** button.  *The **Delete Line flag** is removed from the attribute table and the line is restored*.

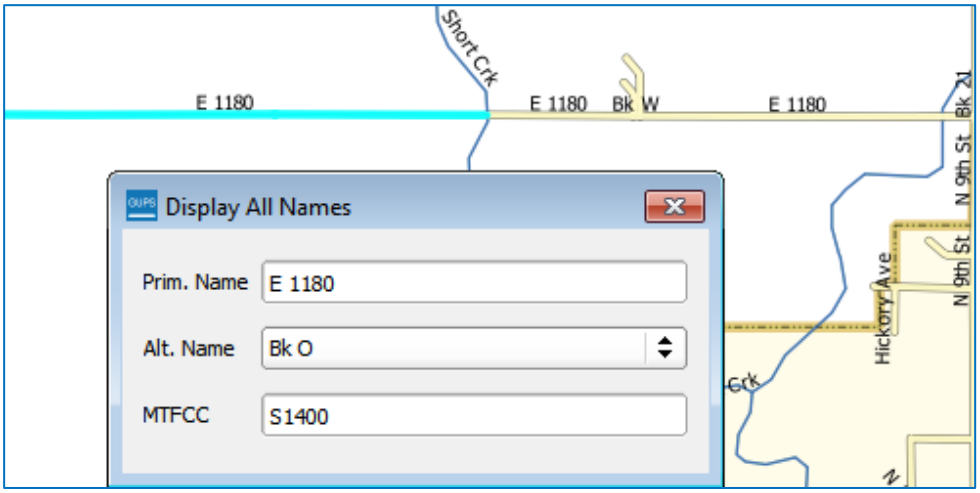
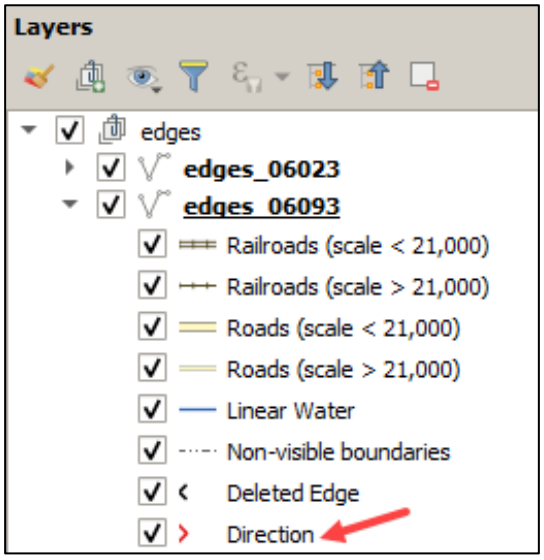
6.2.4 Changing the Attributes of a Linear Feature

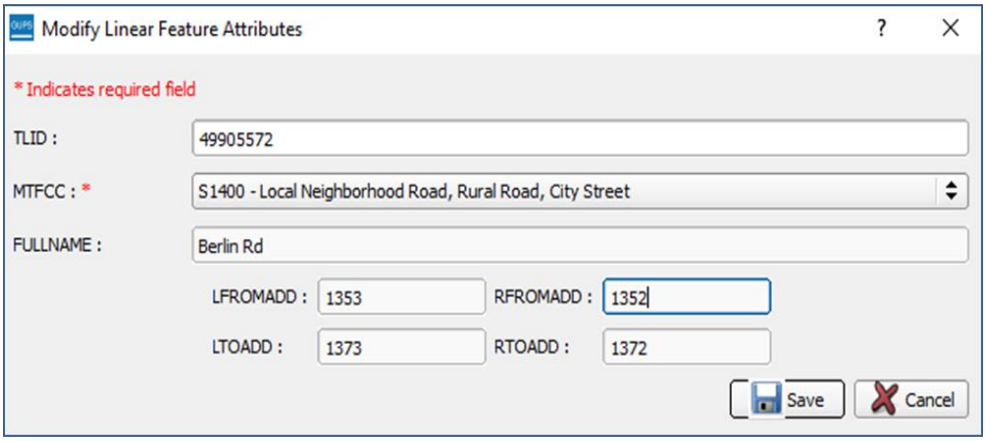
Follow the steps in **Table 36** to change the attributes (e.g., the name, MTFCC, or address range) of a linear feature.

Table 36: Changing the Attributes of a Linear Feature

Step	Action and *Result*
Step 1	If planning to change the name of a linear feature, check first to see if it has an alternate name. To do this, click the **Display All Names** button on the **BAS toolbar**.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	Then click on the linear feature on the map. *The selected feature turns cyan and the* ***Display All Names*** *dialog box opens, showing the primary name in the* ***Prim. Name*** *field and the alternate name, if one is present, in the* ***Alt. Name*** *field*.  To see any additional alternate names, click the drop-down arrow to the right of the **Alt. Name** field. If no alternate name exists, 'NULL' appears in the **Alt. name** field.
Step 2	If providing an address range for a linear feature, check the checkbox next to **>** **direction** in the **Edges** field in the **Layers Panel**. *This activates the arrows that indicate the FROM and TO nodes for line segments*. 
Step 3	Click on the **Modify Linear Feature Attributes** button on the **BAS toolbar**.

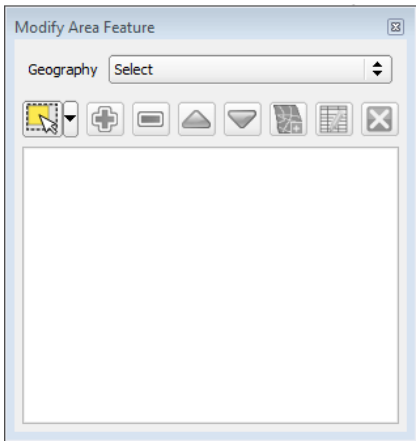
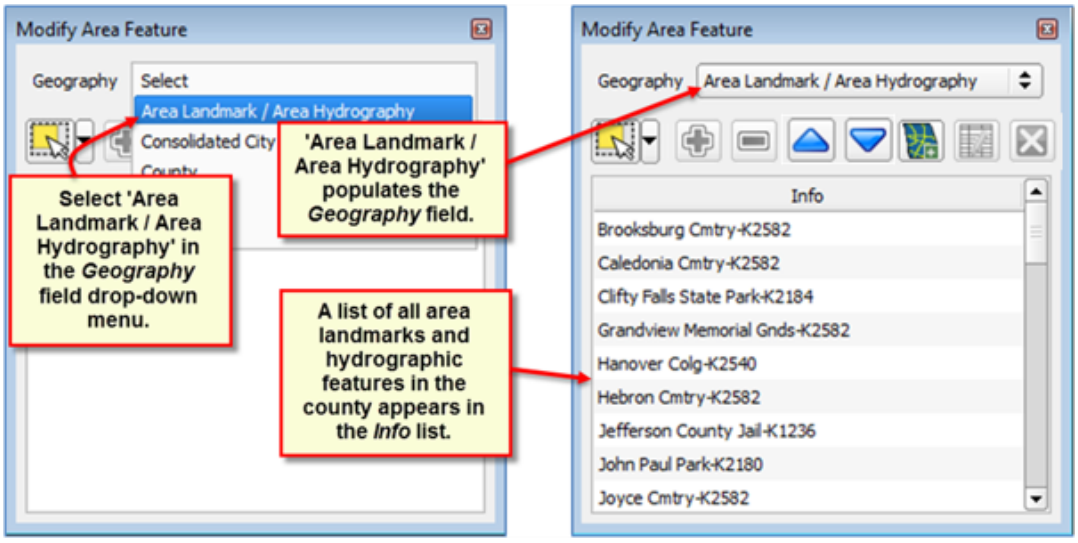
Step	Action and *Result*
Step 4	Click the linear feature on the map with attributes to be edited. *The **Modify Linear Feature Attributes** dialog box opens with the TIGER Line Feature ID (TLID) of the feature selected. The **FULLNAME** field populates if the feature is named. If the feature is not named, the field is blank. The **MTFCC**, **LTOADD**, **RTOADD**, **LFROMADD**, and **RFROMADD** fields show the assigned values for each.* 
Step 5	Update the **FULLNAME** field. If the field is blank, type in the new name. If the field is already populated, highlight the existing name and hit the **Delete** key on the keyboard. It is also possible to backspace over the name to clear the field. Then type in the new name.
Step 6	If correcting the **MTFCC,** click on the down arrow to the right of the field to open the drop-down menu and select the correct MTFCC from the menu.
Step 7	Change the address range for the linear feature, if necessary. Type in potential address ranges in the **LTOADD** (left to address); **RTOADD** (right to address); **LFROMADD** (left from address); **RFROMADD** (right from address) fields based on the directional arrows. The directional arrows show the origin node (FROM) and the end node (TO).
Step 8	Click **Save** button at the bottom of the **Modify Linear Feature Attributes** dialog box.
	The address ranges for all features are blank in the geographic partnership shapefiles because the ranges are stored in tables separate from the shapefiles. Address ranges can be provided in these fields, but be aware that the Census Bureau may already have address ranges. It is important to note which node is the FROM node and which is the TO node (based on the red directional arrows) so that the address ranges are associated with the correct side of the street and the correct census block. **Note:** Provide potential address ranges for blocksides, such as 0-98, 100-198, etc., for even parity and 1-99, 101-199, etc., for odd parity address ranges. Do not provide actual address ranges.

6.3 How to Update Area Landmarks and Hydrographic Areas

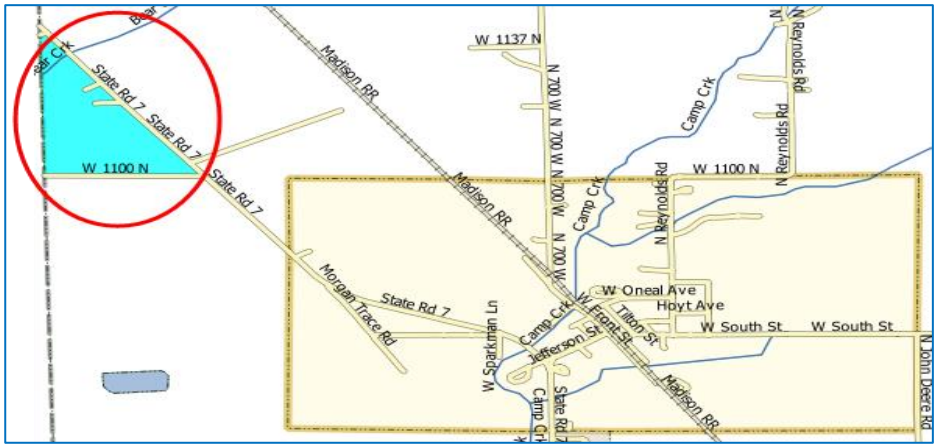
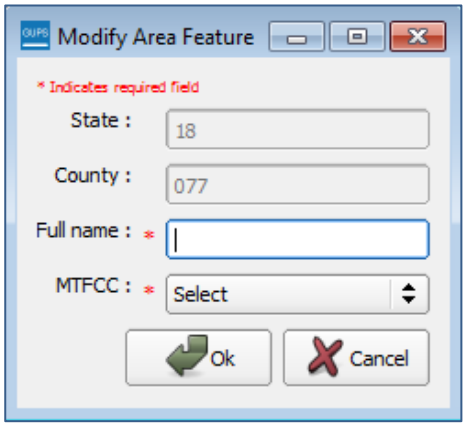
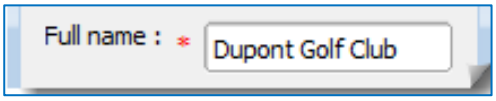
6.3.1 Adding a New Area Landmark/Hydrographic Area

To create a new landmark or hydrographic area, follow the steps in **Table 37**. In this fictitious example, a golf course is added in Jefferson County, Indiana, located northwest of Dupont Town.

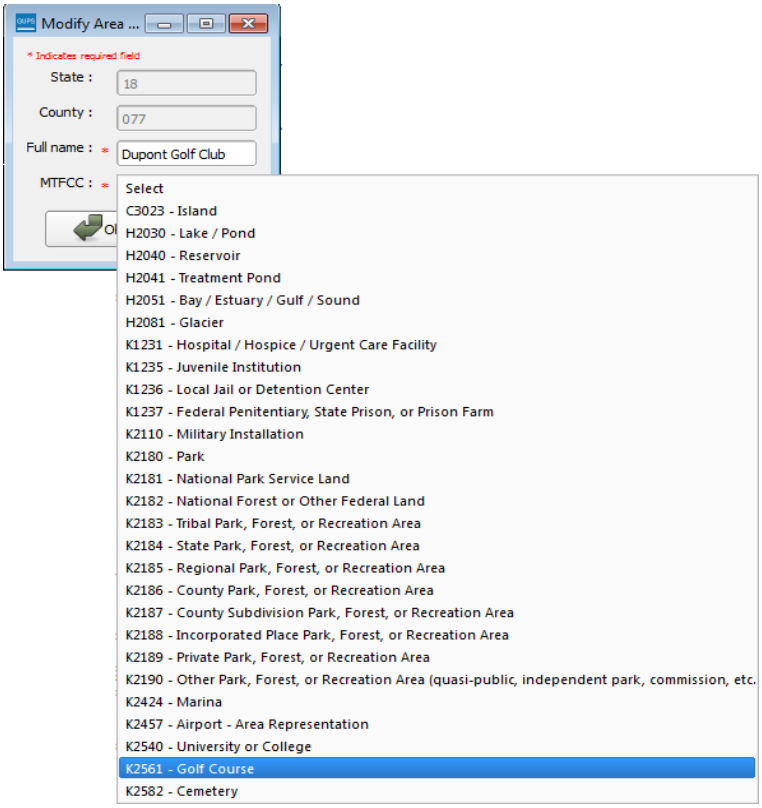
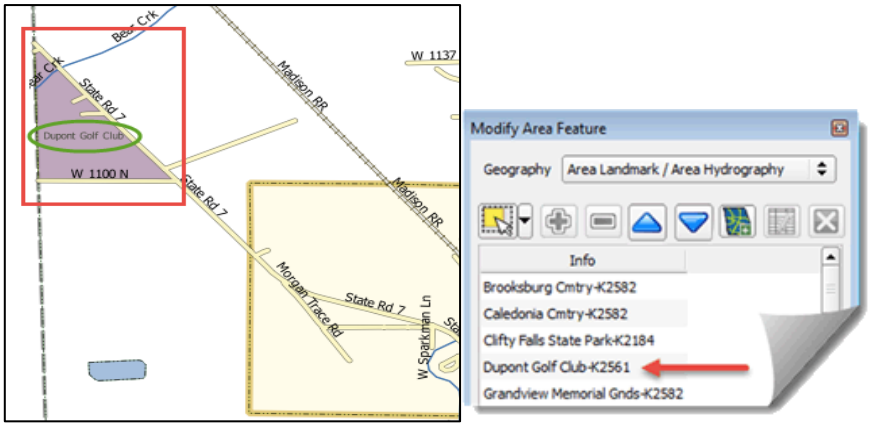
Table 37: Creating a New Area Landmark/Hydrographic Area

Step	Action and *Result*
Step 1	Open in **Map View** the county where the new area landmark or hydrographic area will be added. Be sure the 'arealm' layer is checked in the **Layers Panel**. Then zoom to the location on the map where the landmark or hydrographic will be added.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 
Step 3	In the **Geography** field drop-down menu, select '**Area Landmark/Area Hydrography**'. *'Area Landmark/Area Hydrography' populates the **Geography** field and a list of area landmarks and hydrographic areas in the county appears in the **Info** list.* 
Step 4	Click on the yellow **Select Feature(s)** button on the **Modify Area Feature** toolbar.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	Then click on the first face on the map to select it. To select more than one face, depress the **CTRL** key, and while holding it down, click on the additional faces. In this example, two faces are selected, one on either side of Bear Creek. *The selected faces turn cyan.* 
Step 6	Click on the **Add Entity** button on the **Modify Area Feature** toolbar. *The **Modify Area Feature** box opens.* 
Step 7	In the **Modify Area Feature** box, type in the name of the new area landmark in the **Full name** field. 

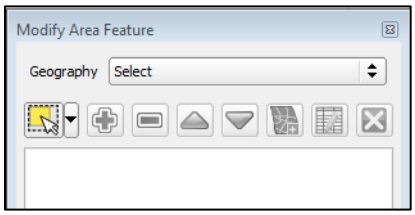
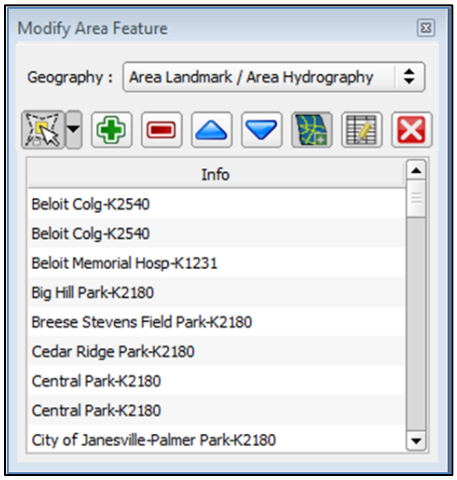
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	Then select the appropriate code in the **MTFCC** field drop-down list, as shown below. 
Step 8	Click **OK**. *The faces selected for the new entity now display in purple (color may vary). The name of the added landmark also appears within the change polygon on the map (see green circle), and the name of the new entity appears in the **Info** list.* 
	Because all geographic areas consist of faces, the user may need to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (click on **Table 33** for instructions to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. One can now select the face to add to the new entity.

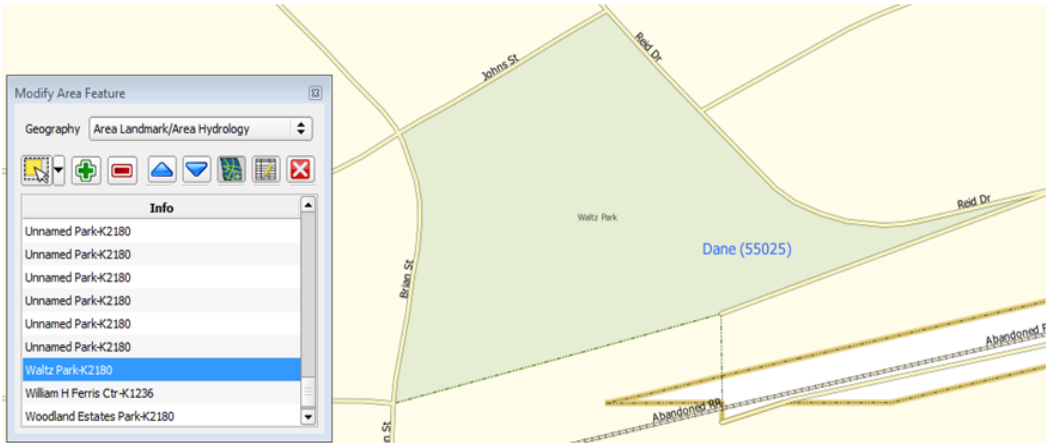
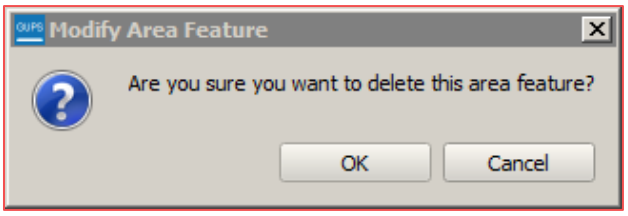
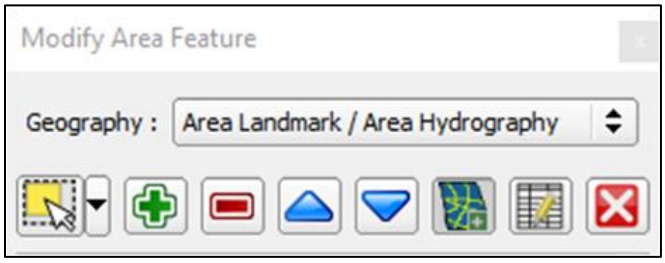
6.3.2 Deleting an Area Landmark/Hydrographic Area

To delete an area landmark or hydrographic area, follow the steps in **Table 38**.

Table 38: Deleting an Area Landmark/Hydrographic Area

Step	Action and *Result*
Step 1	Open in **Map View** the county in which one wants to delete an area landmark or hydrographic area. Be sure the '**arealm'** layer is checked in the **Layers Panel**.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 
Step 3	In the **Geography** field drop-down menu, select '**Area Landmark/Area Hydrography**'. *'Area Landmark/Area Hydrography' populates the **Geography** field and a list of area landmarks and hydrographic areass in the county appears in the **Info** list.* 
Hint	To view all the area landmarks and hydrographic areas in the **Info** list, use the scroll bar located to the far right-hand side of the **Modify Area Feature** dialog box. To move up and down within the list, use the blue navigation arrows located on the small toolbar near the top of the dialog box.

PART 2: HOW TO USE GUPS

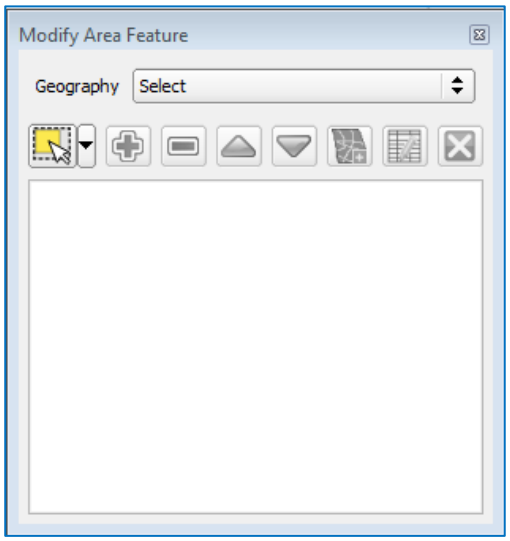
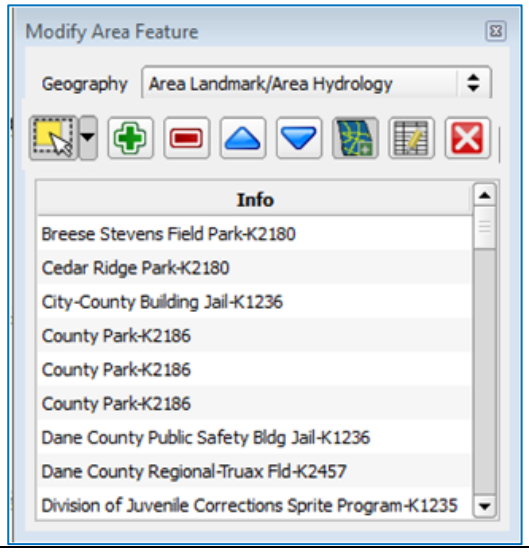
Step	Action and *Result*
Step 4	In the **Info** list, click on the area landmark/hydrographic area one wants to delete. *The selected entry is highlighted in the **Info** list and the map zooms directly to the selected feature.* 
Step 5	Click the **Delete Area Feature** button on the **Modify Area Feature** dialog toolbar. *A pop-up box opens and asks to confirm the deletion of the feature.* 
Step 6	To delete the area landmark/area hydrography, click **OK**. *The linear feature turns gray (color may vary) on the map, and its name disappears from the **Info** list.*
Step 7	Not ready to delete? Click **Cancel** *to be returned to the **Modify Area Feature** dialog.* 
Step 8	Once ready to delete the area landmark/area hydrography, click on the feature name in the **Info** list. *The buttons will reactivate,* and click the **Delete Area Feature** button.

PART 2: HOW TO USE GUPS

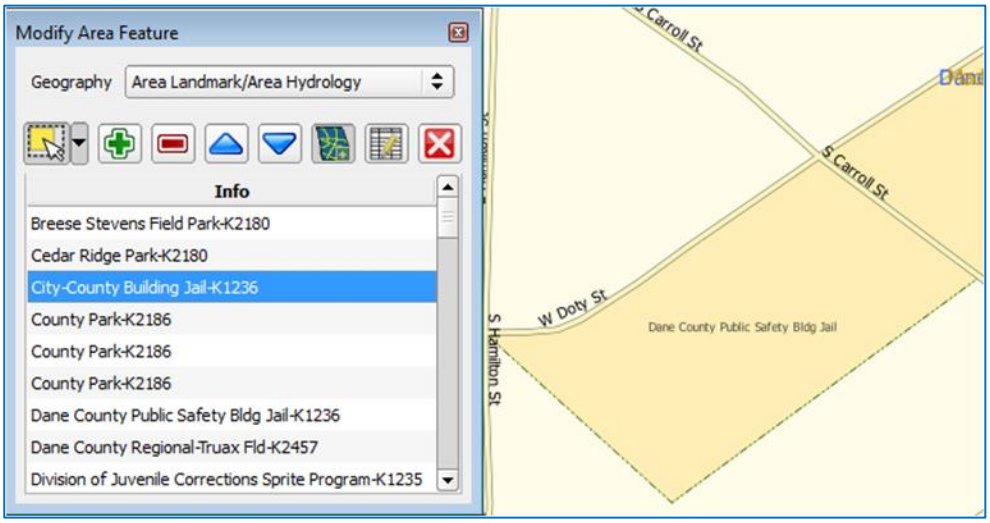
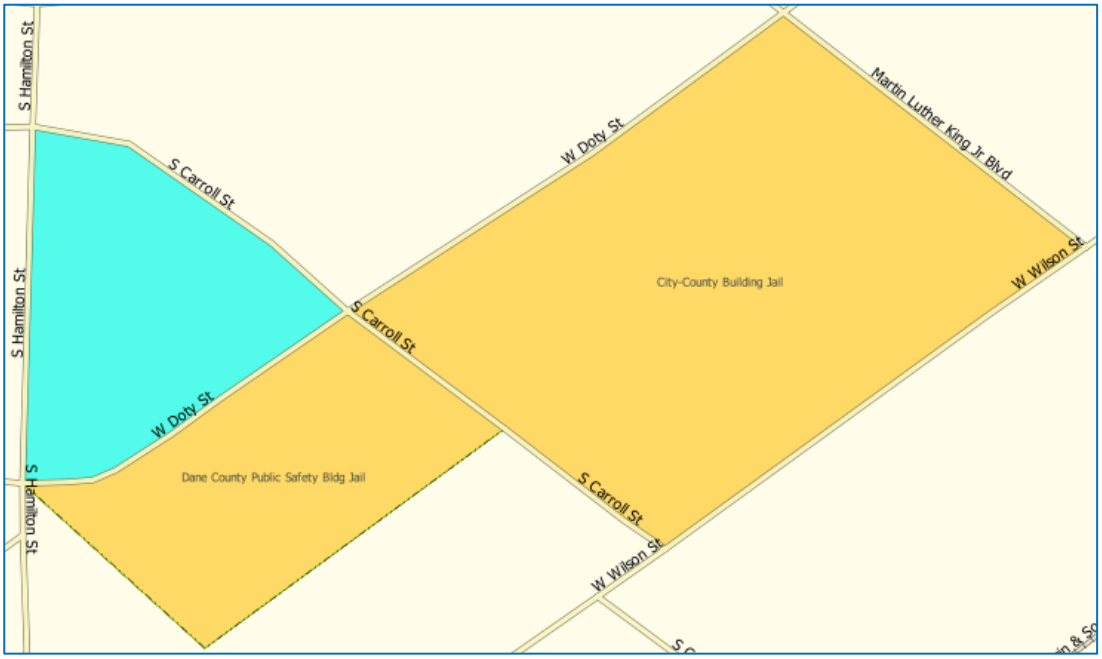
6.3.3 Adding Area to an Area Landmark or Hydrographic Area

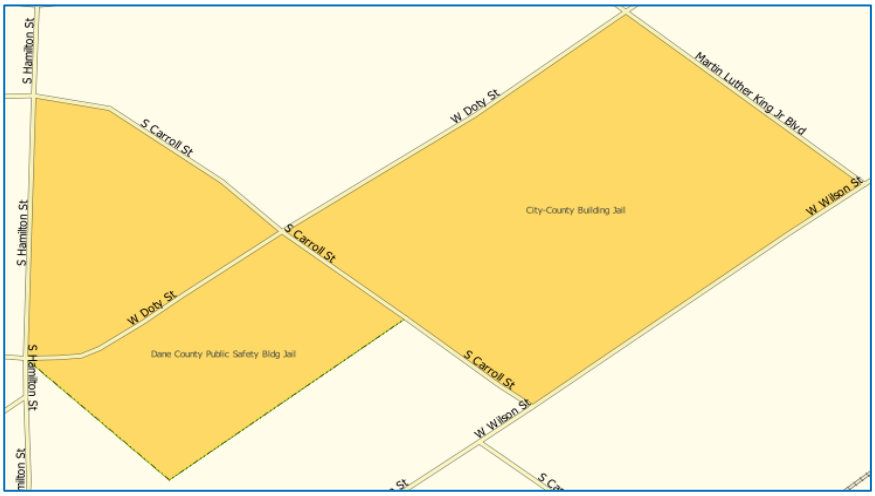
Follow the steps in **Table 39** to add area to an area landmark or hydrographic area.

Table 39: Adding Area to an Area Landmark/Hydrographic Area

Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the area landmark or hydrographic area to which area will be added. Be sure the '**Area_Landmarks'** layer is checked in the **Layers Panel**.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 
Step 3	Click the down arrow next to the **Geography** field and select '**Area Landmark/Area Hydrography**' in the drop-down menu. *The selection populates the **Geography** field and a list of area landmarks/hydrographic areas in the county appears in the **Info** list.* 

PART 2: HOW TO USE GUPS

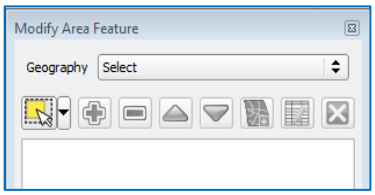
Step	Action and *Result*
Step 4	Click the row in the list for the area landmark/hydrographic area to which area will be added. *The selected entity is highlighted in the **Info** list and the map zooms to its location.* 
Step 5	To select the face(s) to add to the area landmark, click the **Select Feature** button on the **Modify Area Feature** toolbar. Then click the face to be added to the area feature. *The added face turns cyan.* *(**Note:** To select more than one face, depress the **CTRL** key, and while holding it down, click the other faces.)* 

Step	Action and *Result*
Step 6	To add the face(s) selected, click the **Add Area** button on the **Modify Area Feature** dialog box toolbar. *The selected face is added to the area landmark and turns the same color as the other face(s) that make up the area landmark. The map also now shows the full extent of the area landmark.* 
	Because all geographic areas consist of faces, the user may need to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (see **Table 33** for instructions to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. One can now select the face to add to the new entity.

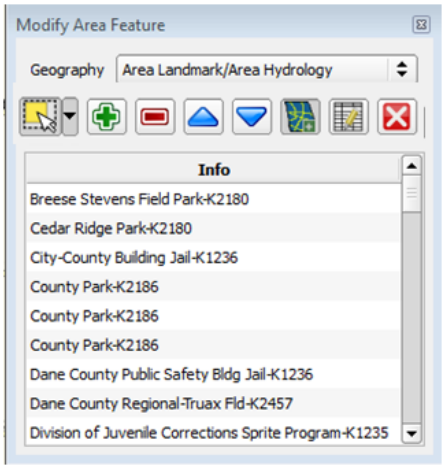
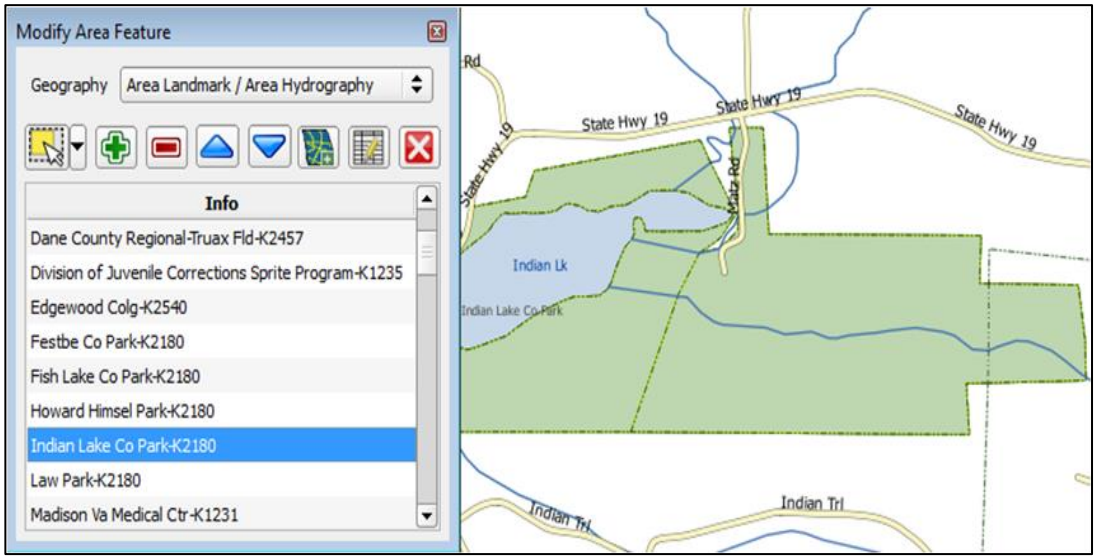
6.3.4 Removing Area from an Area Landmark/Hydrographic Area

Follow the steps in **Table 40** to remove area from an area landmark or hydrographic area.

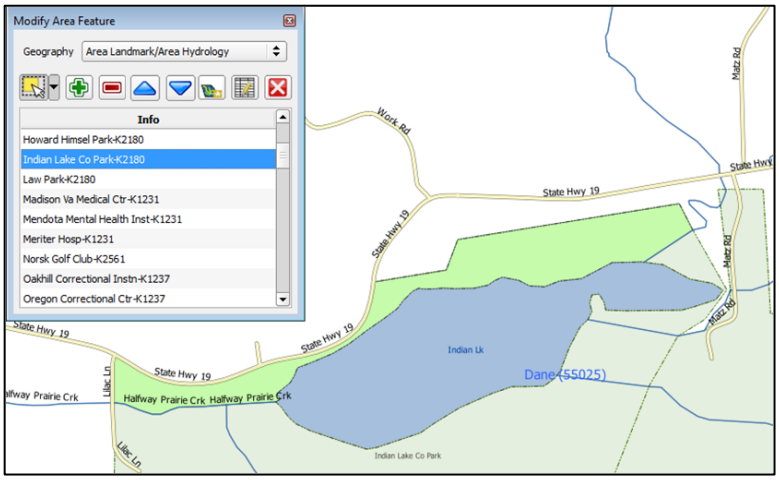
Table 40: Removing Area from an Area Landmark/Hydrographic Area

Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the area landmark or hydrographic area from which area will be removed. Be sure the '**arealm**' layer is checked in the **Layers Panel**.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	In the **Geography** field drop-down menu, select '**Area Landmark/Area Hydrography**'. *'Area Landmark/Area Hydrography' populates the **Geography** field and a list of area landmarks and hydrographic areas in the county appears in the **Info** list.* 
Step 4	Select the area landmark/hydrographic area from which area will be removed. *The selected entity is highlighted in the **Info** list and the map zooms to its location*. In this example, Indian Lake County Park is chosen. 
Step 5	To select the face(s) to remove from the area landmark, click the **Select Feature** button on the **Modify Area Feature** dialog box toolbar. Then click on the first face to remove. To select additional faces, depress the **CTRL** key, and while holding it down, click the additional faces.

PART 2: HOW TO USE GUPS

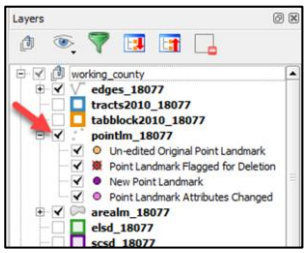
Step	Action and *Result*
Step 6	To remove the face(s) selected, click the **Remove Area** button on the **Modify Area Feature** dialog box's internal toolbar. *The selected face turns light green (color may vary) on the map and is removed from the area landmark or hydrographic area.* 
	Because all geographic areas consist of faces, the user may need to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (click on **Table 33** for instructions to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. One can now select the face to add to the new entity.

6.4 How to Update Point Landmarks

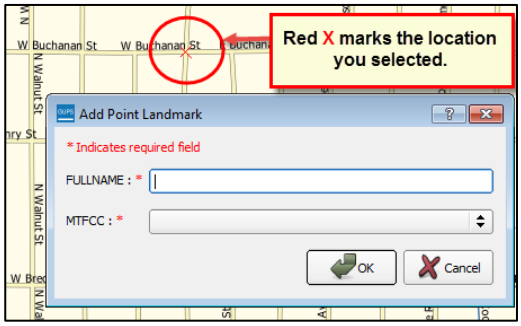
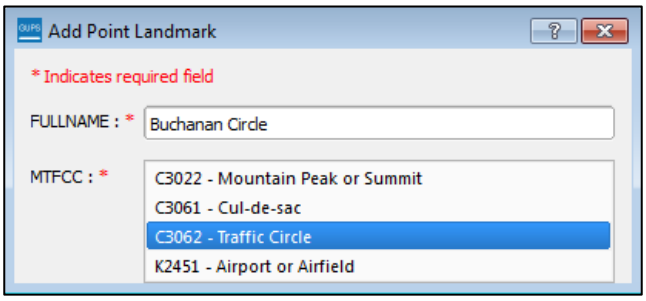
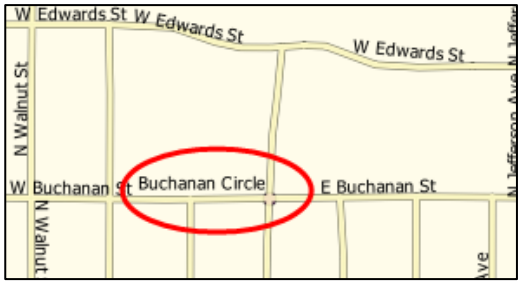
6.4.1 Adding a Point Landmark

To add a point landmark, follow the steps in **Table 41**.

Table 41: Adding a Point Landmark

Step	Action and *Result*
Step 1	Open the project in **Map View**. Be sure the **'Point Landmark'** layer is checked in the **Layers Panel** (**pointlm_18077** in this example). 

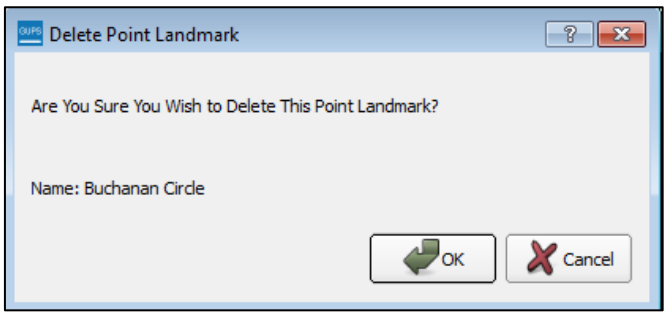
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Click the **Add Point Landmark** button on the **BAS toolbar**.
Step 3	Click on the map 
Step 4	Type in the name for the new point landmark in the **FULLNAME:** field. Then click the down arrow next to the **MTFCC:** field to open the drop-down menu. 
Step 5	Select the MTFCC, then click the **OK** button at the bottom of the box. *The map updates to show the added point landmark*. In this case a traffic circle was added and named Buchanan Circle. 

6.4.2 Deleting a Point Landmark

To delete a point landmark, follow the steps in **Table 42**.

Table 42: Deleting a Point Landmark

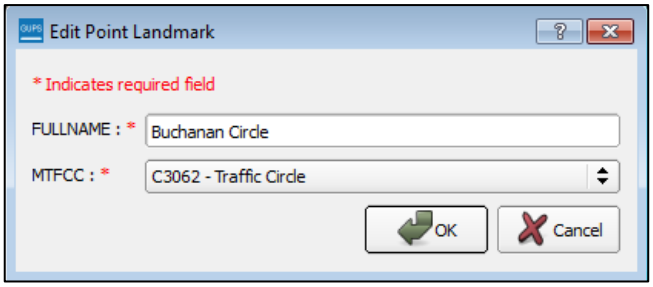
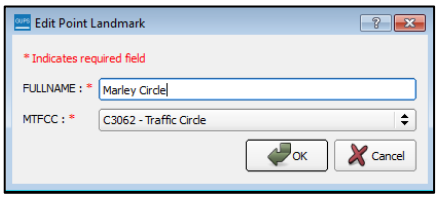
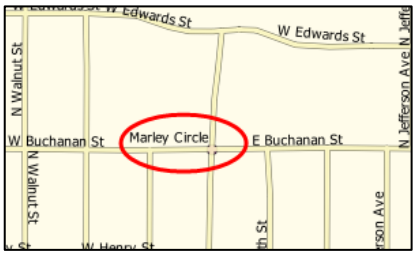
Step	Action and *Result*
Step 1	Zoom to the area on the map where a point landmark will be deleted. In this example, the traffic circle named Buchanan Circle will be deleted.
Step 2	Click the **Delete Point Landmark** button on the **BAS toolbar**.
Step 3	On the map, click on the point landmark to delete (Buchanan Circle). The **Delete Point Landmark** dialog box opens, and asks to confirm the deletion of the point landmark. 
Step 4	Click **OK**. *The point landmark shows a red x over it and marked in the attribute table.*

6.4.3 Changing the Attributes of a Point Landmark

To change the attributes of a point landmark (e.g., its name, MTFCC), follow the steps in **Table 43**.

Table 43: Changing the Attributes of a Point Landmark

Step	Action and *Result*
Step 1	Zoom to the area on the map where the point landmark is located and click on the landmark. In this example, the name of Buchanan Traffic Circle is changed.
Step 2	Click on the **Edit Point Landmark** button on the **BAS toolbar**.

Step	Action and *Result*
Step 3	On the map, click on Buchanan Circle. *The **Edit Point Landmark** dialog box opens.* 
Step 4	To change the name, backspace over the name appearing in the **FULLNAME:** field, then type in the new name. In this example, the name to Marley Circle is changed. 
Step 5	Click **OK**. The new name of the point landmark appears on the map. 

6.5 How to Use GUPS Review and Validation Tools

GUPS provides two tools—the **Geography Review** tool and the **Review Change Polygons** tool to help users review and validate the updates made in the system.

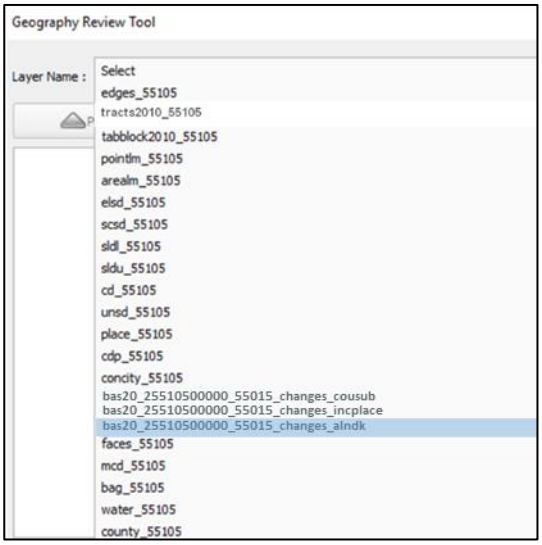
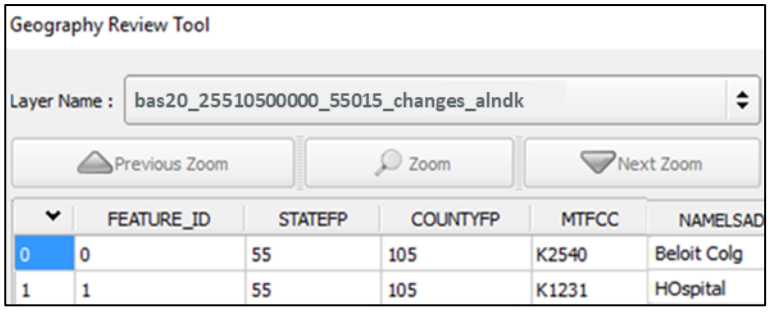
6.5.1 Geography Review Tool

The **Geography Review** tool filters the map layers based on various fields in the attribute table. This tool can check the changes made to linear features, area landmarks, point landmarks, and legal boundaries anywhere within a county. It can also be used to view the attributes of governments, features, landmarks, and boundaries not changed. **Note:** *Although this tool allows users to review changes, it cannot be used to edit them*. Instructions for how to use the **Geography Review** tool information appear in **Table 44**.

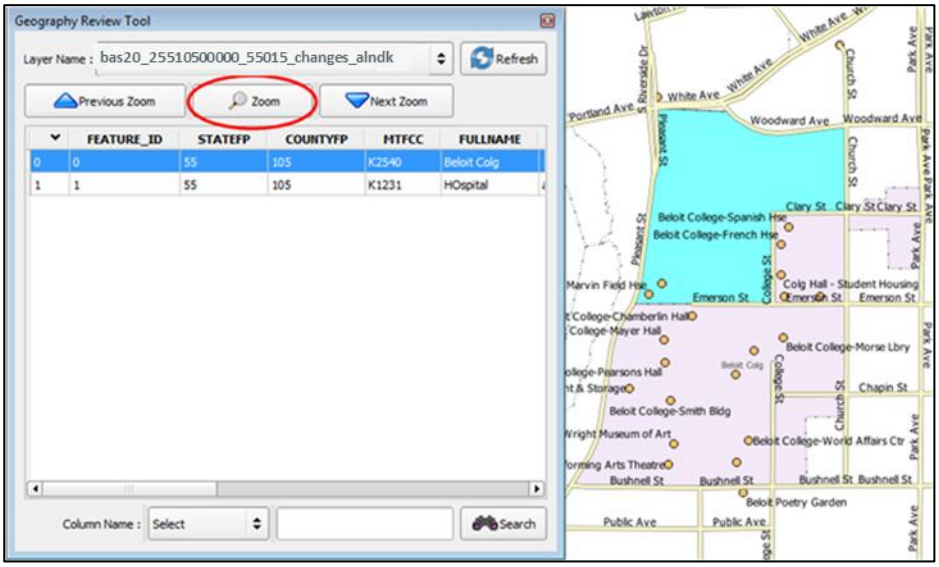
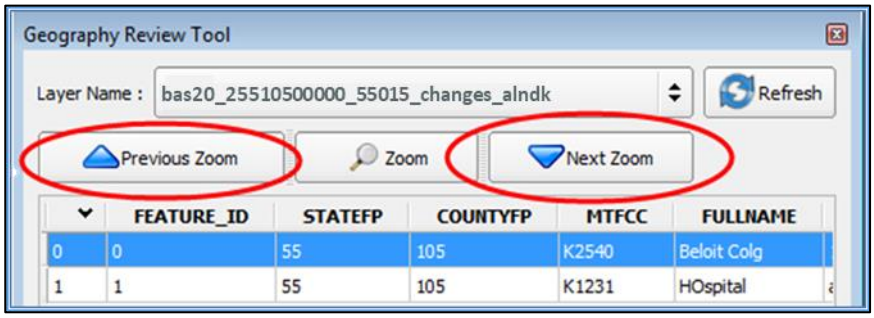
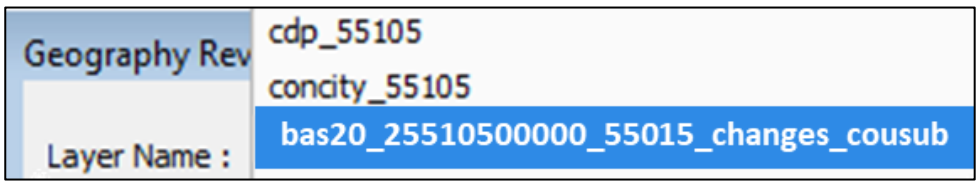
Table 44: Using the Geography Review Tool

Step	Action and *Result*
Step 1	Click on the **Geography Review** button on the **BAS toolbar**.

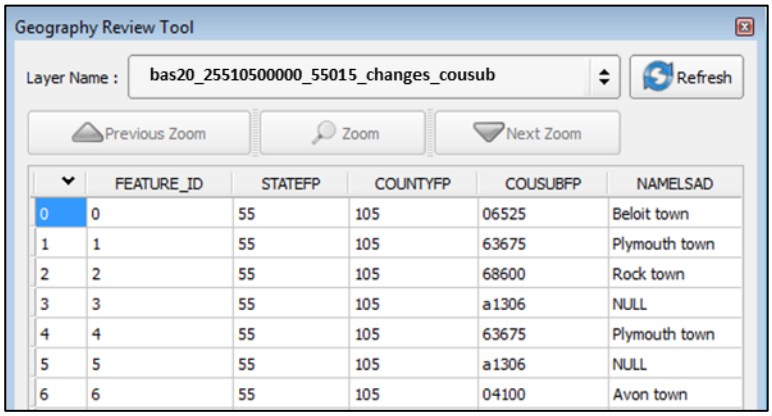
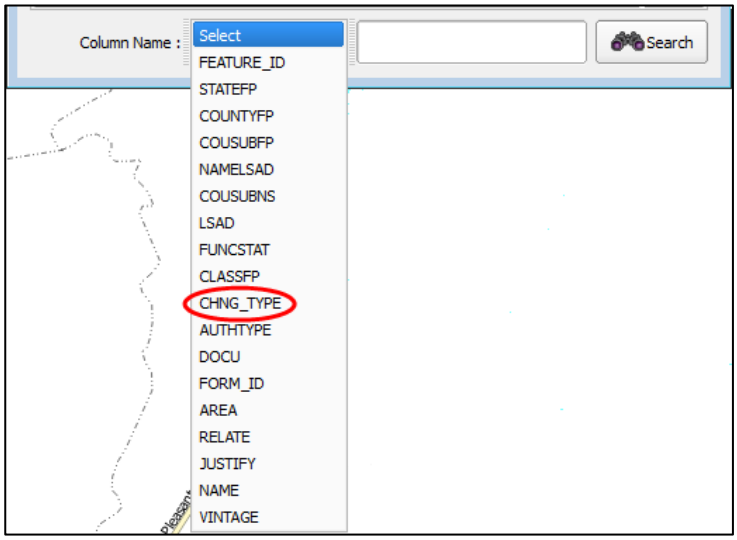
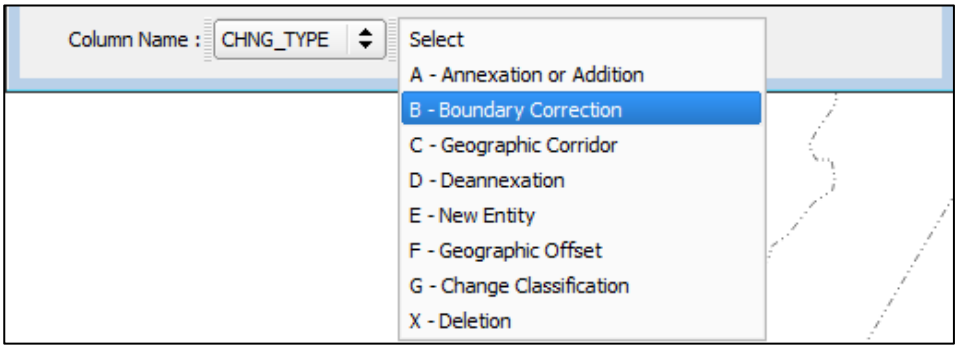
PART 2: HOW TO USE GUPS

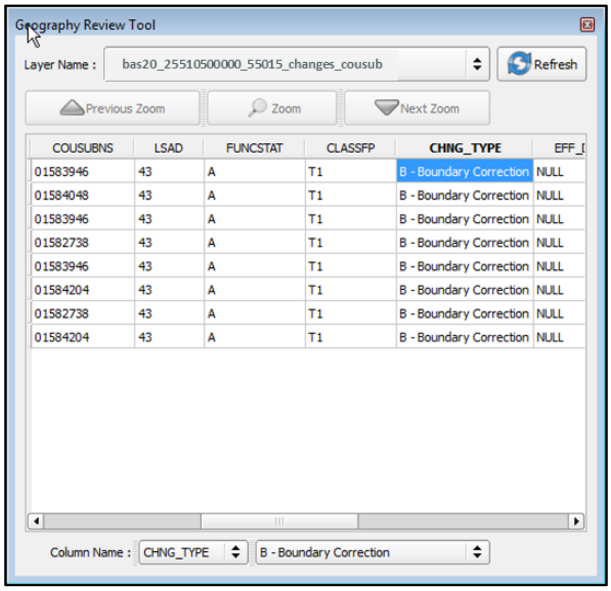
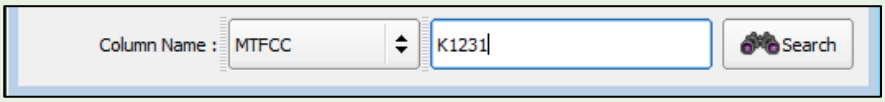
Step	Action and *Result*
	 *The **Geography Review Tool** dialog box opens.*
Step 2	In the **Layer Name:** field drop-down menu, select the data layer to view:  In this example, the file “bas20_25510500000_55105_changes_alndk” was selected. This is the transaction data output file for the area landmark layer (note the word “changes” in the file name to indicate the layer has been updated).
Step 3	*Once a selection is made, the attribute table for the layer opens, with the attributes for each area landmark changed displayed in a separate row.* 
	If not all the columns in the attribute data table are visible, drag the edge of the dialog box outward to widen the view. Users may also move the dialog box to another location by clicking inside the box and dragging it.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 4	To see an area landmark on the map, click its row in the attribute table, then click the **Zoom** button (*the row is highlighted and the map automatically zooms to the landmark selected, which is highlighted and shows changes made in cyan*. 
Step 5	To view other area landmarks listed in the table rows, use the **Previous Zoom** and **Next Zoom** buttons. *The previous or next row highlights and the system zooms to the map for that row.* 
Step 6	Use the **Search** feature at the bottom of the dialog box to filter the table layers by specific attributes (e.g., full name, MTFCC, change type, etc.).
Step 7	First, select the layer to view (in this example, the county subdivision layer is selected). 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	For each feature changed for a county subdivision, the attributes of the changed feature display in the table rows. Each column gives the name of the attribute. 
Step 8	In the **Column Name** drop-down menu, select the attribute by which to filter.  In this example, change type (**CHNG_TYPE**) was selected.
Step 9	Finally, in the **Select** drop-down, select the attribute value by which to filter, then click the **Search** button. In this example, 'Boundary Correction' is selected. 

Step	Action and *Result*
	*After clicking **Search**, the attribute table is filtered to show the rows for all boundary corrections made in the county subdivision layer.* 
Step 10	To view an individual boundary correction, click on its row and click the **Zoom** button.
Step 11	To return to the attribute table to see the full (**unfiltered**) county subdivision layer, click the **Refresh** button in the upper right-hand corner of the dialog box.
	Note that when filtering the table by some attributes (e.g., state and county FIPS code or MTFCC), no drop-down list appears from which to make a selection. This is because some attribute codes are too numerous to make scrolling through a list practicable. Instead one will receive a blank box in which they may type the search value. For example, if filtering the area landmarks layer by MTFCC and one wants to see hospitals in the layer, type in the MTFCC for hospitals (K1231), as shown below, then click **Search**. 

6.5.2 Review Change Polygons Tool

The **Review Change Polygons** tool allows users to view the transactions created from the edits made to legal governments, as well as to area landmarks and hydrographic areas. Users can review the transaction polygons that represent boundary changes, as well as new incorporations and disincorporations. The tool also allows users to make corrections to change polygons.

PART 2: HOW TO USE GUPS

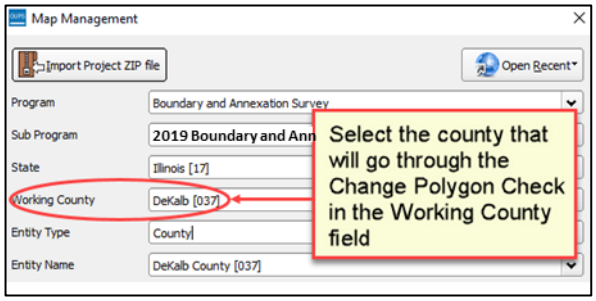
Notes on Reviewing Change Polygons

The **Review Change Polygons** tool must be run before the GUPS will export a file.

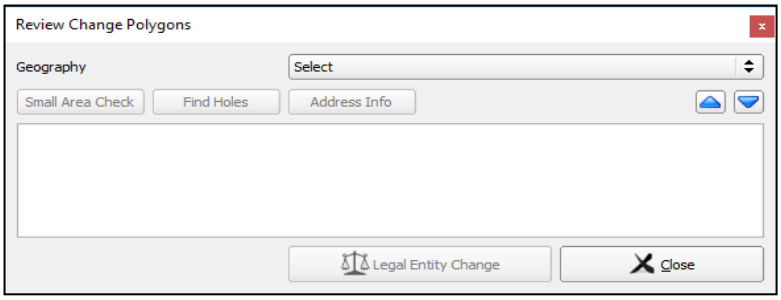
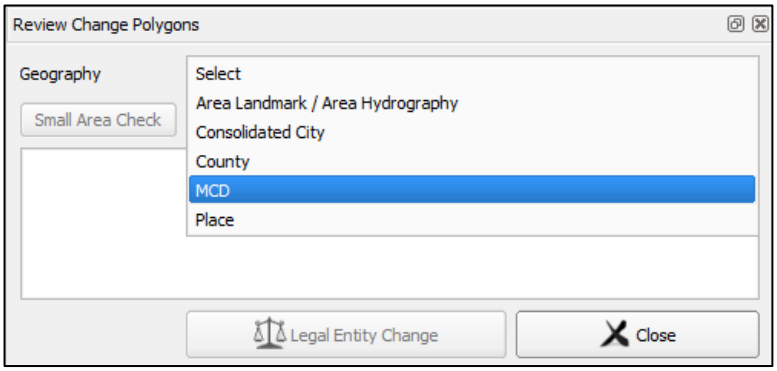
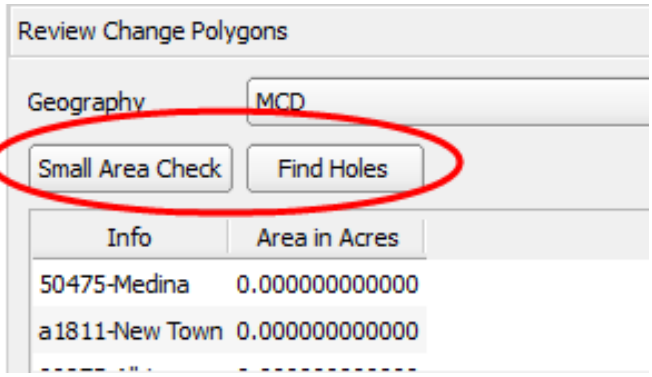
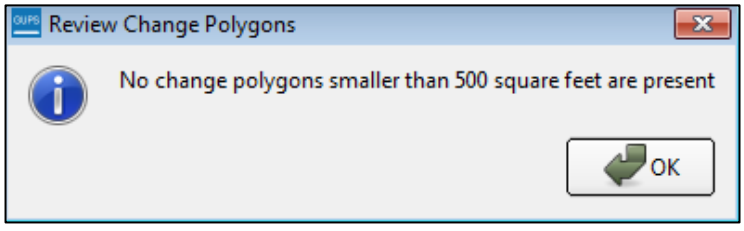
The **Review Change Polygons** tool must be run for each county worked. For example, if changes were made to the working county, and changes were also made to an adjacent county when annexing land for the working county, the change polygon check must be run on **both** counties.

To use the **Review Change Polygons** tool, follow the steps in **Table 45**.

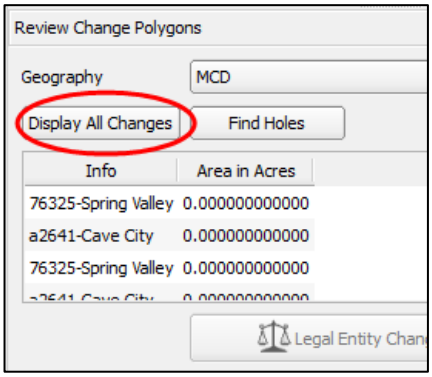
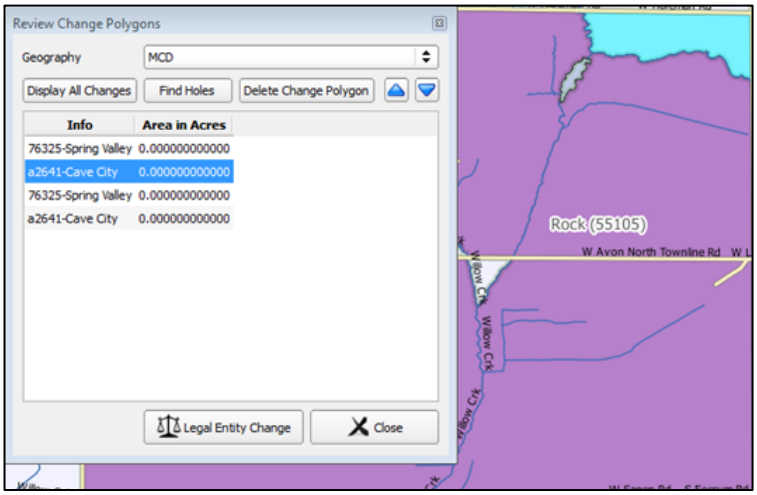
Table 45: Reviewing Change Polygons

Step	Action and *Result*
Step 1	In the **Map Management** dialog box, make sure the county for which the check is to be run appears in the **Working County** field.  Once the **Open** button at the bottom of the dialog box is clicked and the map opens in **Map View**, the **Review Change Polygons** check is ready to run.
	If changes in more than one county were made, the check must be run for ***each*** county worked. This means that after completing the check for one county one must return to **Map Management** and select the additional county which was worked as the working county. Then run the check on it. Repeat this process until the check is run for all counties in which changes were made. If no changes were made in another county, only run the check for the one county worked.
Step 2	Once the working county is loaded, begin the change polygons review. Click on the **Review Change Polygons** button on the **BAS toolbar**. *The **Review Change Polygons** dialog box opens just below the **Layers Panel**.*

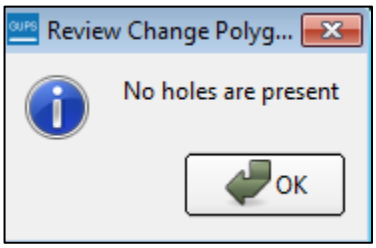
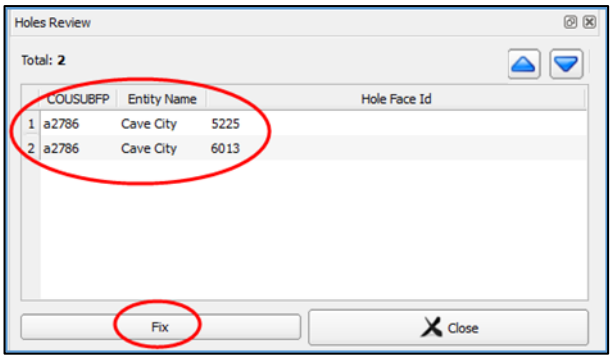
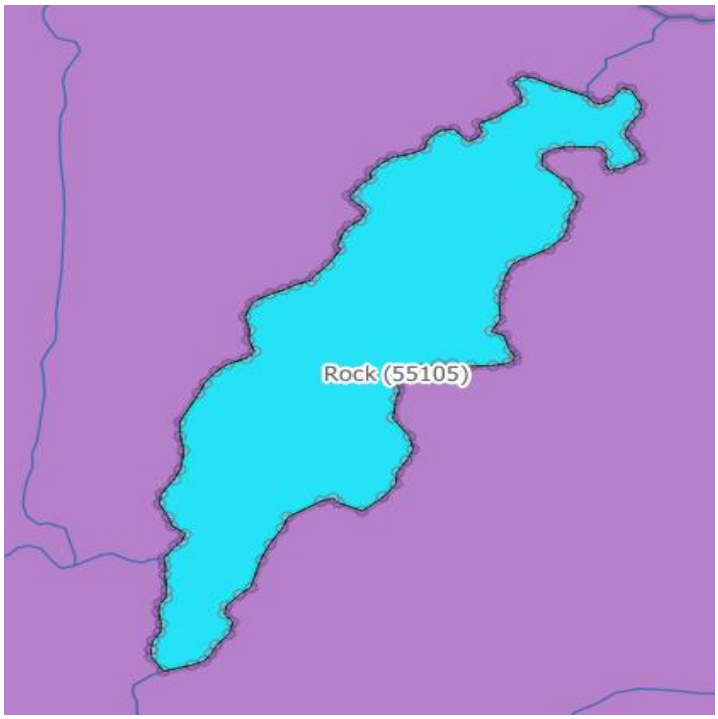
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	 **Note:** This box can be dragged anywhere on the screen and docked.
Step 3	Use the **Geography** drop-down menu shown below to select the geography to review. In this example, 'MCD' has been selected. 
Step 4	*After selecting an entity type, the **Small Area Check** and **Find Holes** buttons become active and all change polygons for the entity type selected appear in the **Info** list at the bottom of the box.* 
Step 5	To check for small area change polygons, click the **Small Area Check** button. *If all change polygons are of sufficient size, a pop-up box informs the user of this.* 

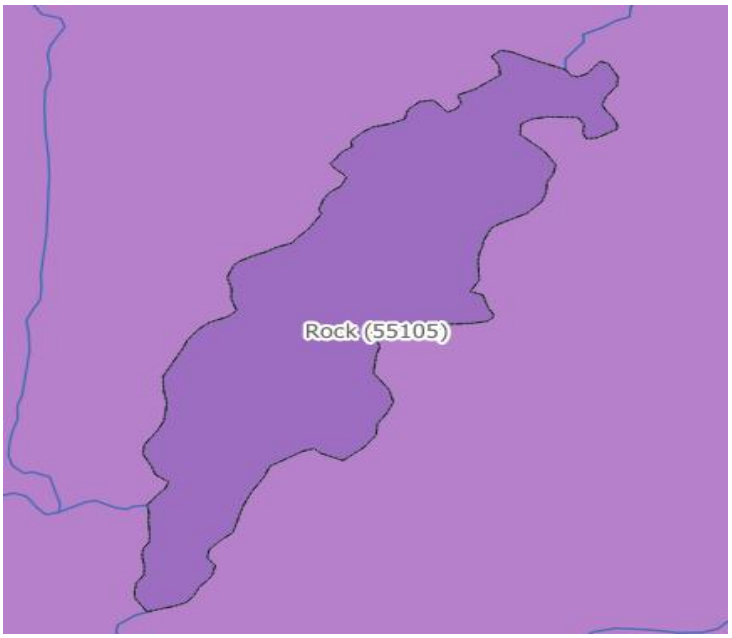
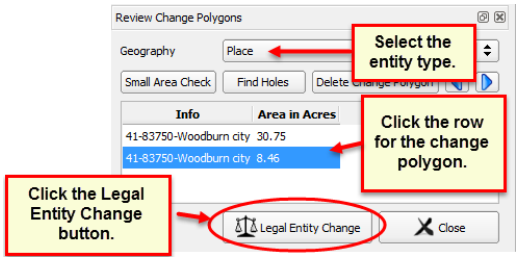
PART 2: HOW TO USE GUPS

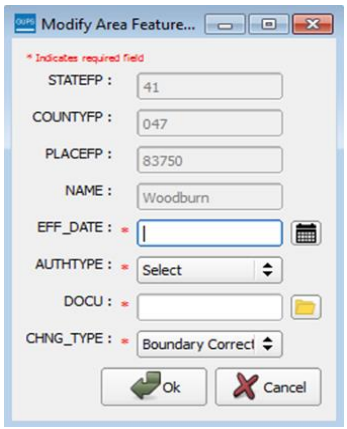
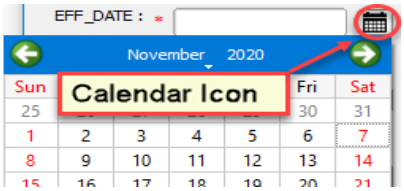
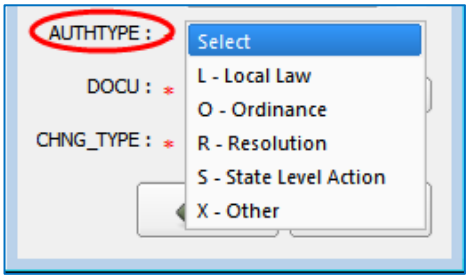
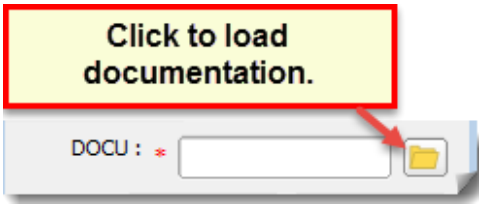
Step	Action and *Result*
Step 6	*If there are small area polygons within an MCD in the working county, they appear in the **Info** list with their acreage noted in the **Area in Acres** column. The **Display All Changes** button also becomes active (this button allows one to toggle back to see all change polygons in the list).* 
Step 7	To view a polygon on the map, click the row for the polygon in the **Info** list. *The polygon is highlighted and the map zooms to the location of the polygon.*  Note in the illustration above, the **Review Change Polygons** box was moved to sit over the map. As stated earlier, one may move the box anywhere on the page and dock it.
Step 8	Next, review the polygons for holes (that is, two or fewer small faces missed when creating a change polygon). While still in the **Review Change Polygons** dialog box, select a geography type from the **Geography** drop-down menu. For this example, '**MCD**' is again selected. *A list of change polygons for MCDs in the county populates the **Info** list and the **Display All Changes** button replaces the **Small Area** button (since this check has already run). The **Find Holes** button remains in its original location.*

PART 2: HOW TO USE GUPS

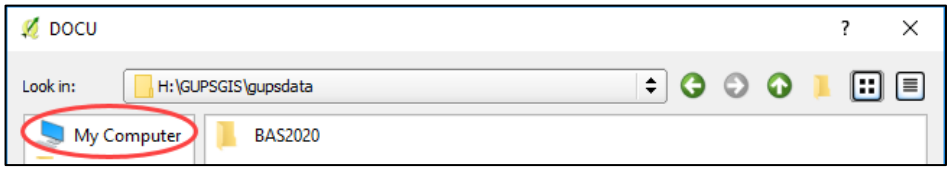
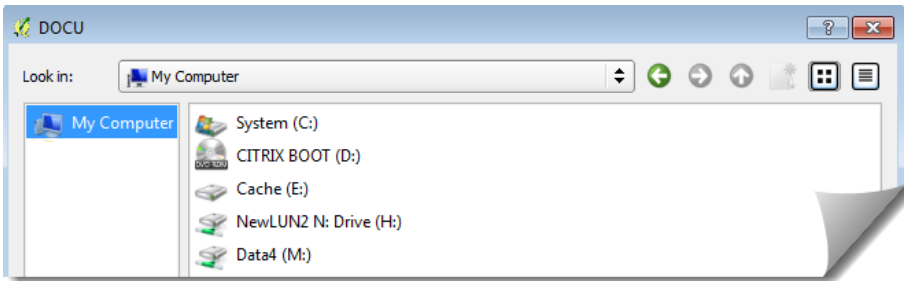
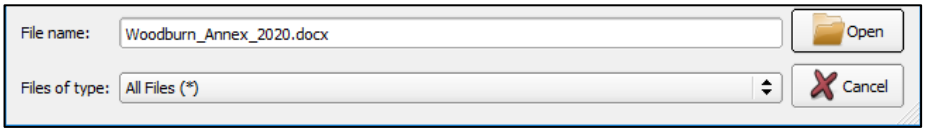
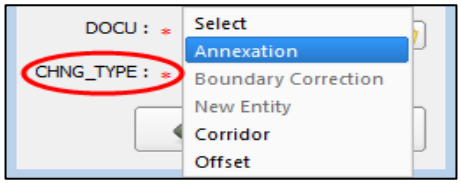
Step	Action and *Result*
Step 9	Click on the row for the polygon in the **Info** list to see it on the map, then click the **Find Holes** button. *If no holes are present, a pop-up box informs the user of this.* 
Step 10	*If holes are found, a list of polygons with holes appears in the **Holes Review** box and the **Fix** button activates at the bottom of the box.* 
Step 11	To correct a change polygon, click on its row to highlight it. *The map zooms to its location and displays all holes in cyan.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 12	Click the **Fix** button to repair the hole. *The change polygon is corrected and the correction displays on the map (i.e., the hole is changed to the same color as the remainder of the polygon).* 
Step 13	Before the **Find Holes** check is complete, repeat the steps above ***for each*** geography type for which change polygons were created.
Step 14	After reviewing for small areas and holes, use the **Review Change Polygons** tool to check the general accuracy of the change polygons. To do so, select the entity type in the **Geography** drop-down menu. *A full list of change polygons for the geography type selected displays in the **Info** list.*
Step 15	Click on the row for each polygon to see it on the map and to review changes. If there is a mistake on the map (e.g., a new incorporated place was created that was supposed to have six faces, but only five were selected), click on the **Modify Area Feature** button on the **BAS toolbar** and make the correction.
Step 16	To review boundary changes, select the entity type to review in the **Geography** drop-down menu at the top of the **Review Change Polygons** dialog box. In this example, '**Place**' was selected. *All boundary change polygons for the entity type selected populate the **Info** list*. To review a boundary change, click on the change polygon in the list, then click the **Legal Entity Change** button at the bottom of the **Review Change Polygons** dialog box, shown below. 

Step	Action and *Result*
	The map zooms to where the change was made and a box opens displaying the information that was entered when the change was coded. Here, because the change was a boundary correction, the effective date, authority type, and documentation fields are not filled.  If this change was mistakenly coded as a boundary correction, and should have been a legal change instead, the error may be corrected here. In this example a change polygon mistakenly coded as a boundary correction rather than an annexation was corrected.
Step 17	Click the calendar icon next to the **EFF_DATE** field to select an effective date for the annexation. 
Step 18	Use the drop-down menu for the **AUTHTYPE** field to select the authority type for the change. 
Step 19	In the **DOCU** field, type in the ordinance or other legal documentation number authorizing the annexation, or upload legal documentation for the change. To upload documentation, click the folder icon next to the **DOCU** field. 

PART 2: HOW TO USE GUPS

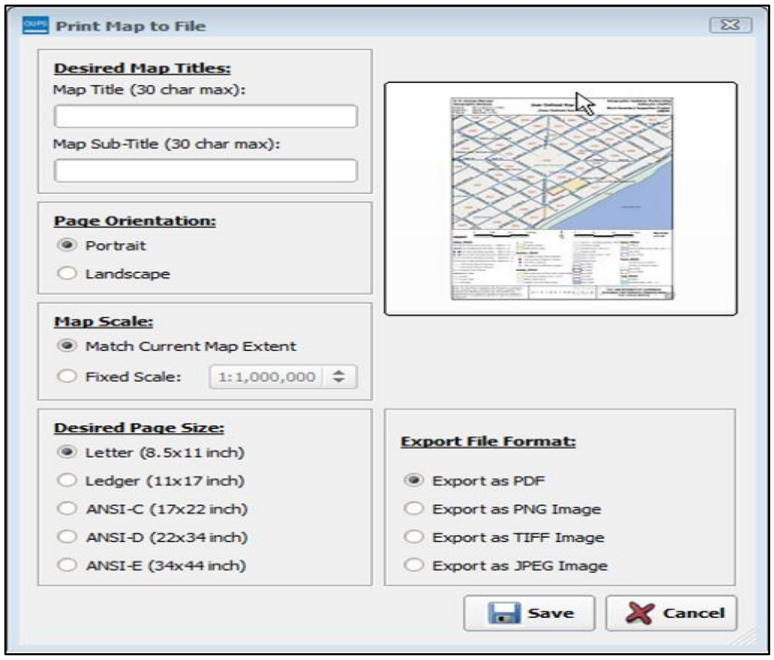
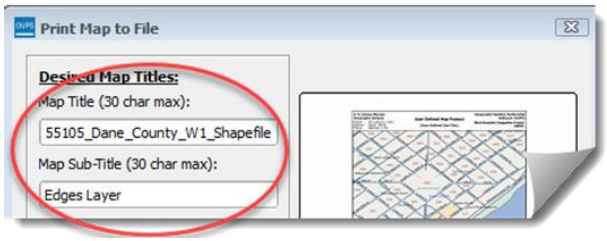
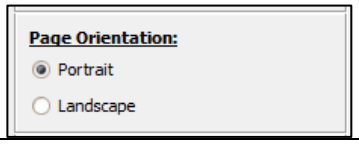
Step	Action and *Result*
	When the ***DOCU*** window opens, click on the icon for 'My Computer' (or simply 'Computer' in some Windows versions) to open the directory where the documentation was saved.  *The directories display, as shown below*.  Select the appropriate directory and navigate to the file to upload. Click the file. Then, to upload it, click the **Open** button at the bottom of the **DOCU** window.  *GUPS uploads the file and the file name appears in the DOCU field.*
Step 20	Finally, in the **CHNG_TYPE** field drop-down menu, change 'Boundary Correction' to the correct change type ('Annexation', 'Corridor', or 'Offset'). Here 'Annexation' is selected. 
Step 21	Click the **OK** button. *The correction is made*.
Step 22	When *all reviews* (for small areas, holes, and boundary changes) have been completed for *all entity types*, and any corrections needed have been made, click the **Save** button on the **BAS toolbar**. *All corrections are saved. The Review Change Polygons check is complete.*
Step 23	If changes were made in more than one working county, return to **Map Management**, select the additional county as the working county, and repeat the steps above. Repeat this process as many times as needed until the **Review Change Polygons** check has been run on all the counties in which changes were made.

PART 2: HOW TO USE GUPS

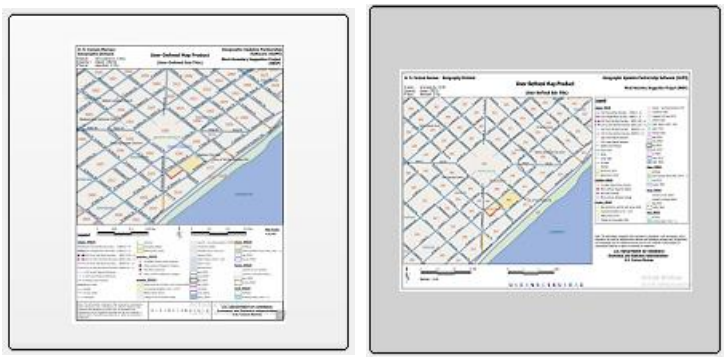
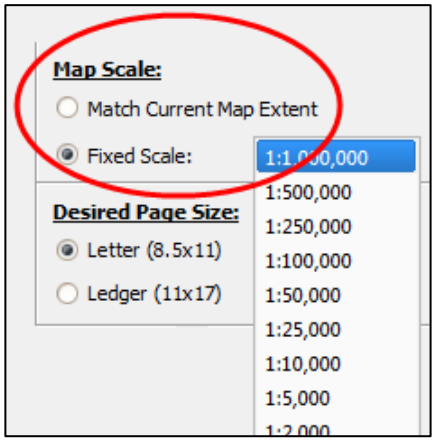
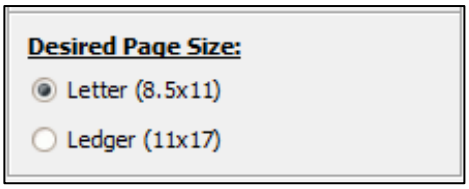
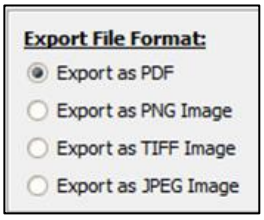
6.6 Exporting a Printable Map

GUPS allows the user to generate printable maps in four formats (.pdf, .png, .tiff, and .jpeg). The maps can be created in portrait or landscape view, on letter or ledger (legal) size paper, and at various scales. To export a printable map from GUPS, follow the steps in **Table 46**.

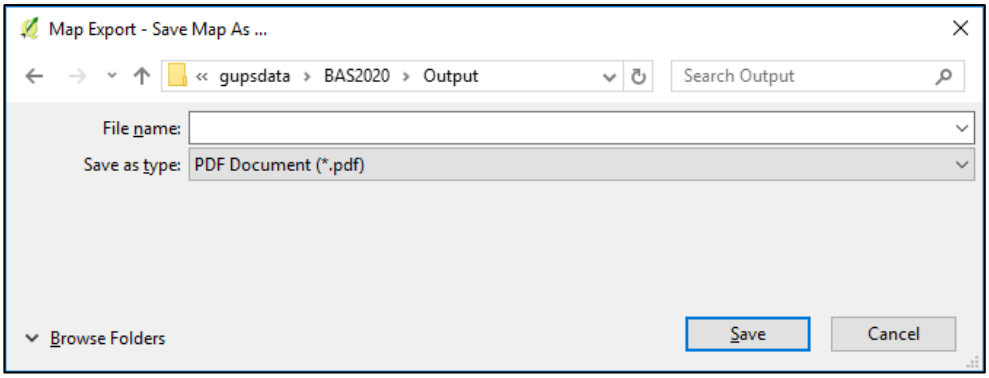
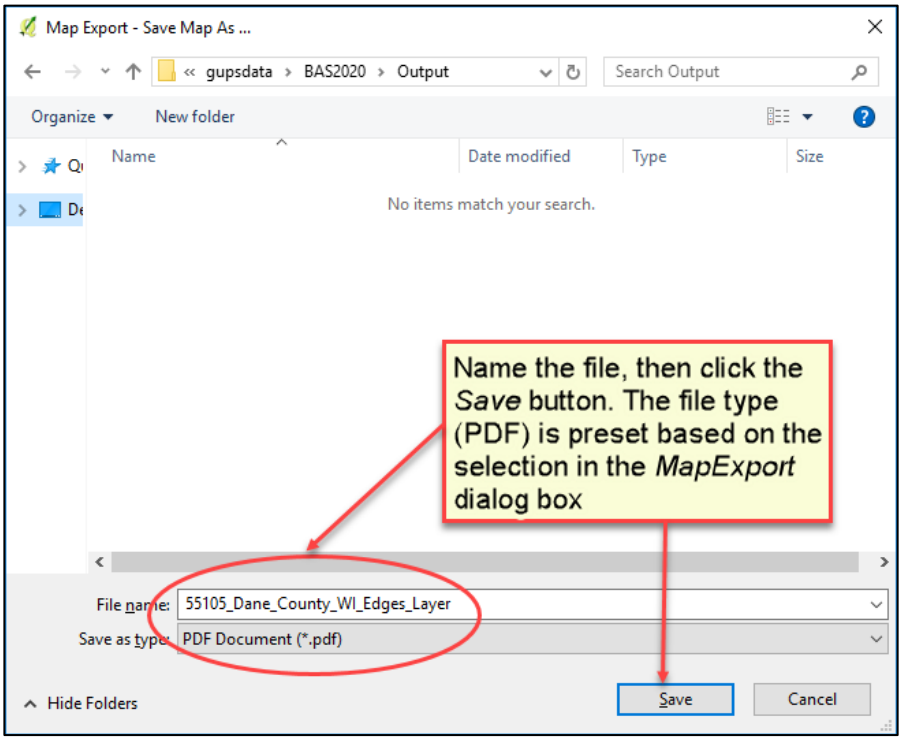
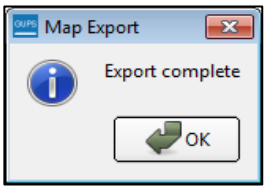
Table 46: Export a Printable Map

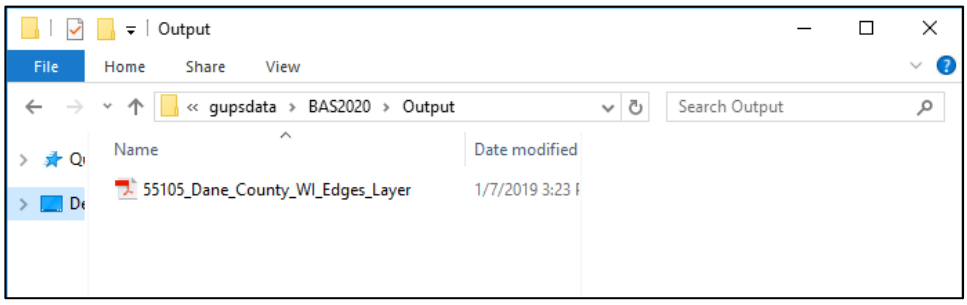
Step	Action and *Result*
Step 1	Click on the **Print Map to File** button on the **BAS toolbar**. *The **Print Map to File** dialog box opens.* 
Step 2	In the **Desired Map Titles** section, type in a map title and sub-title. 
Step 3	Under **Page Orientation**, click the radio button next to 'Portrait' or 'Landscape' to select the map's orientation on the page when printed. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	The map orientation in the preview pane to the right changes to reflect the selection.  *Portrait View (left) and Landscape View (right)*
Step 4	Under **Map Scale**, click the appropriate radio button to select the map scale (one may use the current map extent or set a fixed scale). To select a fixed scale, click the radio button next to 'Fixed Scale', then click the down arrow to open the drop-down menu. In the drop-down list, click on the scale desired. 
Step 5	Under **Desired Page Size**, click the radio button next to the desired page size. 
Step 6	When ready to export the file, under **Export File Format**, click the radio button next to the desired format. One may export the file in .pdf, .png, .tiff, or .jpeg format. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	Click the **Save** button. *The **Map Export – Save Map As…** window opens.*  **Note:** GUPS automatically selected the "output" folder for BAS2020 as the save location. This folder was created by the GUPS installer. To save the file to a different location, navigate to the location first before saving.
Step 8	After selecting the location, type in a name for the file, then click **Save**. 
Step 9	*The file is saved and the user receives a pop-up message confirming that the export is complete.* 

Step	Action and *Result*
Step 10	To save the file, click **OK**. *The file is saved either in the default BAS2020 output location or in the alternate location the user specified. Here the file was saved in the default location.* 

6.6.1 How to Export ZIP Files to Share/Submit

When creating ZIP files to export, users have two options—exporting the file to share with other users or exporting the file for submission to the Census Bureau. In either case, GUPS automatically names the output ZIP file. It packages all the files required by the Census Bureau (including any documentation uploaded) into the ZIP file and saves it in a preset location created by GUPS during the installation process.

Important Note

If changes are made to more than one working county, a separate ZIP file for each county is required for export.

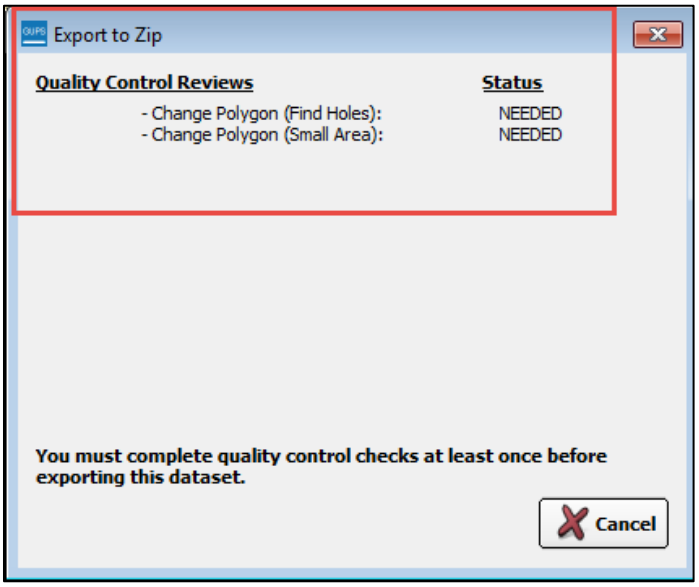
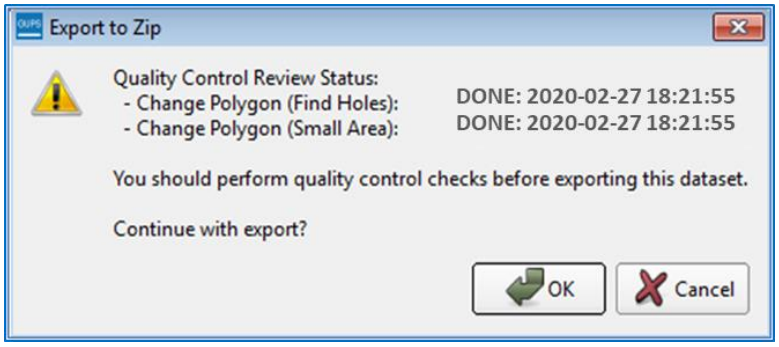
6.6.2 Exporting a File to Share

To export a file to share with another user, follow the steps in **Table 47**.

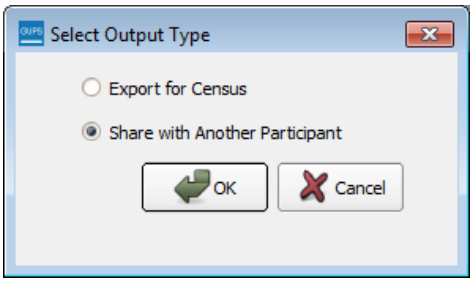
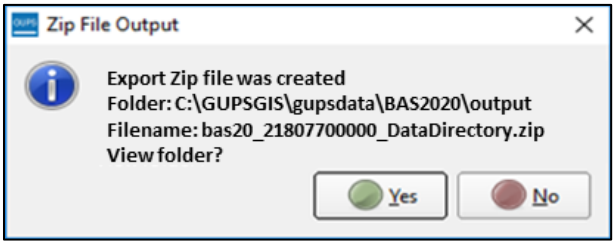
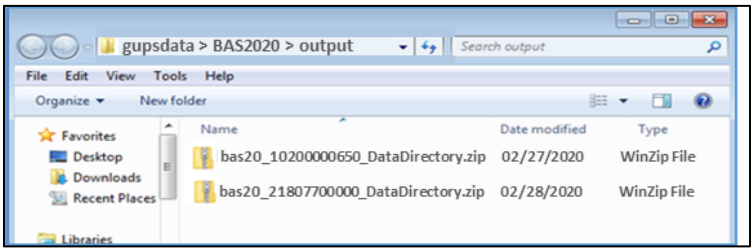
Table 47: Exporting Files to Share with Another User

Step	Action and *Result*
Step 1	Click on the **Export to ZIP** button on the **BAS toolbar**.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	*After clicking the **Export to Zip** button, one of two results may occur, depending on whether the changes were validated using the **Review Change Polygons** tool. If the tool was not used to check the work, the **Export to ZIP** pop-up box appears and lists the specific checks that need to be run before the file can be exported.*  If this message appears, click the **Cancel** button and run the **Review Change Polygons** check. Then repeat the initial export steps again.
Step 3	*If the **Review Change Polygon** check **was already run**, the **Export to ZIP** pop-up box displays the status of the checks and the date and time they were made, as shown below.* 
Step 4	Look carefully at the run times listed. If any additional changes were made after these times, click **Cancel** and run the **Review Change Polygons** check again. Then repeat the export steps.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	*The **Select Output Type** dialog box opens.*  To prepare ZIP file to be shared with another user, select the "Share with Another Participant" radio button. Click **OK**.
Step 6	*The **ZIP File Output** dialog box opens. It informs the user that the ZIP file was created and asks if they want to view the folder.* 
Step 7	*If **Yes** is clicked, the directory opens and displays the folder location where GUPS placed the file.* **Note:** GUPS automatically saves the file to an output folder that the GUPS installer created during the installation process.) 
Step 8	The file may now be shared with another user.

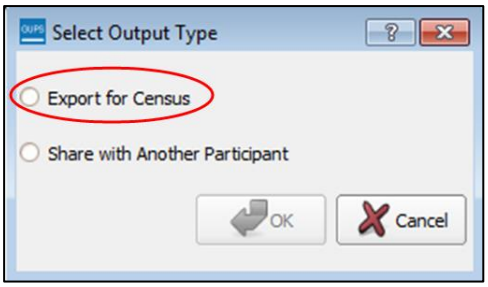
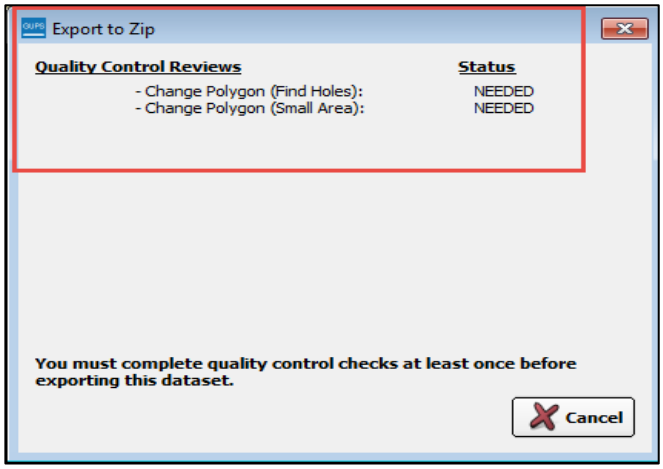
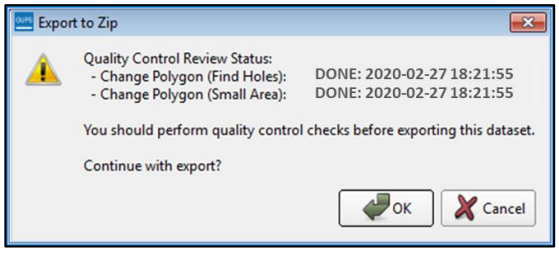
6.6.3 Exporting a File to Submit to the Census Bureau

To export a file to submit to the Census Bureau, follow the steps in **Table 48**.

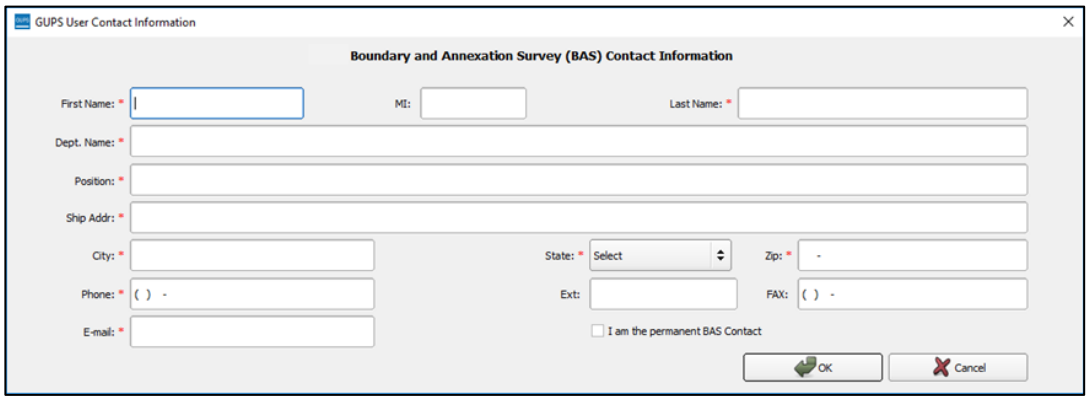
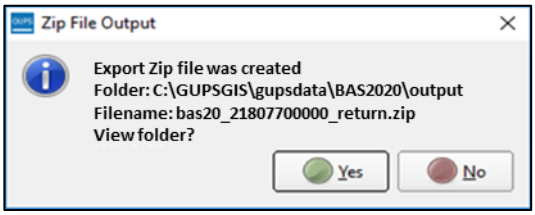
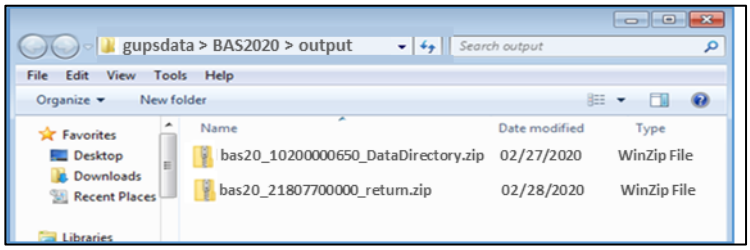
Table 48: Exporting Files for Submission to the Census Bureau

Step	Action and *Result*
Step 1	Click on the **Export to ZIP** button on the **BAS toolbar**.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	*The **Select Output Type** dialog box opens.*  Click the **Export for Census** radio button. Then click **OK**.
Step 2	*After clicking the **OK** button, one of two results may occur, depending on whether the changes were validated using the **Review Change Polygons** tool. If the tool was not used to check the work, the **Export to ZIP** pop-up box appears and lists the specific checks that need to be run before the file can be exported.* 
Step 3	If this message appears, click the **Cancel** button and run the **Review Change Polygons** check. Then repeat the initial export steps again.
Step 4	*If the **Review Change Polygon** check was already run, the **Export to ZIP** pop-up box displays the status of the checks and the date and time they were made, as shown below.* 
Step 5	Look carefully at the run times listed. If any additional changes were made after these times, click **Cancel** and run the **Review Change Polygons** check again. Then repeat the export steps.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 6	Otherwise, click **OK**. *The **GUPS User Contact Information** dialog box opens up*. Complete the required fields and click **OK**.  *The **ZIP File Output** dialog box opens. It informs the user that the ZIP file was created and asks if they want to view the folder.* 
Step 7	*If **Yes** is clicked, the directory opens* and displays the folder location where GUPS placed the file. **Note:** GUPS automatically saves the file to an output folder that the GUPS installer created during the installation process. 
Step 8	The file is now ready to upload to the Census Bureau through the SWIM. See **Table 49: Transmitting Files to the Census Bureau Using SWIM**.

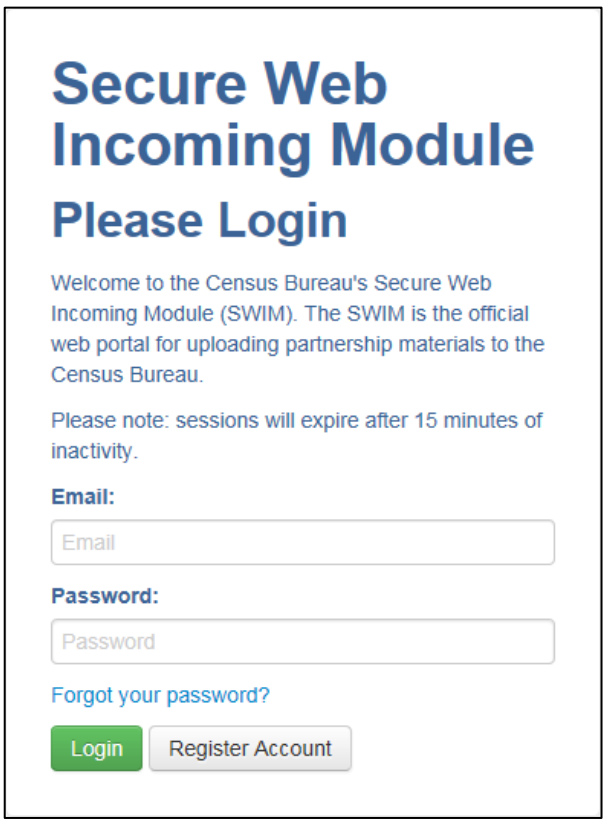
PART 2: HOW TO USE GUPS

SECTION 7: SUBMITTING FILES TO THE CENSUS BUREAU THROUGH SWIM

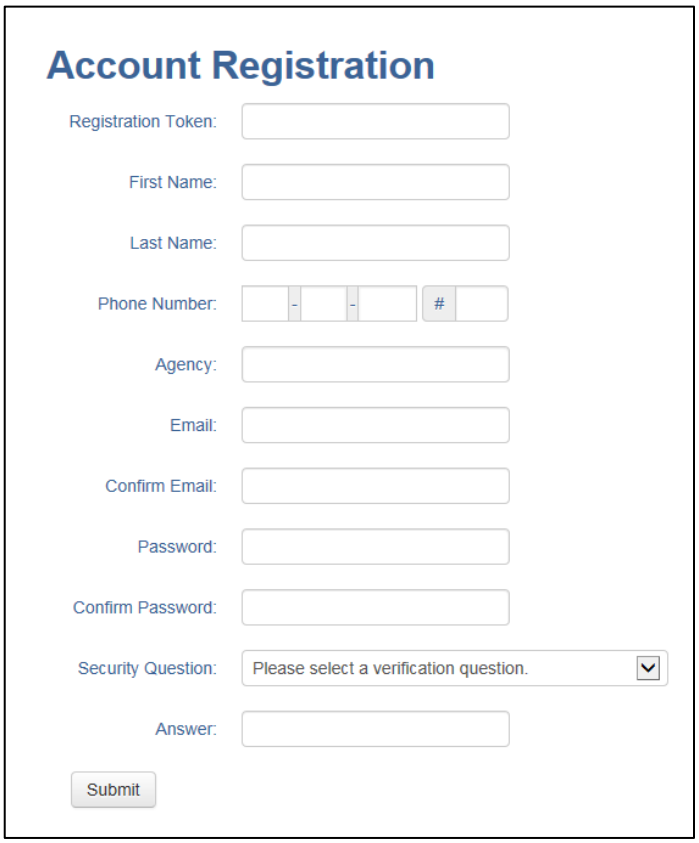
To upload and transmit update files to the Census Bureau, participants must access their accounts in the SWIM, as shown in **Table 49**.

Note: Participants **with existing SWIM accounts** should use their user name (email address) and password. If participants indicated on their BAS Annual Response Form that they wished to receive or use the GUPS application, they automatically receive the SWIM URL and a registration token via email. The email should arrive five days after the Annual Response is completed online (or five business days after the Census Bureau receives the paper form. Participants **without existing SWIM accounts**, should contact the Census Bureau at geo.bas@census.gov to obtain a 12-digit registration token needed to create an account. Once a token has been assigned, participants can create their SWIM accounts.

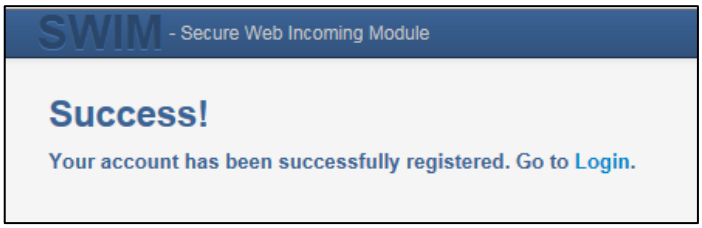
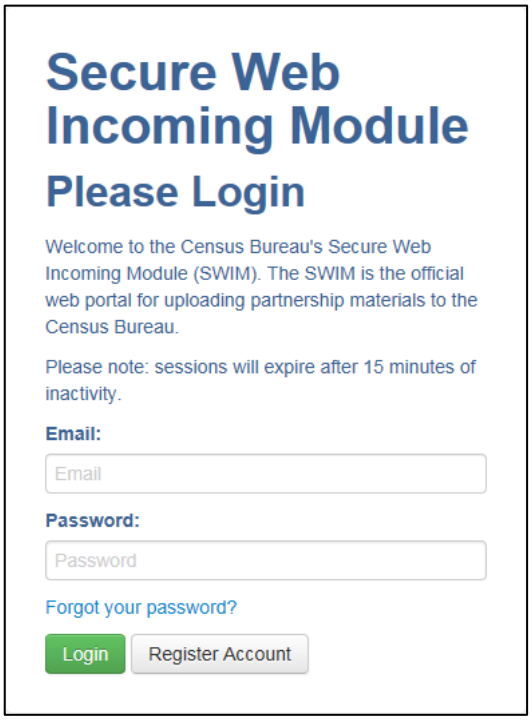
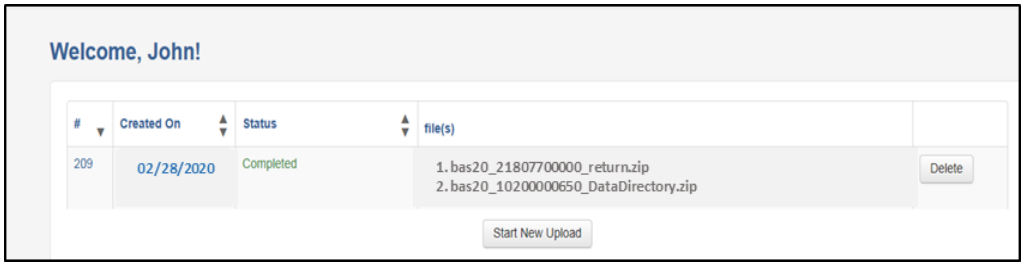
Table 49: Transmitting Files to the Census Bureau Using SWIM

Step	Action and *Result*
Step 1	Open a new browser window and enter the URL <https://respond.census.gov/swim/>. The SWIM login screen opens. 
Step 2	Users that already have a SWIM account should enter their case sensitive email address and password. Click the **Login** button. *The **Welcome** screen opens*. **Go to Step 8**.

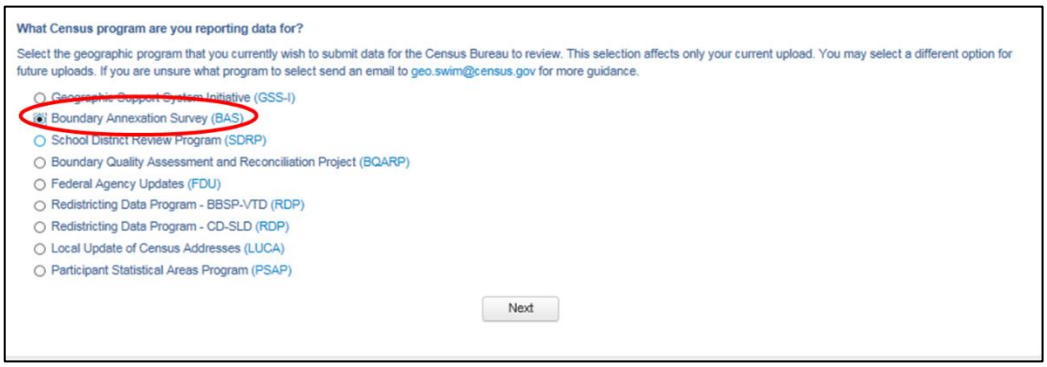
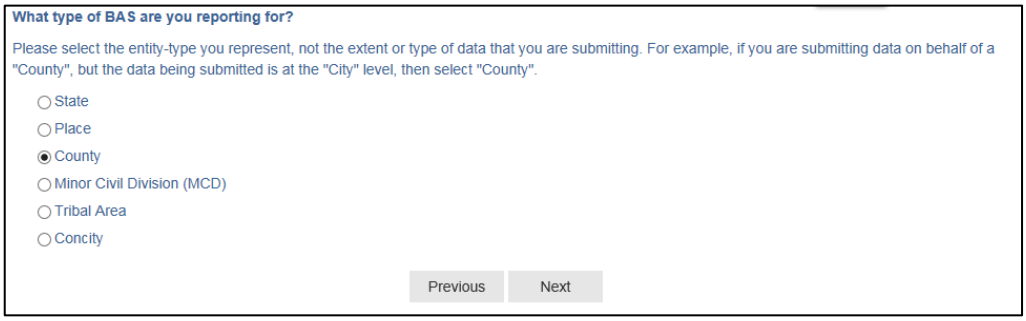
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	Users without a SWIM account must register. Click the **Register Account** button. *The **Account Registration** screen opens*. 
	All fields on the **Account Registration** screen are required.
Step 4	On the **Account Registration** screen, first, enter the 12-digit token provided by the Census Bureau. Then enter contact name, agency, and email in the appropriate fields.
Step 5	Create a password. The passwords must meet the five criteria below: 1. It must be at least 8 characters in length 2. It must have at least one upper case character 3. It must have at least one lower case character 4. It must have at least one number 5. It must have at least one special character (valid special characters are: #, !, $, *, &, ?, ~). **Note:** The commas shown immediately above are to separate the special characters listed. A comma is not a valid character for the password.

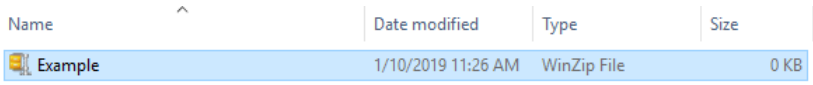
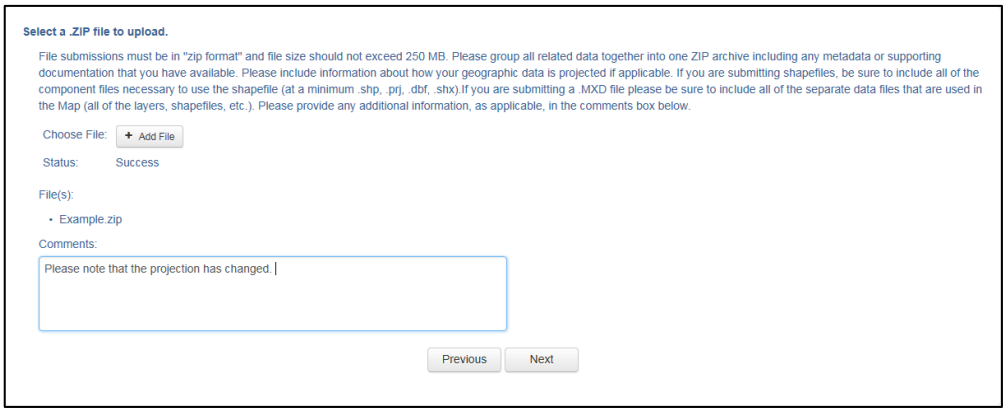
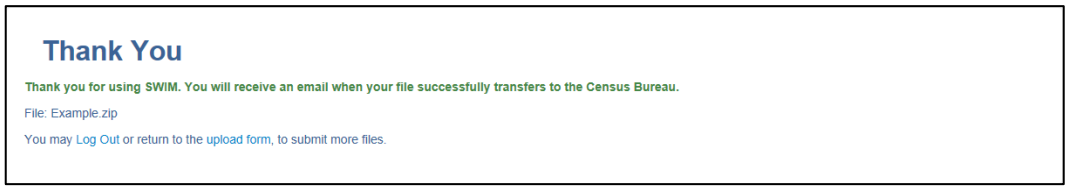
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 6	Set up a security question (click the arrow on the right of the **Security Question** box and select a question in the drop-down list, then enter an answer in the **Answer** box). Click the **Submit** button when finished. *A screen opens to confirm that the account has been successfully registered.*  On the **Confirmation** screen, click **Login,** and *be returned to the Login screen.*
Step 7	Login screen. 
Step 8	On the **Login** screen, enter the email and password then click the green **Login** button. *The **Welcome** screen opens. A list of files the participant has previously uploaded, the creation date of the file, the name of the file, and its corresponding zip size.* If one needs to make modifications, click on the file to edit, then select the **Start New Upload** button. 

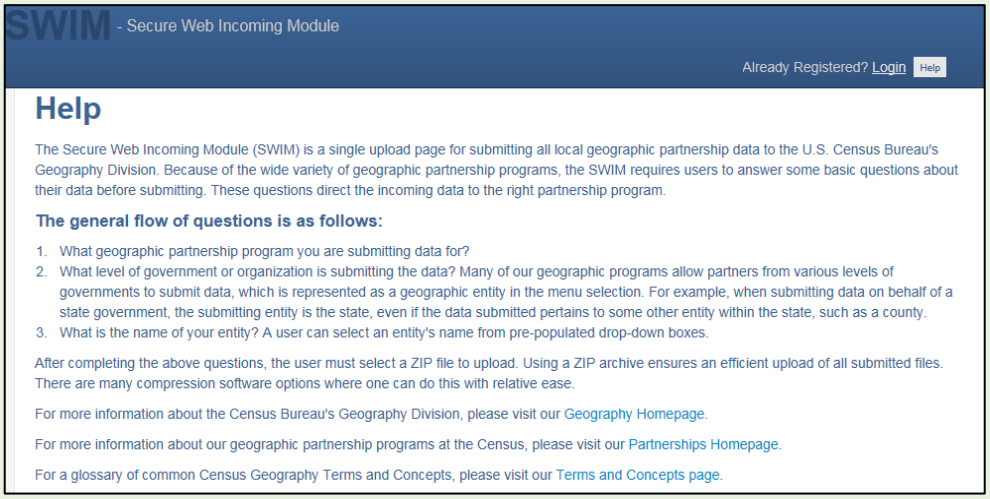
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 9	To begin an upload, click the **Start New Upload** button. Select the **Boundary Annexation Survey (BAS)** radio button, and then click **Next** at the bottom of the screen. 
Step 10	*A screen opens asking "**What type of BAS you are reporting for?**"* Click the radio button next to the governmental unit for which data is being submitted, then click the **Next** button. In this example, **County** is selected. 
Step 11	*A screen opens that allows selection of the state and the entity (in this case county) for which data is being reported.* For this example, North Carolina in the State field drop-down menu and the county in the **County** field drop-down menu are selected. Select the **Next** button.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 12	The **Select a .ZIP file to upload** screen opens. Choose a zip file to upload. **Note:** All files must be a zip file. The zip file cannot contain another zip file. To upload a file, click the **+ Add File** button on the screen.
Step 13	*The **Choose File to Upload** window opens*.  Locate the ZIP file to be uploaded then double-click it. **Note:** Only one file at a time can be added.
Step 14	*Once the file upload is complete, the **Status** field shows '**Success**.' The name of the file appears in the **File(s)** field.* To add another file, click the **+ Add File** and the upload process will repeat. In this example, there are two files uploaded. 
Step 15	After uploading the file(s), type any comments (including pertinent information about data projection or supporting documentation for shapefiles) in the **Comments** field. Click **Next**.
Step 16	*The **Thank You** screen appears and confirms the receipt of the submission.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 17	To submit files for a different entity, click on the '**Upload Form**' link in the phrase "You may Log Out or return to the upload form, to submit more files." This choice returns the user to the **Welcome** screen. To log out, click on **Log Out**. The Census Bureau will acknowledge the receipt of the uploaded file.
	SWIM sessions deactivate after 15 minutes of inactivity. **Note:** While working in SWIM, the participant may obtain help by clicking on the **Help** button on any screen. When the button is clicked, a screen opens with links to help resources. 

APPENDICES

This page intentionally left blank

APPENDIX A BAS CONTACT INFORMATION AND RESOURCES

Table 50: BAS Contact Information and Resources

Action/Question	Resource	Contact
Request shapefiles on DVD	Geography Division	Call: 1-800-972-5651 Email: geo.bas@census.gov
BAS materials questions	Geography Division	Call: 1-800-972-5651 Email: geo.bas@census.gov
Legal boundary questions	Geography Division	Call: 1-301-763-1099 Email: geo.bas@census.gov Fax: 1-800-972-5652
Ask guidance on areas under legal dispute	Census Bureau Legal Office	Call: 1-301-763-9844
GUPS technical support	Geography Division	Call: 1-800-972-5651 Email: geo.bas@census.gov Be sure to have the number for the version of GUPS currently installed. To find this number, go to the **Help** tab on the main **Menu** in GUPS and click 'About GUPS' in the drop-down menu. A pop-up box will provide the number.
SWIM token questions	Geography Division	Call: 1-800-972-5651 Email: geo.bas@census.gov
SWIM technical support	Geography Division	geo.swim@census.gov
Submit output files on DVD (if the participant does not have Internet access)	National Processing Center	Send to: U.S. Census Bureau National Processing Center ATTN: BAS Returns, Bldg 63E 1201 East 10th Street Jeffersonville, IN 47132

APPENDIX B TERMS

Areal Feature - is a prominent and identifying feature of a landscape significant enough to warrant name recognition, such as a lake, park, school, military base, or cemetery, etc. This type of feature class is only assigned to a face geometry. Any face can be assigned to multiple features. For example, a water body can also be part of a park.

Edge - is a one-dimensional object (legacy 1-cell), bounded by two nodes: a start node and an end node. Its geometry is distinguished by the coordinates of the start and end nodes, and additional coordinates that are ordered and serve as vertices (or shape points) between the two nodes. An edge is a primitive feature in the Oracle database.

Effects of having **Edge** features in the MAF/TIGER Database (MTDB):

- Represents an invisible boundary line for various geometry, geographic, and statistical data and can stand alone.
- A linear feature always occupies the same space as an edge and there are attributes on an edge that are lone relevant when a linear feature exists.

Face - is a two-dimensional object (legacy 2-cell) bounded by two or more edges. Its boundary includes not only the edges that separate it from other faces, but also any interior edges (two-dimensional topological primitives) contained within the area of the face.

Geographic Area - is a demarcated area used for the collection and/or tabulation of Census Bureau data.

Geographic Corridor - is an area that includes only a road (or other feature's) right-of-way and does not contain any structures. **Figure 13. Annexed Area Corridor and Unincorporated** shows a corridor that has been created where an incorporated place annexed the road right-of-way, but not the housing units assigned to either side of the road (these belong instead to an unincorporated area). If it is important to the incorporated place that its ownership and/or maintenance of the road and/or its right-of-way be displayed on Census Bureau's maps, a geographic corridor should be created. However, the Census Bureau does not require places to report rights-of-way: maintaining geographic corridors in a nationwide database is difficult and impractical, and the right-of-way should only be included if it is crucial to the place, or if state or local laws require it. The Census Bureau would prefer that the area not be assigned to the place.

Figure 14 shows an example where the right-of-way belongs in an unincorporated area, while the housing units along it are included in an incorporated place (shown in color). While depicting this corridor may be important for local purposes, it is not relevant for Census Bureau tabulations and is not easy to depict in the Census nationwide database. This type of corridor should not be included in a BAS response.

Please note that the Census Bureau does not require places to display rights-of-way or road maintenance corridors that do not contain or potentially contain housing or population. If local or state law does not require depiction of these geographic features, the Census Bureau prefers that they be left off BAS submissions. However, if it is necessary for the place to depict them, then they must be submitted as a geographic corridor.

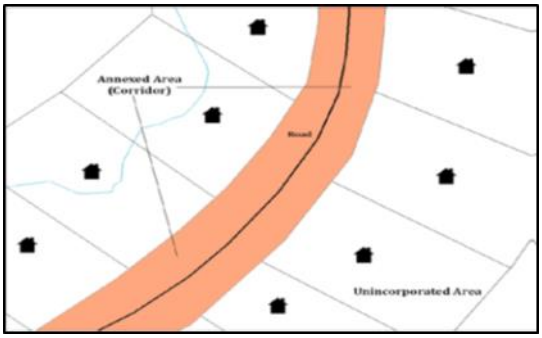


Figure 13. Annexed Area Corridor and Unincorporated Area
A corridor that has been created where an incorporated place annexed the road right-of-way, but not the housing units assigned to either side of the road.

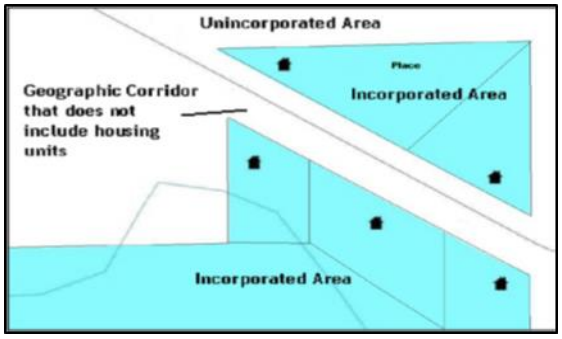


Figure 14. Incorporated Area and Unincorporated Area
The right-of-way belongs in an unincorporated area, while the housing units along it are included in an incorporated place.

To recap, when a participant has a case where a road right-of-way is legally included in the boundary, but the adjacent parcels/houses are not, there are two options. One should either not include the area in the place at all (Scenario A in **Figure 15**), or include it in the place and flag it as a corridor (Scenario C in **Figure 15**). What one should never do is include such areas within the place boundary without flagging them as corridors
(Scenario B in **Figure 15**).

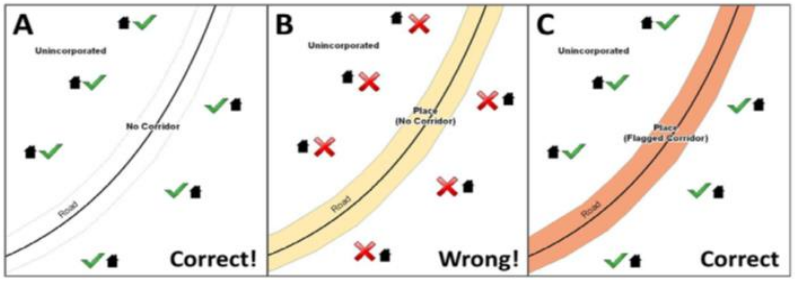


Figure 15. Participant Responses

(A): The respondent did not include place ownership of the road or the right-of-way, allowing houses along the road to be geocoded correctly. (B): The respondent chose to show place ownership of the road, but did not flag it as a corridor, causing houses along the road to be incorrectly geocoded.(C): The respondent chose to show place ownership of the road, and flagged that ownership as a corridor, allowing the houses to be geocoded correctly. Both A and C are acceptable.

Geographic Offsets

A geographic offset is an area (either within or outside of a geographic area) that is only on one side of a road (unlike corridors, which involve both sides of the road) and does not include structures addressed to that side of the road. Much of the same guidelines regarding corridors also holds true for offsets.

The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping. Census Bureau maps are based on spatial data that is topologically integrated which makes maintenance of geographic offsets inefficient. Using the road centerline wherever possible will help to establish more accurate population counts. If a boundary follows a front-lot-line, the Census Bureau strongly prefers that the road centerline be used as the boundary. If a boundary is at the rear of a lot, then it should be depicted as such. If it is unclear whether a particular line is a front-lot-line or something else, please contact the BAS team for assistance. As a rule, if a house or building could not conceivably be built in the area between the potential line and the centerline of the road, then the line can be considered a front-lot-line. **Figure 16** depicts a cadastral (parcel-based) boundary map and **Figure 17** shows how the boundary should be represented when it is sent to the Census Bureau.

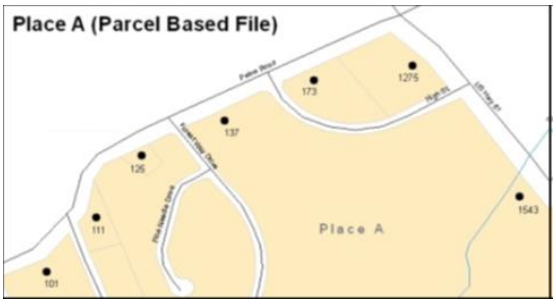


Figure 16. A Cadastral (Parcel-Based) Boundary Map

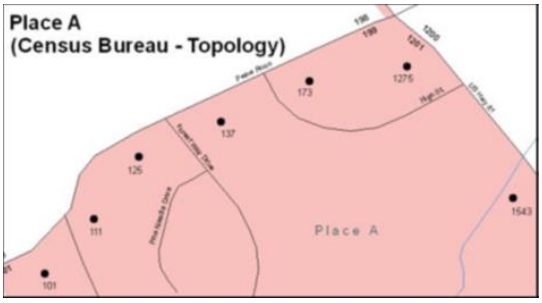


Figure 17. How a Boundary Should be Represented When Sent to the Census Bureau

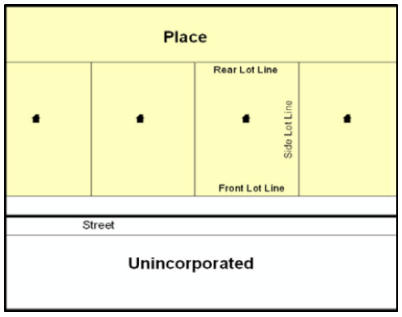


Figure 18. Place Boundary – Front-Lot-Line

Shows a situation in which the place boundary is along the front-lot-line. In this example, the respondent must either use the road centerline as the boundary (preferred), or create an offset.

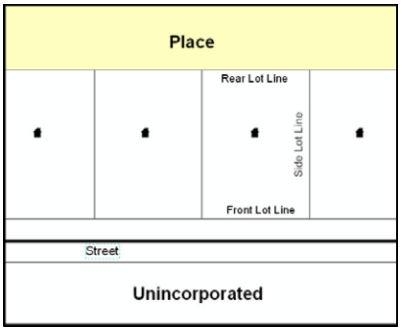


Figure 19. Place Boundary – Rear-Lot-Line

The place boundary is on the rear-lot-line, so the respondent should not use the road centerline or create an offset, but should rather digitize in a new boundary following the rear-lot-line.

The Census Bureau has included an "offset" shapefile in the BAS materials (bas_2020_offset_<ssccc>.shp), so that a jurisdiction can be checked for any existing corridors or offsets. While the Census Bureau prefers that new offsets are not created (see **Figure 17** and **Figure 18**), this information can be helpful in determining if current boundaries are correct.

Linear Feature - is a single dimension feature (Road/Path, Hydro, Rail, or Miscellaneous) along one or more edges.

Point Feature - is an isolated node not connected to an edge. The XY coordinate point is where a structure resides. Point Feature structures include housing units and legacy point landmark of public facilities such as libraries, police stations, schools, churches, malls, and some monuments.

APPENDIX C MTFCC DESCRIPTIONS

The MAF/TIGER Feature Classification Code (MTFCC) is a five-digit code assigned by the Census Bureau to classify and describe geographic objects or features in Census Bureau MAF/TIGER products.

Table 51: MTFCC Descriptions

MTFCC	Feature Class	Feature Class Description
C3022	Mountain Peak or Summit	A prominent elevation rising above the surrounding level of the Earth's surface.
C3023	Island	An area of dry or relatively dry land surrounded by water or low wetland [including archipelago, atoll, cay, hammock, hummock, isla, isle, key, moku and rock].
C3024	Levee	An embankment flanking a stream or other flowing water feature to prevent overflow.
C3026	Quarry (not water-filled), Open Pit Mine or Mine	An area from which commercial minerals are or were removed from the Earth; not including an oilfield or gas field.
C3027	Dam	A barrier built across the course of a stream to impound water and/or control water flow.
C3061	Cul-de-sac	An expanded paved area at the end of a street used by vehicles for turning around. For mapping purposes, the Census Bureau maps it only as a point feature.
C3062	Traffic Circle	A circular intersection allowing for continuous movement of traffic at the meeting of roadways.
C3066	Gate	A movable barrier across a road.
C3067	Toll Booth	A structure or barrier where a fee is collected for using a road.
C3071	Lookout Tower	A manmade structure, higher than its diameter, used for observation.
C3074	Lighthouse Beacon	A manmade structure, higher than its diameter, used for transmission of light and possibly sound generally to aid in navigation.
C3075	Tank/Tank Farm	One or more manmade structures, each higher than its diameter, used for liquid (other than water) or gas storage or for distribution activities.
C3076	Windmill Farm	One or more manmade structures used to generate power from the wind.
C3077	Solar Farm	One or more manmade structures used to generate power from the sun.
C3078	Monument or Memorial	A manmade structure to educate, commemorate, or memorialize an event, person, or feature.

MTFCC	Feature Class	Feature Class Description
C3079	Boundary Monument Point	A material object placed on or near a boundary line to preserve and identify the location of the boundary line on the ground.
C3080	Survey Control Point	A point on the ground whose position (horizontal or vertical) is known and can be used as a base for additional survey work.
C3081	Locality Point	A point that identifies the location and name of an unbounded locality (e.g., crossroad, community, populated place or locale).
C3085	Alaska Native Village Official Point	A point that serves as the core of an Alaska Native village and is used in defining Alaska Native village statistical areas.
G2100	American Indian Area	A legally defined state- or federally recognized reservation and/or off-reservation trust land (excludes statistical American Indian areas).
G2120	Hawaiian Home Land	A legal area held in trust for the benefit of Native Hawaiians.
G2130	Alaska Native Village Statistical Area	A statistical geographic entity that represents the residences, permanent and/or seasonal, for Alaska Natives who are members of or receiving governmental services from the defining legal Alaska Native Village corporation.
G2140	Oklahoma Tribal Statistical Area	A statistical entity identified and delineated by the Census Bureau in consultation with federally recognized American Indian tribes that have no current reservation, but had a former reservation in Oklahoma.
G2150	State-designated Tribal Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a state-appointed liaison for a state-recognized American Indian tribe that does not currently have a reservation and/or lands in trust.
G2160	Tribal Designated Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a federally recognized American Indian tribe that does not currently have a reservation and/or off-reservation trust land.
G2170	American Indian Joint Use Area	An area administered jointly and/or claimed by two or more American Indian tribes.
G2200	Alaska Native Regional Corporation	Corporate entities established to conduct both business and nonprofit affairs of Alaska Natives pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). There are twelve geographically defined ANRCs and they are all within and cover most of the State of Alaska (the Annette Island Reserve-an American Indian reservation-is excluded from any ANRC). The boundaries of ANRCs have been legally established.
G2300	Tribal Subdivision	Administrative subdivisions of federally recognized American Indian reservations, off-reservation trust lands, or Oklahoma tribal statistical areas (OTSAs). These entities are internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations, off-reservation trust lands, or OTSAs.

MTFCC	Feature Class	Feature Class Description
G2400	Tribal Census Tract	A relatively small and permanent statistical subdivision of a federally recognized American Indian reservation and/or off-reservation trust land, delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G2410	Tribal Block Group	A cluster of census blocks within a single tribal census tract delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G3100	Combined Statistical Area	A grouping of adjacent metropolitan and/or micropolitan statistical areas that have a degree of economic and social integration, as measured by commuting.
G3110	Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using whole counties and equivalents.
G3120	Metropolitan Division	A county or grouping of counties that is a subdivision of a Metropolitan Statistical Area containing an urbanized area with a population of 2.5 million or more.
G3200	Combined New England City and Town Area	A grouping of adjacent New England city and town areas that have a degree of economic and social integration, as measured by commuting.
G3210	New England City and Town Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using Minor Civil Divisions (MCDs) in New England.
G3220	New England City and Town Division	A grouping of cities and towns in New England that is a subdivision of a New England City and Town Area containing an urbanized area with a population of 2.5 million or more.
G3500	Urban Area	Densely settled territory that contains at least 2,500 people. The subtypes of this feature are Urbanized Area (UA), which consists of 50,000 + people and Urban Cluster, which ranges between 2,500 and 49,999 people.
G4000	State or Equivalent Feature	The primary governmental divisions of the United States. The District of Columbia is treated as a statistical equivalent of a state for census purposes, as is Puerto Rico.
G4020	County or Equivalent Feature	The primary division of a state or state equivalent area. The primary divisions of 48 states are termed County, but other terms are used such as Borough in Alaska, Parish in Louisiana, and Municipio in Puerto Rico. This feature includes independent cities, which are incorporated places that are not part of any county.

MTFCC	Feature Class	Feature Class Description
G4040	County Subdivision	The primary divisions of counties and equivalent features for the reporting of Census Bureau data. The subtypes of this feature are Minor Civil Division, Census County Division/Census Subarea, and Unorganized Territory. This feature includes independent places, which are incorporated places that are not part of any county subdivision.
G4050	Estate	Estates are subdivisions of the three major islands in the United States Virgin Islands (USVI).
G4060	Subbarrio (Subminor Civil Division)	Legally defined divisions (subbarrios) of minor civil divisions (barrios-pueblo and barrios) in Puerto Rico.
G4110	Incorporated Place	A legal entity incorporated under state law to provide general-purpose governmental services to a concentration of population. Incorporated places are generally designated as a city, borough, municipality, town, village, or, in a few instances, have no legal description.
G4120	Consolidated City	An incorporated place that has merged governmentally with a county or minor civil division, but one or more of the incorporated places continues to function within the consolidation. It is a place that contains additional separately incorporated places.
G4210	Census Designated Place	A statistical area defined for a named concentration of population and the statistical counterpart of an incorporated place.
G4300	Economic Census Place	The lowest level of geographic area for presentation of some types of Economic Census data. It includes incorporated places, consolidated cities, census designated places (CDPs), minor civil divisions (MCDs) in selected states, and balances of MCDs or counties. An incorporated place, CDP, MCD, or balance of MCD qualifies as an economic census place if it contains 5,000 or more residents, or 5,000 or more jobs, according to the most current data available.
G5020	Census Tract	Relatively permanent statistical subdivisions of a County or equivalent feature delineated by local participants as part of the Census Bureau's Participant Statistical Areas Program.
G5030	Block Group	A cluster of census blocks having the same first digit of their four-digit identifying numbers within a Census Tract. For example, block group 3 (BG 3) within a Census Tract includes all blocks numbered from 3000 to 3999.
G5035	Block Area Grouping	A user-defined group of islands forming a single census tabulation block. A BAG must: (1) consist of two or more islands, (2) have a perimeter entirely over water, (3) not overlap, and (4) not cross the boundary of other tabulation geographies, such as county or incorporated place boundaries.

MTFCC	Feature Class	Feature Class Description
G5040	Tabulation Block	The lowest-order census defined statistical area. It is an area, such as a city block, bounded primarily by physical features but sometimes by invisible city or property boundaries. A tabulation block boundary does not cross the boundary of any other geographic area for which the Census Bureau tabulates data. The subtypes of this feature are Count Question Resolution (CQR), current, and census.
G5200	Congressional District	The 435 areas from which people are elected to the U.S. House of Representatives. Additional equivalent features exist for state equivalents with nonvoting delegates or no representative. The subtypes of this feature are 106th, 107th, 108th, 109th, and 111th Congressional Districts, plus subsequent Congresses.
G5210	State Legislative District (Upper Chamber	Areas established by a state or equivalent government from which members are elected to the upper or unicameral chamber of a state governing body. The upper chamber is the senate in a bicameral legislature, and the unicameral case is a single house legislature (Nebraska).
G5220	State Legislative District (Lower Chamber)	Areas established by a state or equivalent government from which members are elected to the lower chamber of a state governing body. The lower chamber is the House of Representatives in a bicameral legislature.
G5240	Voting District	The generic name for the geographic features, such as precincts, wards, and election districts, established by state, local, and tribal governments for the purpose of conducting elections.
G5400	Elementary School District	A geographic area within which officials provide public elementary grade-level educational services for residents.
G5410	Secondary School District	A geographic area within which officials provide public secondary grade-level educational services for residents.
G5420	Unified School District	A geographic area within which officials provide public educational services for all grade levels for residents.
G6120	Public-Use Microdata Area	A decennial census area with a population of at least 100,000 or more persons for which the Census Bureau provides selected extracts of household-level data that are screened to protect confidentiality.
G6300	Traffic Analysis District	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data. A Traffic Analysis District (TAD) consists of one or more Traffic Analysis Zones (TAZs).
G6320	Traffic Analysis Zone	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data.

MTFCC	Feature Class	Feature Class Description
G6330	Urban Growth Area	An area defined under state authority to manage urbanization that the Census Bureau includes in the MAF/TIGER® System in agreement with the state.
G6350	ZIP Code Tabulation Area (Five-Digit)	An approximate statistical-area representation of a U.S. Postal Service (USPS) 5-digit ZIP Code service area.
G6400	Commercial Region	For the purpose of presenting economic statistical data, municipios in Puerto Rico are grouped into commercial regions.
H1100	Connector	A known, but nonspecific, hydrographic connection between two nonadjacent water features.
H2025	Swamp/Marsh	A poorly drained wetland, fresh or saltwater, wooded or grassy, possibly covered with open water [includes bog, cienega, marais and pocosin].
H2030	Lake/Pond	A standing body of water that is surrounded by land.
H2040	Reservoir	An artificially impounded body of water.
H2041	Treatment Pond	An artificial body of water built to treat fouled water.
H2051	Bay/Estuary/Gulf/Sound	A body of water partly surrounded by land [includes arm, bight, cove and inlet].
H2053	Ocean/Sea	The great body of salt water that covers much of the earth.
H2060	Gravel Pit/Quarry filled with water	A body of water in a place or area from which commercial minerals were removed from the Earth.
H2081	Glacier	A body of ice moving outward and down slope from an area of accumulation; an area of relatively permanent snow or ice on the top or side of a mountain or mountainous area [includes ice field and ice patch].
H3010	Stream/River	A natural flowing waterway [includes anabranch, awawa, branch, brook, creek, distributary, fork, kill, pup, rio, and run].
H3013	Braided Stream	A natural flowing waterway with an intricate network of interlacing channels.
H3020	Canal, Ditch or Aqueduct	An artificial waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft [includes lateral].
K1225	Crew-of-Vessel Location	A point or area in which the population of military or merchant marine vessels at sea are assigned, usually being at or near the home port pier.
K1231	Hospital/Hospice/Urgent Care Facility	One or more structures where the sick or injured may receive medical or surgical attention [including infirmary].

MTFCC	Feature Class	Feature Class Description
K1235	Juvenile Institution	A facility (correctional and non-correctional) where groups of juveniles reside; this includes training schools, detention centers, residential treatment centers and orphanages.
K1236	Local Jail or Detention Center	One or more structures that serve as a place for the confinement of adult persons in lawful detention, administered by a local (county, municipal, etc.) government.
K1237	Federal Penitentiary, State Prison, or Prison Farm	An institution that serves as a place for the confinement of adult persons in lawful detention, administered by the federal government or a state government.
K1238	Other Correctional Institution	One or more structures that serve as a place for the confinement of adult persons in lawful detention, not elsewhere classified or administered by a government of unknown jurisdiction.
K1239	Convent, Monastery, Rectory, Other Religious Group Quarters	One or more structures intended for use as a residence for those having a religious vocation.
K1246	Community Center	Community Center.
K2110	Military Installation	An area owned and/or occupied by the Department of Defense for use by a branch of the armed forces (such as the Army, Navy, Air Force, Marines, or Coast Guard), or a state owned area for the use of the National Guard.
K2165	Government Center	A place used by members of government (either federal, state, local, or tribal) for administration and public business.
K2167	Convention Center	An exhibition hall or conference center with enough open space to host public and private business and social events.
K2180	Park	Parkland defined and administered by federal, state, and local governments.
K2181	National Park Service Land	Area—National parks, National Monuments, and so forth—under the jurisdiction of the National Park Service.
K2182	National Forest or Other Federal Land	Land under the management and jurisdiction of the federal government, specifically including areas designated as National Forest, and excluding areas under the jurisdiction of the National Park Service.
K2183	Tribal Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of an American Indian tribe.
K2184	State Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a state government.

MTFCC	Feature Class	Feature Class Description
K2185	Regional Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a regional government.
K2186	County Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a county government.
K2187	County Subdivision Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a minor civil division (town/township) government.
K2188	Incorporated Place Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a municipal government.
K2189	Private Park, Forest, or Recreation Area	A privately owned place or area set aside for recreation or preservation of a cultural or natural resource.
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of some other type of government or agency such as an independent park authority or commission.
K2191	Post Office	An official facility of the U.S. Postal Service used for processing and distributing mail and other postal material.
K2193	Fire Department	Fire Department.
K2194	Police Station	Police Station.
K2195	Library	Library.
K2196	City/Town Hall	City/Town Hall.
K2400	Transportation Terminal	A facility where one or more modes of transportation can be accessed by people or for the shipment of goods; examples of such a facility include marine terminal, bus station, train station, airport and truck warehouse.
K2424	Marina	A place where privately owned, light-craft are moored.
K2432	Pier/Dock	A platform built out from the shore into the water and supported by piles. This platform may provide access to ships and boats, or it may be used for recreational purposes.
K2451	Airport or Airfield	A manmade facility maintained for the use of aircraft [including airstrip, landing field and landing strip].
K2452	Train Station, Trolley or Mass Transit Rail Station	A place where travelers can board and exit rail transit lines, including associated ticketing, freight, and other commercial offices.

MTFCC	Feature Class	Feature Class Description
K2453	Bus Terminal	A place where travelers can board and exit mass motor vehicle transit, including associated ticketing, freight, and other commercial offices.
K2454	Marine Terminal	A place where travelers can board and exit water transit or where cargo is handled, including associated ticketing, freight, and other commercial offices.
K2455	Seaplane Anchorage	A place where an airplane equipped with floats for landing on or taking off from a body of water can debark and load.
K2456	Airport—Intermodal Transportation Hub/Terminal	A major air transportation facility where travelers can board and exit airplanes and connect with other (i.e. non-air) modes of transportation.
K2457	Airport—Statistical Representation	The area of an airport adjusted to include whole 2000 census blocks used for the delineation of urban areas.
K2458	Park and Ride Facility/Parking Lot	A place where motorists can park their cars and transfer to other modes of transportation.
K2459	Runway/Taxiway	A fairly level and usually paved expanse used by airplanes for taking off and landing at an airport.
K2460	Helicopter Landing Pad	A fairly level and usually paved expanse used by helicopters for taking off and landing.
K2540	University or College	A building or group of buildings used as an institution for post-secondary study, teaching, and learning [including seminary].
K2543	School or Academy	A building or group of buildings used as an institution for preschool, elementary or secondary study, teaching, and learning [including elementary school and high school].
K2545	Museum, Visitor Center, Cultural Center, or Tourist Attraction	An attraction of historical, cultural, educational or other interest that provides information or displays artifacts.
K2561	Golf Course	A place designed for playing golf.
K2582	Cemetery	A place or area for burying the dead [including burying ground and memorial garden].
K2586	Zoo	A facility in which terrestrial and/or marine animals are confined within enclosures and displayed to the public for educational, preservation, and research purposes.
K3544	Place of Worship	A sanctified place or structure where people gather for religious worship; examples include church, synagogue, temple, and mosque.

MTFCC	Feature Class	Feature Class Description
L4010	Pipeline	A long tubular conduit or series of pipes, often underground, with pumps and valves for flow control, used to transport fluid (e.g., crude oil, natural gas), especially over great distances.
L4020	Powerline	One or more wires, often on elevated towers, used for conducting high-voltage electric power.
L4031	Aerial Tramway/Ski Lift	A conveyance that transports passengers or freight in carriers suspended from cables and supported by a series of towers.
L4110	Fence Line	A man-made barrier enclosing or bordering a field, yard, etc., usually made of posts and wire or wood, used to prevent entrance, to confine, or to mark a boundary.
L4121	Ridge Line	The line of highest elevation along a ridge.
L4125	Cliff/Escarpment	A very steep or vertical slope [including bluff, crag, head, headland, nose, palisades, precipice, promontory, rim and rimrock].
L4130	Point-to-Point Line	A line defined as beginning at one location point and ending at another, both of which are in sight.
L4140	Property/Parcel Line (Including PLSS)	This feature class may denote a nonvisible boundary of either public or private lands (e.g., a park boundary) or it may denote a Public Land Survey System or equivalent survey line.
L4150	Coastline	The line that separates either land or Inland water from Coastal, Territorial or Great Lakes water. Where land directly borders Coastal, Territorial or Great Lakes water, the shoreline represents the Coastline. Where Inland water (such as a river) flows into Coastal, Territorial or Great Lakes water, the closure line separating the Inland water from the other class of water represents the Coastline.
L4165	Ferry Crossing	The route used to carry or convey people or cargo back and forth over a waterbody in a boat.
P0001	Nonvisible Linear Legal/Statistical Boundary	A legal/statistical boundary line that does not correspond to a shoreline or other visible feature on the ground.
P0002	Perennial Shoreline	The more-or-less permanent boundary between land and water for a water feature that exists year-round.
P0003	Intermittent Shoreline	The boundary between land and water (when water is present) for a water feature that does not exist year-round.
P0004	Other non-visible bounding Edge (e.g., Census water boundary, boundary of an aerial feature)	A bounding Edge that does not represent a legal/statistical boundary, and does not correspond to a shoreline or other visible feature on the ground. Many such Edges bound area landmarks, while many others separate water features from each other (e.g., where a bay meets the ocean).

MTFCC	Feature Class	Feature Class Description
R1011	Railroad Feature (Main, Spur, or Yard)	A line of fixed rails or tracks that carries mainstream railroad traffic. Such a rail line can be a main line or spur line, or part of a rail yard.
R1051	Carline, Streetcar Track, Monorail, Other Mass Transit	Mass transit rail lines (including lines for rapid transit, monorails, streetcars, light rail, etc.) that are typically inaccessible to mainstream railroad traffic and whose tracks are not part of a road right-of-way.
R1052	Cog Rail Line, Incline Rail Line, Tram	A special purpose rail line for climbing steep grades that is typically inaccessible to mainstream railroad traffic. Note that aerial tramways and streetcars (which may also be called "trams") are accounted for by other MTFCCs and do not belong in R1052.
S1100	Primary Road	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
S1200	Secondary Road	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.
S1400	Local Neighborhood Road, Rural Road, City Street	Generally, a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.
S1500	Vehicular Trail (4WD)	An unpaved dirt trail where a four-wheel drive vehicle is required. These vehicular trails are found almost exclusively in very rural areas. Minor, unpaved roads usable by ordinary cars and trucks belong in the S1400 category.
S1630	Ramp	A road that allows controlled access from adjacent roads onto a limited access highway, often in the form of a cloverleaf interchange. These roads are unaddressable and do not carry a name in the MAF/TIGER System.
S1640	Service Drive usually along a limited access highway	A road, usually paralleling a limited access highway, that provides access to structures along the highway. These roads can be named and may intersect with other roads.
S1710	Walkway/Pedestrian Trail	A path that is used for walking, being either too narrow for or legally restricted from vehicular traffic.
S1720	Stairway	A pedestrian passageway from one level to another by a series of steps.

MTFCC	Feature Class	Feature Class Description
S1730	Alley	A service road that does not generally have associated addressed structures and is usually unnamed. It is located at the rear of buildings and properties and is used for deliveries.
S1740	Private Road for service vehicles (logging, oil fields, ranches, etc.)	A road within private property that is privately maintained for service, extractive, or other purposes. These roads are often unnamed.
S1750	Internal U.S. Census Bureau use	Internal U.S. Census Bureau use.
S1780	Parking Lot Road	The main travel route for vehicles through a paved parking area.
S1820	Bike Path or Trail	A path that is used for manual or small, motorized bicycles, being either too narrow for or legally restricted from vehicular traffic.
S1830	Bridle Path	A path that is used for horses, being either too narrow for or legally restricted from vehicular traffic.
S2000	Road Median	The unpaved area or barrier between the carriageways of a divided road.
Note: The information in this table was last updated in November 2017.		

APPENDIX D STANDARD STREET TYPE ABBREVIATIONS

Table 52: Standard Street Type Abbreviations

Street Name Type	Standard Abbreviation
ALLEY	ALY
ANEX	ANX
ARCADE	ARC
AVENUE	AVE
BAYOU	BYU
BEACH	BCH
BEND	BND
BLUFF	BLF
BLUFFS	BLFS
BOTTOM	BTM
BOULEVARD	BLVD
BRANCH	BR
BRIDGE	BRG
BROOK	BRK
BROOKS	BRKS
BURG	BG
BURGS	BGS
BYPASS	BYP
CAMP	CP
CANYON	CYN
CAPE	CPE
CAUSEWAY	CSWY
CENTER	CTR
CENTERS	CTRS
CIRCLE	CIR
CIRCLES	CIRS
CLIFF	CLF
CLIFFS	CLFS
CLUB	CLB
COMMON	CMN
COMMONS	CMNS
CORNER	COR
CORNERS	CORS
COURSE	CRSE
COURT	CT
COURTS	CTS
COVE	CV
COVES	CVS
CREEK	CRK
CRESCENT	CRES
CREST	CRST
CROSSING	XING
CROSSROAD	XRD
CROSSROADS	XRDS
CURVE	CURV
DALE	DL

Street Name Type	Standard Abbreviation
DAM	DM
DIVIDE	DV
DRIVE	DR
DRIVES	DRS
ESTATE	EST
ESTATES	ESTS
EXPRESSWAY	EXPY
EXTENSION	EXT
EXTENSIONS	EXTS
FALL	FALL
FALLS	FLS
FERRY	FRY
FIELD	FLD
FIELDS	FLDS
FLAT	FLT
FLATS	FLTS
FORD	FRD
FORDS	FRDS
FOREST	FRST
FORGE	FRG
FORGES	FRGS
FORK	FRK
FORKS	FRKS
FORT	FT
FREEWAY	FWY
GARDEN	GDN
GARDENS	GDNS
GATEWAY	GTWY
GLEN	GLN
GLENS	GLNS
GREEN	GRN
GREENS	GRNS
GROVE	GRV
GROVES	GRVS
HARBOR	HBR
HARBORS	HBRS
HAVEN	HVN
HEIGHTS	HTS
HIGHWAY	HWY
HILL	HL
HILLS	HLS
HOLLOW	HOLW
INLET	INLT
ISLAND	IS
ISLANDS	ISS
ISLE	ISLE
JUNCTION	JCT
JUNCTIONS	JCTS
KEY	KY
KEYS	KYS

Street Name Type	Standard Abbreviation
KNOLL	KNL
KNOLLS	KNLS
LAKE	LK
LAKES	LKS
LAND	LAND
LANDING	LNDG
LANE	LN
LIGHT	LGT
LIGHTS	LGTS
LOAF	LF
LOCK	LCK
LOCKS	LCKS
LODGE	LDG
LOOP	LOOP
MALL	MALL
MANOR	MNR
MANORS	MNRS
MEADOW	MDW
MEADOWS	MDWS
MEWS	MEWS
MILL	ML
MILLS	MLS
MISSION	MSN
MOTORWAY	MTWY
MOUNT	MT
MOUNTAIN	MTN
MOUNTAINS	MTNS
NECK	NCK
ORCHARD	ORCH
OVAL	OVAL
OVERPASS	OPAS
PARK	PARK
PARKS	PARK
PARKWAY	PKWY
PARKWAYS	PKWY
PASS	PASS
PASSAGE	PSGE
PATH	PATH
PIKE	PIKE
PINE	PNE
PINES	PNES
PLACE	PL
PLAIN	PLN
PLAINS	PLNS
PLAZA	PLZ
POINT	PT
POINTS	PTS
PORT	PRT
PORTS	PRTS
PRAIRIE	PR

Street Name Type	Standard Abbreviation
RADIAL	RADL
RAMP	RAMP
RANCH	RNCH
RAPID	RPD
RAPIDS	RPDS
REST	RST
RIDGE	RDG
RIDGES	RDGS
RIVER	RIV
ROAD	RD
ROADS	RDS
ROUTE	RTE
ROW	ROW
RUE	RUE
RUN	RUN
SHOAL	SHL
SHOALS	SHLS
SHORE	SHR
SHORES	SHRS
SKYWAY	SKWY
SPRING	SPG
SPRINGS	SPGS
SPUR	SPUR
SPURS	SPUR
SQUARE	SQ
SQUARES	SQS
STATION	STA
STRAVENUE	STRA
STREAM	STRM
STREET	ST
STREETS	STS
SUMMIT	SMT
TERRACE	TER
THROUGHWAY	TRWY
TRACE	TRCE
TRACK	TRAK
TRAFFICWAY	TRFY
TRAIL	TRL
TRAILER	TRLR
TUNNEL	TUNL
TURNPIKE	TPKE
UNDERPASS	UPAS
UNION	UN
UNIONS	UNS
VALLEY	VLY
VALLEYS	VLYS
VIADUCT	VIA
VIEW	VW
VIEWS	VWS
VILLAGE	VLG

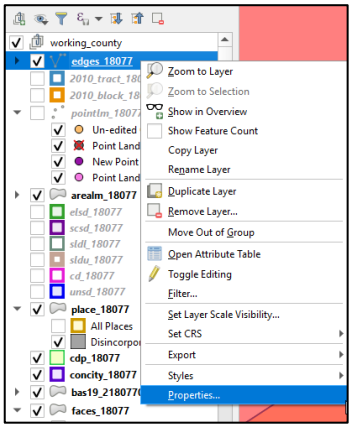
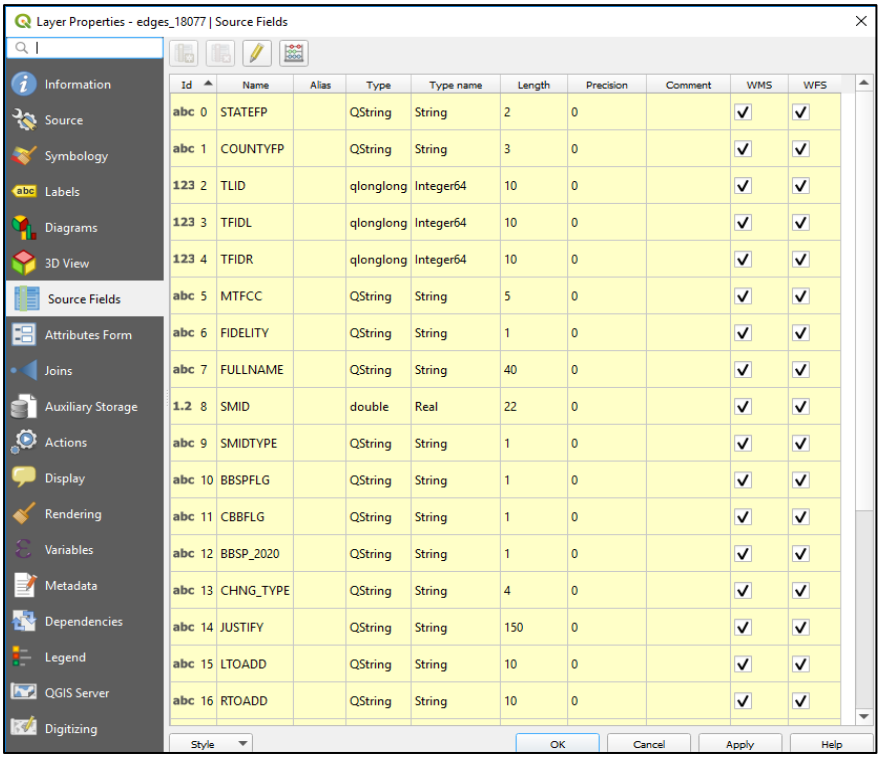
Street Name Type	Standard Abbreviation
VILLAGES	VLGS
VILLE	VL
VISTA	VIS
WALK	WALK
WALKS	WALK
WALL	WALL
WAY	WAY
WAYS	WAYS
WELL	WL
WELLS	WLS

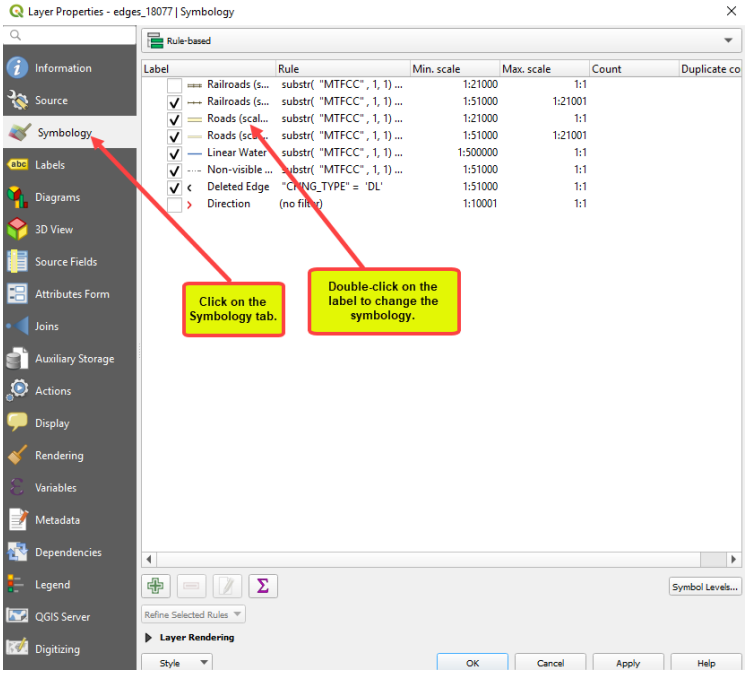
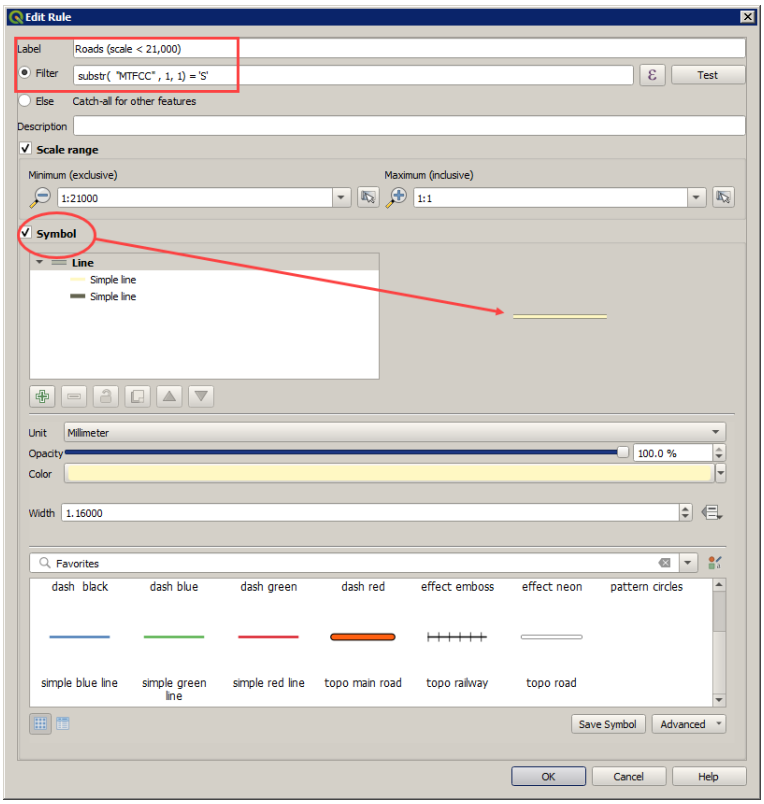
APPENDIX E GUPS TOOLS

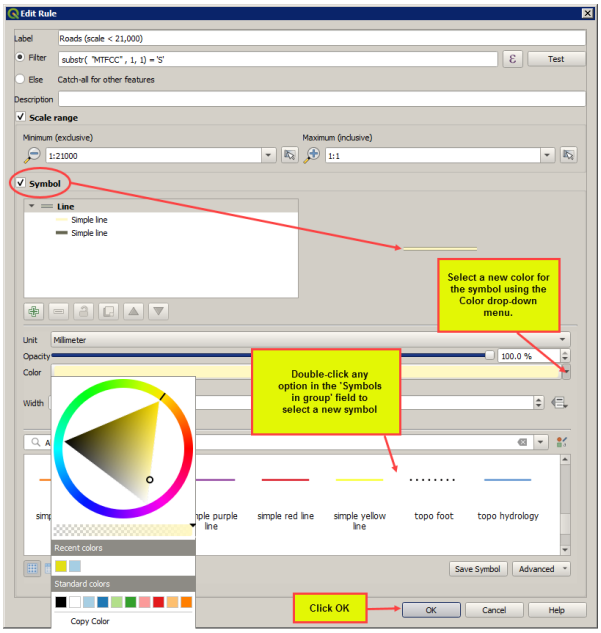
E.1 Set Layer Symbology

GUPS loads a default layer symbology established for each Census Bureau geographic partnership program. The default symbology can be changed to suit users' preferences. To change the default symbology for a layer in GUPS follow the instructions in **Table 53**.

Table 53: Reset Layer Symbology

Step	Action and *Result*
Step 1	Right-click on the layer in the **Layers Panel** (in this example, the Edges layer was selected). *The **Layers** drop-down menu opens*. 
Step 2	In the drop-down menu, choose 'Properties'. *The **Layer Properties** screen opens*. 

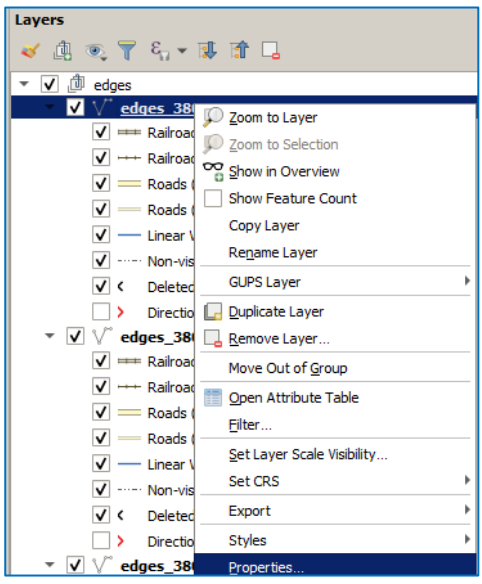
Step	Action and *Result*
Step 3	In the left-hand pane, click on **Symbology**, then double-click the symbol to be edited in the layers list. In this example, 'Roads, substr ("MTFCC, 1,1) = S1100' is selected.  *The **Edit Rule** dialog box opens and the **Label** and **Filter** fields display the item chosen. The **Symbol** pane shows the current symbology (yellow line).* 

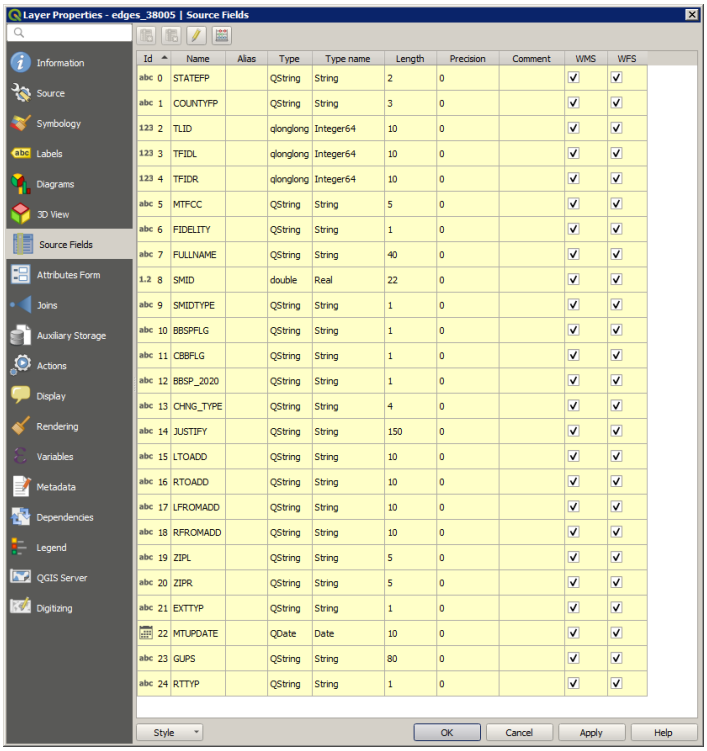
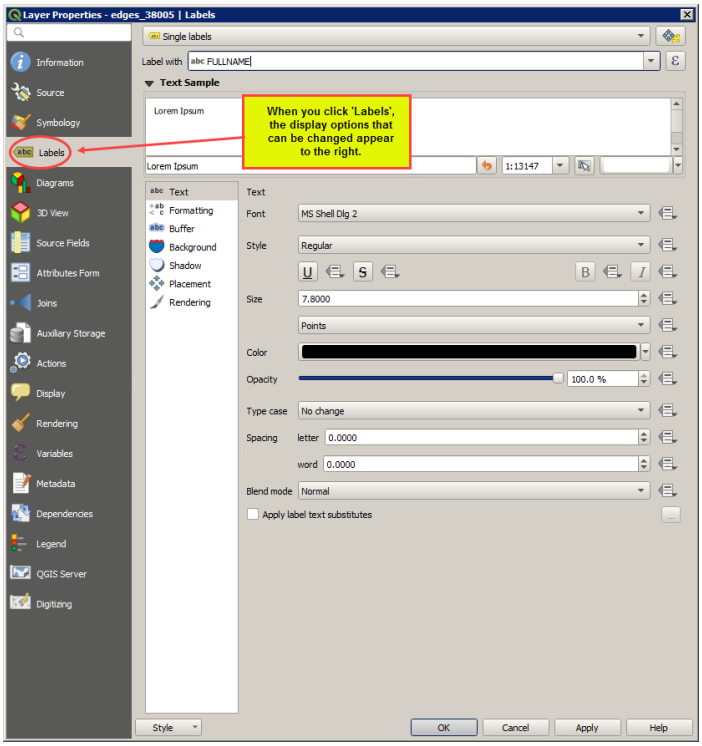
Step	Action and *Result*
Step 4	Choose a new color from the **Color** drop-down menu, or select a different symbol for the layer altogether by double-clicking any symbol in the **Symbols** field. Click **OK**. *The new symbology will display in the **Layers Panel** and in **Map View**.* 

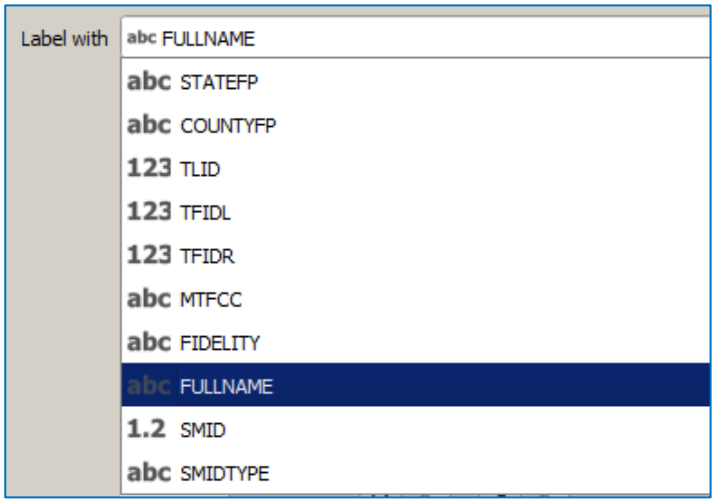
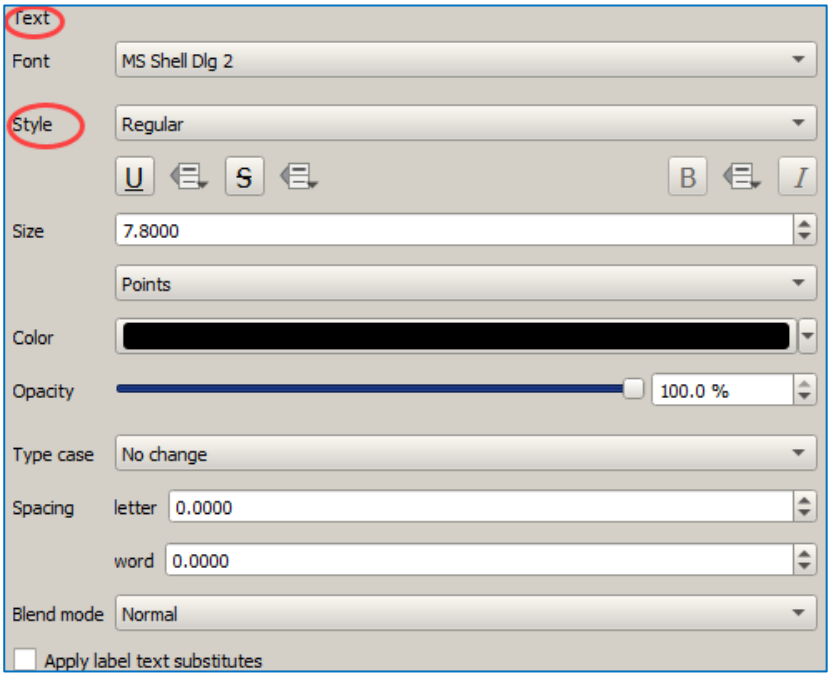
E.2 Change Label Display

To change the default labeling for a layer, follow the steps in **Table 54**.

Table 54: Change Default Labeling

Step	Action and *Result*
Step 1	Right click on the layer (the edges layer is being selected) in the **Layers Panel**. *The Layers drop-down menu opens*. 

Step	Action and *Result*
Step 2	In the drop-down menu, choose 'Properties'. *The **Layer Properties** dialog box opens.* 
Step 3	In the far left-hand pane, click **Labels**. *The options to change the label display properties open in the main window.* 

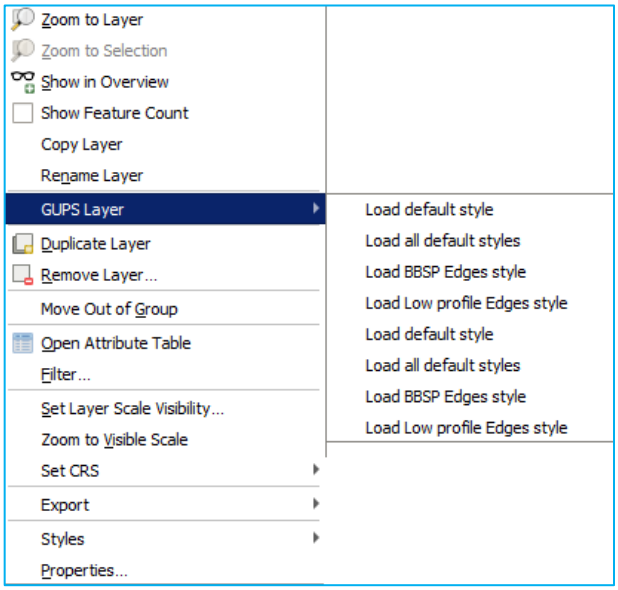
Step	Action and *Result*
Step 4	To change the attribute field, click on the drop-down menu for 'Label this layer with' at the top of the screen, and select the desired option.  **Text style** options allow the user to change the font, style, size, color, transparency, type case, and spacing of layer labels. Shown below are the drop-down options for style. 

E.3 Restoring Default Label Display Settings

To restore the default labeling for a layer, follow the steps in **Table 55**.

Table 55: Restoring Default Labeling

Step	Action and *Result*
Step 1	Right-click on the layer that was changed in the **Layers Panel**. *The layer's drop-down menu opens*.

Step	Action and *Result*
Step 2	In this example, the Edges layer is selected. In the drop-down menu, click on the arrow to the right of '**GUPS Layer**'. Four options appear: '**Load default style**', '**Load all default style**', '**Load BBSP Edges style**', '**Load Low profile Edges style**', '**Load default style**', '**Load all default styles**', '**Load BBSP Edges style'**, and '**Load Low profile Edges style**'. 
Step 3	Select '**Load default style**' to restore the selected layer's original properties OR select '**Load all default style**' to reset *ALL* the layers to their original settings.

E.4 Using the Layers Panel Toolbar to Manage Layers

Using the buttons on the toolbar located at the top of the Layers Panel, users can add and remove layers or groups, manage layer visibility, filter the legend by map content, expand or contract all sections of the Layers Panel list at once, and group layers.

The Layers Panel Layers toolbar shown below in **Figure 20**. Tthe function of each of the buttons on the toolbar is described in **Table 56**.

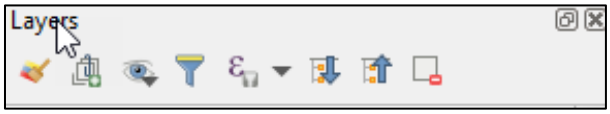
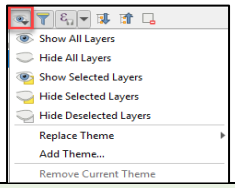
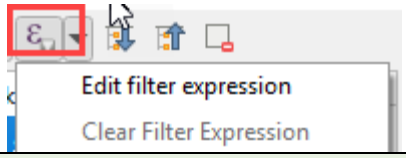


Figure 20. Layers Panel Toolbar

Table 56: Layers Panel Toolbar Buttons

Button	Name	Function/Description
	Open the Layer Styling Panel	Customize symbology and labels of a selected layer.
	Add Group	Allows the user to organize layers in the **Layers Panel** into groups.

Button	Name	Function/Description
	Manage Map Themes	 Allows the user various view options for **Layers**.
	Filter Legend by Map Content	Removes from the **Layers Panel** display any layers that are not currently in the **Map View** extent. This feature ensures that the **Layers Panel** does not contain entries for items not currently in the map view.
	Filter Legend by Expression	 Provides functions which aggregate values over layers and fields.
	Expand All	Expands the **Layers Panel** menus (+) to display all layers under each group's menu.
	Collapse All	Collapses the **Layers Panel** menus (-) to show only groups.
	Remove Layer/Group	Allows the user to remove a layer or group from the **Layers Panel**.

APPENDIX F MAF/TIGER FEATURE CLASSIFICATION

Table 57: MAF/TIGER Feature Classification

MTFCC	FEATURE NAME
S1100	Interstate Highway or Primary Road with limited access
S1200	Primary Road without limited access, US Highway, State Highway, or County Highway, Secondary and connecting roads
S1400	Local Neighborhood Road, Rural Road, City Street
S1500	Vehicular Trail (4WD)
S1630	Ramp
S1640	Service Drive usually along a limited access highway
S1710	Walkway/Pedestrian Trail
S1720	Stairway
S1730	Alley
S1740	Private Road for service vehicles (logging, oil fields, ranches, etc.)
S1750	Private Driveway
H3010	Stream/River
H3013	Braided Stream
H3020	Canal, Ditch or Aqueduct
R1011	Railroad Feature (Main, Spur, or Yard)
R1051	Carline, Streetcar Track, Monorail, Other Mass Transit Rail
R1052	Cog Rail Line, Incline Rail Line, Tram
P0001	Nonvisible Legal/Statistical Boundary
L4010	Pipeline
L4020	Power Transmission Line
L4110	Fence Line
L4121	Ridge Line
L4031	Aerial Tramway/Ski Lift
K2451	Airport or Airfield
L4140	Property/Parcel Line
L4165	Ferry Crossing

APPENDIX G SHAPEFILE NAMES

State Shapefile Names - PVS_19_v2_<layername>_<SS>.shp, where <SS> is the number corresponding to the state, for example, "24" and <layername> is the abbreviation for the shapefile layer, describe in detail below.

Table 58: State Shapefiles Names

Shapefile Layer	<layername>
American Indian Areas (AIA) – Legal	aial
2010 American Indian Areas (AIA) – Legal	aial2010
American Indian Areas (AIA) – Statistical	aias
American Indian Tribal Subdivisions (AITS) - Legal	aitsl
American Indian Tribal Subdivisions (AITS) - Statistical	aitss
Block Area Group	bag
Metropolitan Statistical Area/Metropolitan Statistical Area	cbsa
Congressional Districts	cd
Census Designated Place	cdp
Counties and Equivalent Areas	county
2010 Counties and Equivalent Areas	county2010
Elementary School Districts	elsd
County Subdivisions - Legal	mcd
New England City and Town Areas	necta
Incorporated Places	place
2010 Public Use Microdata Areas	puma2010
Secondary School Districts	scsd
State Legislative Districts Lower	sldl
State Legislative District Upper Chambers	sldu
State	state
Tribal Block Groups	tbg
Tribal Census Tracts	tct
2010 Census Tracts	tracts2010
Urban Area	uac
Unified School District State-Based	unsd

County Shapefile Names - PVS_19_v2_<layername>_<SSCCC>.shp, where <SSCCC> is the number corresponding to the state and county, for example, "24001" and <layername> is the abbreviation for the shapefile layer, describe in detail below.

Table 59: County Shapefiles Names

Shapefile Layer	<layername>
American Indian Areas (AIA) – Legal	aial
American Indian Areas (AIA) – Statistical	aias
American Indian Tribal Subdivisions (AITS) - Legal	aitsl
American Indian Tribal Subdivisions (AITS) - Statistical	aitss
Alaska Native Regional Corporations (ANRC)	anrc
Area Landmark	arealm
Block Area Groups	bag
Block Groups	bg
Metropolitan Statistical Area/Metropolitan Statistical Area	cbsa
Census County Division	ccd
Congressional Districts	cd
Census Designated Place	cdp
Consolidated Cities	concity
Counties and Equivalent Areas	county
Census Tracts - Current	curtracts
All Lines	edges
Elementary School Districts	elsd
Hawaiian Home Lands (HHL)	hhl
County Subdivisions - Legal	mcd
New England City and Town Areas	necta
Offsets	offset
Incorporated Places	place
Point Landmarks	pointlm
2010 Public Use Microdata Areas	puma2010
Secondary School Districts	scsd
State Legislative Districts Lower	sldl
State Legislative Districts Upper	sldu
Subbarrios	submcd
Census Blocks - Current	tabblock
2010 Census Blocks	tabblock2010

Shapefile Layer	<layername>
2010 Traffic Analysis Delineation	tad2010
2010 Traffic Analysis Zones	taz2010
Tribal Block Groups	tbg
Tribal Census Tracts	tct
2010 Census Tracts	tracts2010
Census Urban Areas	uac
Urban Growth Area	uga
Hydrography - Area	water
Unified School Districts	unsd
Relationship Tables	
Address Ranges	addr
Topological Faces (2-cells with all geocodes)	faces
Topological Faces - Area Landmark Relationship	areafaces
Topological Faces - Area Hydrography Relationship	hydrofaces
Linear Feature Names - Fielded	allnames

APPENDIX H SHAPEFILE LAYOUTS

Table 60: Edges Shapefile (PVS_19_v2_edges)

Attribute Field	Length	Type	Description
STATEFP	2	String	FIPS state code
COUNTYFP	3	String	FIPS county code
TLID	10	Double	Permanent edge ID
TFIDL	10	Double	Permanent face ID (left)
TFIDR	10	Double	Permanent face ID (right)
MTFCC	5	String	MAF/TIGER Feature Class Code
FIDELITY	1	String	Indication to a respondent when their entity boundary has changed through spatial enhancement
FULLNAME	40	String	Decoded feature name with abbreviated qualifier, direction, and feature type
SMID	22	String	Spatial Theta ID
SMIDTYPE	1	String	SMIDTYPE code
BBSPFLG	1	String	Redistricting data project participant's submitted request of an EDGE for selection as a block boundary
CBBFLG	1	String	Indicates the status of an EDGE for a selection as a block boundary
BBSP_2020	1	String	New BBSP flag
CHNG_TYPE	4	String	Type of linear feature update
JUSTIFY	150	String	Justification of change
LTOADD	10	String	Left To address
RTOADD	10	String	Right To address
LFROMADD	10	String	Left From address
RFROMADD	10	String	Right From address
ZIPL	5	String	Left zip code
ZIPR	5	String	Right zip code
EXTTYP	1	Char	Extension type
MTUPDATE	10	Date	Date of last update to the edge

Table 61: Address Ranges Attribute File (PVS_19_v2_addr)

Attribute Field	Length	Type	Description
OID	8	STRING	Object ID
TLID	22	Integer	TIGER Line ID
STATEFP	2	String	FIPS State Code
COUNTYFP	3	String	FIPS County Code

Attribute Field	Length	Type	Description
FROMHN	12	String	From House Number
TOHN	12	String	To House Number
SIDE	1	String	Side Indicator Flag
ZIP	5	String	5-digit ZIP Code
PLUS4	4	String	ZIP+4 Code
LFROMADD	10	String	Left From Address
LTOADD	10	String	Left To Address
RFROMADD	10	String	Right From Address
RTOADD	10	String	Right To Address
ZIPL	5	String	Left 5-digit ZIP Code
ZIPR	5	String	Right 5-digit ZIP Code
ZIP4L	4	String	Left ZIP+4 Code
ZIP4R	4	String	Right ZIP+4 Code

Table 62: Census Block Shapefile (PVS_19_v2_tabblock2010)

Attribute Field	Length	Type	Description
BLKSZIND	1	String	Block Size Indicator
BLOCK	4	String	Block Number
BLOCKCE	4	String	Tabulation Block Number
BLOCKID	15	String	FIPS State Code, FIPS County Code, Census Tract Code, Block Number
COUNTYFP	3	String	Census County FIPS code
COUNTYFP10	3	String	FIPS County Code
FID	10	Integer	Permanent Face ID
NCELIGBLE	1	String	New Construction Program eligible
PARTFLG	1	String	Part Flag Indicator
Shape	7	String	Type of shape
STATEFP	2	String	Census state FIPS code
STATEFP10	2	String	FIPS State Code
SUFFIX1CE	2	String	Census Block Suffix 1
SUFFIX2CE	2	String	Census Block Suffix 2
TRACTCE10	6	String	Census tract code

Table 63: Census Tract Shapefile (PVS_19_v2_curtracts)

Attribute Field	Length	Type	Description
CHNG_TYPE	2	String	Type of area update
COUNTYFP	3	String	FIPS County Code
EFF_DATE	8	String	Effective Date or Vintage
FID	10	Integer	Permanent Face ID
JUSTIFY	150	Char	Justification
NAME	100	String	Name
NEW_CODE	2	String	New Congressional District Code
RELATE	120	String	Relationship Description
Shape	7	String	Type of shape
STATEFP	2	String	FIPS State Code
TRACTCE	6	String	Census Tract Code
TRACTID	11	String	FIPS State Code, FIPS County Code, Census Tract Code
TRACTLABEL	7	String	Tract number used for LUCA geocoding
TRACTTYP	1	String	Tract Characteristic Flag
VINTAGE	2	String	Vintage updated with returned data

Table 64: American Indian Areas Shapefile (PVS_19_v2_aial)

Attribute Field	Length	Type	Description
AIANNHCE	4	String	Census AIANNH Code
AIANNHFSR	1	String	Flag Indicating Level of Recognition of an AIA
AIANNHNS	8	String	ANSI numeric identifier for AIA areas
AREA	10	Double	Acreage of Area Update
AUTHTYPE	1	String	Authorization Type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
CHNG_TYPE	2	String	Type of Area Update
CLASSFP	2	String	FIPS 55 Class Code Describing an Entity
COMPTYP	1	String	Indicates if Reservation, Trust Land, or both are Present
COUNTYFP	3	String	FIPS County Code
DOCU	120	String	Supporting Documentation
EFF_DATE	8	Date	Effective Date
FID	10	Integer	Permanent Face ID
FORM_ID	4	String	(MTPS and Web BAS Only)
FUNCSTAT	1	String	Functional Status

Attribute Field	Length	Type	Description
JUSTIFY	150	Char	Justification
LSAD	2	String	Legal / Statistical Area Description
NAME	100	String	AIA name
NAMELSAD	100	String	Name with Translated LSAD
PARTFLG	1	String	Part Flag Indicator
RELATE	120	String	Relationship description
Shape	7	String	Type of shape
STATEFP	2	String	FIPS State Code
VINTAGE	2	String	Vintage of the Data

Table 65: County and Equivalent Areas Shapefile (PVS_19_v2_county)

Attribute Field	Length	Type	Description
STATEFP	2	String	FIPS state code
COUNTYFP	3	String	FIPS county code
COUNTYNS	8	String	ANSI feature code for the county or equivalent feature
NAMELSAD	100	String	Name with translated LSAD code
LSAD	2	String	Legal/Statistical Area Description code
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 66: County Subdivisions Shapefile (PVS_19_v2_mcd)

Attribute Field	Length	Type	Description
STATEFP	2	String	FIPS state code
COUNTYFP	3	String	FIPS county code
COUSUBFP	5	String	FIPS 55 county subdivision code
NAMELSAD	100	String	Name with translated LSAD
COUSUBNS	8	String	ANSI feature code for the county subdivision
LSAD	2	String	Legal/Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 67: Incorporated Place Shapefile (PVS_19_v2_place)

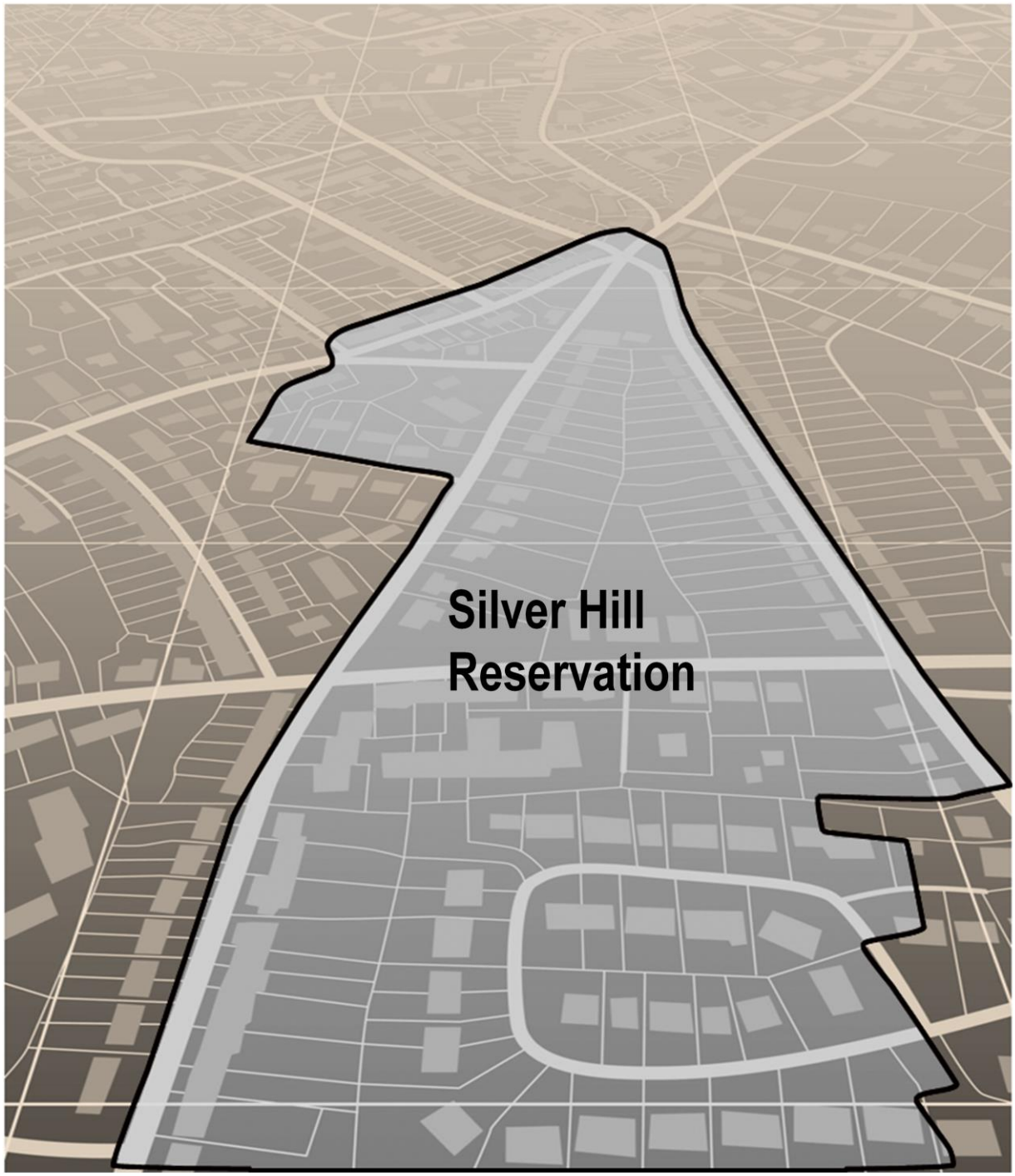
Attribute Field	Length	Type	Description
STATEFP	2	String	FIPS state code
COUNTYFP	3	String	FIPS county code
PLACEFP	5	String	FIPS 55 place code
NAMELSAD	100	String	Name with translated LSAD
PLACENS	8	String	ANSI feature code for the place
LSAD	2	String	Legal / Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing and entity
PARTFLG	1	String	Indicates if only part of a feature is represented
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage

Attribute Field	Length	Type	Description
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Boundary and Annexation Survey (BAS) Tribal Respondent Guide: GUPS

Instructions for Using the Geographic Update Partnership Software (GUPS)

Revised as of October 15, 2019



United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

This page intentionally left blank

Table of Contents

Introduction viii
A. The Boundary and Annexation Survey viii
B. What's New for the 2020 BAS? viii
C. Key Dates for BAS Respondents ix
D. BAS State Agreements ix
E. Legal Disputes ix
F. Respondent Guide Organization ix

Section 1. Process and Workflow 1
1.1 Receiving the GUPS Application and Shapefiles 1
1.2 Getting Help 2
1.2.1 GUPS Help 2
1.2.2 BAS Help 2

Section 2. Reviewing BAS Data 1
2.1 Boundary Corrections 1
2.2 Legal Boundary Changes 1
2.3 Tribal Areas that can be Submitted through BAS 1
2.4 Submitting Acceptable Documentation 2
2.5 Reviewing Linear Features 3
2.6 Reviewing Area Landmarks and Hydrographic Areas 4
2.7 Reviewing Point Landmarks 5

Section 3. Quality Control and File Submission 7
3.1 Validating Updates 7
3.2 Submitting Files through Secure Web Incoming Module (SWIM) 7
3.3 Submitting Files on DVD 8

Section 4. Requirements and Installation 9
4.1 Getting Started 10
4.2 How to Install GUPS 11

Section 5. Using GUPS (Basics and Map Management) 16
5.1 How to Access BAS Shapefiles 16
5.2 Import Data from the Census Bureau's BAS Website 17
5.3 Download Shapefiles from the BAS Website 25
5.4 Download Shapefiles from the Census Bureau ftp2 Site 27
5.5 Using the GUPS Interface 30
5.5.1 GUPS Main Page 30
5.5.2 Layers Panel and Map View 32
5.5.3 Managing the Map View from Within the Layers Panel 33
5.5.3.1 Manage Layer Visibility 33
5.5.3.2 Reorder Data Layers 34
5.5.3.3 Expand/Contract Layers Panel Menus 34
5.6 Menu & Toolbars 35
5.6.1 Menu Tabs 35
5.6.2 Standard Toolbar Buttons 40
5.6.2.1 Identify a Feature Using the Identify Features Button 42

5.6.2.2 Select/Deselect Features Using the Select Features and Deselect Features Buttons 44
5.6.2.3 Select Features by Querying the Attribute Table 47
5.6.2.4 View an Attribute Table for a Layer on the Map 49
5.6.2.5 Determine Distance, Area, and Angles on the Map 50
5.6.2.6 Save Locations on a Map Using the Bookmark Button 52
5.6.3 BAS Toolbar Buttons 53
5.6.4 Status Bar 54
5.7 How to Import User-Provided Data into GUPS 55
5.7.1 The Add Data Toolbar 55
5.7.2 How to Upload User-Provided Data Layers 56
5.7.3 How to Import a Shared ZIP Shapefile 58

Section 6. Making BAS Updates in GUPS 61

6.1 How to Update Legal Boundaries 61
6.1.1 Adding Land Area as Reservation or Trust Lands for the First Time 61
6.1.2 Adding (or Deleting) Land Area to an Existing Reservation or Existing Off-Reservation Trust Land 69
6.1.3 Make a Boundary Correction (Add Area/Remove Area) 75
6.1.4 Adding a Geographic Offset 78
6.2 How to Update Linear Features 84
6.2.1 Adding a Linear Feature 84
6.2.2 Deleting a Linear Feature 86
6.2.3 Restoring a Deleted Linear Feature 87
6.2.4 Changing the Attributes of a Linear Feature 88
6.3 How to Update Area Landmarks and Hydrographic Areas 90
6.3.1 Adding a New Area Landmark/Hydrographic Area 90
6.3.2 Deleting an Area Landmark/Hydrographic Area 93
6.3.3 Adding Area to an Area Landmark or Hydrographic Area 96
6.3.4 Removing Area from an Area Landmark/Hydrographic Area 98
6.4 How to Update Point Landmarks 100
6.4.1 Adding a Point Landmark 100
6.4.2 Deleting a Point Landmark 102
6.4.3 Changing the Attributes of a Point Landmark 102
6.5 How to Use GUPS Review and Validation Tools 103
6.5.1 Geography Review Tool 104
6.5.2 Review Change Polygons Tool 108
6.6 Exporting a Printable Map 115
6.6.1 How to Export ZIP Files to Share/Submit 119
6.6.2 Exporting a File to Share 119
6.6.3 Exporting a File to Submit to the Census Bureau 121

Section 7. Submitting Files to the Census Bureau through SWIM 124

Appendices 131
Appendix A BAS Contact Information and Resources A-1
Appendix B TERMS B-1
Appendix C MTFCC Descriptions C-1
Appendix D Standard Street Type Abbreviations D-1
Appendix E GUPS Tools E-1

E.1 Set Layer Symbology E-1
E.2 Change Label Display E-3
E.3 Restoring Default Label Display Settings E-5
E.4 Using the Layers Panel Toolbar to Manage Layers E-6
Appendix F MAF/TIGER Feature Classification F-1
Appendix G Shapefile Names G-1
Appendix H Shapefile Layouts H-1

LIST OF FIGURES

Figure 1. Tribal BAS Workflow 1
Figure 2. GUPS Main Page Layout 30
Figure 3. Close Layers Panel 32
Figure 4. Restore the Layers Panel 33
Figure 5. Managing Layer Visibility 34
Figure 6. Menu and Toolbars 35
Figure 7. Manage Layer Toolbar 35
Figure 8. Standard Toolbar 40
Figure 9. Sub-tool Markers 41
Figure 10. BAS Toolbar 53
Figure 11. Status Bar 54
Figure 12. Add Data Toolbar 55
Figure 13. Annexed Area Corridor and Unincorporated Area B-2
Figure 14. Incorporated Area and Unincorporated Area B-2
Figure 15. Participant Responses B-2
Figure 16. A Cadastral (Parcel-Based) Boundary Map B-3
Figure 17. How a Boundary Should be Represented When Sent to the Census Bureau B-3
Figure 18. Place Boundary – Front-Lot-Line B-4
Figure 19. Place Boundary – Rear-Lot-Line B-4
Figure 20. Layers Panel Toolbar E-6

LIST OF TABLES

Table 1: Available Change Types by Government Type 2
Table 2: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas 4
Table 3: Restricted Point Landmark MTFCCs 6
Table 4: GUPS Hardware and Software Requirements 10
Table 5: Install the GUPS Application 11
Table 6: Start a New Project Using Shapefiles from the BAS Website 17
Table 7: Download Shapefiles from the BAS Website to a Hard Drive 25
Table 8: Download Shapefiles from ftp2 Site to a Hard Drive (State Users) 28
Table 9: GUPS Main Page Elements 31
Table 10: Menu Tabs and Their Functions 35
Table 11: Adjust Snapping Tolerances 39
Table 12: Standard Toolbar Buttons 41
Table 13: Identify a Feature on the Map 43
Table 14: Select/Deselect Features on the Map 45
Table 15: Select Features by Querying the Attribute Table 47
Table 16: View Layer Attributes Using the Attributes Table 49
Table 17: Measure Distances, Area, and Angles on a Map 50
Table 18: Bookmark Locations on a Map 52
Table 19: BAS Toolbar Buttons 53
Table 20: Status Bar Elements 54
Table 21: Add Data Toolbar Buttons 55
Table 22: Load Shapefiles/Geodatabase Layers 57
Table 23: Load Data from a Web Mapping Service 57
Table 24: Add Imagery Files 58
Table 25: Import a ZIP File Shared by Another User 59
Table 26: Add Land Area as Reservation or Off-reservation Trust Land 61
Table 27: Record an Addition 69
Table 28: Make a Boundary Correction 75
Table 29: Add a Geographic Offset 78
Table 30: Adding a Linear Feature 84
Table 31: Deleting a Linear Feature 86
Table 32: Restoring a Deleted Linear Feature 87
Table 33: Changing the Attributes of a Linear Feature 88
Table 34: Creating a New Area Landmark/Hydrographic Area 90
Table 35: Deleting an Area Landmark/Hydrographic Area 93

Table 36: Adding Area to an Area Landmark/Hydrographic Area 96
Table 37: Removing Area from an Area Landmark/Hydrographic Area 98
Table 38: Adding a Point Landmark 101
Table 39: Deleting a Point Landmark 102
Table 40: Changing the Attributes of a Point Landmark 102
Table 41: Using the Geography Review Tool 104
Table 42: Reviewing Change Polygons 108
Table 43: Exporting a Printable Map 115
Table 44: Exporting Files to Share with Another User 119
Table 45: Exporting Files for Submission to the Census Bureau 121
Table 46: Transmitting Files to the Census Bureau Using SWIM 124
Table 47: BAS Contact Information and Resources A-1
Table 48: MTFCC Descriptions C-1
Table 49: Standard Street Type Abbreviations D-1
Table 50: Reset Layer Symbology E-1
Table 51: Change Default Labeling E-3
Table 52: Restoring Default Labeling E-5
Table 53: Layers Panel Toolbar Buttons E-6
Table 54: MAF/TIGER Feature Classification F-1
Table 55: State Shapefiles Names G-1
Table 56: County Shapefiles Names G-2
Table 57: Edges Shapefile (PVS_19_v2_edges) H-1
Table 58: Address Ranges Attribute File (PVS_19_v2_addr) H-2
Table 59: Census Block Shapefile (PVS_19_v2_tabblock2010) H-2
Table 60: Census Tract Shapefile (PVS_19_v2_curtracts) H-3
Table 61: American Indian Areas Shapefile (PVS_19_v2_aial) H-3
Table 62: County and Equivalent Areas Shapefile (PVS_19_v2_county) H-4
Table 63: County Subdivisions Shapefile (PVS_19_v2_mcd) H-5
Table 64: Incorporated Place Shapefile (PVS_19_v2_place) H-5

INTRODUCTION

A. The Boundary and Annexation Survey

The U.S. Census Bureau conducts the Boundary and Annexation Survey (BAS) annually to collect information about selected legally defined geographic areas, such as counties (and equivalent areas), incorporated places, minor civil divisions (MCDs), federally recognized American Indian Areas (AIAs) — including reservations, off-reservation trust lands and tribal subdivisions, and Hawaiian Homelands. BAS also provides an opportunity for participants to review the names and geographic relationships for these areas. Title 13, Section 6, United States Code authorizes this survey.

The Census Bureau uses the boundary information collected during BAS to tabulate data for the decennial and economic censuses, and to support the yearly delivery of the Population Estimates Program (PEP) and the American Community Survey (ACS) data. Maintaining correct boundaries and boundary-to-feature relationships through BAS helps ensure that the Census Bureau assigns the appropriate housing and population counts to each government.

In compliance with the Office of Management and Budget Circular A-16, BAS supports the Census Bureau's spatial data steward responsibilities for the Federal Geographic Data Committee (FGDC) and the Geospatial One-Stop by updating the inventory and boundaries of governments.

In addition, BAS is the source of up-to-date information on changes to the boundaries, codes and names of incorporated places, MCDs, counties (and equivalent areas), Hawaiian Homelands, and federally recognized AIAs, which include reservations and off-reservation trust lands used by the U.S. Geological Survey (USGS), the National Map, and the Geographic Names Information System (GNIS). Please visit the BAS program website at <https://www.census.gov/programs-surveys/bas.html>.

For more information on BAS, please view the BAS video series on the Census Bureau's BAS website at <https://www.census.gov/programs-surveys/bas/library/videos.html>.

B. What's New for the 2020 BAS?

1. The Boundary Validation Program (BVP) runs in parallel with 2020 BAS. The BVP provides Tribal Chairs (TCs) and Highest Elected Officials (HEOs), for tribal, state, and local governments, the opportunity to review the Census Bureau's boundary data to ensure the Census Bureau has the correct legal boundary, name, and status information for eligible governments across the United States. For more information on the BVP, please visit the BVP website at: <https://www.census.gov/programs-surveys/bas/information/bvp.html>.

2. The 2020 BAS is the final opportunity for tribal, state, and local governments to provide legal boundary, name, and status information updates prior to 2020 Census data tabulation.

3. The Census Bureau developed a BAS Partnership Toolbox for ArcGIS users. This toolbox is designed to simplify and standardize the BAS updating process. The toolbox and additional information can be found at <https://www.census.gov/programs-surveys/bas/geographies/map-tools/arcmap-tools.html>.

C. Key Dates for BAS Respondents

January 1, 2020—Boundary updates must be legally in effect on or before this date to be reported in the current survey year and to be used for the 2020 Census data tabulations. Boundary updates effective after this date will be held until the following BAS cycle.

March 1, 2020—Boundary updates returned by this date will be reflected in the 2020 Census, the Final BVP materials, and in next year's BAS materials.

May 31, 2020—Boundary updates returned by this date will be reflected in the 2020 Census and in next year's BAS materials.

D. BAS State Agreements

The Census Bureau has established a number of agreements with states for reporting boundary changes. Please visit the BAS State Agreements webpage within the BAS program website at <https://www.census.gov/programs-surveys/bas/information/state-agreements.html> or call **1-800-972-5651** for information regarding state agreements.

Note: The Census Bureau can only establish BAS state agreements for states that require local governments to report boundary changes to a state agency.

E. Legal Disputes

If the Census Bureau discovers that an area of land is in dispute between two or more jurisdictions, the Census Bureau will not make any boundary corrections until the parties come to a written agreement or there is a documented final court decision regarding the dispute. To learn more, please contact the Census Bureau Legal Office at **1-301-763-9844**.

For disputes involving tribal areas, the Census Bureau must defer to the Office of the Solicitor at the Department of the Interior for a legal opinion. Often complicated land issues require an extended period of time for resolution, and in those cases, the Census Bureau will retain the current boundary in the database until a legal opinion is issued by the Solicitor's office.

F. Respondent Guide Organization

This guide was created for those who choose to participate in the survey using GUPS. Those using their own GIS should consult the *Boundary and Annexation Survey Tribal Respondent Guide: Digital* available on the BAS website: <https://www.census.gov/programs-surveys/bas/information/response-methods.Digital_BAS.html>. Those using paper maps should consult the *Boundary and Annexation Survey Respondent Guide: Paper* available on the BAS website:<https://www.census.gov/programs-surveys/bas/information/response-methods.Paper_BAS.html>. This guide is equipped with shortcuts to subjects that respondents may want to jump to directly. To move directly to one of these sections, click on the linked text.

This guide contains two parts:

Part 1: Provides an overview of BAS. It specifies the:

- **Process and Workflow**.
- **Reviewing BAS Data** (Information specific to the review and update of each type of geographic area).
- **Quality Control and File Submission**.
- **Submitting Files through Secure Web Incoming Module (SWIM)**).
- **Submitting Files on DVD.**

Part 2: Describes GUPS and gives step-by-step instructions (Action/*Result* in table format*)* for:

- **Requirements and Installation.**
- **How to Install GUPS**.
- **Using GUPS (Basics and Map Management)**.
- **How to Access BAS Shapefiles**.
- **Import Data from the Census Bureau's BAS Website**.
- **Download Shapefiles from the BAS Website** .
- **Download Shapefiles from the Census Bureau ftp2 Site**.
- **How to Import User-Provided Data into GUPS**.
- **Making BAS Updates in GUPS**.
- **How to Update Legal Boundaries**.
- **How to Update Linear Features**.
- **How to Update Area Landmarks and Hydrographic Areas**.
- **How to Update Point Landmarks**.
- **How to Use GUPS Review and Validation Tools**.
- **Exporting a Printable Map**.
- **Submitting Files to the Census Bureau through SWIM**.

Note: In all the Action/*Result* tables, the action is usually a command or action the participant needs to perform and the Result(s) of the action will be shown in *italics*. For example: if the participant clicks the GUPS icon on the desktop, *the software should begin to run automatically.*

PART 1: BAS OVERVIEW

SECTION 1. PROCESS AND WORKFLOW

Figure 1 below illustrates the three phases of the work to be completed for Tribal BAS. The first section in the diagram includes initial steps. The second section indicates the types of geographic data that should be reviewed and updated. The last section lists the final steps to validate and submit changes.

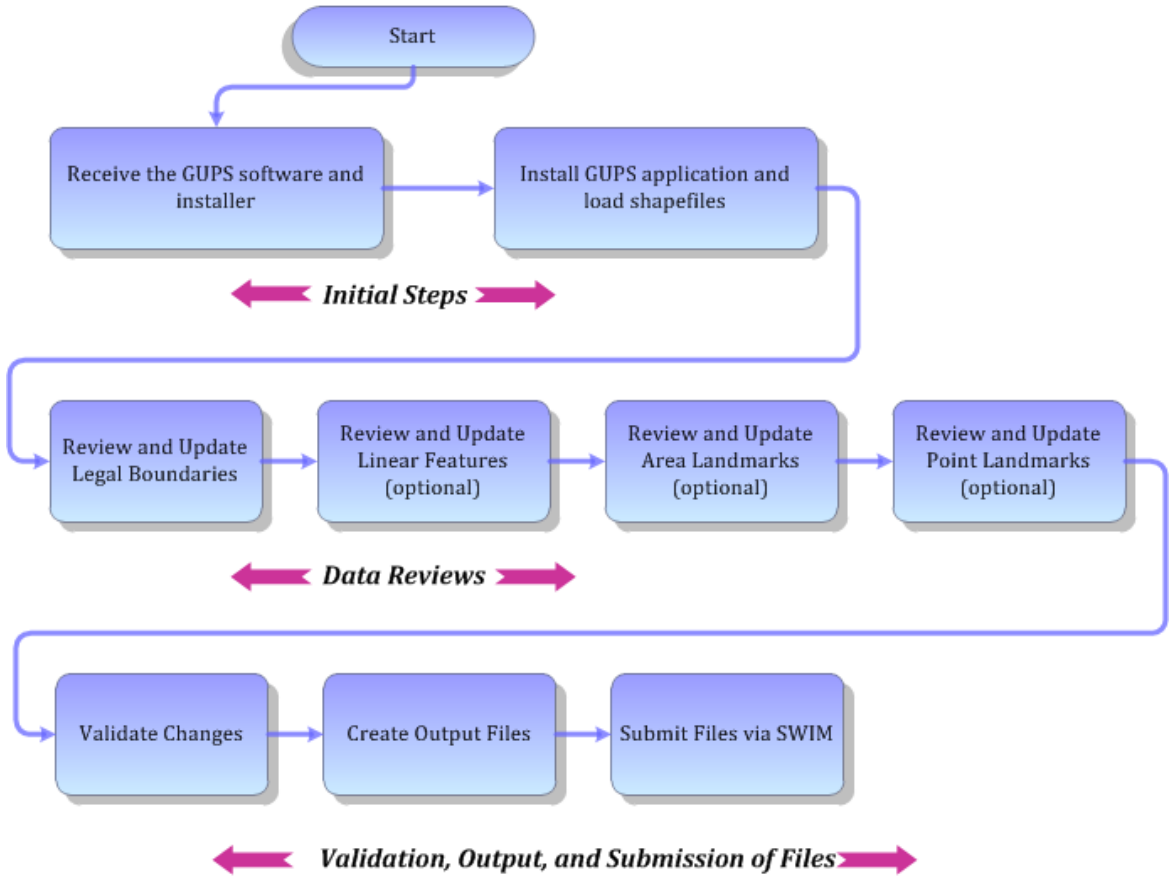


Figure 1. Tribal BAS Workflow

The sections of this guide are organized around the topical areas in the diagram and provide needed program information and procedures, as well as relevant deadlines.

See **Appendix A** for a list of contacts and helpful program links.

1.1 Receiving the GUPS Application and Shapefiles

GUPS is available for installation two ways. GUPS software is available for download directly from the BAS website <https://www.census.gov/programs-surveys/bas/technical-documentation/gups-instructions.html>. Participants can also request to receive GUPS software on DVD, which will be shipped in a package that includes a DVD containing GUPS, this respondent guide in portable document format (.pdf), and a read me text (.txt) file.

PART 1: BAS OVERVIEW

Once GUPS is installed, the BAS shapefiles can be imported from the BAS website directly to the GUPS application. Instructions on how to load data into GUPS appears in **5.2, Import Data from the Census Bureau's BAS Website**. If a participant does not have internet access, they may request shapefiles on DVD. To request a data DVD, call **1-800-972-5651** or email geo.bas@census.gov.

1.2 Getting Help

Part 2: How to Use GUPS of this guide contains directions for how to use the tools available within the GUPS application, as well as step-by-step instructions for how to carry out specific shapefile updates (e.g., additions and deletions of tribal areas, adding and deleting features and landmarks, etc.).

1.2.1 GUPS Help

Training videos for help with using GUPS are available on the BAS website <https://www.census.gov/programs-surveys/bas/library/videos.html>. In addition, a 508-compliant version of this guide is available at https://www.census.gov/programs-surveys/bas/information/respondent-guides.html.

For supplemental information on functions within GUPS that are specific to QGIS, a QGIS user's manual can be found at <http://docs.qgis.org/3.4/en/docs/user_manual/index.html>. The QGIS manual offers particularly helpful information on several activities that are touched on in this guide, but not described in detail, including working with user-provided data layers, creating search expressions for attribute tables, and creating customized coordinate systems. For questions concerning technical problems with the GUPS application, user support is available via telephone at **1-800-972-5651** and by email geo.bas@census.gov.

1.2.2 BAS Help

BAS participants may find the *Boundary and Annexation Survey (BAS) Tribal Respondent Guide: Digital* helpful. Although designed for experienced GIS users, it provides important information on geocoding, topological relationships, and spatial accuracy relevant to Census Bureau shapefiles. This guide can be downloaded at: <https://www.census.gov/programs-surveys/bas/information/response-methods.Digital_BAS.html>.

PART 1: BAS OVERVIEW

SECTION 2. REVIEWING BAS DATA

The Census Bureau requests that participants review and update all legal governments and boundaries within their reservation/trust lands/tribal subdivisions, including the additions and deletions of land area and boundary corrections. They may also update linear features and landmarks, including area landmarks, hydrographic areas, and point landmarks, although review of these is optional.

To help conduct the review, the GUPS application allows participants to import and overlay their own geospatial data layers with the Census Bureau shapefiles. Image files may be imported from web mapping services, geodatabases, and other file types. Steps to import the most common types of user-provided data are provided in **Section 5.7**, **How to Import User-Provided Data into GUPS**.

2.1 Boundary Corrections

A boundary correction is the adjustment of a boundary to correct an error in how the Census Bureau depicts an existing boundary. Boundary corrections should follow the general shape of the existing boundary. Legal documentation is not required when submitting a boundary correction to the Census Bureau.

2.2 Legal Boundary Changes

Legal boundary changes are the result of legal actions (e.g., additions), and documenting such changes is the primary goal of BAS. AIA Legal documentation (e.g., statute, federal court decision, trust deed) must accompany all AIA legal boundary changes.

2.3 Tribal Areas that can be Submitted through BAS

The following can be updated through Tribal BAS:

- **Federal American Indian Reservations** are areas that have been set aside by the United States for the use of tribes, the exterior boundaries of which are more particularly defined in the final tribal treaties, agreements, executive orders, federal statutes, secretarial orders, or judicial determinations.
- **Federal Off-Reservation Trust Lands** are areas for which the United States holds title in trust for the benefit of a tribe (tribal trust land) or for an individual American Indian (individual trust land).

Note: Trust lands may be located on or off a reservation; however, the Census Bureau tabulates data only for off-reservation trust lands. Please do not submit on-reservation trust land because the Census Bureau can only show the exterior reservation boundary. The Census Bureau does not identify fee land (or land in fee simple status) or restricted fee lands as specific geographic areas.

- **Tribal Subdivisions** are legal administrative subdivisions of federally recognized American Indian reservations and off-reservation trust lands, and are described as additions, administrative areas, areas, chapters, county districts, communities, districts, or segments. These areas are

internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations and off-reservation trust lands.

- **Hawaiian Homelands** are areas held in trust for Native Hawaiians by the state of Hawaii, pursuant to the Hawaiian Homes Commission Act of 1920, as amended.

Table 1 shows the specific changes allowed for each legal government type.

Table 1: Available Change Types by Government Type

Entity Type	Available Change Types
Hawaiian Home Land (HHL)	• New Entity • Deleted Entity • Addition • Deletion • Boundary Correction (add) • Boundary Correction (remove) • Geographic Corridor • Geographic Offset
Reservation / Trust Land	• New Entity (No Land previously. Have Reservation land and adding Trust Lands for first time, or Have Trust land and are adding Reservation for first time) • Deleted Entity (changing from Reservation to Trust land or Trust Land to Reservation) • Addition (adding to type of geography that already exists) • Deletion (Deleting a portion of Reservation or Trust Land) • Boundary Correction (add) • Boundary Correction (remove) • Geographic Offset
Tribal Subdivision	• Adding tribal subdivisions for first time • Deleting tribal subdivisions all together • Addition • Deletion • Boundary Correction (add) • Boundary Correction (remove)

2.4 Submitting Acceptable Documentation

The Census Bureau is responsible for depicting reservation and off-reservation trust land boundaries, but because the Census Bureau is not the authority on the boundaries, documentation is required to update reservation and off-reservation trust land boundaries.

The following changes require documentation:

- New off-reservation trust land.
- New reservation land.
- Changes from off-reservation trust land to reservation land and changes from reservation land to off-reservation trust land.
- Large changes to existing off-reservation trust land.

- Large changes to existing reservation land.
- Boundary corrections to off-reservation trust land or reservation land that do not follow the general shape of the boundary.

For off-reservation trust land, the most common documentation is a trust deed or a letter from the Bureau of Indian Affairs (BIA). Documents should state that the land is "in trust" for the tribe.

For reservation land, documentation examples include (but are not limited to) federal register notice, Act of Congress, Executive Order, or a new legal opinion issued by the BIA. When submitting large boundary corrections to an existing reservation, please submit the reservation document.

If no documentation is available, please contact the tribe's regional BIA office to obtain documentation. The Census Bureau will treat legal opinions issued in writing from the BIA as documentation since the BIA is the authority on reservation and off-reservation trust land boundaries. If the Census Bureau cannot interpret a document, such as a treaty, the Census Bureau will contact the BIA for assistance.

For questions about documentation, please call the Census Bureau at **1-800-972-5651** or email geo.bas@census.gov. To contact the BIA, please reach out to the nearest regional office, see <http://www.bia.gov/WhoWeAre/RegionalOffices/index.htm>.

2.5 Reviewing Linear Features

It is important that Census Bureau data reflects the most recent linear features to ensure that new or previously missed housing units located along these features are identified and located. When reviewing linear features (edges layer) on the Census Bureau shapefiles, first determine whether any features are missing or need to be deleted. Pay particular attention to areas that have experienced recent population growth or construction activities, as these are the most likely to possess new or altered linear features (e.g., new subdivisions, traffic circles converted to straight ways, or privately maintained roads that serve as public streets, but exclude private driveways).

Attribute updates (e.g., name, class code, and address ranges) may also be added for selected features. For a complete list of Master Address File and Topologically Integrated Geographic Encoding and Reference (MAF/TIGER) Feature Class Codes (MTFCC), refer to **Appendix C** .

To aid in the review of linear features, GUPS allows users to import local street centerline files, hydrography layers, imagery, and other user-provided geospatial data for reference and comparison against the Census Bureau data.

In the review, please note:

- **S1100 and S1200**—If adding road features with an MTFCC of S1100 (Primary Road) or S1200 (Secondary Road), users must supply a feature name. As is the case for all road features, the feature name should be a proper name or route number.

- **Spatial Inaccuracies**—The Census Bureau will not process the wholesale spatial realignment of features to enhance spatial accuracy. If a feature is in the incorrect location, delete the feature and add it in the correct location. Take this action only if the feature is exceedingly spatially inaccurate and/or the current location (with respect to other features and boundaries) affects the tabulation of housing units to the correct geography, such as legal governments, census tracts, and census blocks.
- **Address Range Changes**—The Census Bureau accepts address range data as part of the linear feature update layer. As with other linear feature updates, the required attributes and corresponding change type for the update must be supplied. In addition, because existing address ranges are not shown in the Census Bureau's outgoing shapefiles, it is recommended that participants only add address ranges to new features.

2.6 Reviewing Area Landmarks and Hydrographic Areas

The Census Bureau accepts updates to area landmarks and hydrographic areas in a similar manner to legal boundary changes. However, area landmarks and hydrographic areas are not legal governments, so no documentation or effective dates are required.

Allowable updates for area landmarks and hydrographic areas are:

- Add new area landmark or hydrographic area.
- Remove area landmark or hydrographic area.
- Change or add landmark name.
- Boundary corrections (add and remove area).

If ***adding*** a new area landmark or hydrographic area, please add only:

- Water bodies.
- Glaciers.
- Airports.
- Cemeteries.
- Golf courses.
- Parks.

The Census Bureau cannot add other types of area landmark/hydrographic areas to the MAF/TIGER System at this time (even though others may already exist in the database). **Table 2** shows the acceptable MTFCCs for new area landmarks or hydrographic areas.

Table 2: Acceptable MTFCCs for New Area Landmarks/Hydrographic Areas

MTFCC	Description
H2030	Lake/Pond
H2040	Reservoir
H2041	Treatment Pond
H2051	Bay/Estuary/Gulf/Sound
H2081	Glacier
C3023	Island
K1231	Hospital/Hospice/Urgent Care Facility

MTFCC	Description
K1235	Juvenile Institution
K1236	Local Jail or Detention Center
K1237	Federal Penitentiary, State Prison, or Prison Farm
K2110	Military Installation
K2180	Park
K2181	National Park Service Land
K2182	National Forest or Other Federal Land
K2183	Tribal Park, Forest, or Recreation Area
K2184	State Park, Forest, or Recreation Area
K2185	Regional Park, Forest, or Recreation Area
K2186	County Park, Forest, or Recreation Area
K2187	County Subdivision Park, Forest, or Recreation Area
K2188	Incorporated Place Park, Forest, or Recreation Area
K2189	Private Park, Forest, or Recreation Area
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)
K2424	Marina
K2540	University or College
K2457	Airport – Area Representation
K2561	Golf Course
K2582	Cemetery

Note: If adding an MTFCC K2457 (Airport – Area Representation) area landmark, please limit the updates to major airports (major regional and international airports). The feature should show the full extent of the airport facility, that is, do not limit the addition to simply the landing strips.

Area Landmark/Hydrographic Area Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating area landmark and hydrographic area changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau are working on incorporating those changes, and they will be reflected in the next year's BAS materials.

2.7 Reviewing Point Landmarks

Because many of the point landmarks contained in the Census Bureau's MAF/TIGER System originate from USGS GNIS, which is the official gazetteer of point landmark names for the Federal Government, point landmark updates are limited in BAS. The Census Bureau cannot modify any point landmark imported from the GNIS database. Thus, be aware that name changes or deletions submitted for the following types of landmarks may be left unchanged:

- K2451 (Airport or Airfield).
- K2582 (Cemetery).

- C3022 (Summit or Pillar).
- C3081 (Locale or Populated Place).

Also, due to Title 13 privacy concerns, any landmark with an MTFCC shown in **Table 3** below cannot be added to the MAF/TIGER System as a point landmark. The MAF/TIGER System no longer maintains any point landmarks with these MTFCCs. Landmarks with these codes could identify a residence or private business. Thus, it is also important *not* to add any of the point landmark types shown in the table using alternative MTFCCs.

Table 3: Restricted Point Landmark MTFCCs

MTFCC	Description
K1100	Housing Unit Location
K1121	Apartment Building or Complex
K1122	Rooming or Boarding House
K1223	Trailer Court or Mobile Home Park
K1226	Housing Facility/Dormitory for Workers
K1227	Hotel, Motel, Resort, Spa, Hostel, YMCA, or YWCA
K1228	Campground
K1229	Shelter or Mission
K1232	Halfway House/Group Home
K1233	Nursing Home, Retirement Home, or Home for the Aged
K1234	County Home or Poor Farm
K1235	Juvenile Institution
K1241	Sorority, Fraternity, or College Dormitory
K1251	Military Group Quarters
K1299	Other Group Quarters Location
K2100	Governmental
K2197	Mixed Use/Other Non-residential
K2300	Commercial Workplace
K2361	Shopping Center or Major Retail Center
K2362	Industrial Building or Industrial Park
K2363	Office Building or Office Park
K2364	Farm/Vineyard/Winery/Orchard
K2366	Other Employment Center
K2424	Marina
K2500	Other Workplace
K2564	Amusement Center

Point Landmark Changes May Be Delayed

The Census Bureau prioritizes boundary changes to legal areas to meet ACS, PEP, and BAS deadlines. Therefore, there may be delays in incorporating point landmark changes to the MAF/TIGER System. Please do not resubmit any changes that were sent during the previous year's BAS. The Census Bureau is working on incorporating those changes, and they will be reflected in the next year's BAS materials.

PART 1: BAS OVERVIEW

SECTION 3. QUALITY CONTROL AND FILE SUBMISSION

3.1 Validating Updates

Once BAS updates are complete, please conduct a review of the change polygons using the validation tools to ensure that:

1. The polygons have no unintended holes (e.g., several faces were annexed but missing a traffic circle or small pond).
2. All boundary corrections meet a minimum size threshold (very small corrections cannot be processed).

Validate Often

Validation tools in GUPS can be accessed at any time while working in the application. For best results, utilize the tools while working to identify errors early and avoid extensive rework. Steps to use the Geographic Review tool and the Review Change Polygons tool are included in **Section 6.5, How to Use GUPS Review and Validation Tools**.

3.2 Submitting Files through Secure Web Incoming Module (SWIM)

Prompt submission of updates is appreciated. It benefits the Census Bureau—allowing the BAS team to review the files early, provide feedback, and avoid backups in file processing—and the participant—guaranteeing their updates are recorded accurately and are reflected in the latest releases of Census Bureau data products.

For those with Internet access, all BAS submissions must be made via the SWIM. Due to security reasons, the Census Bureau cannot accept files sent via email or through its alternate FTP sites. For those without Internet access, see **Section 3.3, Submitting Files on DVD**.

If participants indicated on their Annual Response Form that they wished to receive or use the GUPS application, they will automatically receive the SWIM URL and a registration token via email. The email should arrive five days after the Annual Response Form is completed online (or five business days after the Census Bureau receives the paper form).

The registration token allows users to establish personal SWIM accounts. If a SWIM token does not arrive after the amount of time specified, email geo.bas@census.gov or call **1-800-972-5651**. Once registered, the token will no longer be necessary to log into the system.

PART 1: BAS OVERVIEW

Current SWIM Users

If a participant is in another Census Bureau partnership program, or participated in a previous BAS year and already has a SWIM account, they may use their current account to submit files for BAS. They do not need to set up a new account.

Note: Participants will not be able to upload a file larger than 250 MB and SWIM will block participants from uploading a zip file that contains another zip file.

For step-by-step instructions to submit files through the SWIM, refer to **Table 46**.

3.3 Submitting Files on DVD

If internet access is unavailable, please copy the ZIP file(s) to DVD for submission. The DVD should be mailed to:

U.S. Census Bureau
National Processing Center
ATTN: BAS Returns, Bldg 63E
1201 East 10th Street
Jeffersonville, IN 47132

PART 2: HOW TO USE GUPS

SECTION 4. REQUIREMENTS AND INSTALLATION

This section includes information needed to use GUPS. It offers a description of the GUPS application and gives specific instructions (in the form of Step/*Action* tables) for how to use GUPS to make BAS updates. Reminder: this guide is equipped with shortcuts to subjects that respondents may want to jump to directly. To move directly to one of these sections, click on the **linked** text.

Section 4. Requirements and Installation

- **Getting Started** - Lists the hardware and software requirements for GUPS and SWIM.
- **How to Install GUPS** - Provides instructions for installing the application.

Section 5. Using GUPS (Basics and Map Management)

- **How to Access BAS Shapefiles** - Provides instructions to load shapefiles.
- **Import Data from the Census Bureau's BAS Website**.
- **Download Shapefiles from the BAS Website** .
- **Download Shapefiles from the Census Bureau ftp2 Site**.
- **Using the GUPS Interface** - Including the Menu, Toolbars, Layers Panel or Map Legend, and the Map View area.
- **GUPS Main Page**.
- **Menu & Toolbars**- Offers instructions for using the tools available through the menu and toolbars.
- **How to Import User-Provided Data into GUPS**.
- **How to Upload User-Provided Data Layers**.
- **How to Import a Shared ZIP Shapefile**.

Section 6. Making BAS Updates in GUPS

- **How to Update Legal Boundaries** - Gives instructions to make required and optional updates in the application.
- **Adding (or Deleting) Land Area to an Existing Reservation or Existing Off-Reservation Trust Land**.
- **Make a Boundary Correction (Add Area/Remove Area)**.
- **Adding a Geographic Offset**.
- **How to Update Linear Features**.
- **How to Update Area Landmarks and Hydrographic Areas**.
- **How to Update Point Landmarks**.
- **How to Use GUPS Review and Validation Tools**.
- **Exporting a Printable Map**.

Section 7. Submitting Files to the Census Bureau through SWIM -Provides instructions to submit files to the Census Bureau through SWIM.

PART 2: HOW TO USE GUPS

4.1 Getting Started

Download GUPS from the BAS website at: <https://www.census.gov/programs-surveys/bas/technical-documentation/gups-instructions.html>. If the GUPS package was requested, it should include a DVD containing the GUPS software, respondent guides, and a readme text file.

Before beginning the installation, check that the computer has the capabilities needed to run GUPS (using **Table 4**).

GUPS is based on QGIS (formerly known as Quantum GIS), a free and open-source desktop geographic information system application. To learn more about QGIS, visit their website at <http://www.qgis.org/en/site/>. The GUPS application was developed for use in a desktop PC or a network environment.

Table 4 lists the hardware and software requirements to install and run GUPS. Also included are the software requirements to submit files through the SWIM website.

Table 4: GUPS Hardware and Software Requirements

Hardware	Operating System	Browser
Disk Space Needed to Run GUPS: 4 GB ***Disk Space Needed to Store Shapefiles:*** Shapefile sizes vary. To view the size of the shapefiles, right-click, and choose **Properties** in the drop-down menu. *The **Files Properties** box opens and displays the folder size.* Select multiple files/folders in the list to view their properties via the same method. **RAM:** 4 GB minimum, 8 GB or more recommended for optimal performance.	**Windows®:** To run GUPS, Windows users need one of the following operating systems: • Windows 7® • Windows 8® • Windows 10® ***Apple®:*** Mac OS X® users must secure a license for Microsoft Windows and use a Windows bridge. The suggested bridge software is Boot Camp®, which comes pre-installed on all Mac computers. Locate instructions for using Boot Camp at: <https://www.apple.com/support/bootcamp/getstarted/>. **IMPORTANT:** Since Boot Camp requires a restart of the computer to set up the bridge, be sure to print the instructions provided at the URL above before beginning installation.	**SWIM runs on the two most recent versions of each of these major browsers:** • Internet Explorer® • Google Chrome® • Mozilla Firefox® • Apple Safari®

Depending on the Windows OS version, the GUPS dialog boxes may have a different appearance than the screenshots contained in the user guide, although the content is the same.

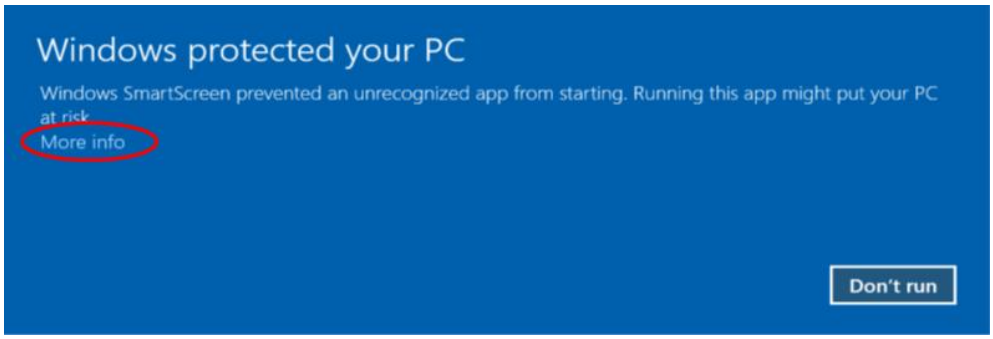
Note: GUPS continues to evolve through updates and revisions. As a result, some discrepancies between the appearance of individual screens or buttons in this guide may differ from the actual software received with the feedback materials. Other variations in color or styles may also exist.

PART 2: HOW TO USE GUPS

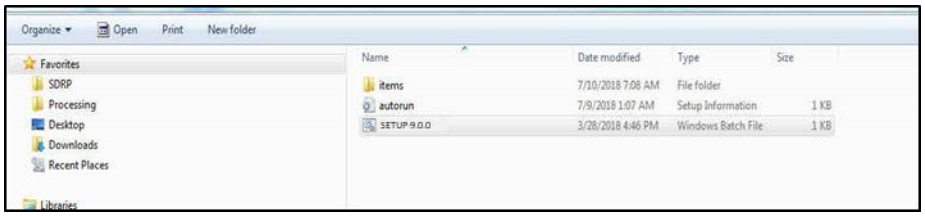
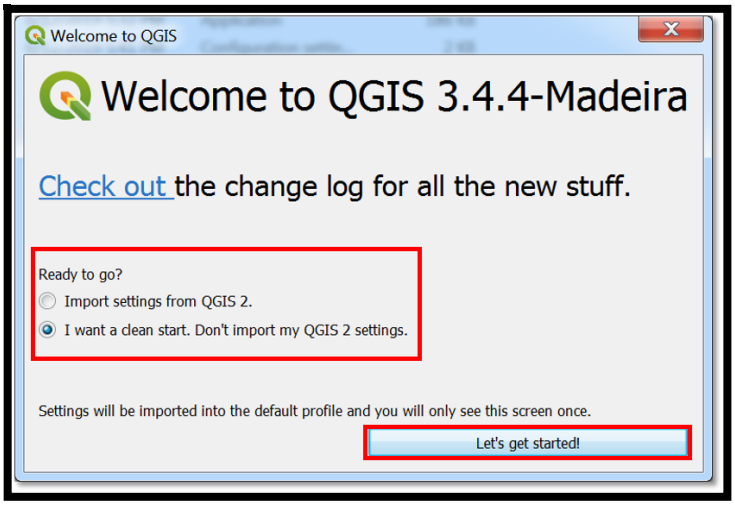
4.2 How to Install GUPS

To install the GUPS application users must have Administrator privileges for their computer. If a version of GUPS is already installed, please check that it is the latest version. Go to the **GUPS** tab and select the **About GUPS** option in the drop-down menu to find the GUPS version number. If it is not GUPS Version 10.17.04-0 or later, download the most recent version and follow the setup instructions. Alternatively, compare the currently installed version with the one provided on the Census Bureau's installation DVD to ensure the latest version. To complete the installation, follow the steps in **Table 5**.

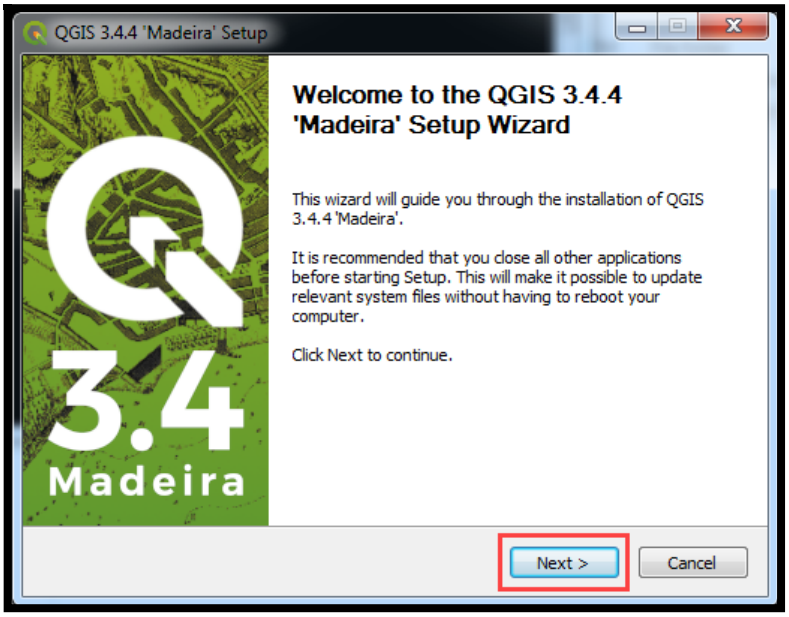
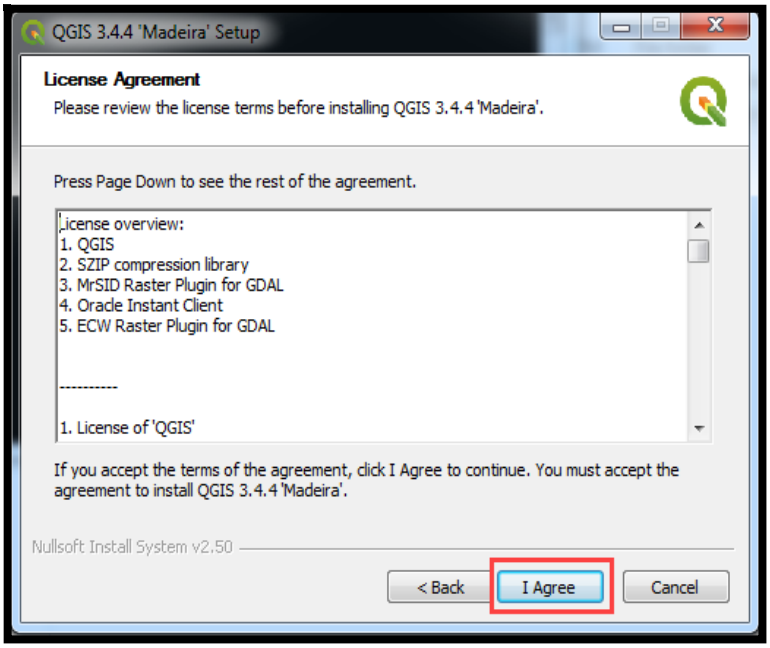
Table 5: Install the GUPS Application

Step	Action and *Result*
Step 1	Click the direct download link <https://www2.census.gov/geo/pvs/gups/gups.zip> or place the installation DVD into the computer's DVD drive. *For some users, a **Windows protected your PC** pop-up box may appear.*  To continue, click '**More info**', then select '**Run anyway?**'.
Step 2	Other users may receive a user account control pop-up that asks, "Do you want to run this file?", "Do you want to allow the following program from an unknown publisher to make changes to this computer?", or a similar query. See an example below. If this pop-up occurs, click Run, Yes, Allow, or an option that allows the installation to proceed. *The software should begin to run automatically.*

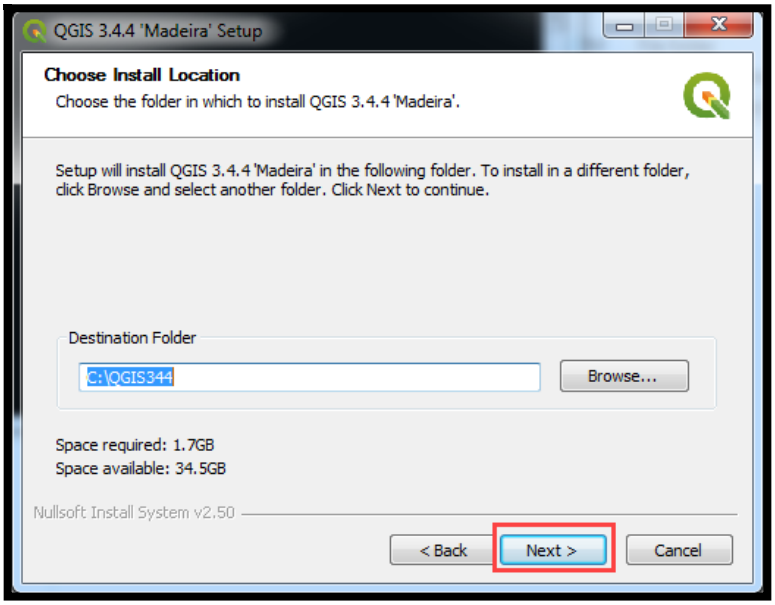
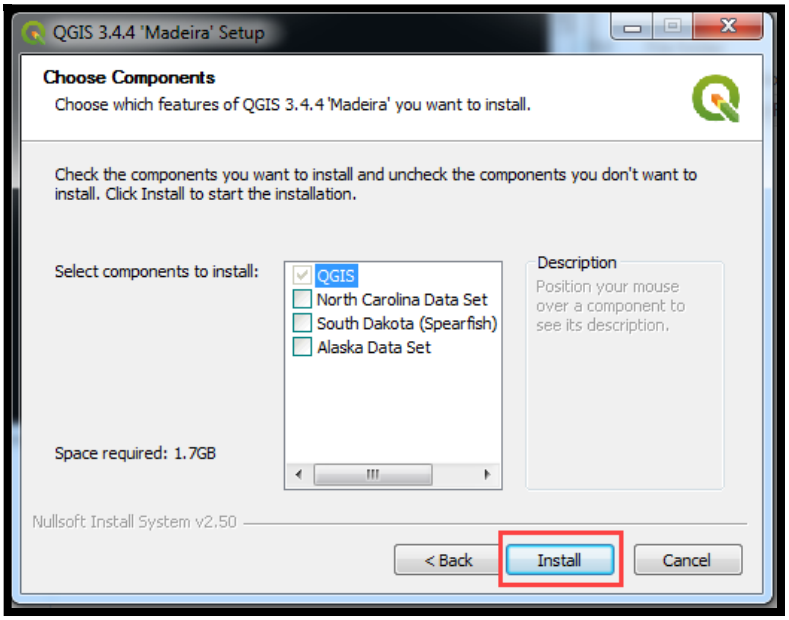
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	If the software does not run automatically, open Windows Explorer, navigate to the DVD drive, and double-click on the file named ***Setup-10.0.x.x.bat***. **Note:** The name of this file may vary slightly, but it will be the only setup **.bat** file available.  If the software still does not run properly, contact the local System Administrator for assistance.
Step 4	A ***Welcome to QGIS 3.4.4-Madeira*** window pops up allowing users to import previous settings used into the default profile. Users may choose to import their settings or to have a clean start. Select the desired options and click "Let's get started".  Before proceeding, close all other programs or applications. Once other programs and applications are closed, click the **Next** button.

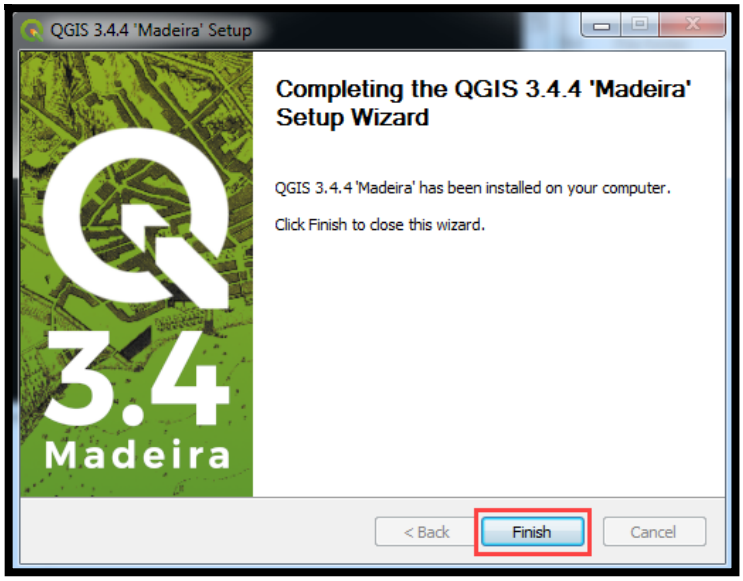
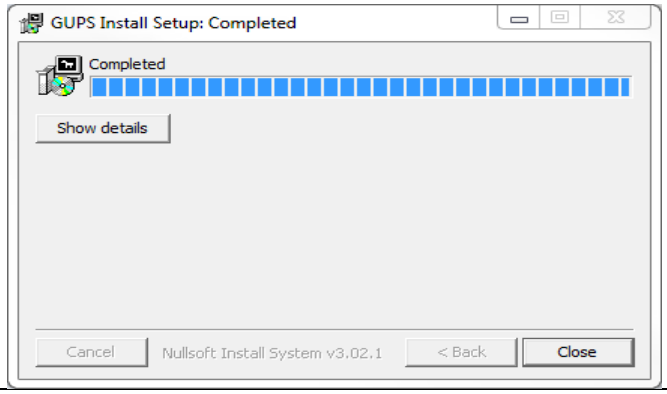
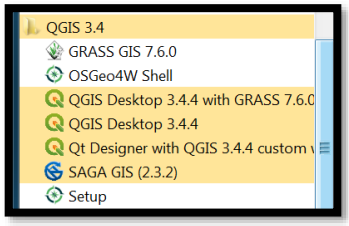
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	*When the installer opens, the **Welcome to the QGIS Setup Wizard** screen appears.*  **Note**: The version needed for2020 BAS is QGIS 3.f4.4 Madeira. If the exact same version of QGIS exists on the computer, an instruction to uninstall and reinstall appears. Participants may retain other versions of QGIS that may be in use for other programs, but must reinstall if the same version exists on the computer to ensure installation of the latest update. Before proceeding with installation, close all other programs or applications. Once other programs and applications are closed, click the **Next** button.
Step 6	*The **License Agreement** screen appears.*  Read the **License Agreement** and click the **I Agree** button to continue.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	*The **Choose Install Location** screen opens.* It is recommended to install the application at the default: (i.e., C:\Program files\QGISGUPS). Otherwise, use the **Browse** button to navigate to a preferred location.  The Browse button on this screen allows participants to browse the local computer for an installation location. The Census Bureau recommends the installation of the GUPS application to the default location: (e.g., C:\QGIS344) to prevent installation errors or issues. To begin the installation, click the **Next** button.
Step 8	*The **Choose Components** screen opens*.  '☑QGIS' in the **Select components to install** field is checked and grayed out since it is the default. Simply click **Install** to continue.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	To review a previous page or reread the license agreement, click the **Back** button (each screen contains this button). *This returns the screen to the previous page*.
Step 9	The software should take between 5 and 10 minutes to install. *When it is finished, the **Completing the QGIS GUPS Setup Wizard** screen opens.*  Click the **Finish** button.
Step 10	*The **GUPS Install Setup: Completed** screen opens showing the status of the installation of GUPS.* When completed, click the **Close** button on the following screen. 
Step 11	To complete the installation, click the **Close** button at the bottom of the **GUPS Install Setup: Completed Setup Wizard** screen. *Once the application installs, QGIS will be added to the All Programs Start Menu list.* 

PART 2: HOW TO USE GUPS

SECTION 5. USING GUPS (BASICS AND MAP MANAGEMENT)

After successfully installing GUPS, participants are ready to start their Tribal BAS updates. There are three ways to retrieve shapefiles when starting a new project:

- From the Census website (loads directly into GUPS).
- From DVD (if one was requested).
- From My Computer (if the files have been downloaded to the hard drive).

Table 6 shows the steps to open GUPS and start a new project using the Census Bureau website. **Table 7** shows the same steps to open GUPS, but starts a new project using the Census Bureau provided DVD or My Computer (downloaded Census shapefiles saved to the hard drive).

5.1 How to Access BAS Shapefiles

BAS shapefiles from the BAS website can be pulled directly into the application when working in GUPS by choosing the Census Web option during project setup. Users can load the shapefiles as needed or load multiple county files at once. This is the preferred method for loading the Census Bureau's BAS shapefiles into GUPS as it ensures that required files are placed in the correct location for the application to access.

Another option for loading files is to download the shapefiles from the BAS website (or from the Census Bureau ftp2 site), then import them into GUPS. BAS shapefiles are available for download from the BAS website here: <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html>. Instructions for how to download Census Bureau shapefiles appear in **Table 6** and **Table 7**. Downloading files to the hard drive is not the preferred method when working in GUPS, and should be used only when necessary (e.g., if additional data layers that GUPS does not automatically load need to be pulled in as user-provided data).

If the shapefiles were received as part of the GUPS package on a DVD, the files can be loaded directly into GUPS from the DVD. Instructions for how to load shapefiles are contained in **Table 6.**

Whether the files are pulled from the BAS website or from the DVD, the GUPS application unzips them and places them into a pre-established folder created on the computer's home directory during the installation process (C:\GUPSGIS\gupsdata\BAS2020\shape). It then displays them in the application and manages the files. There is no need to take any further action.

> ***CAUTION!***
> Regardless of the source of the shapefiles, it is important **NOT TO CHANGE** any shapefile or folder name. The files and folders must have the ***exact*** names given for the GUPS application to recognize and load them.

PART 2: HOW TO USE GUPS

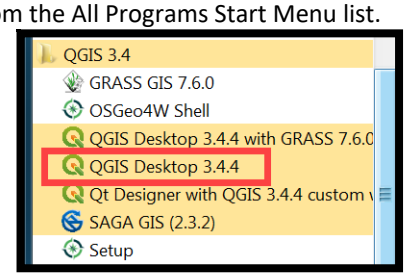
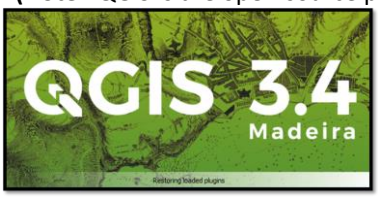
5.2 Import Data from the Census Bureau's BAS Website

To open the GUPS application and begin Tribal BAS updates, follow the steps in **Table 6**. Before beginning, note that:

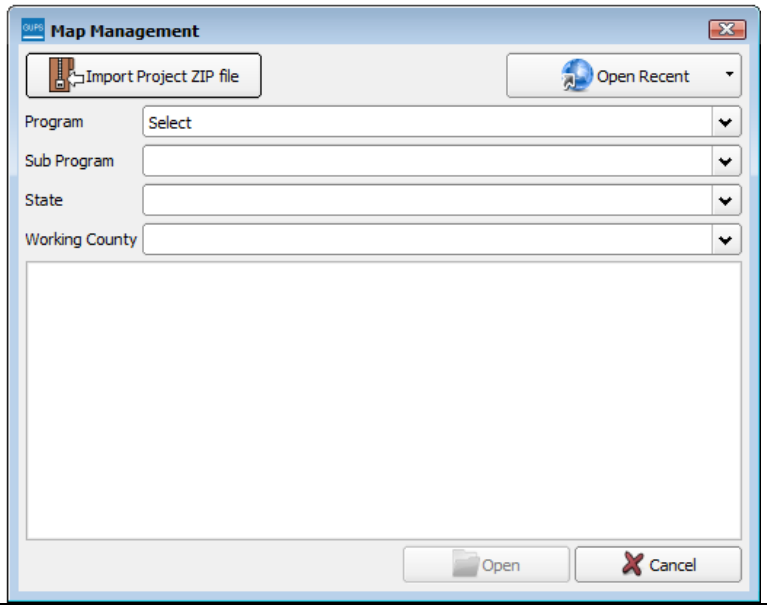
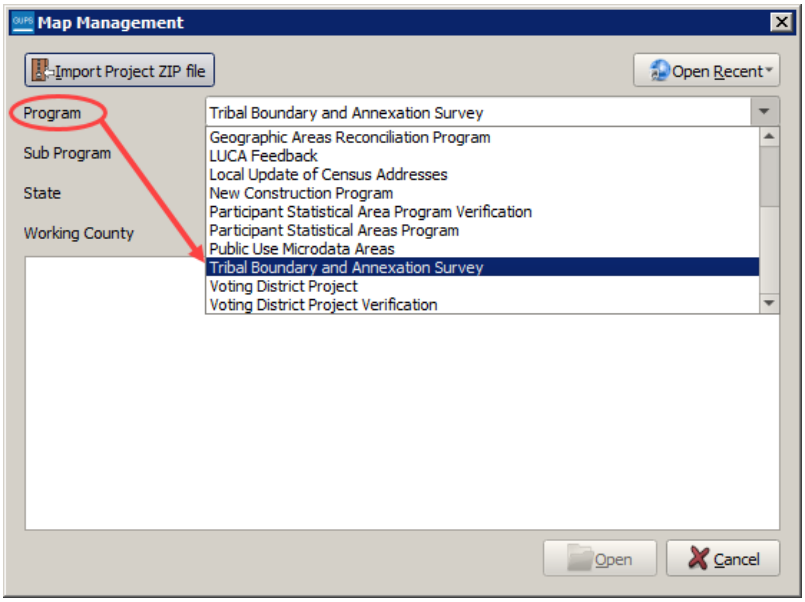
1. To practice using GUPS without committing the changes made, simply exit the system without saving. Before the system closes, it will give the option to discard the changes.
2. If comfortable with the system, but not all changes are completed in one session, simply save the changes, then close the system. When opening GUPS later, reopen the project and continue working.

Note: In all the Action/*Result* tables, the action is usually a command or action to be performed and the *Result(s)* of the action will be shown in italics. For example: click the QGIS icon on the desktop, *the software should begin to run automatically*.

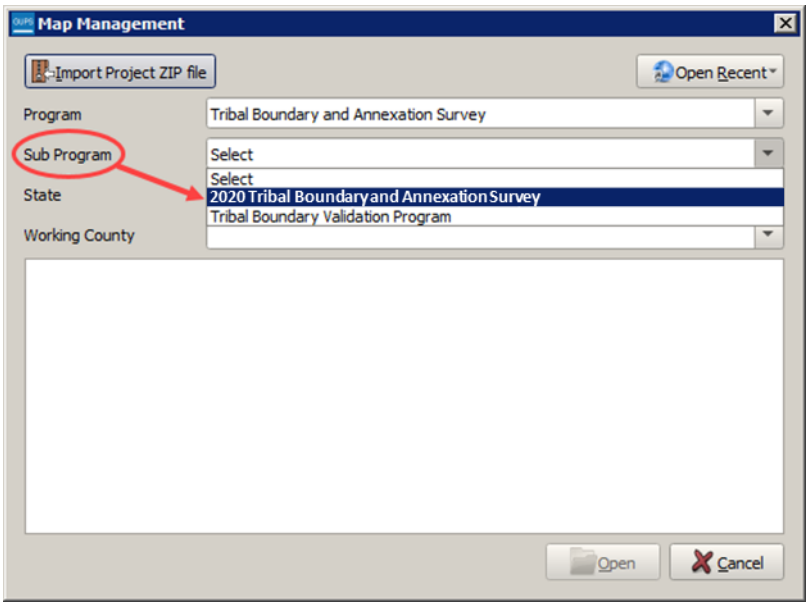
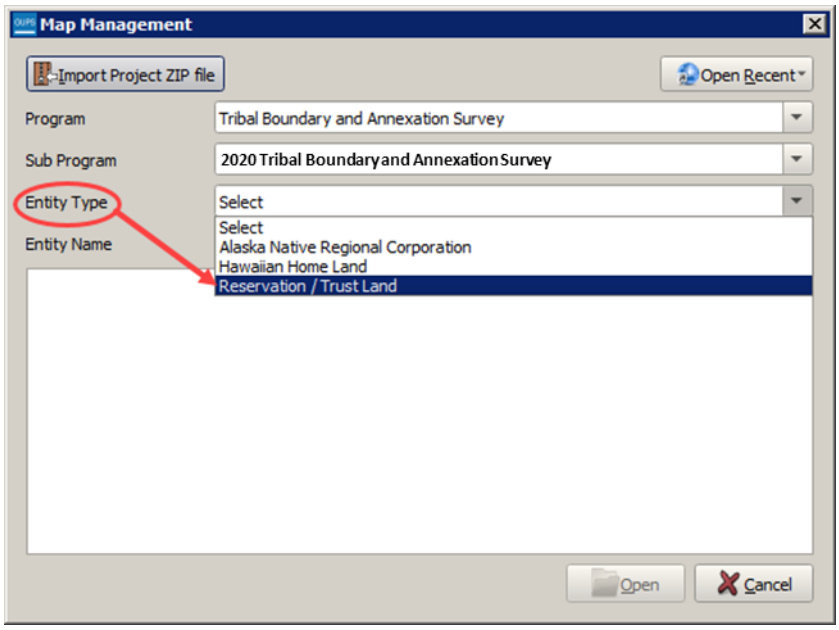
Table 6: Start a New Project Using Shapefiles from the BAS Website

Step	Action and *Result*
Step 1	Select **QGIS Desktop** 3.4.4 from the All Programs Start Menu list.  *The QGIS splash screen appears*. **(Note:** QGIS is the open-source platform for building GUPS.) 
Step 2	Wait until the application loads (this may require a few minutes on older computers). *When the GUPS application has loaded, the GUPS main page opens and the QGIS Tips! box appears*. **Note:** Since GUPS was built on the QGIS open-source platform, there may be references to QGIS in several locations within the GUPS application.

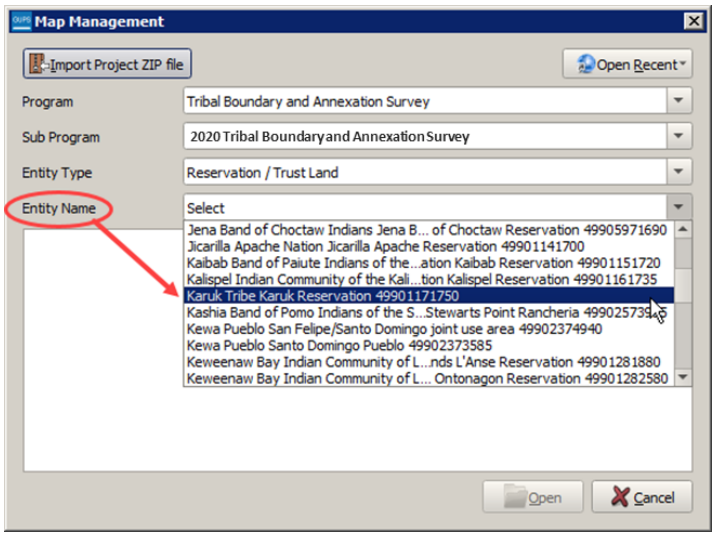
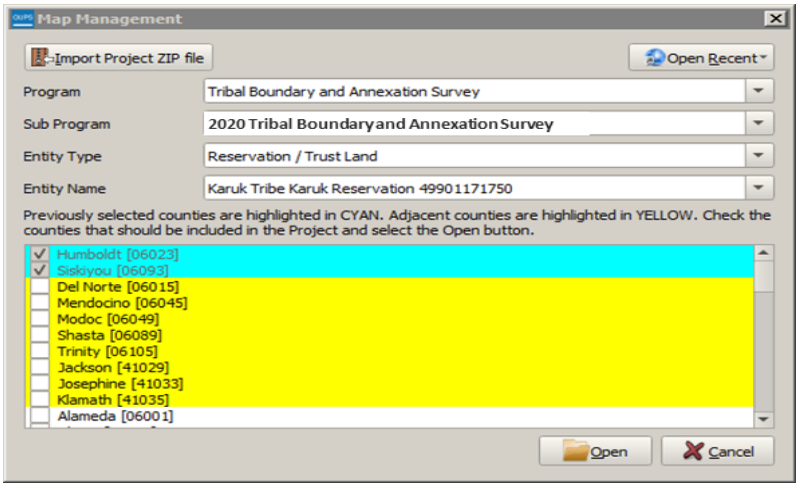
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	To view QGIS system tips, click the **Next** button to read the first tip. Thereafter use the **Previous** and **Next** buttons to navigate within tips. To no longer see tips on startup, click the checkbox in the bottom left-hand corner that reads 'I've had enough tips, don't show this on start up any more!'
Step 4	To begin a GUPS project, close the **QGIS Tips! box** by clicking the **OK** button. *The box closes and the **Map Management** dialog box opens, as shown below.* 
Step 5	In the **Map Management** dialog box, use the drop-down menu next to the **Program** field to select the program, **'Tribal Boundary and Annexation Survey'**. '*Tribal Boundary and Annexation Survey' populates the field*. 

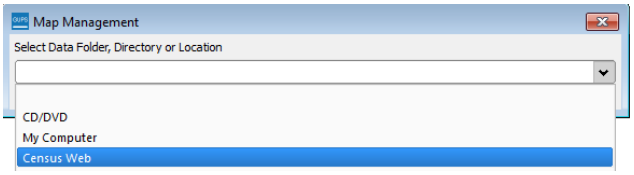
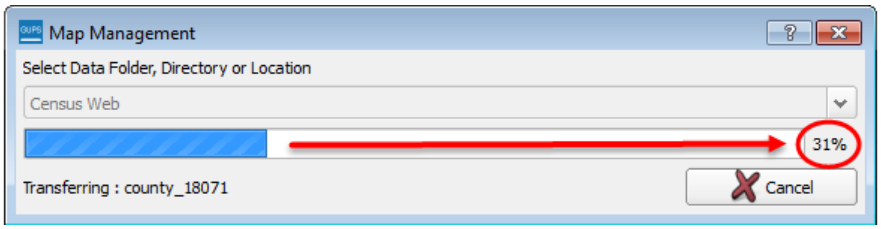
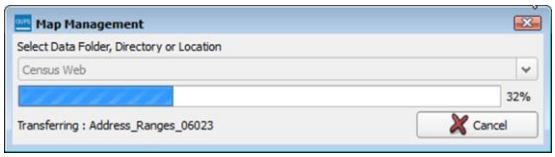
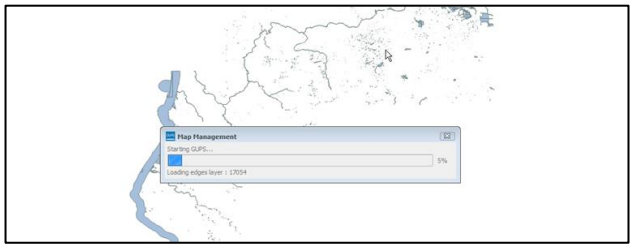
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 6	In the **Sub Program** field, select '**Tribal Boundary and Annexation Survey**'. 
Step 7	In the **Entity Type** field drop-down menu, select the entity type represented by this submission. The options are 'Alaska Native Regional Corporation', 'Hawaiian Homeland', and Reservation/Trust Land'.  This example uses Reservation/Trust Land.

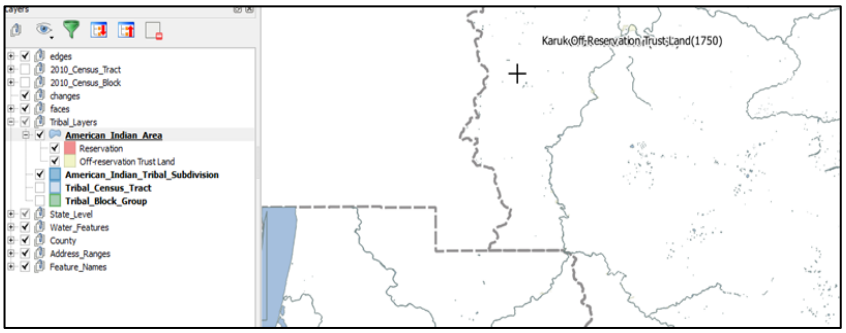
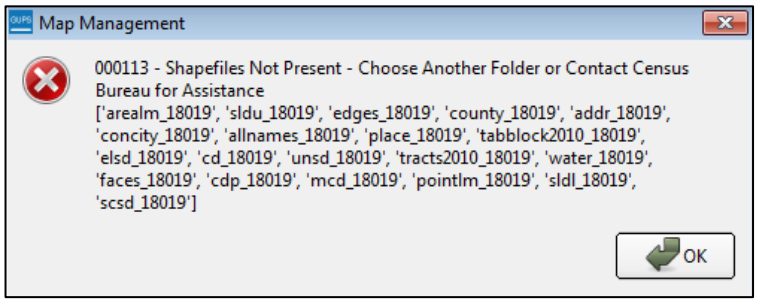
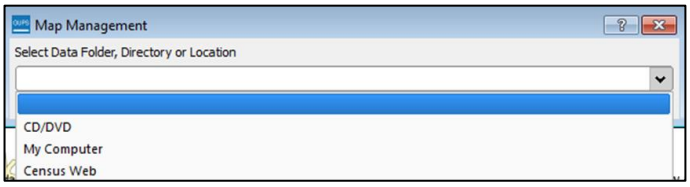
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 8	Next, select the **Entity Name** field drop-down. Since the entity type '**Reservation/Trust Land**' was selected GUPS automatically provides a list of the **Reservations and Off-Reservation Trust Lands**. The scroll bar to the right allows users to move up and down the list of reservations/trust lands. 
Step 9	Once the entity is selected from the drop-down menu, *the Map Management screen will provide users with a list of counties. The counties in which the selected entity already exists will be at the top of the list and their corresponding check boxes will be 'checked'. Adjacent counties (counties whose borders touch the automatically selected county or counties) are highlighted in **YELLOW**. Any previously selected counties will be highlighted in **CYAN**.* All checked counties will display in the **Map View**. Uncheck the box for any counties that do not need to be seen. To select additional counties to display (users may choose up to a **total of 10** at once), check the checkboxes next to them. Scroll down using the scroll bar to the right to see the full list of counties. 

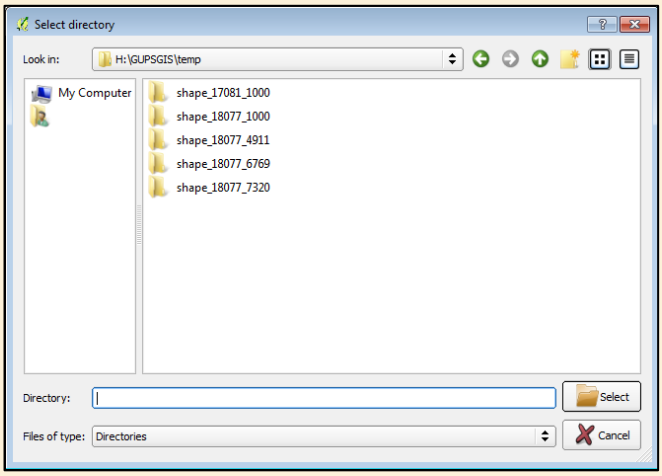
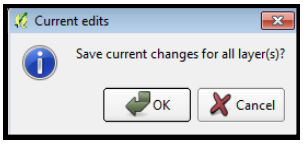
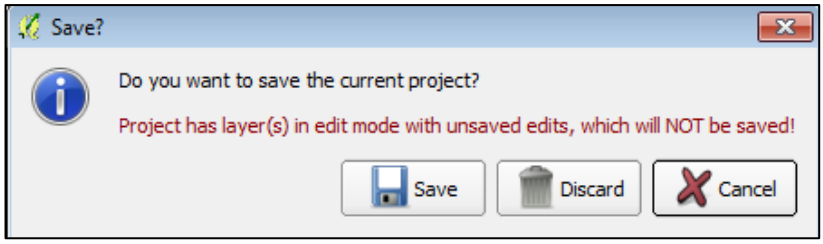
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 10	After selecting the working county or counties, GUPS asks to specify the location from which to pull the county's (or county equivalent's) shapefile. *The **Select Data Folder, Directory or Location** box opens*.
Step 11	In the **Select Data Folder, Directory or Location** box drop-down menu, select the location from which to pull the file. This example assumes the user is pulling the data from the BAS website, so click on **Census Web** in the drop-down menu. 
Step 12	When **Census Web** is chosen, *the shapefile for the county begins to load and progress is displayed by a blue striped bar (color may vary), with the percentage of the upload completed displayed to the right.* 
Step 13	As GUPS loads the data, it unzips and copies the files to a folder that in the home directory created during the installation process. The data is then loaded into the GUPS application.  

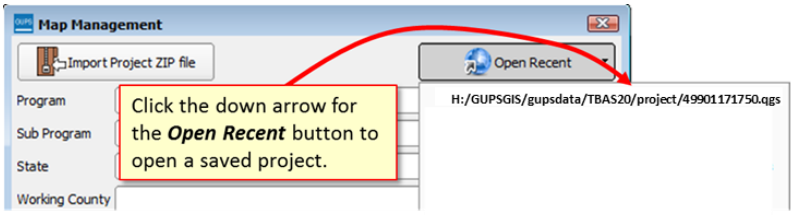
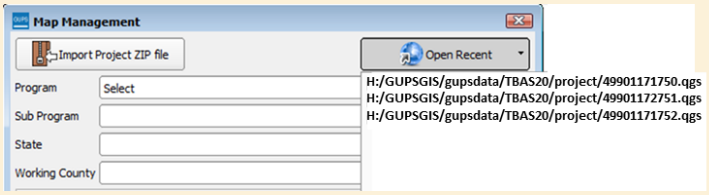
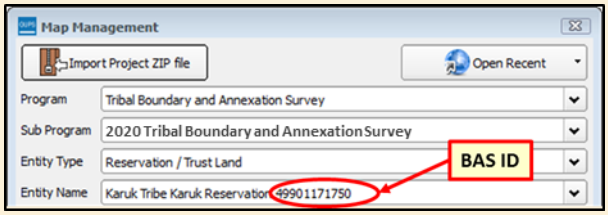
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 14	It then pulls the file into the GUPS application. 
Step 15	If for any reason shapefiles are missing from the location chosen in the **Select Data Folder, Directory or Location** drop-down menu, or the files are corrupted and cannot be loaded, an error message will display. 
Step 16	Click **OK** to return to the **Map Management** dialog box.
Step 17	Try loading the file(s) from another location. After reopening map management, reselect the desired working county and pick another option for loading the files. 
	If loading shapefiles using the 'Census Web' and 'CD/DVD' options is not successful, follow the instructions in **Table 7** or **Table 8.** Table 8 to download the files to the computer from the BAS website or Census Bureau's ftp2 site. Then pull them into GUPS using the 'My Computer' option in the **Select Data Folder, Directory or Location** drop-down menu. *When 'My Computer' is selected the **Select directory** screen opens*.

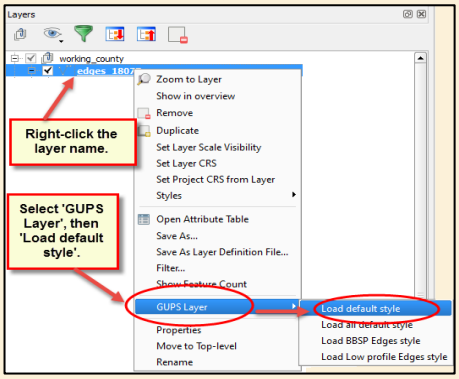
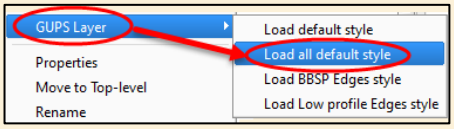
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	 On this screen, click on the **My Computer** icon in the left-hand corner. Navigate to the location of the files to be loaded, then select the files and click on the **Select** button at the bottom of the **Select directory** screen. *GUPS unzips and loads the files, then moves them to the pre-established folder on the home directory*.
Step 18	After working on a project, be sure to save before exiting. Otherwise the edits will be lost. To save, click the **Save** icon on the **Standard toolbar**. *The **Current edits** pop-up box asks to save the changes for all layers.*  Click **OK**. *The changes are saved*.
Step 19	Close the application to discard any changes (click the red X in the upper right-hand corner of the main GUPS page). *A **Save?** pop-up warning asks "Do you want to save the current project?"*  Click **Discard** to not save the current project.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 20	To reopen a saved project, in the **Map Management** dialog box, click the down arrow next to the **Open Recent** button. *The drop-down menu opens with a list of current projects.* 
	If sharing a computer with other GUPS users, multiple project files may appear in the drop-down menu, as shown below. Here three separate users in Karuk Reservation have created projects on the same computer.  To identify which of the entries in the list represents the project, look at its number string. This string comprises the BAS ID. Each BAS ID is 11 digits. The first digit indicates the Entity Type (i.e., the user type) (4 = American Indian Area). The next two digits are the state FIPS code and 99 is what BAS uses for all AIAs since they can cross state lines. The following four digits are the TR code (the tribe code). The final four digits are the AIANNHCE/TA Code (the tribal area code). The number string, 49901171750.qgs reflects a project created by the Karuk Tribal participant, where 4 = American Indian Area; 99 = state FIPS code used for tribal areas; 0117 = code for Karuk Tribe; and 1750 = Karuk Reservation/Trust Land. The BAS ID information for a particular geography is available within the **Map Management** dialog box. Below is an example for Karuk Tribe Karuk Reservation. 
Step 21	After identifying the correct file to reopen, select it from the list. *The map for the project automatically loads and the layers show in the **Layers Panel.***
	Census Bureau-defined default layers and view settings are loaded each time a new project is started in GUPS. If these default settings have been changed and then are saved during a project, reopening the project will load these saved changes rather than the Census Bureau-defined default layers and view setting.

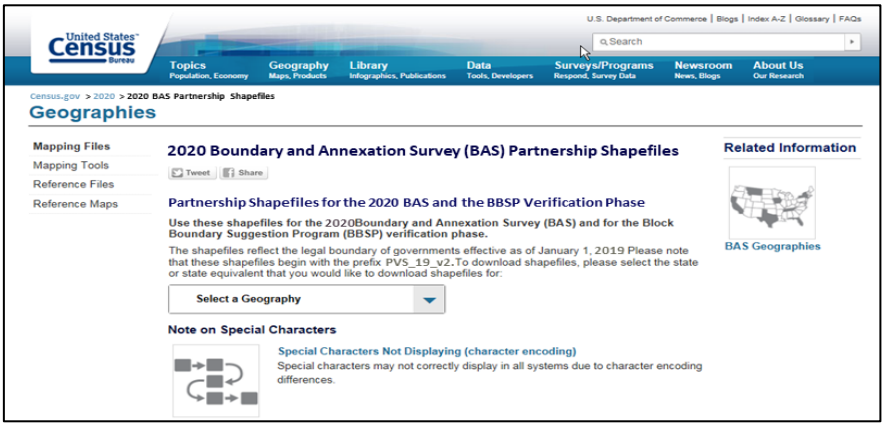
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	To restore the default settings for a layer: • Click on the layer in the **Layers Panel.** *A drop-down menu opens*. • In the drop-down menu, select '**GUPS Layer**'. *A submenu opens*. • In the submenu, select '**Load default style**' (see illustration below).  To reset the default settings for all layers, select '**Load all default style.**' 

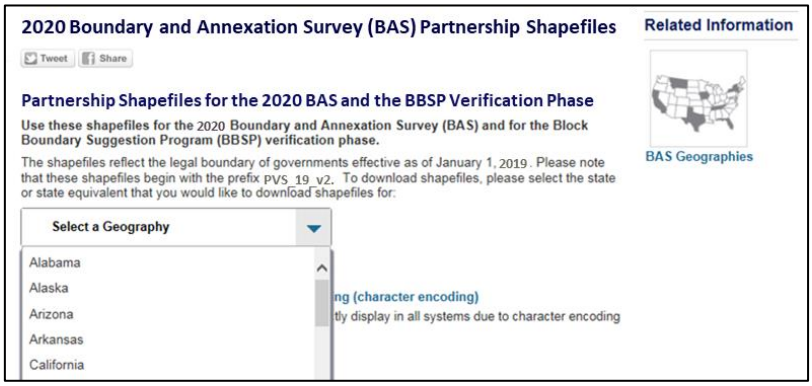
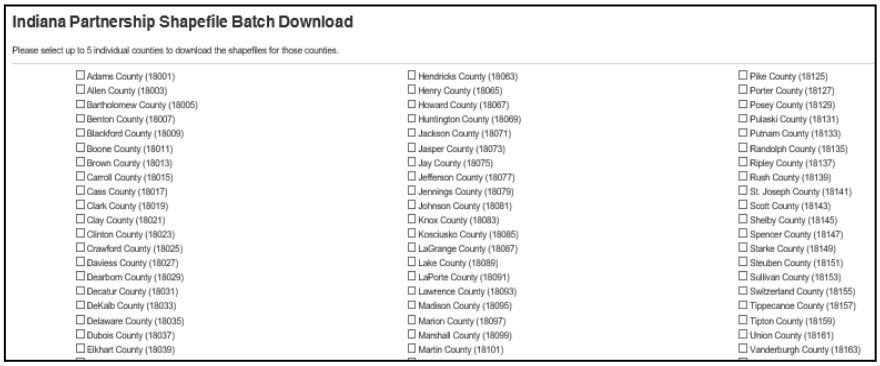
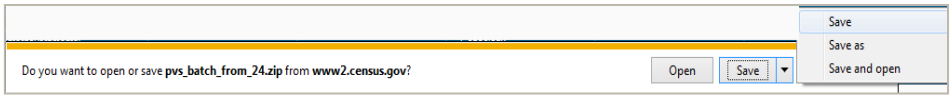
5.3 Download Shapefiles from the BAS Website

Follow the steps in **Table 7** to download the files from the BAS website to the hard drive. Please note that images may vary slightly as website updates are made after this document is published.

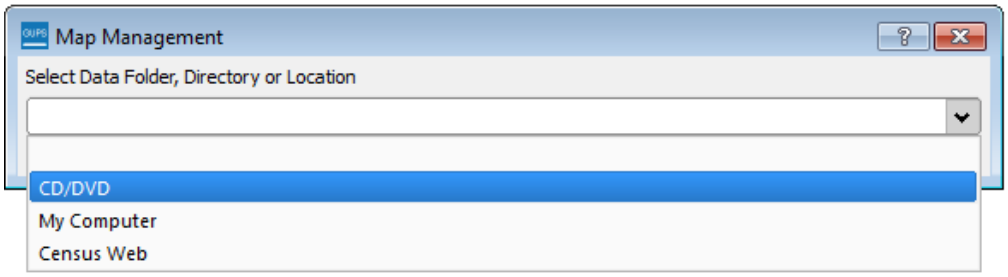
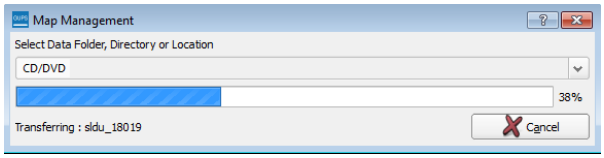
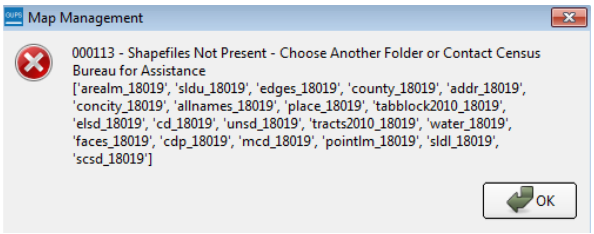
Table 7: Download Shapefiles from the BAS Website to a Hard Drive

Step	Action and *Result*
Step 1	Enter the URL <https://www.census.gov/geographies/mapping-files/2020/geo/bas/2020-bas-shapefiles.html> into the Internet browser. *The **Boundary and Annexation Survey (BAS) Partnership Shapefiles** page opens*. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Under '2020 Partnership Shapefiles', in the '**Select a Geography**' drop-down box, select the name of the state in which the entity is located from the drop-down list. *The **[State Name] Partnership Shapefile Batch Download** page opens*. 
Step 3	To select the county(ies) or county equivalent(s) needed, click the box next to it. Select up to five (5) counties at a time as needed. Once the necessary counties are selected, hit the **Submit** button at the bottom left hand side of the page.  *A prompt to save the file(s) appears*. 
Step 4	Click the down arrow next to **Save** and select 'Save As' in the drop-down list. *The **Save As** dialog box appears, with the file appearing in the **File Name** field. If more than one county was selected, a single ZIP file containing the selected counties is saved*.
Step 5	In the **Save As** dialog box, select a location on the home directory to save the files.
Step 6	Click the **Save** button. *The file(s) are saved in the selected location*.
Step 7	To obtain shapefiles for additional counties, repeat the download process as needed.

PART 2: HOW TO USE GUPS

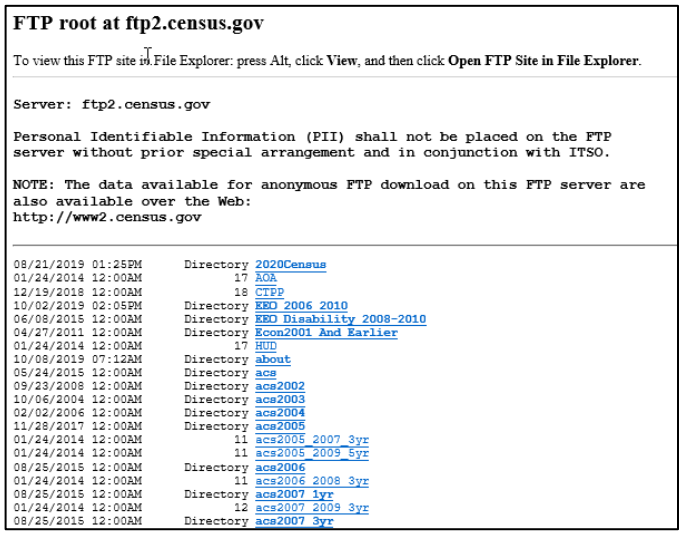
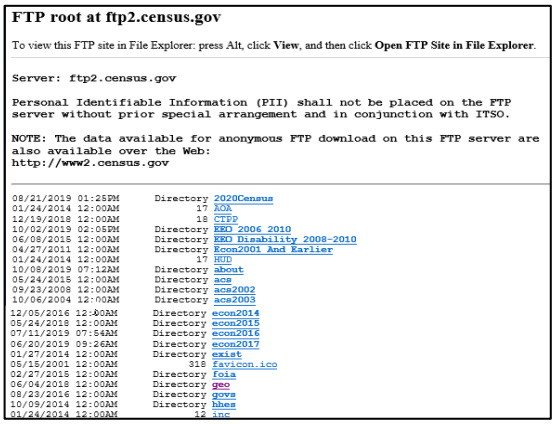
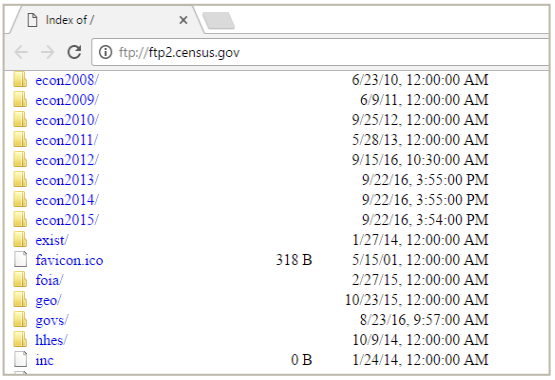
Step	Action and *Result*
Step 8	When the geography is selected in GUPS, the application asks to specify the location ('CD/DVD', 'My Computer', or 'Census Web') of the files. When a selection is made, GUPS asks to select a directory. Navigate to the location where the files were saved and select those to be uploaded. *GUPS unzips and loads the files, then moves them to the pre-established folder in the home directory*.
Step 9	When the **Select Data Folder, Directory or Location** box opens, use the drop-down menu to select the location from which to pull the shapefiles. In this instance, **this example loads them from a Census Bureau-provided DVD**. To do so, insert the DVD into the DVD drive, then select 'CD/DVD', as shown below.  *The files for Clark and Jennings Counties begin to load and progress is displayed by the blue striped bar (color may vary), with the progress percentage noted to the right.* 
Step 10	If for any reason shapefiles are missing from the location chosen in the **Select Data Folder, Directory or Location** drop-down menu, or the files are corrupted and cannot be loaded, an error message will display. 

5.4 Download Shapefiles from the Census Bureau ftp2 Site

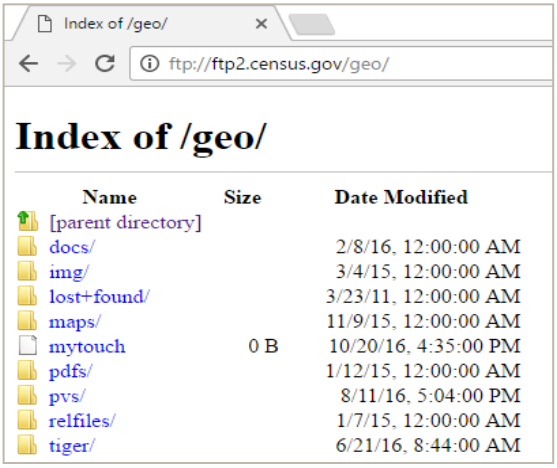
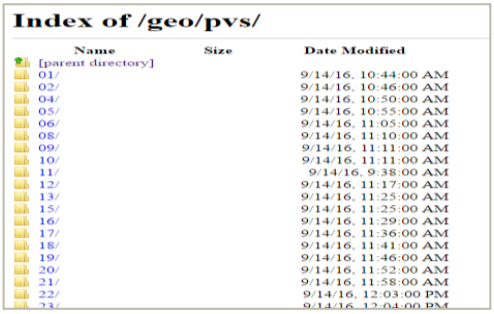
If using GUPS at the state level, or if downloading shapefiles for several counties at one time, follow the steps in **Table 8**.

PART 2: HOW TO USE GUPS

Table 8: Download Shapefiles from ftp2 Site to a Hard Drive (State Users)

Step	Action and *Result*
Step 1	Using Internet Explorer (IE) or another web browser navigate to <ftp://ftp2.census.gov/>. *The **FTP root at ftp2.census.gov** main page opens.* 
Step 2	Press '**Alt**' and click the '**View**' tab on the browser menu and select "**Open FTP site in File Explorer**" to open the Census Bureau FTP site in Windows Explorer (sometimes called file explorer). If using Windows Explorer to access the ftp2 site, no login information is required.  

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	After the Census Bureau FTP site has been opened in file explorer, click the '**geo**' folder. 
Step 4	Within the '**geo**' folder, click the '**pvs**' folder (**p**artnership **v**erification **f**iles). 
Step 5	Select the state folder that contains the county or counties for which data is downloading. The state folders are represented using two-digit state FIPS codes.
Step 6	There are several sets of shapefiles within each state directory. Download the most recent partnership shapefiles. These shapefiles are contained within a zip file with the prefix **partnership_shapefiles_19v2.** Each zip file ends with a five-digit state-county FIPS code (e.g., 08051) which represents the county for which the data is downloading. **Make sure to choose the filename with "19v2", because the "19v1" files are sometimes also available in the folders**.
Step 7	Select the county or counties that are to be downloaded to the local drive. These files may be copied to any desired location. When selecting a geography in GUPS, the application asks to specify the location ('CD/DVD', 'My Computer', or 'Census Web') of the files. When 'My Computer' is selected, GUPS asks to select a directory. Navigate to the location where the files will be saved and select those that are to be uploaded. *GUPS unzips and loads the files, then moves them to the pre-established folder on the home directory*.
	If using an FTP client software such as winscp or FileZilla (or other) <ftp://ftp2.census.gov/> may be connected to without a password. Participants should enter 'anonymous' as the user name and their email address as the password.

PART 2: HOW TO USE GUPS

5.5 Using the GUPS Interface

5.5.1 GUPS Main Page

Figure 2 shows the layout of the main GUPS page. This page contains all the tools needed for making BAS updates. All work is completed from this page. Shown in the figure are the main page elements.

These include the:

1. Menu.
2. Layers Panel.
3. Map View (where the data display).
4. Toolbars (Standard toolbar, BAS toolbar, and Add Layers toolbar).
5. Status Bar (at bottom of page).

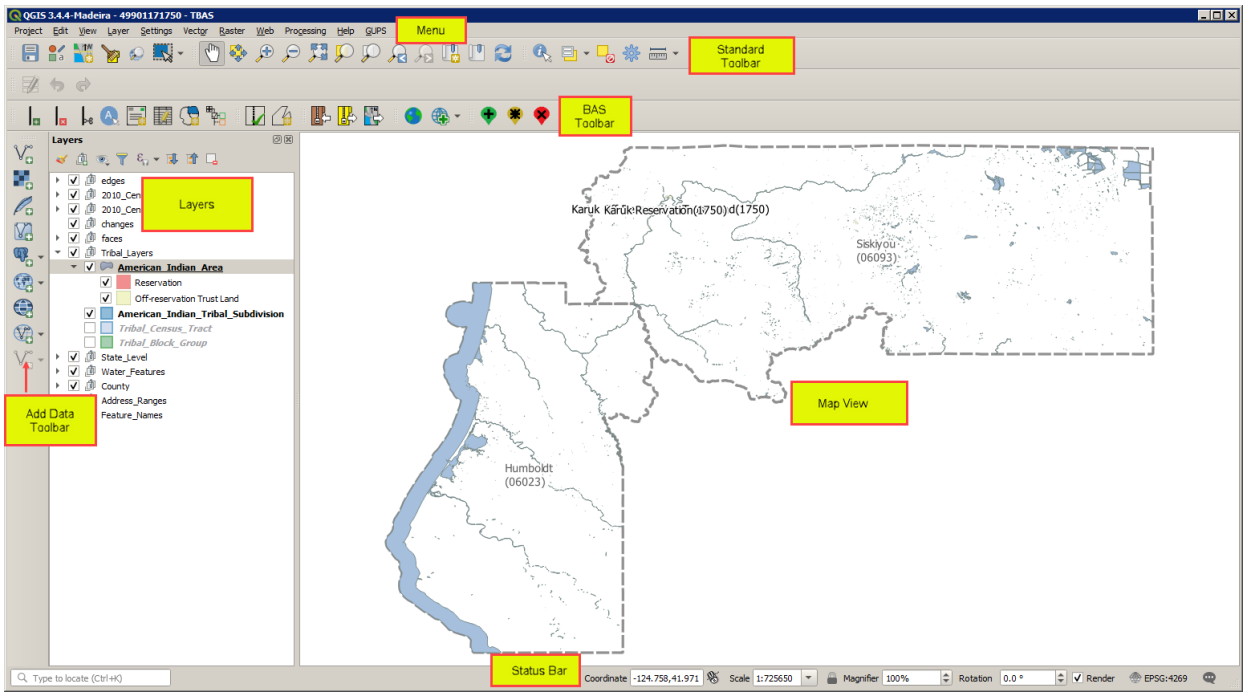
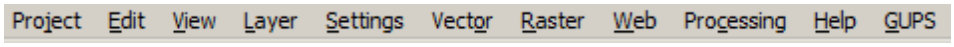
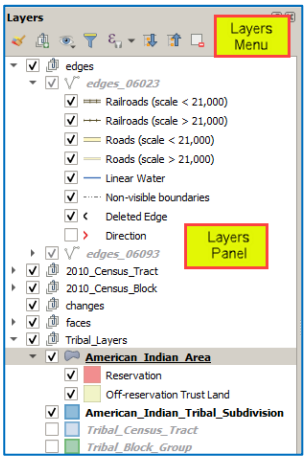
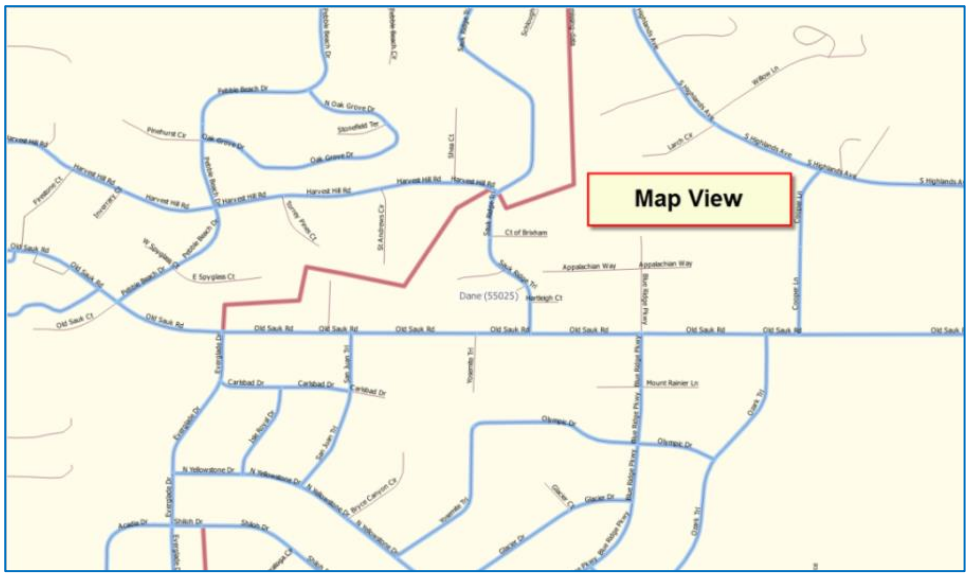


Figure 2. GUPS Main Page Layout

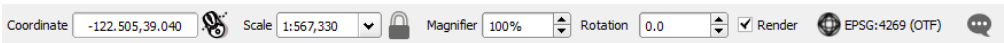
The purpose for each element on the main GUPS page is explained in Section 5.5.1 through Section 5.7.1 which describe in detail the individual components and specific functions of each element.

PART 2: HOW TO USE GUPS

Table 9: GUPS Main Page Elements

Page Element	General Function
Menu	The menu offers basic features such as **settings** and **help**; tools to manage the map view and import user-provided data; important calculation, measurement, and geoprocessing tools; and tools needed to make shapefile updates. Note that almost all of the functions available from the **menu** are also available in the application's more conveniently located toolbars. 
Layers Panel	The **Layers Panel** shows the layers on the map for the county selected. Layers (or groups) can be removed, layer visibility managed, and legend content filtered through the Layers Panel toolbar. 
Map View	The **Map View** displays the data for the county selected in the **Map Management** dialog box. 

PART 2: HOW TO USE GUPS

Page Element	General Function
Standard Toolbar	Provides the navigation and other tools needed to interact with the map and layers' attribute tables.
BAS Toolbar	Gives the specific tools needed to make BAS updates, view linear feature attributes, review and validate changes, import and export zipped files, and print maps.
Manage Layers Toolbar	Offers tools to import non-Census data. Map layers may be superimposed in GUPS to compare the features on the users' maps with those on the Census Bureau shapefiles. **Note:** although shown horizontally here, this toolbar appears aligned vertically to the left of the **Layers Panel** in the GUPS application.
Status Bar	Displays information on the map scale, projection, and coordinates and allows adjusting of the display. 

5.5.2 Layers Panel and Map View

When choosing a program and geography in the **Map Management** dialog box, GUPS automatically loads a set of default data layers (and default layer groups) defined by the Census Bureau for the program specified. As the map opens in **Map View**, the list of the preset layers (already grouped) appears in the **Layers Panel.**

Use the **Layers Panel** and the small **toolbar** appearing at its top to manage the map view. Note that the **Layers Panel** and the **Map View** windows are interdependent. Selections that are made in the **Layers Panel** are immediately reflected on the map display.

Close the **Layers Panel** at any time to see more of the map (just click on the small '**x**' in the upper right-hand corner).

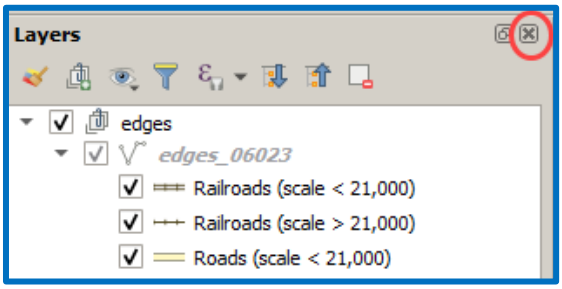


Figure 3. Close Layers Panel

PART 2: HOW TO USE GUPS

To restore the Layers Panel, click the View tab on the Menu, select '**Panels**' in the drop-down menu, click the arrow next to '**Panel**' to open the submenu, then click on '**Layers**'.

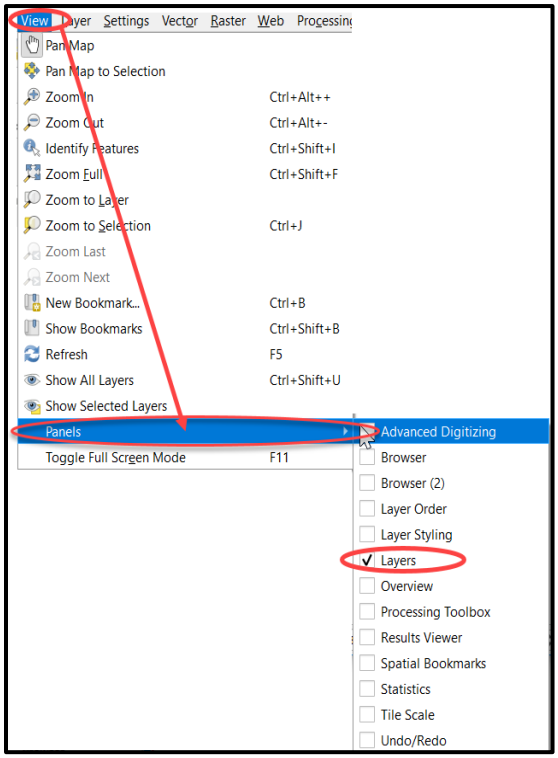


Figure 4. Restore the Layers Panel

The **Layers Panel** will then reopen and display in its default position on the page.

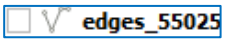
5.5.3 Managing the Map View from Within the Layers Panel

Within the **Layers Panel**, layer visibility can be managed (i.e., determine what layers display on the map), data layers reordered, and new layer symbology set.

5.5.3.1 Manage Layer Visibility

To add or remove layers from the map view:

- Click the checkbox next to a layer to add it to the map view.

- Uncheck the checkbox next to a layer to remove it from the view. 

Note: To remove a layer from the map document right-click the name of the layer and select '**Remove Layer**' in the drop-down menu. The layer will be removed from the map document. After removal, the layer would need to be re-added if needed again.

PART 2: HOW TO USE GUPS

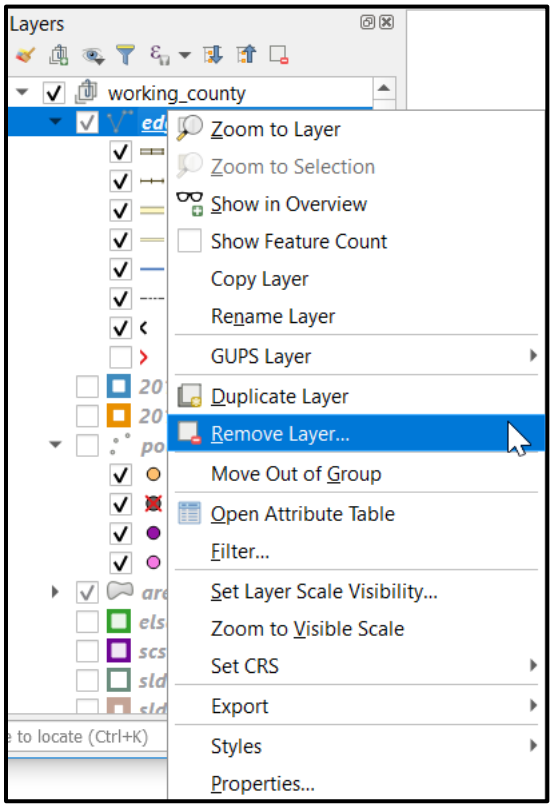


Figure 5. Managing Layer Visibility

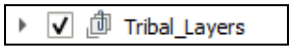
5.5.3.2 Reorder Data Layers

In the **Layers Panel**, the order in which the layers are listed determines how the layers display on the map. The layers at the top display on top of those below them. To change the display order:

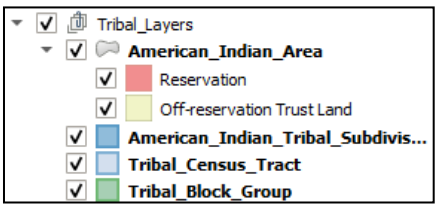
1. Left-click on the layer name.
2. Hold down the mouse button and drag the layer to the desired position in the list.
3. Release the mouse button to place the layer in its new position. The map display will then reflect the new layer order in the **Layers Panel.**

5.5.3.3 Expand/Contract Layers Panel Menus

To expand or contract the menu for a layer or layer group:

- Click on the ' ▸ ' sign to expand the group: 

- When the ' ▸ ' sign next to the layer name is clicked, the layer's submenu opens:



- Click on the box and uncheck next to the layer to *close the submenu(s)*.

PART 2: HOW TO USE GUPS

5.6 Menu & Toolbars

The main **Menu**, the **Standard toolbar**, and the **BAS toolbar** are located at the top of the GUPS page. These toolbars offer general GIS and system tools used to make BAS updates.

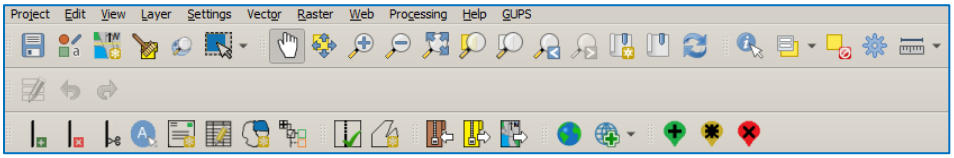


Figure 6. Menu and Toolbars

The **Manage Layer toolbar**, the vertical toolbar located to the left of the **Layers Panel** (shown here in a horizontal position) is used to import user-provided data.

Figure 7. Manage Layer Toolbar

Note: Although the **Menu** is always located at the top of the page and cannot be moved, the toolbars may be moved the toolbars to a more convenient location. For example, drag the **Add Data toolbar** to the top of the page to expand the area available for the **Layers Panel** and **Map View**.

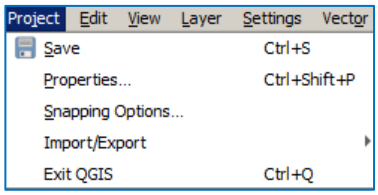
While working with the toolbars, hover the mouse over any toolbar button to see the name of the tool it represents. Resize and reposition the toolbars by dragging them.

The Menu, the Standard toolbar, and the BAS toolbar are described in the section below. The Add Data toolbar is discussed in **Section 5.7, How to Import User-Provided Data into GUPS**.

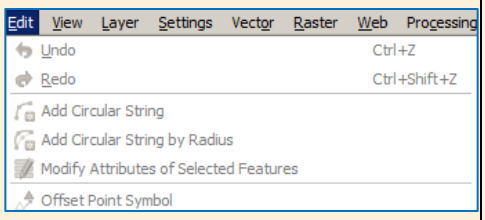
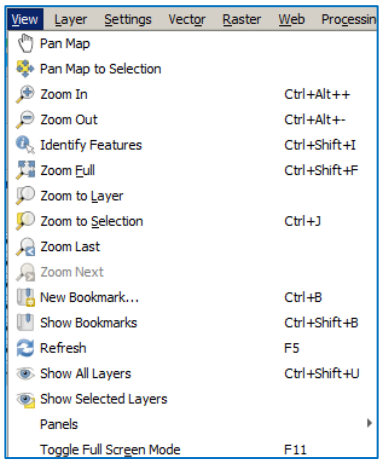
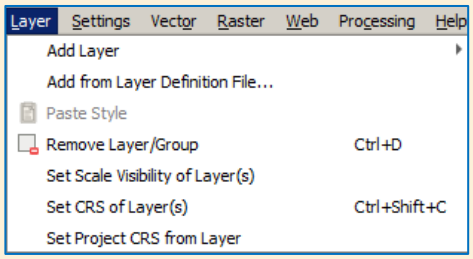
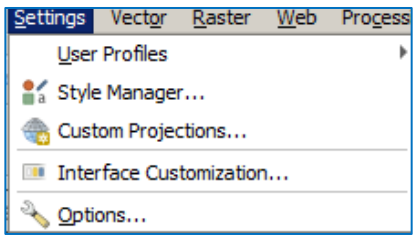
5.6.1 Menu Tabs

Table 10 below defines each of the tabs on the main **Menu**, provides an image of the drop-down options for each, and describes each tab's function.

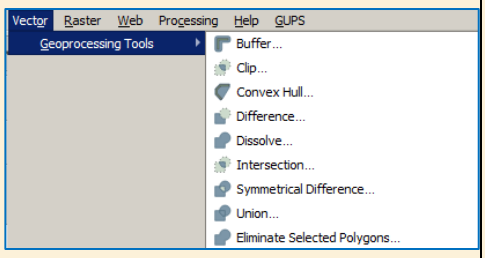
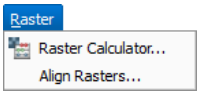
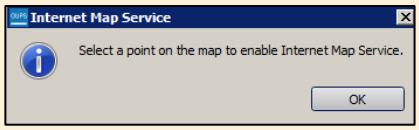
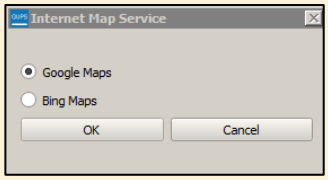
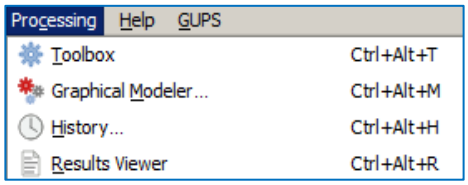
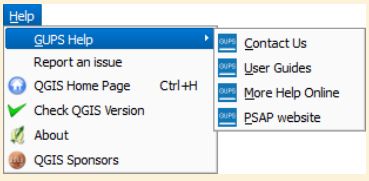
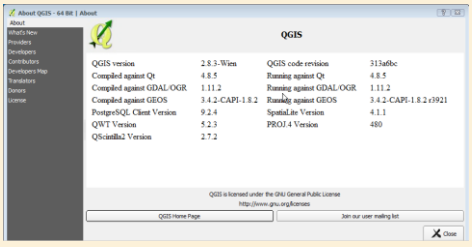
Table 10: Menu Tabs and Their Functions

Tab	Drop-down Menu	Function/Description
Project		From the **Project** tab, click on 'Save' to save the project, click on 'Save as Image' to create an image file of the map in **Map View**, or exit the application. When using '**Save as Image**', GUPS provides various image file type formats when exporting a map view (.png, .jpg, .tif, etc.).

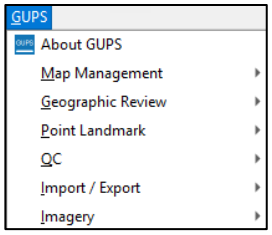
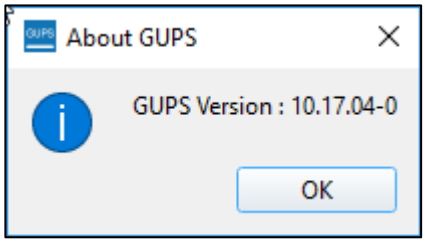
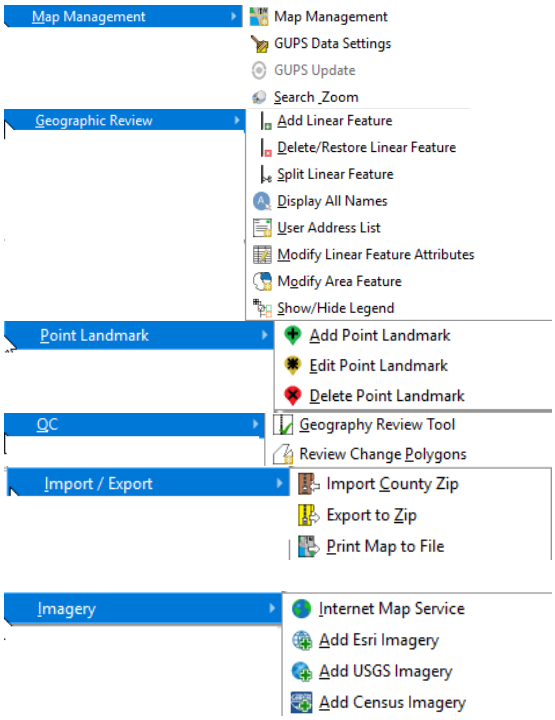
PART 2: HOW TO USE GUPS

Tab	Drop-down Menu	Function/Description
Edit		From the **Edit** tab, click 'Undo' to undo the last action or 'Redo' to redo an undone action. **Note:** For '**Undo**' to work, the correct layer must be selected in the **Layers Panel.** For example, if a linear feature is added to the **Edges** layer, then the layer is deselected by selecting the **Area Landmarks** layer, '**Undo**' will not delete the linear feature. The **Edges** layer must be reselected to undo the linear feature's addition. **Note:** Multiple actions can be undone on a single layer (e.g., the addition of several linear features) if the project has not been saved. If the project is saved, the Undo option is disabled until more changes are made.
View		The **View** tab is used to complete several actions also available on the **Standard toolbar**. Included are options for navigating the map, identifying feature attributes, measuring distance, and creating spatial bookmarks to return to the same map view at a later time. This location also provides a way to: • Set what toolbars display. • Restore the Layers Panel if it has been closed it (click 'Panels' in the drop-down menu, click the right arrow, click 'Layers' in the Layers down-menu). • Refresh the map to restore it to the original map extent.
Layer		The **Layer** tab on the Main menu toolbar allows you to Add Layer, Add from Layer Definition File, Paste Style, Remove Layer/Group, Set Scale Visibility of Layer(s), set Coordinate Reference System (CRS) of layer(s), and set project CRS from layer. **Note:** Many of these same functions are more conveniently located on the **Add Layers toolbar** and the small toolbar that sits at the top of the **Layers Panel.**
Settings		The **Settings** tab provides access to User Profiles, Style Manager, Custom Projections, Interface Customization, and General Options for QGIS.

PART 2: HOW TO USE GUPS

Tab	Drop-down Menu	Function/Description
Vector		The **Vector** tab provides access to several Geoprocessing Tools, used to create buffers around features, overlay areas to create an intersection, union, or symmetrical difference, merge features, and perform other common geoprocessing actions.
Raster		The **Raster** tab provides access to a Raster Calculator, which performs calculations on the basis of existing raster pixel values. It includes a Georeferencer tool, which can be used to assign coordinates to the raster, and access to the Terrain Analysis, Projection, Conversion, Extraction, Analysis, and Miscellaneous Tools to assist in drawing land detail.
Web	 	Clicking on the Web tab will create a pop up which will display either “Select a point on the map to enable Internet Map Services” or the Internet Map Service window giving the option to view the maps in either Google Maps or Bing Maps.
Processing		Although available to GUPS users, the options under the **Processing** tab are not needed for Census Bureau geographic program participation. The items under this tab pertain to algorithms, creating models, viewing the results of algorithms executed, and history.
Help	 	The **Help** tab provides tools for understanding QGIS (the open-source platform on which GUPS was developed) and the GUPS application itself. It also contains BAS contact information, access to the online version of this guide, training videos, and other information. Clicking the **About** option will bring up the latest version of GUPS installed on the computer.

PART 2: HOW TO USE GUPS

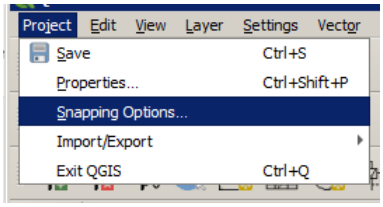
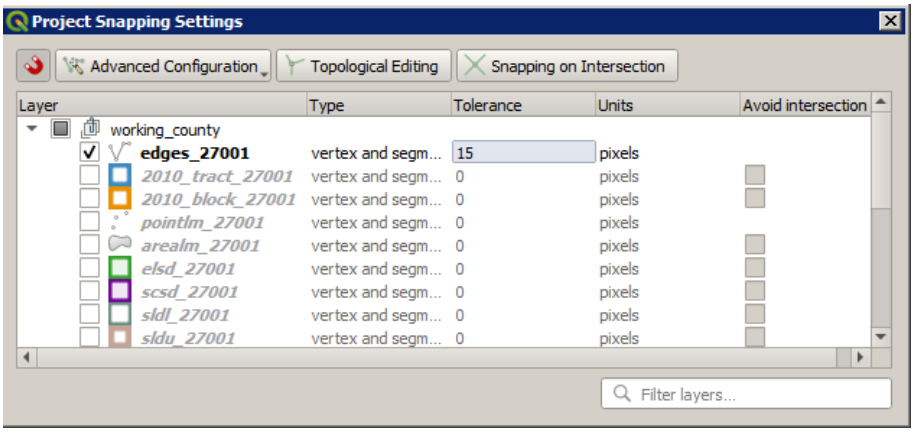
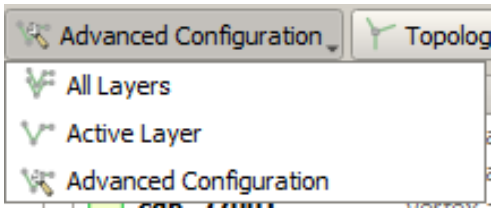
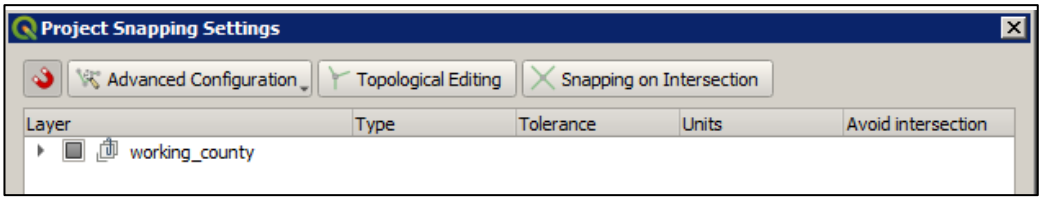
Tab	Drop-down Menu	Function/Description
GUPS	 Click the **About GUPS** option in the drop-down menu to find the GUPS version number. This number will be required if technical assistant is needed. Here the version number is 10.17.04-0 current_20191008. The number that appears may be more recent based on the user's computer and software. 	The **GUPS** tab provides quick access to Map Management, Geographic Review, Point Landmark, Quality Control (QC), Import/Export, and Imagery drop-down screens. 

Note on Snapping Tolerances

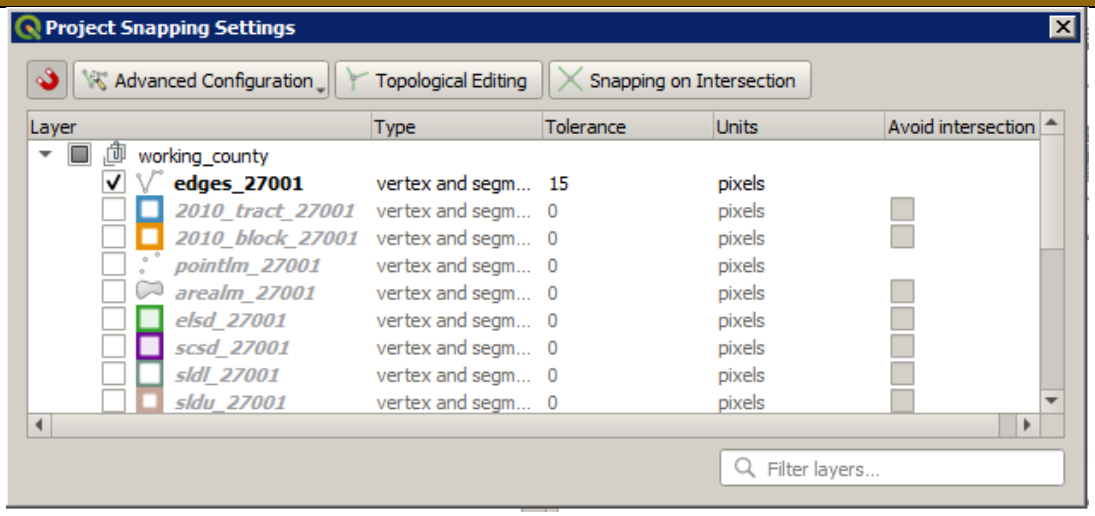
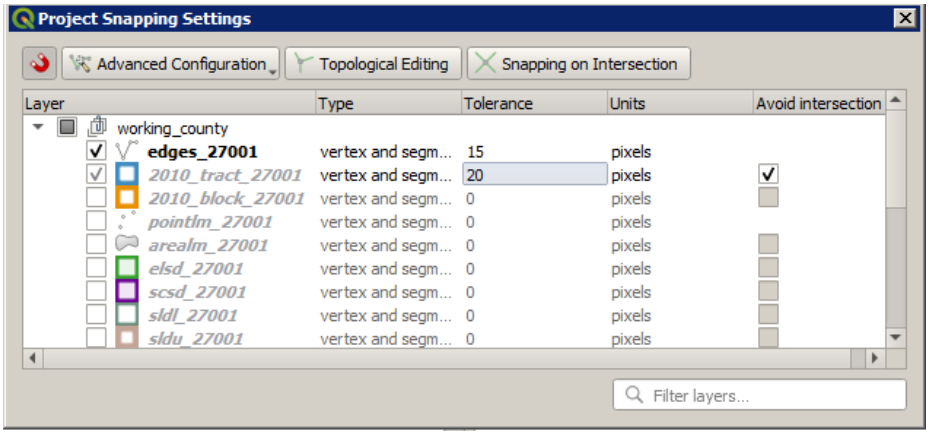
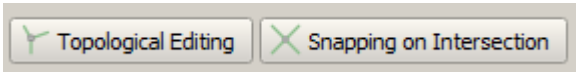
Snapping tolerances in GUPS are pre-defined by layer (e.g., the default tolerance for edges is set to 15 pixels). When making boundary corrections, it may be beneficial to adjust the snapping tolerances for a layer or layers. To do this, follow the steps in the table below.

PART 2: HOW TO USE GUPS

Table 11: Adjust Snapping Tolerances

Step	Action and *Result*
Step 1	In the **Project** tab drop-down menu, click on '**Snapping Options**'.  *The **Snapping Setting** dialog box opens.* 
Step 2	From the **Advanced Configuration** drop-down menu, select whether to apply the tolerance adjustment to the current layer only or to all layers. 
Step 3	Within the Layer window, you will need to expand the layer menu to see all the layers. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	
Step 4	Check the box next to each layer to snap. From the **Tolerance** drop-down menu, use the up and down arrows to select the value, and then select the units (map units or pixels) in the drop-down to the right and also whether to avoid intersection. 
Step 5	To enable topological editing and/or snapping on an intersection, select either box. 
Step 6	Exit out of the window. *The new snapping tolerances are set.*

5.6.2 Standard Toolbar Buttons

The **Standard toolbar** provides the navigation tools to interact with the map and layers' attribute tables.

Figure 8. Standard Toolbar

PART 2: HOW TO USE GUPS

The **Standard toolbar** actually includes several smaller toolbars. Each sub-toolbar is identified by a series of small parallel lines that precede it.

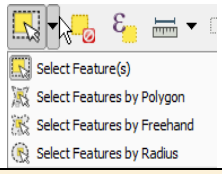
Figure 9. Sub-tool Markers

The first sub-toolbar contains the **Save** button, **Style Manager** button, **Map Management** button**, GUPS Data Settings** button, the **Search** button, and the **Select Features** button. The second sub-toolbar provides tools for viewing, navigating the map and creating spatial bookmarks in **Map View**, and the third sub-toolbar is used to identify, select features by value, deselect all features on the map, access processing tools in the Toolbox, and make measurements.

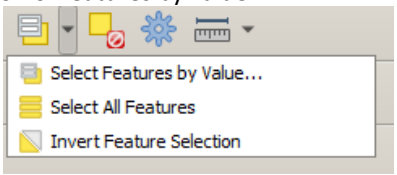
The location of the sub-toolbars can be moved by simply left-clicking the parallel lines preceding the sub-toolbar and while holding down the mouse, dragging the sub-toolbar to the desired location.

Each button on the Standard toolbar and its purpose is defined in the table below.

Table 12: Standard Toolbar Buttons

Button	Name	Function/Description
	Save	Saves the current GUPS project, including any user changes to layer properties, projection, last viewed extent, and layers added.
	Style Manager	Allows customization of map symbols.
	Map Management	Choose a geographic participant program in GUPS and access the automatically loaded default map display layers based on the program chosen.
	GUPS Data Settings	**Warning! This tool deletes files and folders permanently!** Change GUPSGIS data working directory and clean GUPS project data.
	Search	Search the map by place, landmark, or street name and zoom automatically to the feature.
	Select Features by Area or Single Click	Allows the user to select layer features in the map window with a single click, by dragging the cursor, or by drawing graphics on the screen. 
	Pan Map	Shifts the map in **Map View** without changing the map scale. Click the button, then click a location on the map to re-center the map to the clicked location.
	Pan Map to Selection	Shifts the map in **Map View** to the rows selected in the attribute table for a selected feature. After selecting a feature(s), click the button to re-center the map based on the selected feature(s).

PART 2: HOW TO USE GUPS

Button	Name	Function/Description
	Zoom In	Displays the map in **Map View** at a larger scale. Click the button, then click on the map at the location to be zoomed.
	Zoom Out	Displays the map in **Map View** at a smaller scale.
	Zoom Full	Displays the map in **Map View** at a smaller scale and zooms the map view to the full extent of the county.
	Zoom to Selection	Zooms the **Map View** to the rows selected by query in the attribute table for a feature(s). After selecting a feature(s) on the map, click the button to view the feature(s) at a greater map scale.
	Zoom to Layer	Zooms the **Map View** to the layer selected in the **Layers Panel.** After selecting the layer, click the button to zoom to the layer's extent.
	Zoom Last	Zooms the **Map View** to the previous map extent.
	Zoom Next	Zooms the **Map View** forward to the next map extent (only if a previous extent is available).
	New Bookmark	Creates and names a spatial bookmark of the current map view.
	Show Bookmarks	Display all bookmarks created by the user.
	Refresh	Displays **Map View** to initial full display.
	Identify Features	Identifies geographic features. Click the button, then click on a feature on the map to identify the feature at the location.
	Select Features by Value	Allows selection of features by value. 
	Deselect Features from All Layers	Deselects selected features from all layers.
	Processing Toolbox	Displays list of processing tools available.
	Measure	Provides options to measure linear distance, area, and angles on the map.

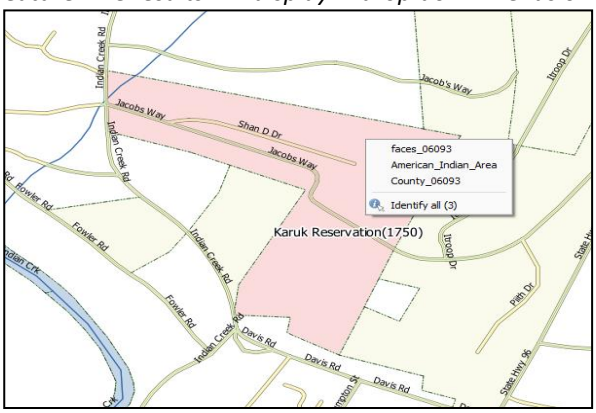
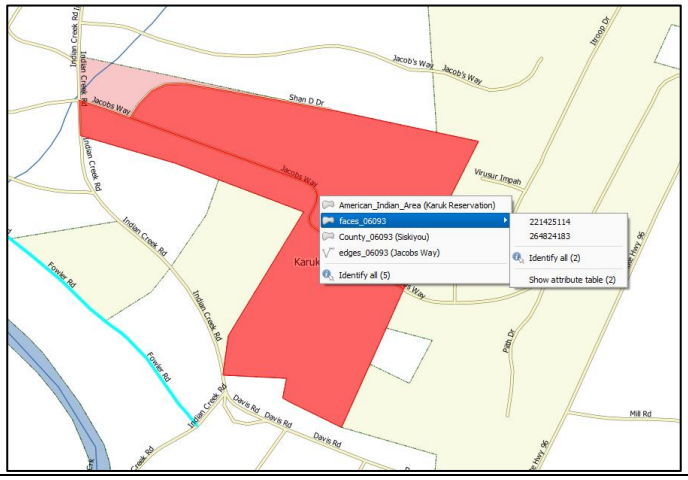
Most of the sub-toolbar buttons defined above are straight-forward. Those related to features, however, require further explanation. These buttons are used to identify and select/deselect features on the map and to view feature attributes. They are also used to make measurements and create spatial bookmarks.

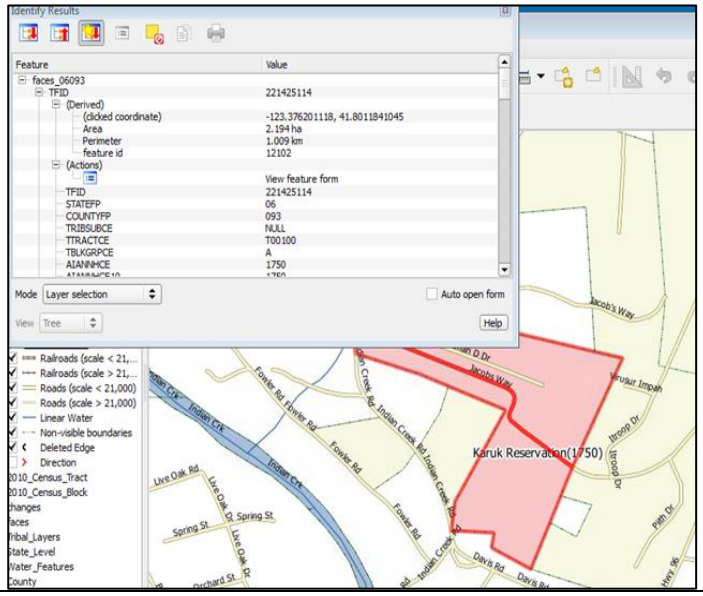
5.6.2.1 Identify a Feature Using the Identify Features Button

To identify a feature on the map, follow the steps in **Table 13**.

PART 2: HOW TO USE GUPS

Table 13: Identify a Feature on the Map

Step	Action and *Result*
Step 1	Click the **Identify** button on the **Standard toolbar**.
Step 2	Then right-click on the feature. *The results will display in drop-down menus on the map*.  To see all attributes for the feature, select 'Show attribute table' in the **faces** drop-down menu. 

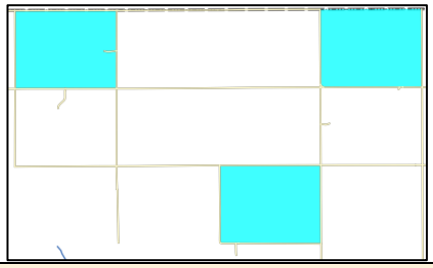
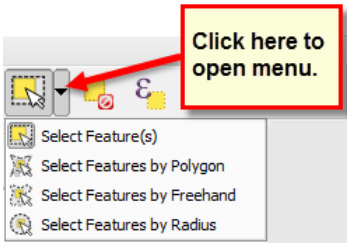
Step	Action and *Result*
Step 3	Alternately, click the **Identify** button, then left-click on the feature. *The feature turns red (color may vary) and the **Identify Results** screen opens under the **Layers Panel**, showing the feature attributes*. (Note that here the screen was dragged from beneath the **Layers Panel** so that it sits over the map.) 

5.6.2.2 Select/Deselect Features Using the Select Features and Deselect Features Buttons

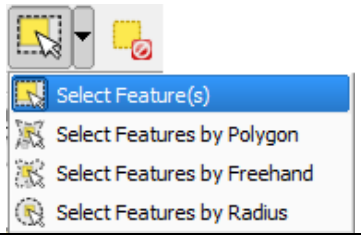
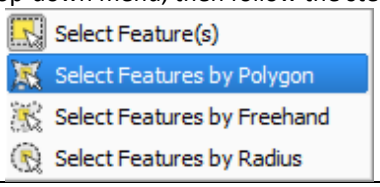
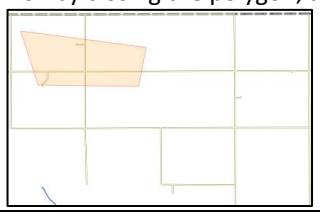
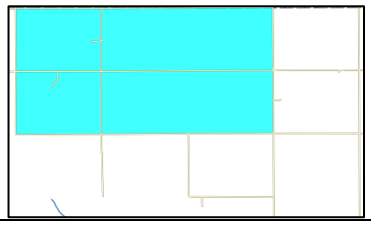
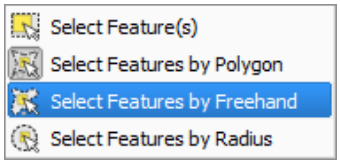
The **Select Features** button provides several ways to select features on the map. The **Deselect Features from All Layers** button will deselect previously selected features.

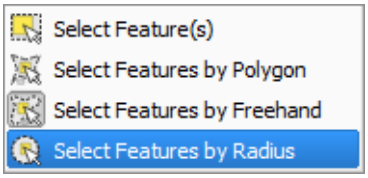
Table 14 describes each of the feature selection methods, discusses when one might be preferable over another, and explains how to deselect features.

Table 14: Select/Deselect Features on the Map

Step	Action and *Result*
Step 1	To begin, click on a layer name in the **Layers Panel.** For example, to select a linear feature, click on the 'edges' layer. To select faces, click on the 'faces' layer.
Step 2	Click once on the **Select Features** button on the **Standard Toolbar**.
Step 3	To select an edge or face on the map, click on it. In this example, select 'faces' in the **Layers Panel** and click on a face. *The face selected turns cyan*.
Step 4	To select more than one face, hold down the **CTRL** key while clicking on the additional face(s). This method is useful when selecting noncontiguous faces, as shown below. 
	To select multiple features, click the **Select Feature** button, then drag the cursor over the features on the map. This method is useful when selecting a large number of contiguous faces or a large number of nearby linear features without having to click each feature one by one.
	A Note on GUPS Tools GUPS tools remain active until a different tool is selected. For example, if the **Select Features** tool is used to choose faces for a new area landmark, then in order to add a new linear feature instead, the **Add Linear Feature** must be clicked before clicking on the map again. If note, the **Select Features** tool, still active, selects a face.
Step 5	To open other **Select Features** options, click on the down arrow to the right of the **Select Features** button. *The **Select Features** drop-down menu opens*.  Note that when a menu option is selected, the button's appearance changes.

PART 2: HOW TO USE GUPS

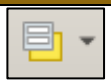
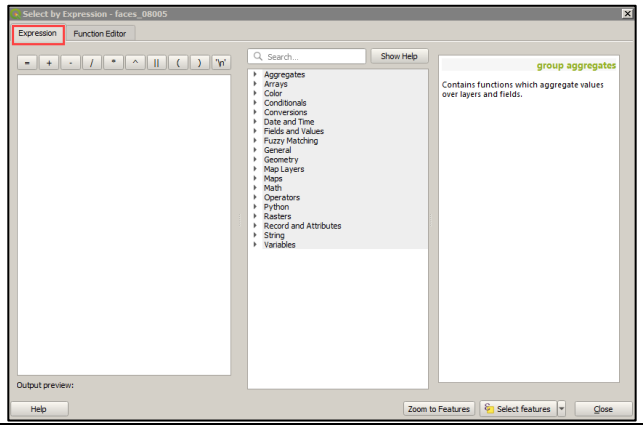
Step	Action and *Result*
Step 6	The first option in the menu, '**Select Feature(s)**', duplicates the functions made available in the Select Features button on the main toolbar. 
Step 7	The second option, '**Select Features by Polygon**', selects features via a polygon drawn on the map. To use this feature select it in the drop-down menu, then follow the steps below. 
Step 8	Left-click on the map to begin the polygon. Drag the cursor to extend the line, left-click, and then extend the line in a new direction. Finish by closing the polygon, as shown below. 
Step 9	To complete the selection, right-click. *All faces with an edge appearing within the polygon are highlighted in cyan*. 
Step 10	The third option, '**Select Features by Freehand**', selects features based on user-defined shapes drawn on the map.  To use this option, click on the map and use the cursor to draw any shape (polygon, triangle, circle, etc.). *If the shape does not cross any edges, the single face in which the shape is drawn is selected and turns cyan. If the shape crosses several faces, all faces whose edges are crossed are selected and turn cyan*. **Note:** This method is particularly useful when attempting to select a very small face. For example, draw a tiny triangle within a face to select it.

Step	Action and *Result*
Step 11	The final option, '**Select Features by Radius**', selects features by defining a circle around the features to select.  To use this tool, left-click on the map, then hold down the mouse and drag the cursor outward to expand the circle. Release the mouse when done. *The feature(s) selected is (are) highlighted in cyan*.
Step 12	Polygons can be deselected by holding and using the same selection option to select by holding **CTRL** and retracing over the polygons, or deselect a feature or features automatically by clicking the **Deselect Features from All Layers** button once. *The selected features in all layers are deselected.*

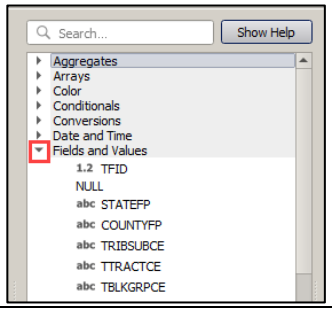
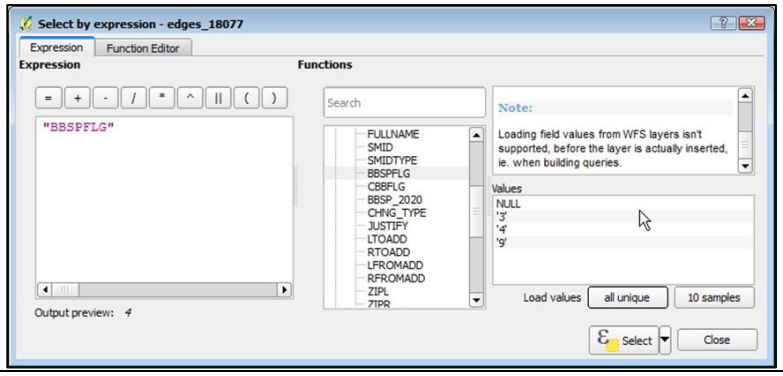
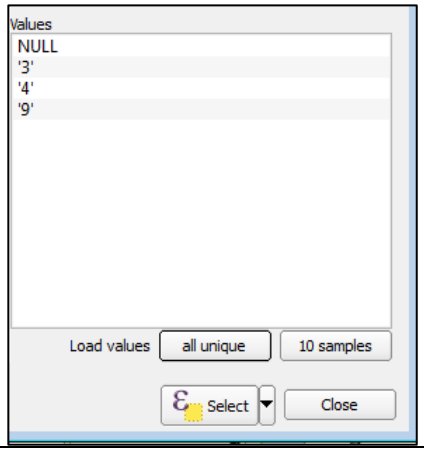
5.6.2.3 Select Features by Querying the Attribute Table

Another method to select features is by querying the attribute table. To do so, follow the steps in **Table 15**. In this example, the attribute table is being queried for the edges layer to locate and select all linear features flagged as edges for block boundaries.

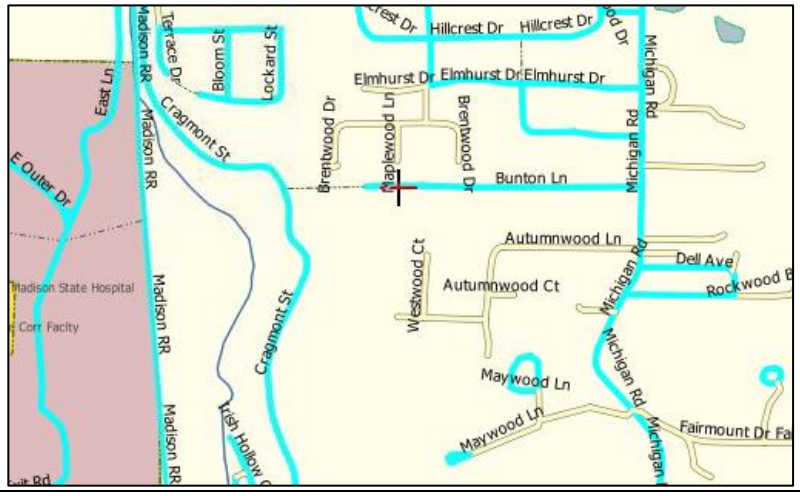
Table 15: Select Features by Querying the Attribute Table

Step	Action and *Result*
Step 1	Click the **Select Features by Value** button on the **Standard toolbar**.  *In the drop down menu, **Select by Expression** window opens. The window has two tabs: **Expression** and **Function Editor**.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Under the **Expressions** tab, click the ' ▸ ' symbol next to the items in the **Functions** field to display their submenus. 
Step 3	To build a query, click the '**+**' sign next to '**Fields and Values**' to open the list of choices and then double-click on a field name. In this example, the '**BBSP Flag**' is selected to search for all features flagged as edges for block boundaries. *Once selected, "**BBSP Flag**" appears in the expression pane, and a **Load values** field is added to the **Fields** pane at the bottom far-right corner.* 
Step 4	Select an operator from a full list by clicking the '**+**' sign next to "Operators" in the **Functions** pane. **OR**, if one needs a commonly used operator such as equals, plus, or minus, click its corresponding button in the row of buttons at the top of the **Expression** pane.
Step 5	In this example, the operator for equals is required. Double-click the '**=**'operator button. *The expression in the Expression pane now reads "BBSP Flag" =.*
Step 6	To select a specific value for the field "BBSP Flag", click either the **all-unique** or **10 samples** button in the **Load values** field. *The **Values** field above the buttons populates with all allowed values*. 

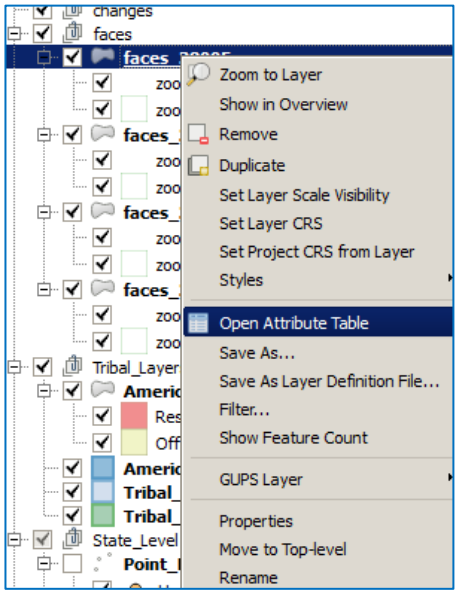
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	Select a value. Then select '**4**' by double-clicking on it in the **Values** field list. The expression changes to "BBSP Flag" = '4'.
Step 8	Click the **Select by Expression** button just below the **Load values** field. Then click **Close**. *All edges marked with a BBSP Flag with a value of '**4**' turn cyan on the map.* 

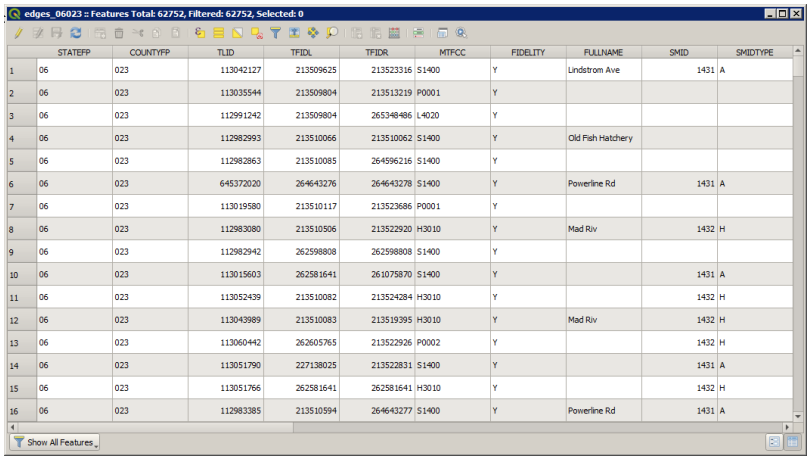
5.6.2.4 View an Attribute Table for a Layer on the Map

To view an attribute table for a map layer, follow the steps in **Table 16**.

Table 16: View Layer Attributes Using the Attributes Table

Step	Action and *Result*
Step 1	Right-click the layer in the **Layers Panel.** *The drop-down menu opens*. 

PART 2: HOW TO USE GUPS

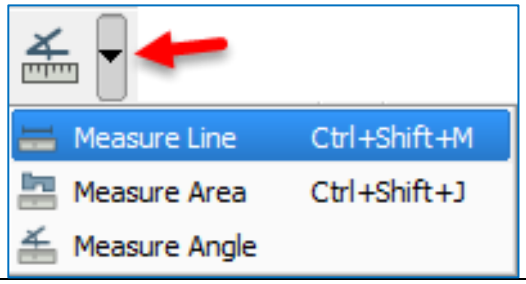
Step	Action and *Result*
Step 2	Click the '**Open Attribute Table**' option in the drop-down menu. *The Attribute table opens showing all features in the layer and their attributes (e.g., name, MTFCCs, etc.). Each column represents a separate attribute and each row an individual feature.* 
Step 3	To select a feature to view, click on the number on the far left of the row. To select multiple features, click on the number of the row for the first feature, then press the **CTRL** key. While holding the **CTRL** key down, click on the numbers for the other desired individual features. To select a range of features, click on the number for the row showing the first feature, then press the **SHIFT** key. While holding down the **SHIFT** key, click on the number for the last row to be selected.

	STATEFP	COUNTYFP	TLID	TFIDL	TFIDR	MTFCC	FIDELITY	FULLNAME	SMID	SMIDTYPE
1	06	023	113042127	213509625	213523316	S1400	Y	Lindstrom Ave	1431	A
2	06	023	113035544	213509804	213513219	P0001	Y			
3	06	023	112991242	213509804	265348486	L4020	Y			
4	06	023	112982993	213510066	213510062	S1400	Y	Old Fish Hatchery		
5	06	023	112982863	213510085	264596216	S1400	Y			
6	06	023	645372020	264643276	264643278	S1400	Y	Powerline Rd	1431	A
7	06	023	113019580	213510117	213523686	P0001	Y			
8	06	023	112983080	213510506	213522920	H3010	Y	Mad Riv	1432	H
9	06	023	112982942	262598808	262598808	S1400	Y			
10	06	023	113015603	262581641	261075870	S1400	Y		1431	A
11	06	023	113052439	213510082	213524284	H3010	Y		1432	H
12	06	023	113043989	213510083	213519395	H3010	Y	Mad Riv	1432	H
13	06	023	113060442	262605765	213522926	P0002	Y		1432	H
14	06	023	113051790	227138025	213522831	S1400	Y		1431	A
15	06	023	113051766	262581641	262581641	H3010	Y		1432	H
16	06	023	112983385	213510594	264643277	S1400	Y	Powerline Rd	1431	A

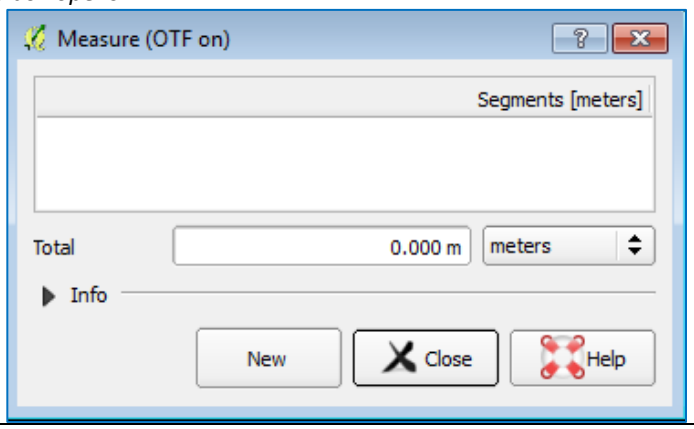
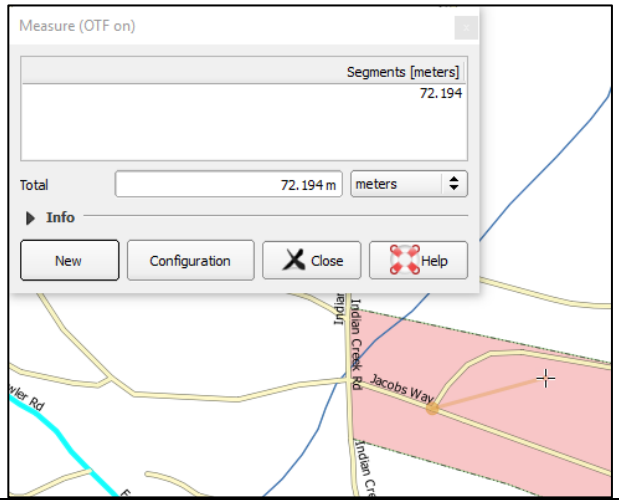
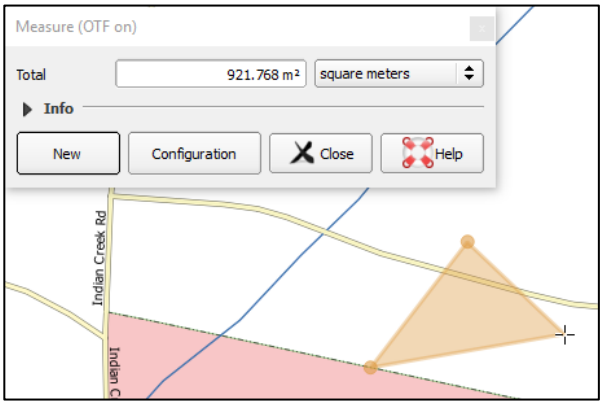
5.6.2.5 Determine Distance, Area, and Angles on the Map

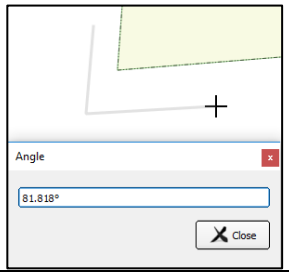
To measure the distance between two or more points, area, or an angle on a map, follow the steps in **Table 17**.

Table 17: Measure Distances, Area, and Angles on a Map

Step	Action and *Result*
Step 1	Click the **Measure** button on the **Standard toolbar**. *The **Measure** button drop-down menu opens.* 

PART 2: HOW TO USE GUPS

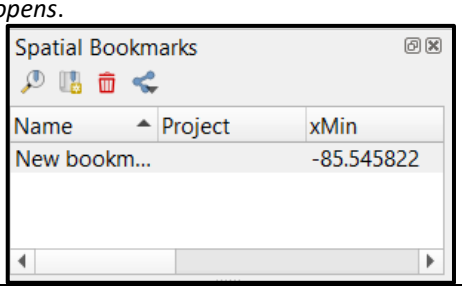
Step	Action and *Result*
Step 2	To measure the distance between two points on the map, select '**Measure Line**' in the drop-down menu. *The **Measure** box opens*. 
Step 3	Zoom to the map location to be measured. Then click on the beginning point on the map and continue clicking on points until reaching the final point. Right-click when finished. *The length of each segment of the line drawn, as well as the total length of the line between the beginning point and the ending point, appear in the **Measure** box*. 
Step 4	To measure area on the map, select '**Measure Area**' in the drop-down menu. *The **Measure** box opens*. When the box opens, left-click on the map to begin drawing a polygon around the area to be measured. Left-click at each vertex of the polygon. Right-click when finished. *The area polygon encompasses appears in the **Total** field. Use the drop-down to the right to see the area in other units of measure.*  To begin a new measurement, click the **New** button.

Step	Action and *Result*
Step 5	To measure an angle on the map, first select the '**Measure Angle**' option in the drop-down menu. Then left-click on the map to begin drawing the angle. Drag the mouse (but do not hold down the mouse button) to create the first side of the angle. Then left-click. Drag the mouse again (again without holding down the mouse button) to draw the second leg. *The **Angle** box opens showing the angle measurement*. 

5.6.2.6 Save Locations on a Map Using the Bookmark Button

To save geographic locations on the map and view them later, follow the steps in **Table 18**.

Table 18: Bookmark Locations on a Map

Step	Action and *Result*
Step 1	Zoom to the location on the map in **Map View** to be bookmarked and click on the **New Bookmark** button on the **Standard toolbar**. *The **Spatial Bookmarks** box opens*. 
Step 2	Click on the row named '**New bookmark**'. Then backspace over '**New bookmark**' and type in a descriptive name for the bookmark (255-character limit). Click the **Close** button. *The bookmark is added*.
Step 3	To view and manage spatial bookmarks, click on the **Show Bookmarks** button on the **Standard toolbar**. *The **Spatial Bookmarks** dialog box again opens*. To zoom to a bookmark, click on a bookmark name in the dialog box and then click the **Zoom to** button. To delete a bookmark, click on the bookmark name, then press the **Delete** button.
	Bookmark names and coordinates can be edited from the **Geospatial Bookmarks** dialog box.

PART 2: HOW TO USE GUPS

5.6.3 BAS Toolbar Buttons

The **BAS toolbar** provides the BAS-specific functions needed to complete a participant's review and update activities, as well as to import and export zipped shapefiles.

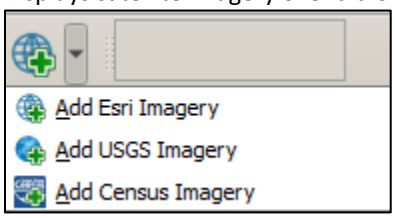
Figure 10. BAS Toolbar

Each toolbar button is described in **Table 19**.

Table 19: BAS Toolbar Buttons

Button	Name	Function/Description
	Add Linear Feature	Add a new linear feature.
	Delete/Restore Linear feature	Delete an existing linear feature.
	Split Linear Feature	Split a linear feature. Splitting a linear feature may be necessary to accurately reflect an entity's location. This feature "splits" the original into two.
	Display All Names	Displays all names for a street with multiple names assigned in the MAF/TIGER System.
	User Address List	Import an address list (.csv, .txt, etc.) into GUPS.
	Modify Linear Feature Attributes	Edit attributes of a selected linear feature.
	Modify Area Feature	Make updates to legal area (additions, deletions, boundary corrections, etc.).
	Show/Hide Legend	Shows or hides the layer.
	Geography Review Tool	Review the attribute table for a layer.
	Review Change Polygons	Review change polygons in a layer and make corrections (reviews change polygons for holes and minimum size).
	Import County ZIP	Import zipped Census Bureau shapefiles shared by another GUPS user.

PART 2: HOW TO USE GUPS

Button	Name	Function/Description
	Export to ZIP	Create the ZIP file containing all required data and shapefiles to be submitted to the Census Bureau.
	Print Map to File	Export a printable map in .pdf, .png, .tif, or jpeg format.
	Internet Map Service	Add imagery from Google Maps or Bing Maps.
	Add Esri Imagery	Displays satellite imagery overlaid on the QGIS map. 
	Add Point Landmark	Add a new point landmark.
	Edit Point Landmark	Edit point landmark attributes.
	Delete Point Landmark	Delete an existing point landmark.

5.6.4 Status Bar

The **Status bar** at the bottom of the GUPS main page displays information about the map. It helps adjust the map scale and see the mouse cursor's coordinates on the map.

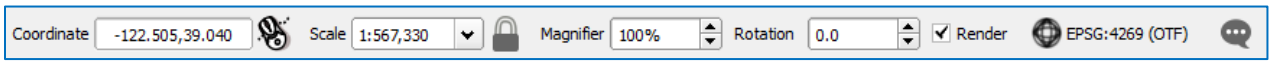


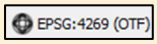
Figure 11. Status Bar

Table 20 describes each element of the Status Bar.

Table 20: Status Bar Elements

Item	Description
Coordinate	Shows the current position in map coordinates (default is decimal degrees for GUPS) as the map cursor is moved across the map.
	Toggles between the coordinate position of the mouse cursor or the map view extents as the map is panned and zoomed.

PART 2: HOW TO USE GUPS

Item	Description
Scale	Shows the current zoom level in the **Map View**. Can be changed by selecting one of the predefined levels from the drop down, by typing in a new ratio, or using the scroll wheel on the mouse.
	Locks the scale to use the magnifier to zoom in or out.
Magnifier	Allows the map view to be set to a specific zoom level.
Rotation	Shows the map rotation.
Render	Temporarily prevent layers from drawing. Enable by clicking the checkbox immediately to the left of "Render".
	Clicking on the icon opens the projection properties for the current map.
	Displays system messages for the QGIS session.

5.7 How to Import User-Provided Data into GUPS

5.7.1 The Add Data Toolbar

To import one's own imagery, geodatabase, shapefiles, web mapping service, or other data layers into GUPS use the **Add Data toolbar**.

Figure 12. Add Data Toolbar

Although shown in a horizontal position in Figure 12, the **Add Data toolbar** appears arranged vertically to the left of the **Layers Panel** in GUPS. Its buttons are described in **Table 21**.

Table 21: Add Data Toolbar Buttons

Button	Name	Function/Description
	Add Vector Layer	Add vector based shapefile and geodatabase files.
	Add Raster Layer	Add raster based shapefile and geodatabase files.
	Add SpatialLite Layer	Add data from a SpatialLite database.
	Add/Edit Virtual Layer	Add or Edit Virtual Layers.

PART 2: HOW TO USE GUPS

Button	Name	Function/Description
	Add PostGIS Layer	Add PostGIS layer.
	Add WMS/WM(T)S Layer	Add Web Mapping Services and Web Mapping Tile Services. Publicly accessible and secured WMS services are supported.
	Add WCS Layer	Add Web Coverage Services, which provide access to raster data useful for client-side map rendering.
	Add WFS Layer	Add Web Feature Services.
	New Shapefile Layer	 Add a new shapefile layer or new temporary scratch layer.

5.7.2 How to Upload User-Provided Data Layers

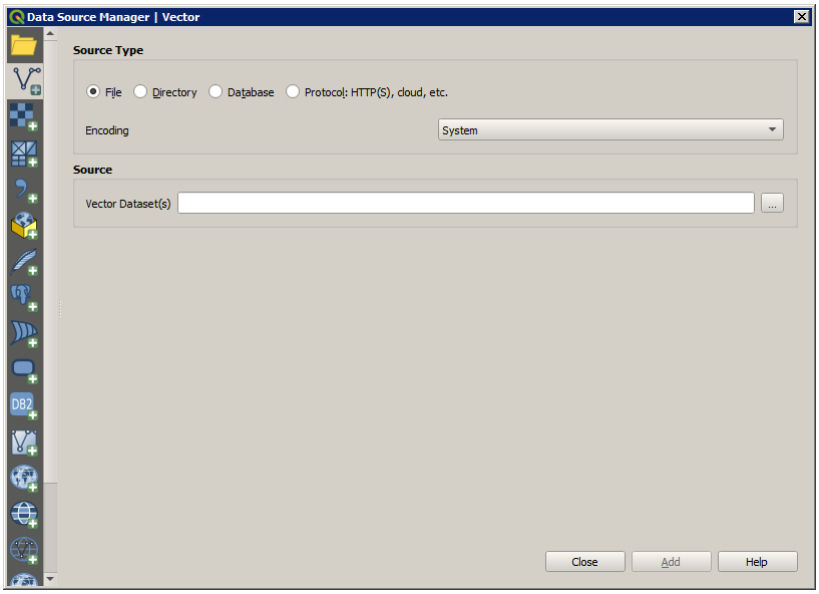
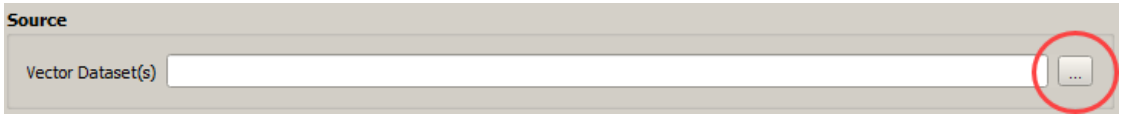
GUPS supports vector data in a number of formats, including those supported by the OGR library data provider plugin, such as Esri shapefiles, MapInfo MIF (interchange format), and MapInfo TAB (native format). It also supports PostGIS layers in a PostgreSQL database and SpatiaLite layers. Support for additional data types (e.g., delimited text) is provided by additional data provider plugins.

Below are the steps to import the most commonly used data formats. To load shapefile or geodatabase data layers into the map, follow the steps in the table below.

Note: Only one user-provided data layer may be uploaded at a time. If uploading multiple data layers, note that GUPS will only allow upload one layer at a time.

PART 2: HOW TO USE GUPS

Table 22: Load Shapefiles/Geodatabase Layers

Step	Action and *Result*
Step 1	Begin the upload. Click the **Add Vector Layer** button on the **Add Data toolbar**. *The **Add Vector Layer** dialog box opens.* 
Step 2	In the **Encoding** drop-down menu, the default value is '**System**'. If an error message appears when opening the file, use the drop-down to select UTF-8. *UTF-8 populates the **Encoding** field*.
Step 3	Click the ellipses button and navigate to the folder where the shapefile or geodatabase is saved on the computer. 
Step 4	Left-click the file to be uploaded, then click the **Add** button. *The shapefile / geodatabase is added to the **Layers Panel** and to the **Map View** window.*

To load data from a web mapping service, follow the steps in **Table 23**.

Table 23: Load Data from a Web Mapping Service

Step	Action and *Result*
Step 1	Begin the upload. Click the **Add WMS/WM(T)S Layer** button on the **Add Data toolbar**. *The **Add Layers from a WM(T)S Server** dialog box opens*.
Step 2	Select the web mapping service. Click the **Layers** tab, then click the **New** button under the tab. *The **Create a new WMS Connection** dialog box opens*.

Step	Action and *Result*
Step 3	In the **Name** field, type a name for the web mapping imagery service. In the **URL** field, type the URL for the service. If the service requires a user name and password, type them in the fields provided. Click **OK**. *The service will be added to the drop-down menu for web mapping services appearing just below the **Labels** tab*. **Note:** If working inside a firewall, users may be prompted to enter a user name and password to obtain resources from outside the firewall.
Step 4	Select the imagery service added in the drop-down menu. *The available layers appear in the **ID/Name/Title/Abstract** box.*
Step 5	Click on the layer to be displayed, then click the **Add** button. *The WMS is added to the map showing in **Map View** and to the **Layers Panel.***
	When the WMS is added, it displays over the top of other layers selected for **Map View**. To make it display below these layers, click on the WMS layer and, while holding down the mouse button, drag it to the bottom of the **Layers Panel.**

If participants do not have access to a web mapping service, have a poor Internet connection, or work under a restrictive firewall, they can still add other types of imagery files to GUPS (e.g., a county or state imagery dataset). One option for adding imagery may be the National Agricultural Imagery Service (NAIP), supplied in web mapping service format by the U.S. Geological Survey. To add imagery files, follow the steps in the **Table 24**.

Table 24: Add Imagery Files

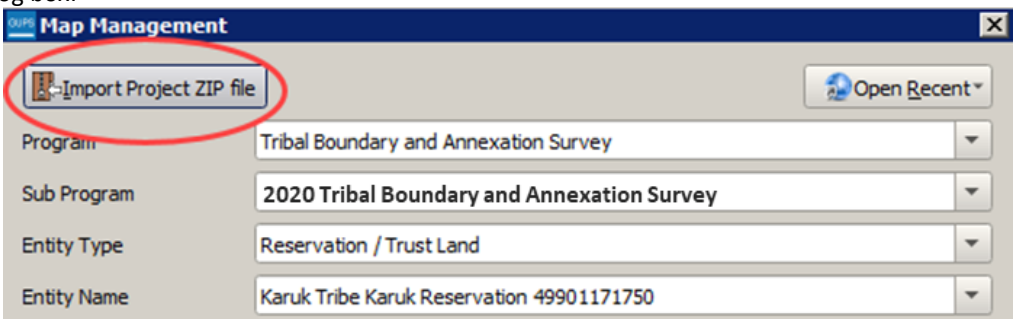
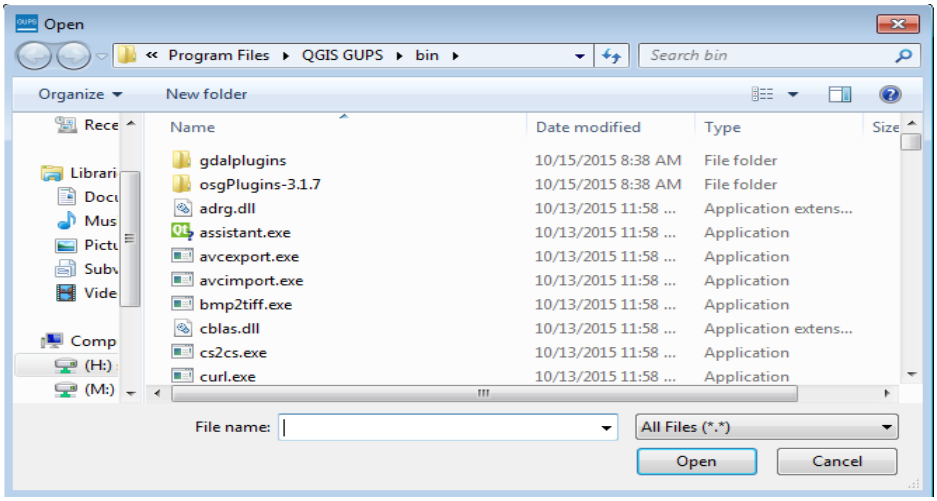
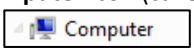
Step	Action and *Result*
Step 1	Click the **Add Raster Layer** button on the **Add Data toolbar**. *The **Open a GDAL Supported Raster Data Source** dialog box opens.*
Step 2	Navigate to the folder where the imagery file is stored.
Step 3	Select the file, then click **Open**. *The file loads into GUPS*.

5.7.3 How to Import a Shared ZIP Shapefile

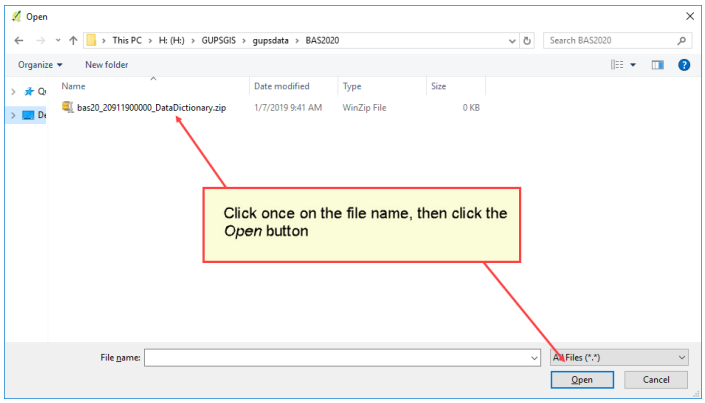
To import Census Bureau shapefiles already updated by another user, use the **Import Project ZIP File** button (available both on the BAS toolbar and in the Map Management dialog box), then follow the steps in **Table 25**.

PART 2: HOW TO USE GUPS

Table 25: Import a ZIP File Shared by Another User

Step	Action and *Result*
Step 1	Click the **Import Project ZIP File** button in the upper left-hand corner of the **Map Management** dialog box:  **OR** on the **BAS toolbar**:
Step 2	*The **Open** window launches*. 
Step 3	From this window, click on the **Computer** icon (called **My Computer** in some versions of Windows) located in the far-left-hand pane.  When the list of directories opens, navigate to the location where the shared ZIP file is located.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 4	Click once on the file, then click the **Open** button.  *The file loads into **Map View**.*

PART 2: HOW TO USE GUPS

SECTION 6. MAKING BAS UPDATES IN GUPS

The tables in this section provide step-by-step instructions for making BAS updates. The examples assume participants have read and understood the directions for opening GUPS and using Map Management. If not yet comfortable with Map Management, please review the contents of **Section 5, Using GUPS (Basics and Map Management)** before making updates. It is highly recommended to use a source of imagery data when making any BAS updates.

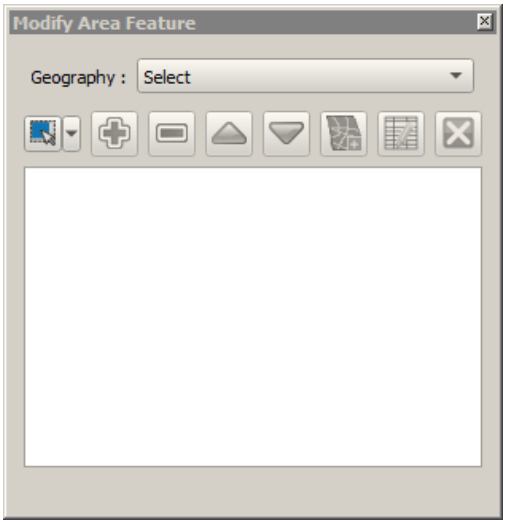
6.1 How to Update Legal Boundaries

All examples shown here, although using real data, are purely fictitious. They are employed for purposes of illustration only and do not indicate any actual geographic changes.

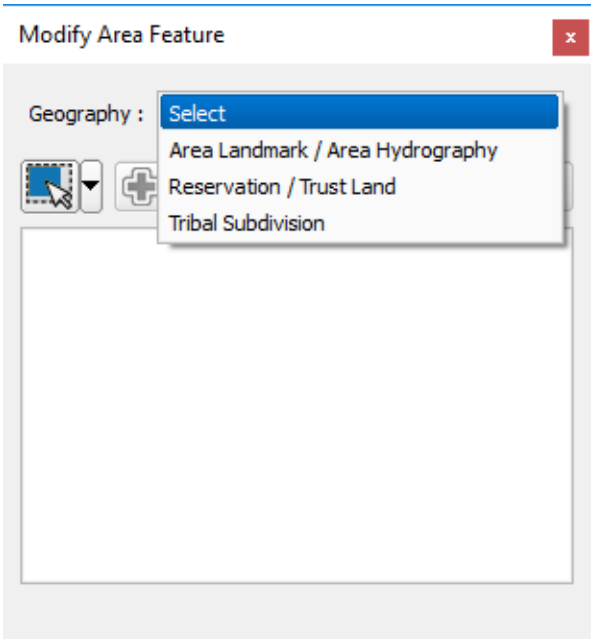
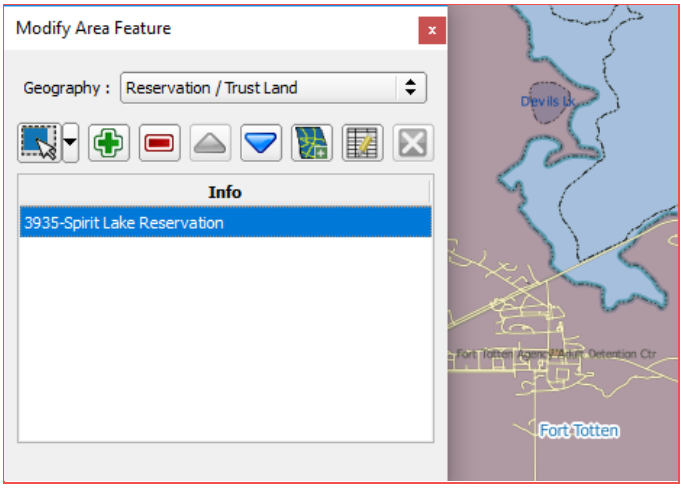
6.1.1 Adding Land Area as Reservation or Trust Lands for the First Time

Follow the steps in the **Table 26** to add land as reservation or off-reservation trust land(s). In this example, a parcel of land is added as a fictitious newly acquired 'off-reservation' trust land for the Spirit Lake Reservation (3935).

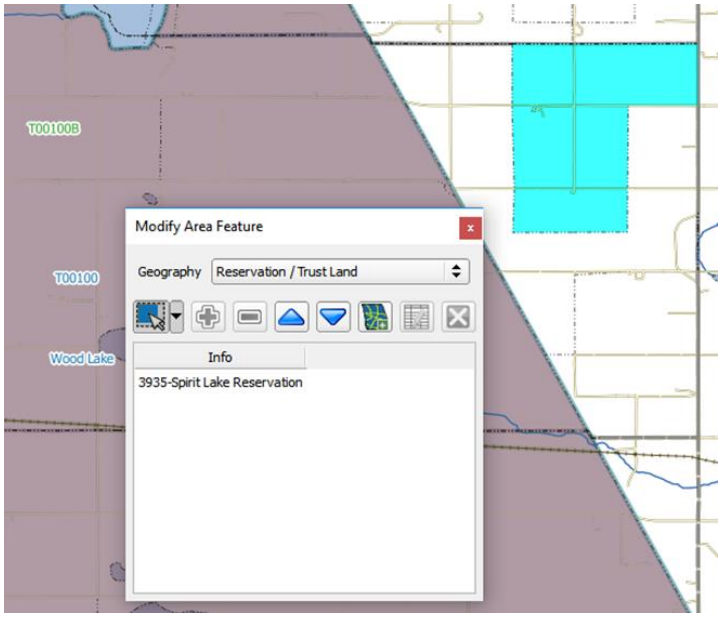
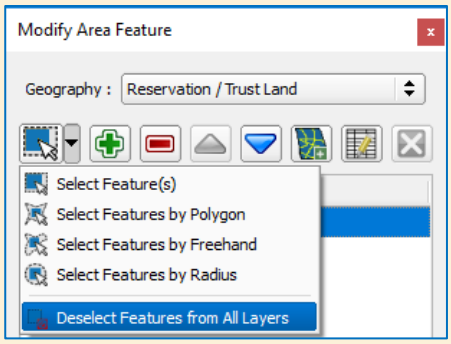
Table 26: Add Land Area as Reservation or Off-reservation Trust Land

Step	Action and *Result*
Step 1	Open in **Map View** the entity where the new trust land(s) will be added. Be sure that all layers desired to be seen are checked in the **Layers Panel.** It is recommended to check (turn on) all Tribal Layers.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens*. 

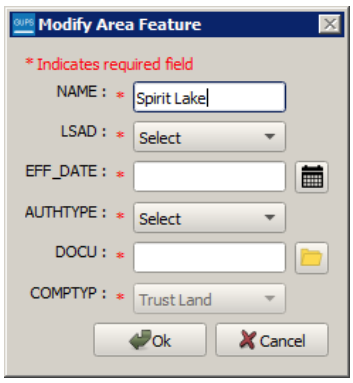
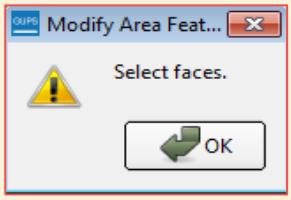
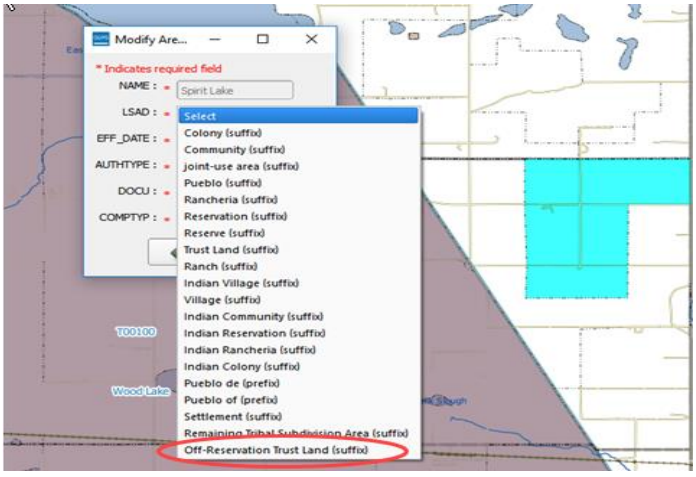
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	Click the drop-down area next to the **Geography** field, and select the entity type to be added from the drop-down menu. In this example Off-Reservation trust land is being added, so 'Reservation/Trust Land' is selected.  *Reservation/Trust Land appears in the **Geography** field and prior to any changes, Spirit Lake Reservation will be the only file that becomes available.*
Step 4	Double-click on the row in the list for the place that is making the annexation. (**Note:** The list of places is short, but in some cases it can be long. Use the scroll bar to the right of the list to move up and down the list, if needed.) *The map zooms to the place selected upon double-clicking a row.*  If the map does not zoom to a scale sufficient to make the changes, click on the **Zoom in** button on the **Standard toolbar**.

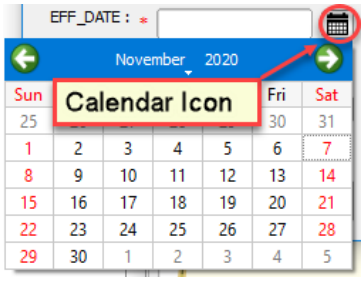
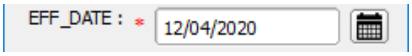
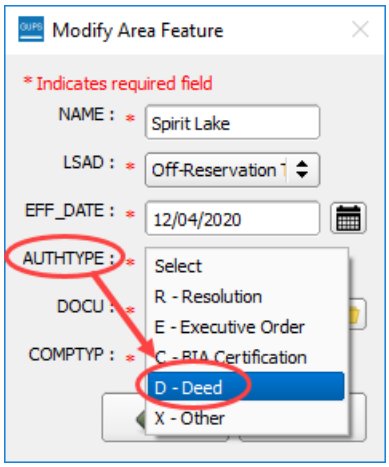
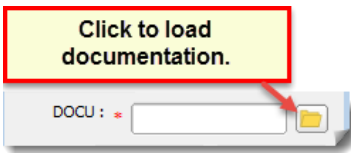
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	Then click on the map to select the face or faces. If the entity includes only a single face, simply click once on the face to select it. If the entity includes several contiguous faces, after clicking on the first face, depress the **CTRL** key and while holding it down, left-click on each additional face to be added. *The selected faces turn cyan.*  **Note:** Faces may also be selected (after clicking the Select Features button) by simply dragging the cursor over the edges that mark their boundaries. Additional means of selecting faces (by polygon and by radius) are discussed in **Section 1**.
	Because all geographic areas consist of faces, it may be necessary to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (see **Table 30** for instructions on how to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. The new face can now be added to the new entity.
	If a face is accidentally selected, it can be deselected with the **Deselect Features from All Layers** option in the **Select Feature(s)** drop-down menu. 

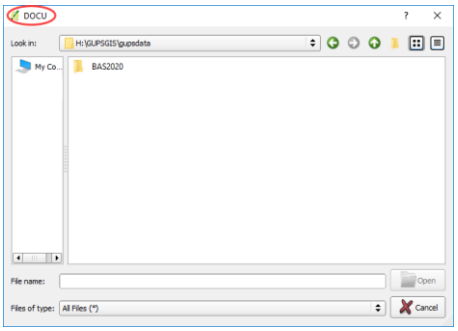
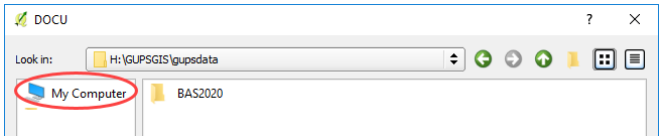
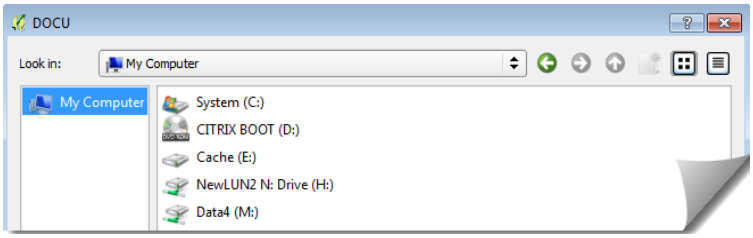
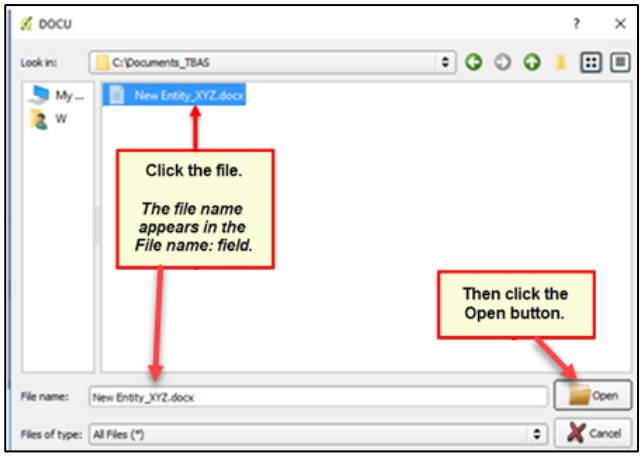
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 6	To record a new entity, click the **Add Entity** button on the dialog box toolbar. *The **Modify Area Feature** new entity dialog box opens.* 
	A pop-up warning will appear if **Add Entity** is clicked before selecting the faces. Simply click **OK** and add the faces.  Since faces were already selected, the pop-up warning does not appear.
Step 7	In the new entity dialog box, select the **LSAD** (Legal/Statistical Area Description) from the drop-down list available. This example indicates an 'Off-Reservation Trust Land (suffix)' since a reservation already exists. If a reservation didn't already exist, then the LSAD should be 'Trust Land (suffix)'. The term 'Off-Reservation Trust Land' or 'Trust Land' will be added to the Entity Name, in this example, will be added to Spirit Lake Reservation. 

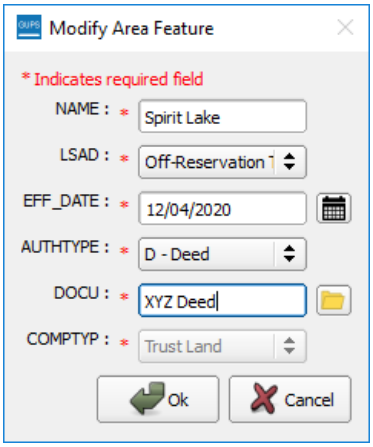
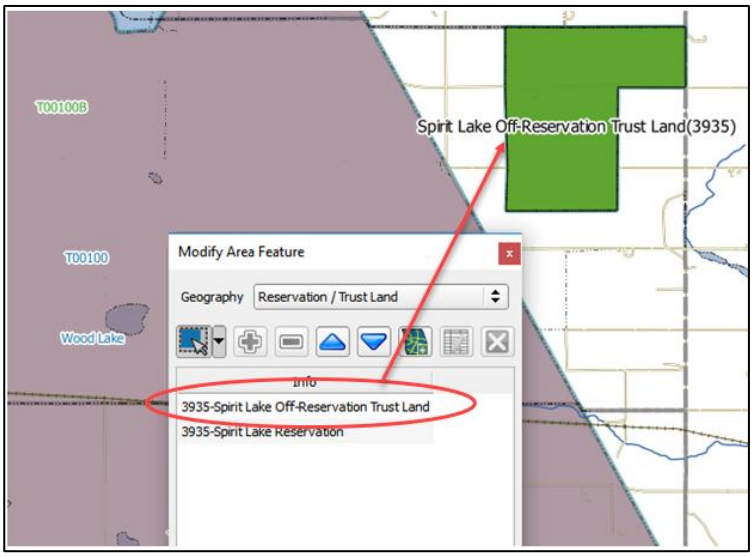
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 8	Next add the effective date for the legal change. Click on the calendar icon next to the **EFF_DATE** field and, *when the calendar opens*, click on the effective date.  *The date selected populates the **EFF_DATE** field.* 
Step 9	Next, add the authority type using the **AUTHTYPE** drop-down menu. This example indicates the AUTHTYPE as a D-Deed. 
Step 10	Finally, upload documentation for the change. For all changes that are more than cartographic boundary corrections, documentation will need to be provided. To upload documentation, click the folder icon next to the **DOCU** field. 

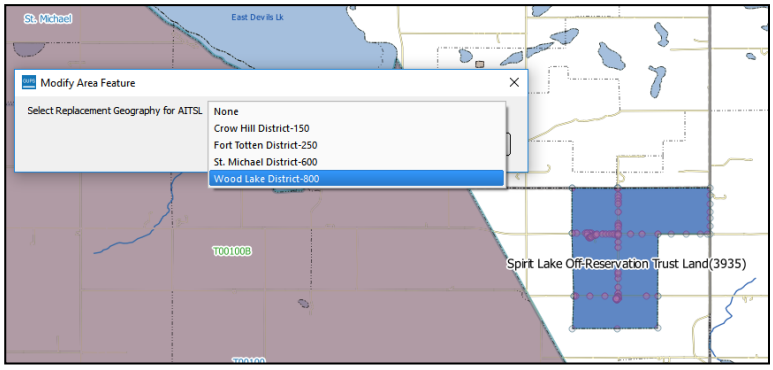
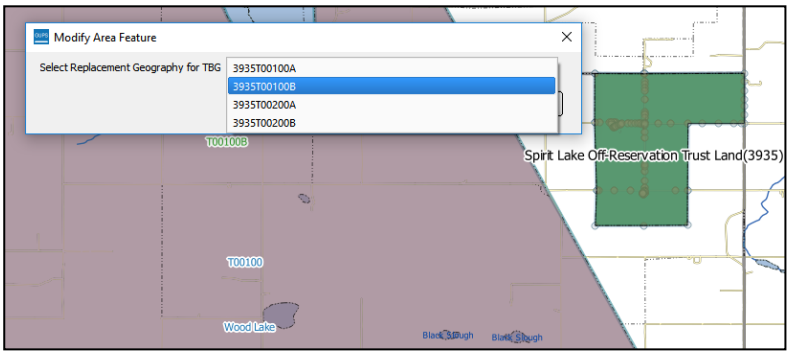
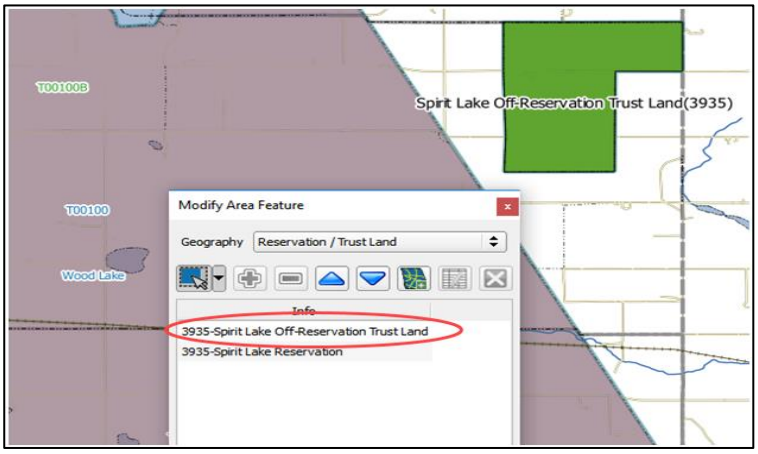
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	*The **DOCU** window opens.* 
Step 11	Click on the icon for **My Computer** (or simply **Computer** in some Windows versions) to open the directory where documentation is saved.  *The directories display, as shown below.* 
Step 12	Select the appropriate directory in the list and navigate to the file to be uploaded as documentation, then click the file. *The file name appears in the **File name** field.* To upload the file, click the **Open** button. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 13	Once the **Open** button has been clicked, *the name of the document appears in the **DOCU** field.* 
Step 14	Click the **OK** button. **Note:** Red asterisks indicate required fields. These required fields must be completed to move forward. If **OK** is clicked before completing one or more required fields, GUPS will not move on. Any required field not completed will highlight in red. **If the reservation and/or trust lands contain more than one census tract, or more than one block group or more than one Tribal Subdivision – there are a few additional steps – continue on to Step 15 below.** If not, and all required fields have been completed, when OK is clicked, *the faces for the new entity turn green on the map (colors may vary) and the name of the new entity appears on the list in the **Modify Area Feature** dialog box*. Skip to **Step 16**. 
	Once the Census Bureau verifies the new Trust Lands, it will assign it the same FIPS code as the Reservation.

PART 2: HOW TO USE GUPS

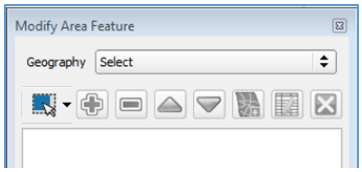
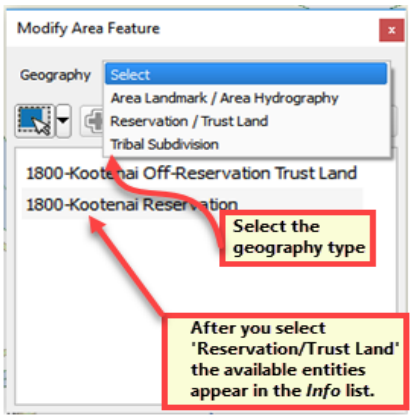
Step	Action and *Result*
Step 15	If there is more than one census tract, block group or tribal subdivision, there are additional steps to follow when adding area either as 'reservation' or 'trust land'. After clicking **OK** (in **Step 14**) if there is currently more than one tribal subdivision defined for the Entity, *a pop-up window will appear with a drop down menu to select which Tribal subdivision (AITSL) the new area should be assigned to. In this example, the new Off-Reservation Trust Land is being assigned to Wood Lake District (800).*  Once a selection is made, if there is more than one Tribal Block Group (TBG), *a new pop-up window will appear with a drop-down menu to select which Tribal Census Tract/Tribal Block Group to which the new area should be assigned. In this example, it is being assigned to the adjacent area labeled 3935T00100B.*  Once the selection is made, *users are returned to the Modify Area Feature menu* and can continue with additional changes to the boundaries. (**Step 16**) 

Step	Action and *Result*
Step 16	To make additional changes to the map, simply make a new selection in the **Modify Area Feature** dialog box **Geography** field and continue work (refer back to **Step 3** above). Changes may be saved while working or once all the work is done, however, it is recommended to save changes as they are made to avoid losing work in the event of a power outage or system interruption. Changes can be made to the reservation boundary, trust land boundaries and tribal subdivision boundaries.

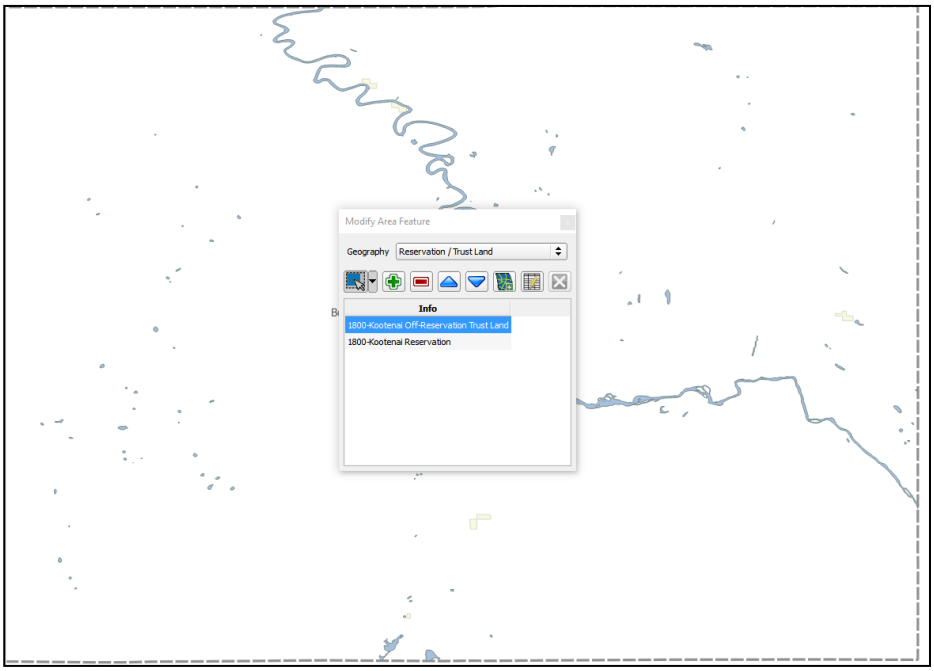
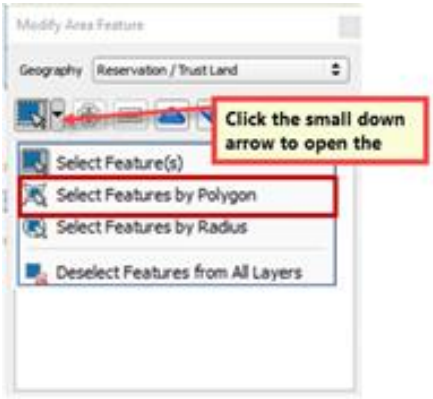
6.1.2 Adding (or Deleting) Land Area to an Existing Reservation or Existing Off-Reservation Trust Land

Follow the steps in **Table 27** to record land being added to an existing reservation or existing off-reservation trust lands. The fictitious example in the table looks at Kootenai Off-Reservation Trust Lands.

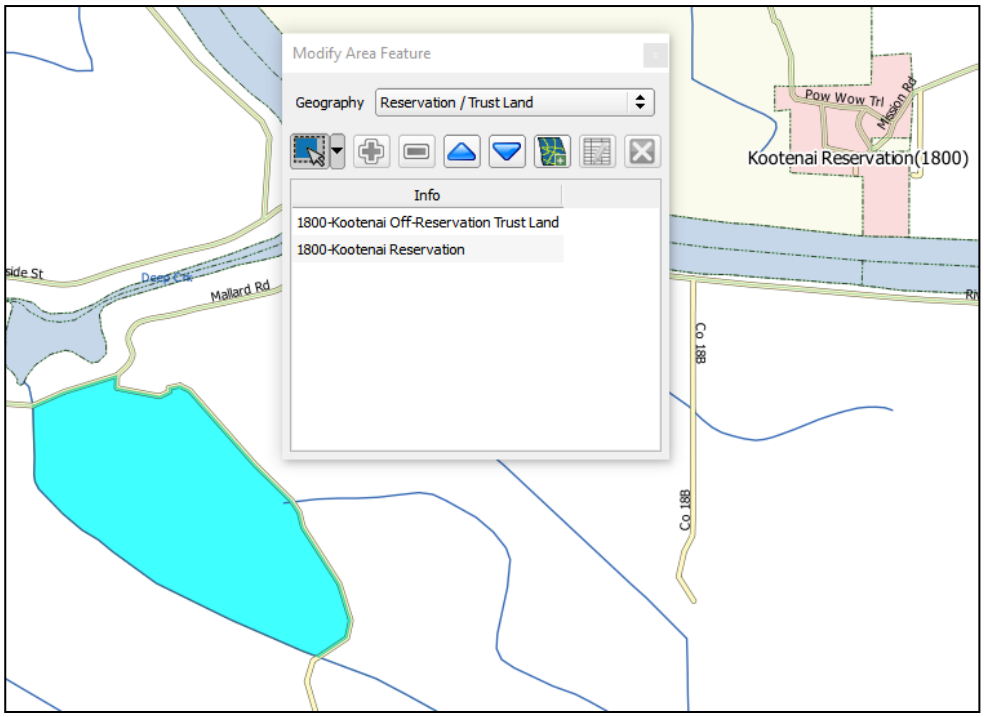
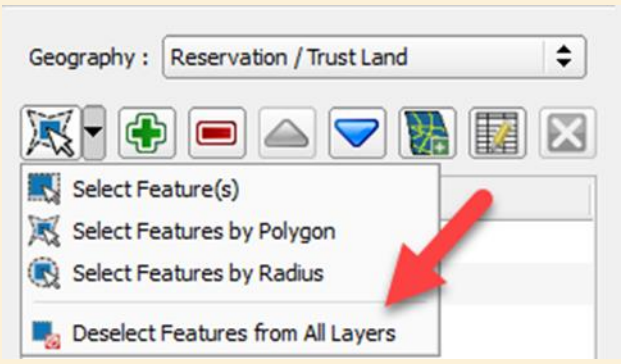
Table 27: Record an Addition

Step	Action and *Result*
Step 1	Open in **Map View** the entity. Be sure that all layers desired to be seen are checked in the **Layers Panel.**
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The Modify Area Feature dialog box opens*. 
Step 3	Click the drop-down area next to the **Geography** field, and select the entity type (here '**Reservation/Trust Land**'), from the drop-down menu. *A list of available entities appears in the **Info** list in the bottom portion of the dialog box.* 

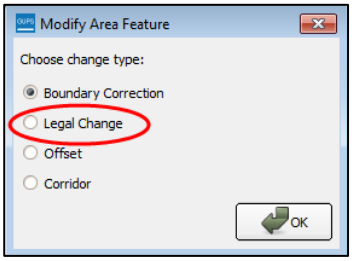
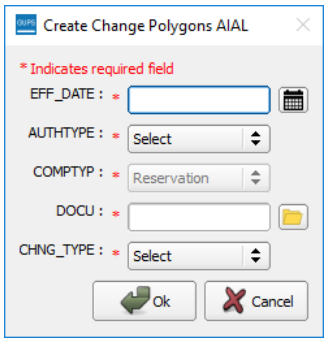
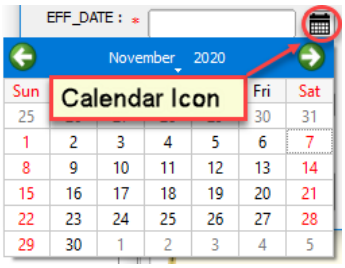
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 4	Click on the row in the list for the entity that is making the addition (here 'Kootenai Off-Reservation Trust Land'). (**Note:** *The map zooms to the full extent of the entity selected when a row is clicked.)* 
Step 5	Click on the **Zoom in** button on the **Standard toolbar** to zoom into the area where the addition is to be made.
Step 6	To select the faces to be added to the off-reservation trust lands, click on the small down arrow next to the **Select Features** button on the dialog box toolbar. *The **Select Features** button drop-down menu opens*. In this example the "polygon" method is used to select the faces to be added to Kootenai Off-Reservation Trust Lands. Click on **'Select Features by Polygon'** in the menu. 

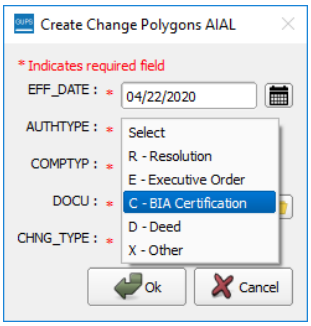
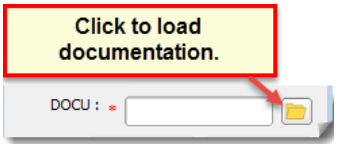
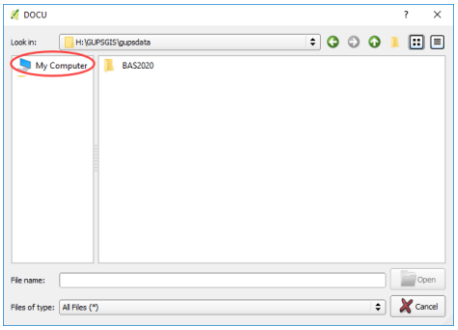
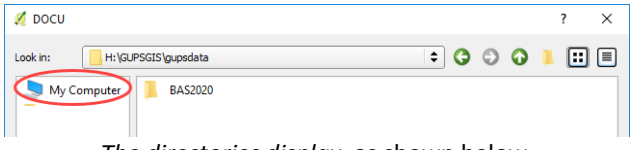
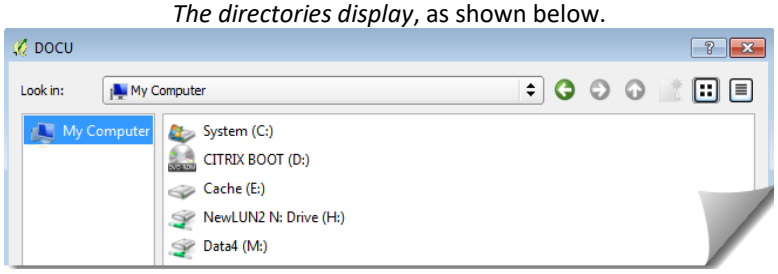
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	Next, go to the map and place the cursor where the faces should be added. To select a single face, simply drag the cursor outward in the center of the face. To select multiple faces, drag the cursor across the edges that separate the faces. In this example, select seven faces. *The faces selected turn cyan.* 
	Because all geographic areas consist of faces, it may be necessary to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (see **Table 30** for instructions on how to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. The new face can now be added to the new entity.
	If a face is selected by accident, use the **Deselect Features from All Layers** option in the **Select Feature(s)** drop-down menu to clear the selected faces from the screen and start over. 

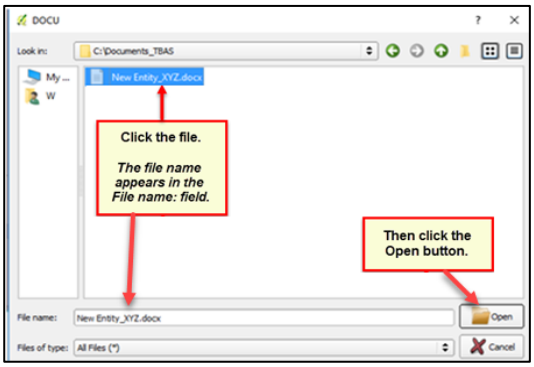
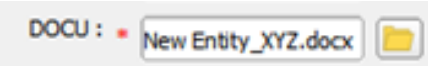
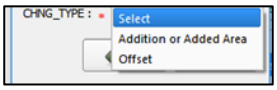
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 8	Click the **Add Area** button on the dialog box toolbar. *The **Modify Area Feature Choose change type** pop-up box appears, and asks to choose the change type.* 
Step 9	Since this is an addition (not a boundary correction), click the '**Legal Change**' radio button, then click **OK**. *The **Create Change Polygons** dialog box opens.* 
Step 10	Click the calendar icon next to the **EFF_DATE** field to open the calendar, then click on the effective date for the annexation.  *The selected date will populate the **EFF_DATE** field.*

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 11	Select an authority type for the addition in the **AUTHTYPE** field drop-down menu. 
Step 12	In the **DOCU** field, type in the ordinance or other legal documentation number authorizing the addition of the Off-Reservation Trust Lands or upload documentation for the change. To upload documentation, click the folder icon next to the **DOCU** field.  *The **DOCU** window opens*. 
Step 13	Click on the icon for **My Computer** (or simply **Computer** in some Windows versions) to open the directory where documentation is saved.  *The directories display*, as shown below. 

PART 2: HOW TO USE GUPS

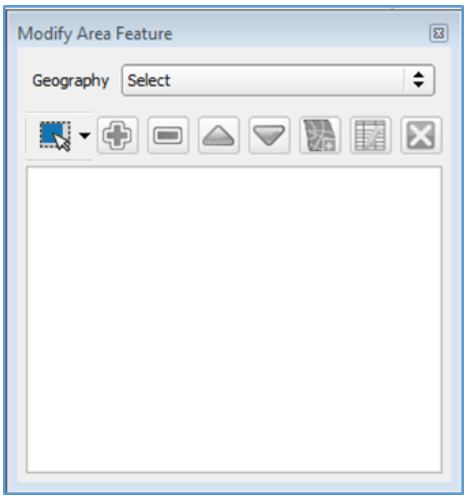
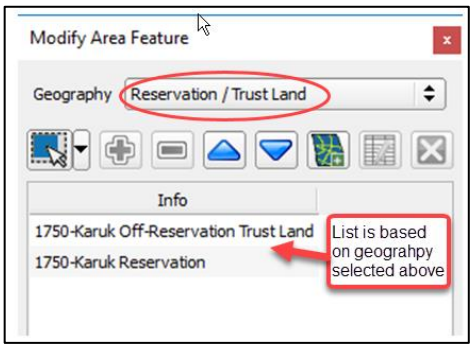
Step	Action and *Result*
Step 14	Select the appropriate directory in the list and navigate to the file to be uploaded. Click the file, then to upload it, click the **Open** button at the bottom of the **DOCU** window.  *The name of the document populates the **DOCU** field on the dialog box.* 
Step 15	Finally, select '**Addition or Added Area**' in the drop-down menu for the **CHNG_TYPE** field. 
Step 16	When finished, click **OK**. *The added faces (once saved) turn green in color on the map (color may vary).* If there is more than one census tract, block group or tribal subdivision, there are additional steps to follow when adding area either as 'reservation' or 'trust land'. Instructions can be found beginning in **Table 26 Step 15**.

PART 2: HOW TO USE GUPS

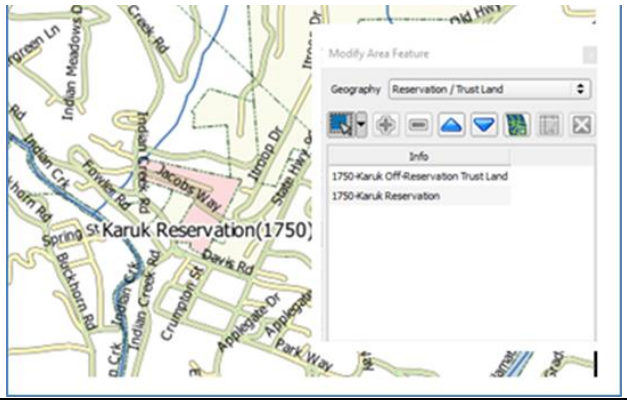
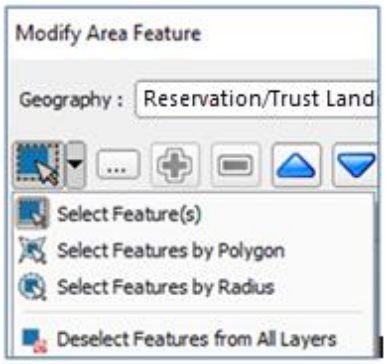
6.1.3 Make a Boundary Correction (Add Area/Remove Area)

To make a boundary correction that adds or removes area from a government, follow the steps in **Table 28**. In this fictitious example, a boundary correction is made to the Karuk Off-Reservation Trust land.

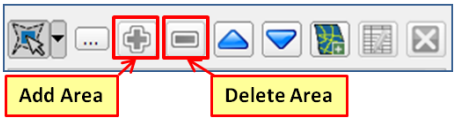
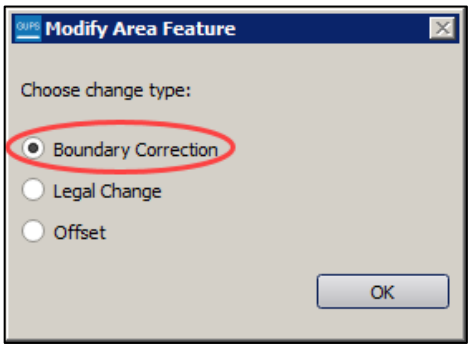
Table 28: Make a Boundary Correction

Step	Action and *Result*
Step 1	Open in **Map View** the entity. Be sure that all layers desired to be seen are checked in the **Layers Panel.**
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens*. 
Step 3	Click the arrow next to the **Geography** field, and select in the drop-down menu the entity type for which are will be added or removed. In this example, **'Reservation/Trust Land'** is selected. *The **Info** list populates with the entities for the geography that was chosen at the beginning of the project.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 4	Click on the row in the list for the area for which area is being added or removed (here Karuk off-Reservation trust land). *The map zooms to the area selected.* 
Step 5	Click the down arrow next to the **Select Features** button to select the face(s) to add or remove for the boundary correction. *The **Select Features** drop-down menu opens*.  In this example, add two small faces that are difficult to select, so opt for **'Select Features by Freehand'**. This method allows placing the cursor inside the first face and drawing a tiny line. *The selected face turns cyan*. To select the other face, press the **CTRL** key, and while holding it down, repeat the action for the remaining face. *Both faces turn cyan*.

PART 2: HOW TO USE GUPS

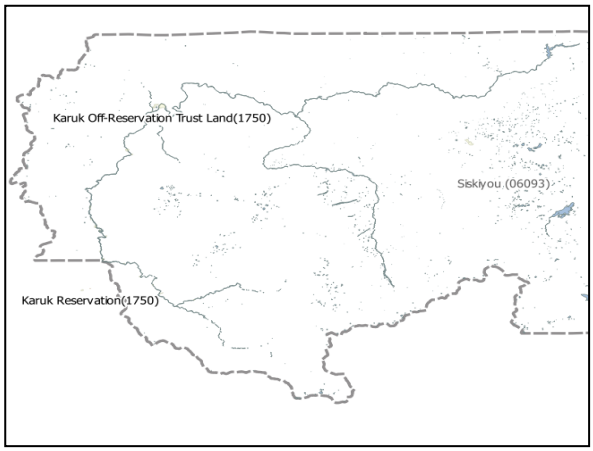
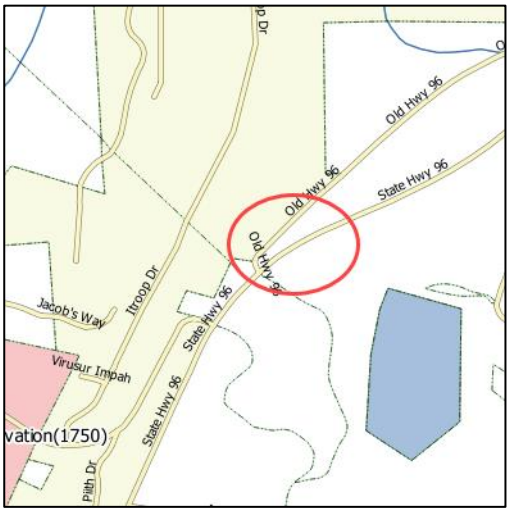
Step	Action and *Result*
	To add area, the area must be outside the selected entity. To remove area, the area must be within the selected entity.
Step 6	On the **Modify Area Feature** toolbar, click on the **Add** button (to add area to the entity) or on the **Remove** button (to remove area from the entity).  *The **Modify Area Feature Choose change type** pop-up box opens, and asks to choose the change type.* 
Step 7	Since a boundary correction is being made, rather than a legal boundary change, click the radio button next to '**Boundary Correction**'. Then click OK. *The added faces turn green on the map (color may vary) and are added to the legal entity boundary.*
	Removing area from a boundary is conducted following the same steps, the only difference being that the **Remove** button is clicked on the **Modify Area Feature** toolbar. Once the faces are selected and the **Remove** button clicked, the same Modify **Area Feature Choose change type** pop-up box appears. Select '**Boundary Correction**', and see the faces turn green.

PART 2: HOW TO USE GUPS

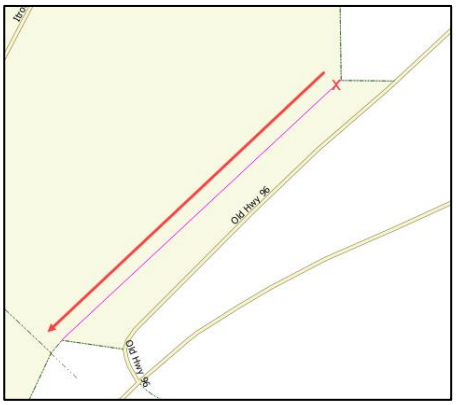
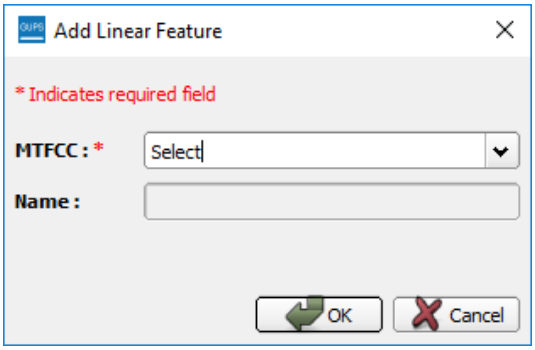
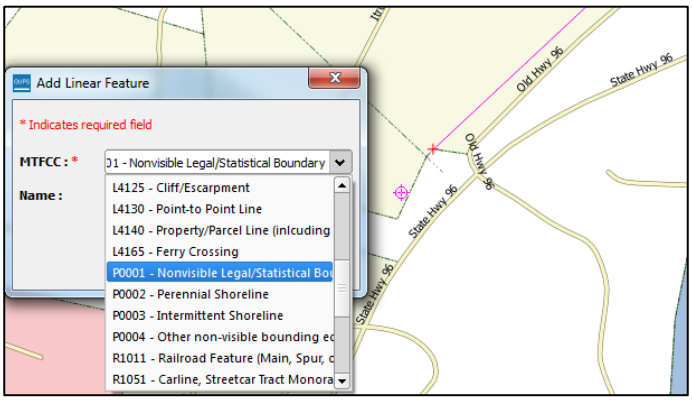
6.1.4 Adding a Geographic Offset

The steps to add a geographic offset are shown in **Table 29**. The fictitious example provided uses Karuk Reservation and Off-Reservation Trust Land. The steps in the table show how the tribe would mark the addition of a geographic offset along Old Hwy 96 in order to ensure that the houses that are addressed to the north side of that stretch of highway are not included within the reservation/trust land boundary.

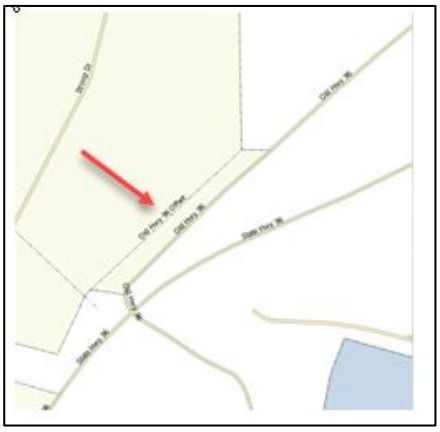
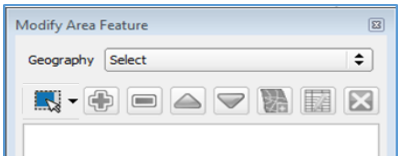
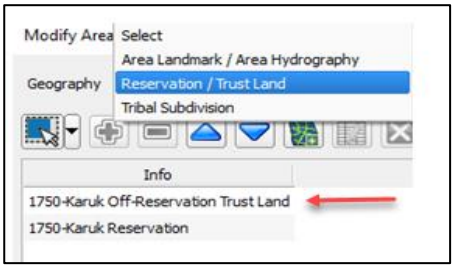
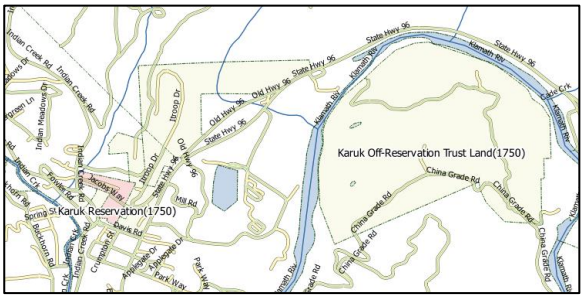
Table 29: Add a Geographic Offset

Step	Action and *Result*
	Creating a geographic offset requires two actions: first split the face (if an edge does not already exist), then add the area.
Step 1	Load the data for the reservation (in this example, Karuk Reservation/Trust Land). 
Step 2	Pan to the location of the geographic offset (here Old Hwy 96). 

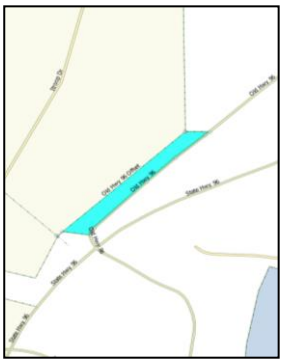
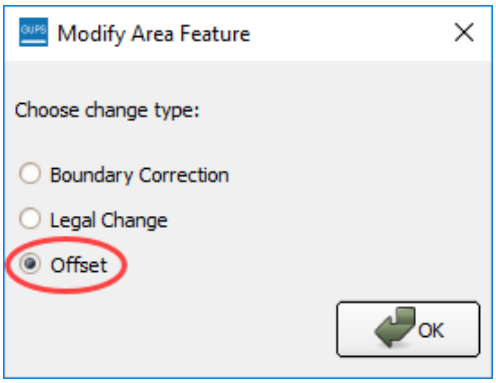
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	Click the **Add Linear Feature** button on the **BAS toolbar**.
Step 4	Left-click on the map at the beginning point of the first line and drag the cursor to create the line marking the offset distance from the highway. Left-click at the end of the line, then right-click to tell GUPS to finish drawing. *The line appears on the map, and the **Add Linear Feature** dialog box opens.*  
Step 5	Type a name if desired in the **Name** field, then select the appropriate MTFCC code in the **MTFCC** drop-down list. In this example, select 'P0001 – Nonvisible Legal/Statistical Boundary'.  *The **MTFCC** field populates with the selection.*

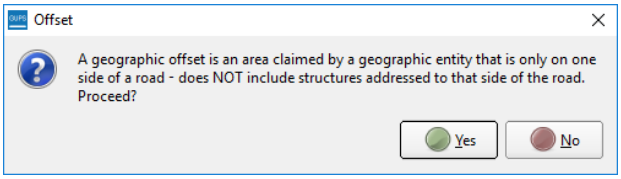
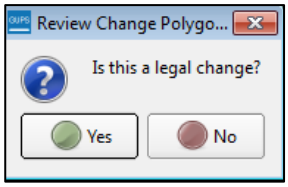
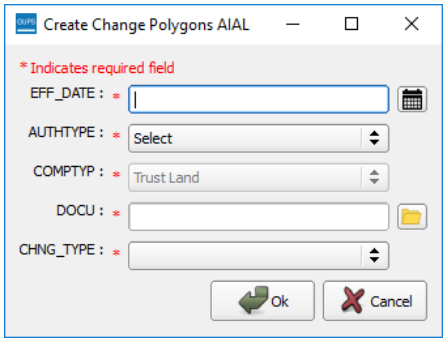
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 6	Click the **OK** button. *The line turns from purple to dark green (colors may vary) and the name, if provided, is added to the map*. 
Step 7	To add the area: click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens*. 
Step 8	In the **Geography** field drop-down menu, select the entity type (in this case, 'Reservation/Trust Land'). *A list of the available options populates the **Info** list at the bottom of the dialog box*. 
Step 9	Click on the row for Karuk Off-Reservation Trust Land in the list. *The map zooms to the Karuk Off-Reservation Trust Land.* 

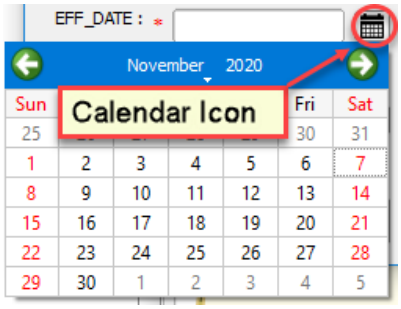
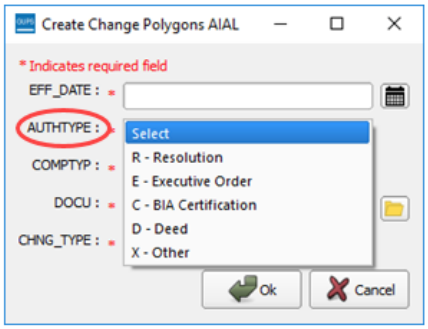
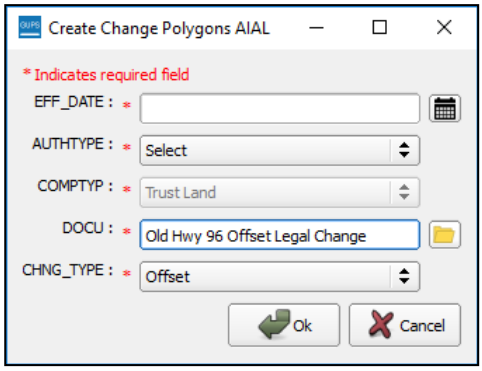
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 10	Pan to the location of the new offset drawn on the map. Then click the **Select Feature(s)** button on the small toolbar near the top of the **Modify Area Feature** dialog box.
Step 11	Left-click inside the offset face, then drag the cursor across the road. *When the cursor is released the face on the north side of the road will be selected and turn cyan to highlight*. 
Step 12	To record the offset, click the **Add** button on the **Modify Area Feature** dialog box toolbar. *The **Modify Area Feature Choose change type** dialog box opens*. 

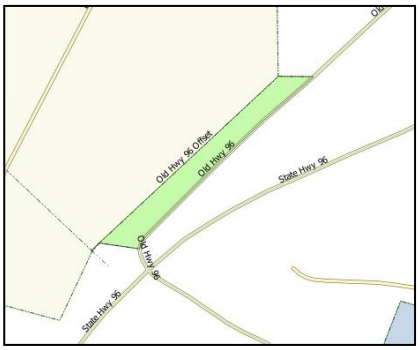
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 13	Click the radio button next to **Offset**. *A box opens giving an explanation of what a geographic offset is and asking to proceed*.  Click **Yes**. *The screen returns to the* ***Modify Area Feature Choose change type*** *box.*
Step 14	Click the **OK** button at the bottom of the box.
Step 15	*The* ***Review Change Polygons*** *pop-up box opens and asks whether this is a legal change*. 
Step 16	If the geographic offset is not part of a legal change, click **No**. *The change is automatically added as a boundary correction.* If the geographic offset is a legal change, click **Yes**. *The* ***Create Change Polygons*** *dialog box opens*. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 17	Click on the calendar icon next to the **EFF_DATE** field to select an effective date for the change. 
Step 18	Use the **AUTHTYPE** drop-down menu to select an authority type. 
Step 19	In the **DOCU** field, either type in the documentation number, or upload legal documentation of the change. To upload a document, click on the folder icon, navigate to the directory where the document is stored, and double-click the file. *The file uploads to GUPS and the name of the file appears in the **DOCU** field*. 
Step 20	In the **CHNG_TYPE** field, select '**Offset**' in the drop-down list. O*ffset fills the **CHNG_TYPE** field as shown in the screenshot above*.

PART 2: HOW TO USE GUPS

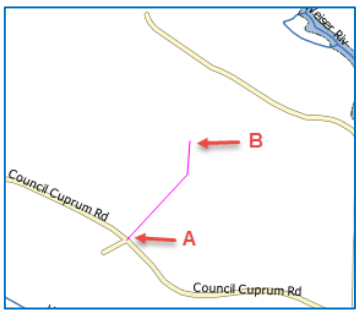
Step	Action and *Result*
Step 21	Click **OK**. *The face marking the offset turns green on the map (color may vary). The offset has been added.* 

6.2 How to Update Linear Features

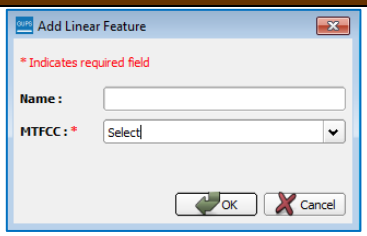
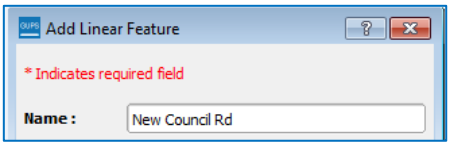
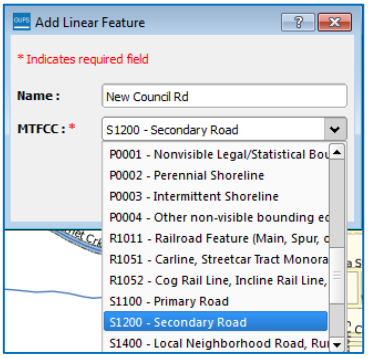
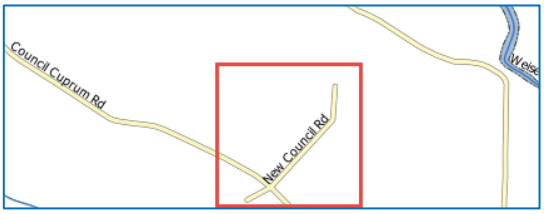
6.2.1 Adding a Linear Feature

Follow the steps below to add a linear feature.

Table 30: Adding a Linear Feature

Step	Action and Result
Step 1	Open in **Map View** the entity where the new linear feature will be added. Be sure that the edges layer is checked in the **Layers Panel.** Then zoom to the location on the map where the feature will be added.
Step 2	Click on the **Add Linear Feature** button on the **BAS toolbar**.
Step 3	Left-click the mouse at the starting point of the line (A) and continue to left-click the mouse at each vertex (shape) point of the line. Right-click the mouse (B) when the new line is completed. The right-click tells GUPS to finish drawing.  *The **Add Linear Feature** dialog box opens.*

PART 2: HOW TO USE GUPS

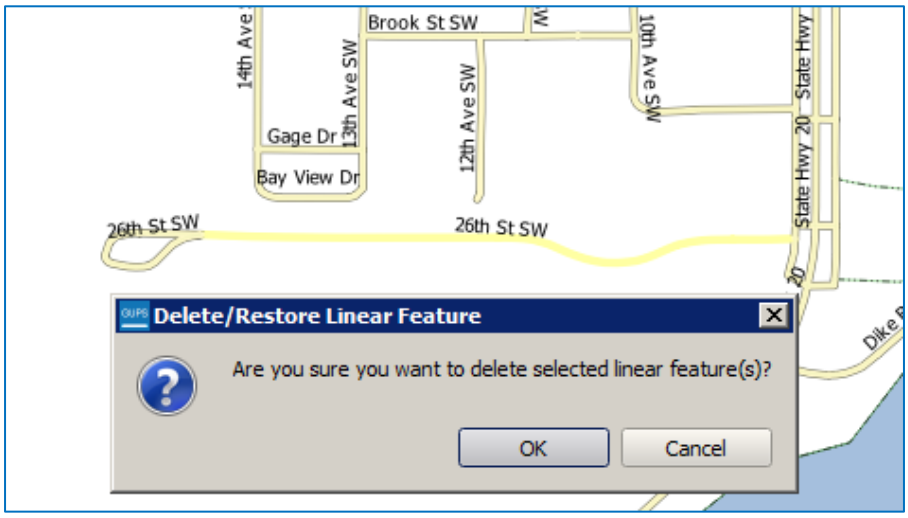
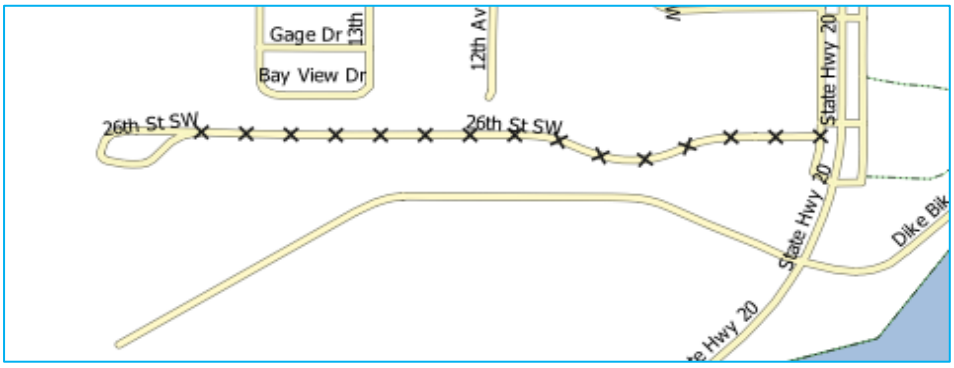
Step	Action and Result
	
Step 4	Type the name of the new linear feature in the **Name** field if the feature is named; otherwise, leave blank. Be sure when entering the feature name either to spell out the feature type (e.g., street, road, avenue), or to select an approved abbreviation from the list provided in **Appendix D** . 
Step 5	In the **MTFCC** field drop-down menu, choose the appropriate code for the feature. 
Step 6	Click the **OK** button at the bottom of the **Add Linear Feature** dialog box. *The added linear feature and the assigned name appear on the map.* 
	Adding a linear feature coincident with a boundary – GUPS will not allow one linear feature to be placed over another. For example, if attempting to add a road overlaying a legal boundary line, a pop-up box will warn 'Added Line Overlays an Existing line'. If adding a linear feature coincident with a boundary, follow the instructions for updating linear feature attributes instead (for instructions click on **Table 33**). Once a street is added on a boundary edge, update the MTFCC in the **Update Attributes** pop-up to one of the "S" class feature codes (e.g., S1400) and add a name in the **FULLNAME** field.

PART 2: HOW TO USE GUPS

6.2.2 Deleting a Linear Feature

To delete a linear feature, follow the steps below.

Table 31: Deleting a Linear Feature

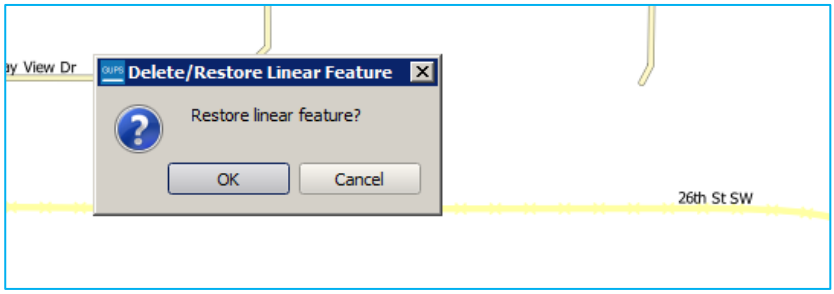
Step	Action and *Result*
Step 1	Open in **Map View** the entity where the linear feature will be deleted. Be sure that the edges layer is checked in the **Layers Panel.** Then zoom to the location on the map where the feature will be deleted.
Step 2	Click on the **Delete Linear Feature** button on the **BAS toolbar**.
Step 3	Left-click the linear feature to be deleted. In the example below, 26th St SW was clicked. *The clicked linear feature turns yellow (color may vary) and the **Delete Linear Feature** pop-up box appears, asking for confirmation to delete the feature.* 
Step 4	Click **OK**. *The line is deleted in the attribute table. The yellow color is removed from the line and the line now has Xs marked on the street.* 

Step	Action and *Result*
	When a linear feature is deleted, it is not actually removed from the Census Bureau shapefile. GUPS assigns a Delete Line flag to the feature in the attribute table, and the feature is later processed for deletion when the Census Bureau receives the BAS file. **Note:** If there are multiple linear features to delete, click the **Delete Linear Feature** button on the toolbar once, then press **CTRL** and click each of the features to be deleted. GUPS will delete all of the linear features selected. The cursor can also be dragged over multiple linear features to select them.

6.2.3 Restoring a Deleted Linear Feature

To restore a deleted linear feature, follow Table **32**.

Table 32: Restoring a Deleted Linear Feature

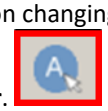
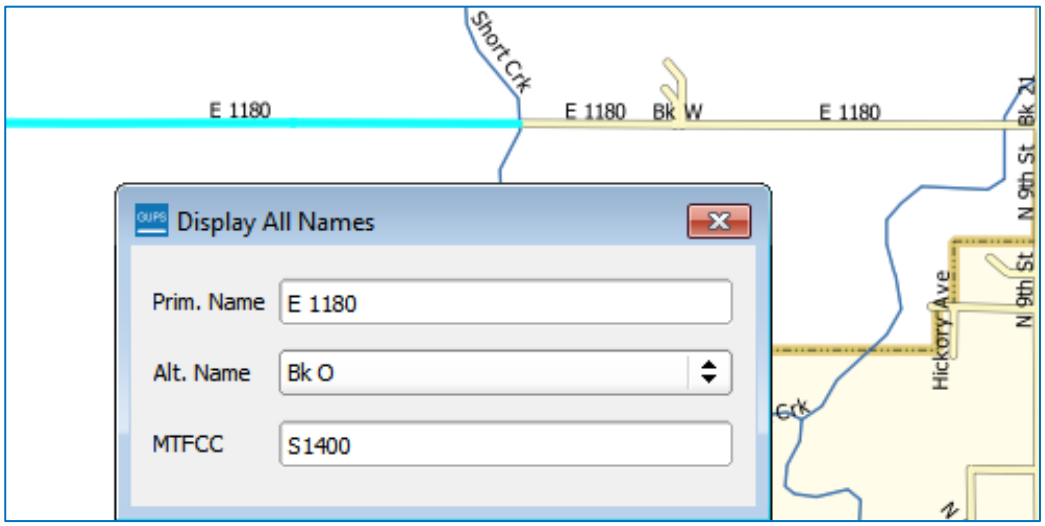
Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the deleted linear feature. Be sure the edges layer is checked in the **Layers Panel.** Then zoom to the location on the map where the deleted feature is located.
Step 2	Left-click on the deleted feature. *The deleted feature turns cyan and the **Delete Linear Feature** dialog box opens. The box asks for confirmation to restore the line.* 
Step 3	To restore the linear feature, click the **OK** button. *The **Delete Line flag** is removed from the attribute table and the line is restored.*

PART 2: HOW TO USE GUPS

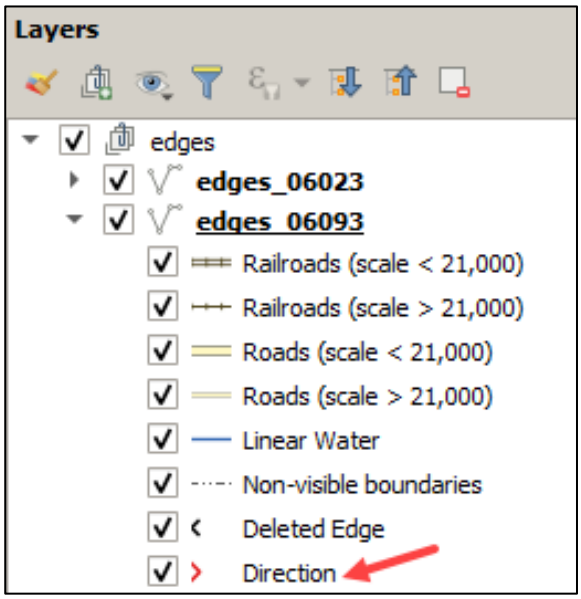
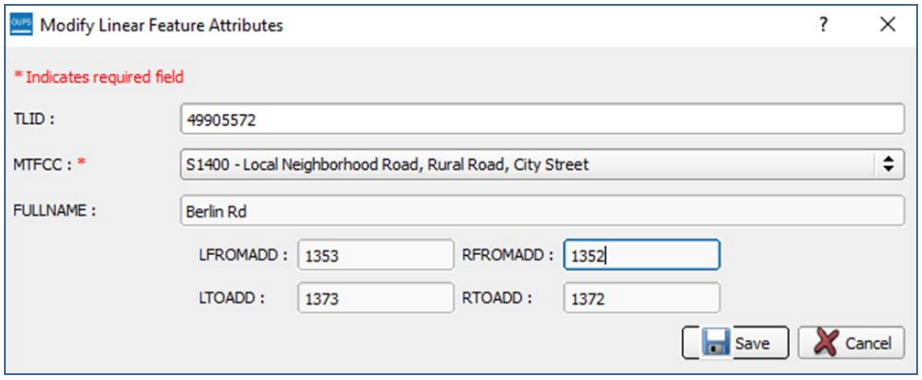
6.2.4 Changing the Attributes of a Linear Feature

Follow the steps in **Table 33** to change the attributes (e.g., the name, MTFCC, or address range) of a linear feature.

Table 33: Changing the Attributes of a Linear Feature

Step	Action and *Result*
Step 1	Identify any alternate names a linear feature may have before planning on changing the name. To identify all names, click the **Display All Names** button on the **BAS toolbar**.  Then click on the linear feature on the map. *The selected feature turns cyan and the **Display All Names** dialog box opens, showing the primary name in the **Prim. Name** field and the alternate name, if one is present, in the **Alt. Name** field.*  To see any additional alternate names, click the drop-down arrow to the right of the **Alt. Name** field. If no alternate name exists, 'NULL' appears in the **Alt. name** field.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	If providing an address range for a linear feature, check the checkbox next to **>** **direction** in the **Edges** field in the **Layers Panel.** *This activates the arrows that indicate the FROM and TO nodes for line segments*. 
Step 3	Click on the **Modify Linear Feature Attributes** button on the **BAS toolbar**.
Step 4	Click the linear feature on the map with attributes to be edited. *The **Modify Linear Feature Attributes** dialog box opens with the TIGER Line Feature ID (TLID) of the feature selected. The **FULLNAME** field populates if the feature is named. If the feature is not named, the field is blank. The **MTFCC**, **LTOADD**, **RTOADD**, **LFROMADD**, and **RFROMADD** fields show the assigned values for each.* 
Step 5	Update the **FULLNAME** field. If the field is blank, type in the new name. If the field is already populated, highlight the existing name and hit the **Delete** key on the keyboard. It is also possible to backspace over the name to clear the field. Then type in the new name.

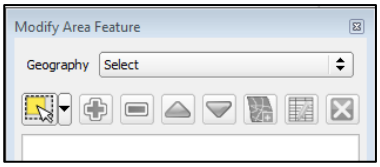
Step	Action and *Result*
Step 6	If correcting the **MTFCC**, click on the down arrow to the right of the field to open the drop-down menu and select the correct MTFCC from the menu.
Step 7	Change the address range for the linear feature, if necessary. Type in potential address ranges in the **LTOADD** (left to address); **RTOADD** (right to address); **LFROMADD** (left from address); **RFROMADD** (right from address) fields based on the directional arrows. The directional arrows show the origin node (FROM) and the end node (TO).
Step 8	Click **Save** button at the bottom of the **Modify Linear Feature Attributes** dialog box.
	The address ranges for all features are blank in the geographic partnership shapefiles because the ranges are stored in tables separate from the shapefiles. Address ranges can be provided in these fields, but be aware that the Census Bureau may already have address ranges. It is important to note which node is the FROM node and which is the TO node (based on the red directional arrows) so that the address ranges are associated with the correct side of the street and the correct census block. **Note:** Provide potential address ranges for blocksides, such as 0-98, 100-198, etc., for even parity and 1-99, 101-199, etc., for odd parity address ranges. Do not provide actual address ranges.

6.3 How to Update Area Landmarks and Hydrographic Areas

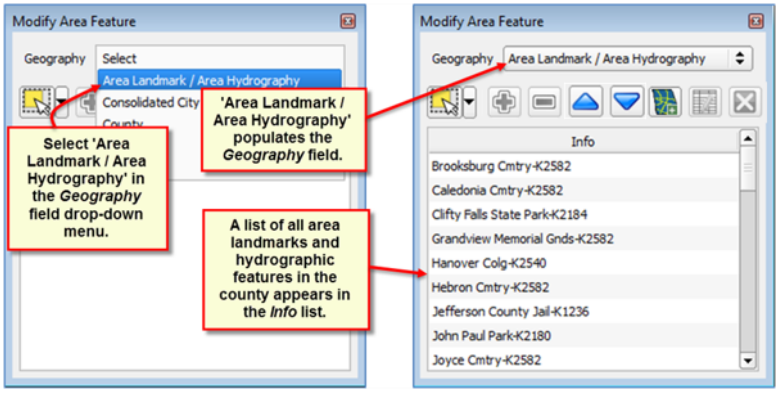
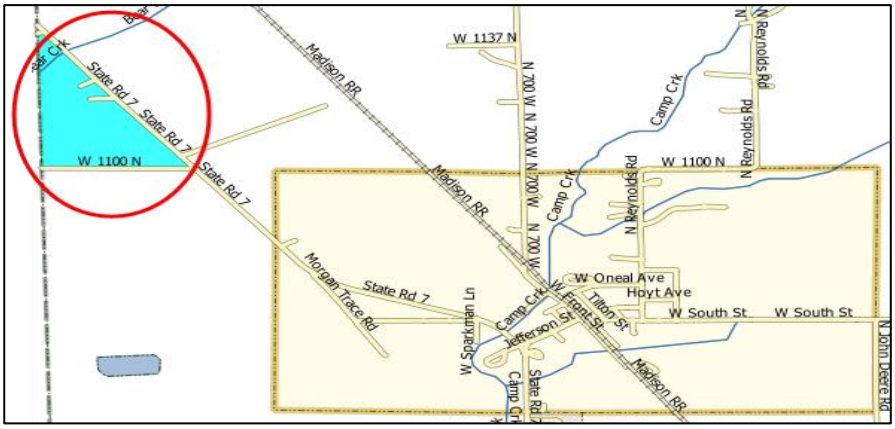
6.3.1 Adding a New Area Landmark/Hydrographic Area

To create a new landmark or hydrographic area, follow the steps below. In this fictitious example, a golf course is added in Jefferson County, Indiana, located northwest of Dupont Town.

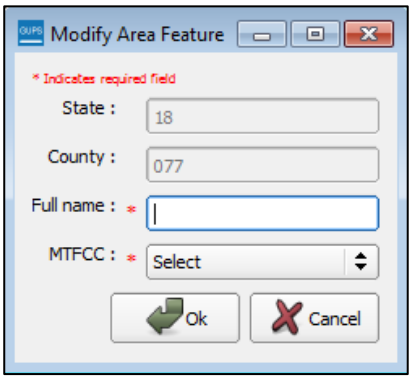
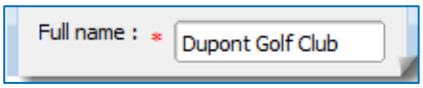
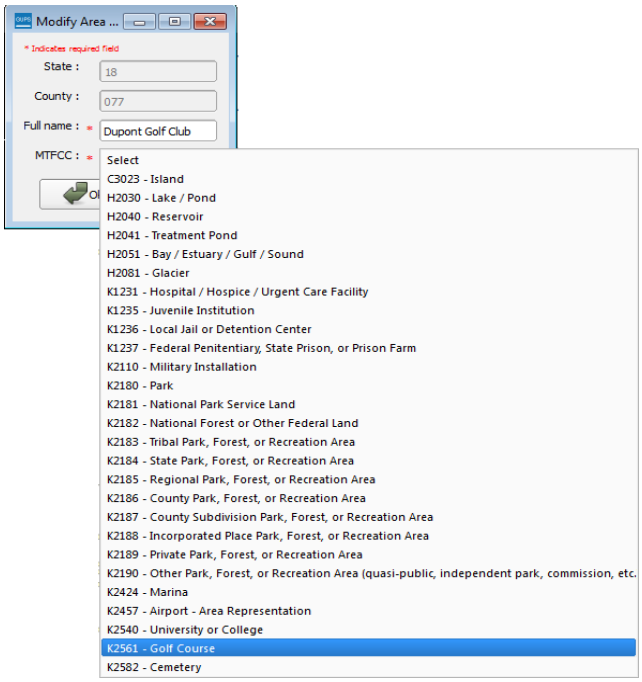
Table 34: Creating a New Area Landmark/Hydrographic Area

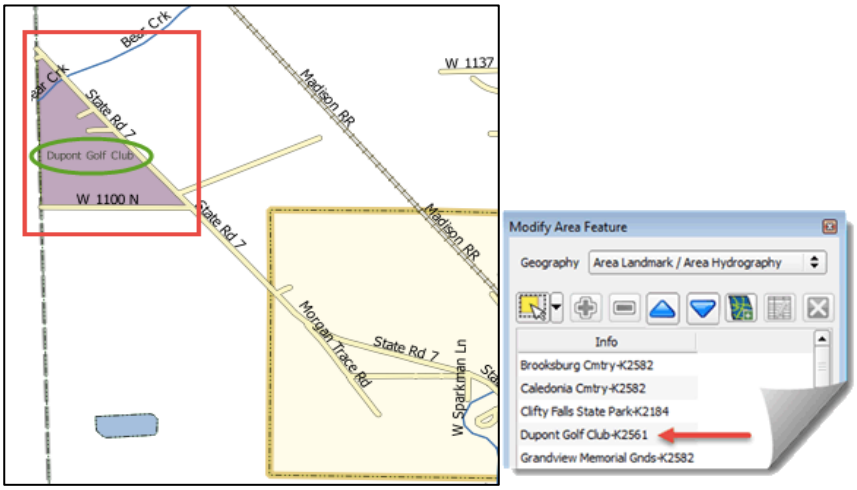
Step	Action and *Result*
Step 1	Open in **Map View** the county where the new landmark or hydrographic area will be added. Be sure the **'Area_Landmarks'** layer is checked in the **Layers Panel.** Then zoom to the location on the map where the landmark or hydrographic area will be added.
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	In the **Geography** field drop-down menu, select '**Area Landmark/Area Hydrology**'. *'Area Landmark/Area Hydrology' populates the **Geography** field and a list of area landmarks and hydrological features in the county appears in the **Info** list.* 
Step 4	Click on the yellow **Select Feature(s)** button on the **Modify Area Feature** toolbar.
Step 5	Then click on the first face on the map to select it. To select more than one face, depress the **CTRL** key, and while holding it down, click on the additional faces. In this example, two faces are selected, one on either side of Bear Creek. *The selected faces turn cyan.* 
Step 6	Click on the **Add Entity** button on the **Modify Area Feature** toolbar.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	*The **Modify Area Feature** box opens.* 
Step 7	In the **Modify Area Feature** box, type in the name of the new area landmark in the **Full name** field.  Then select the appropriate code in the **MTFCC** field drop-down list, as shown below. 

Step	Action and *Result*
Step 8	Click **OK**. *The faces selected for the new entity now display in purple (color may vary). The name of the added landmark also appears within the change polygon on the map (see green circle), and the name of the new entity appears in the **Info** list.* 
	Because all geographic areas consist of faces, it may be necessary to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (see **Table 30** for instructions on how to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. The new face can now be added to the new entity.

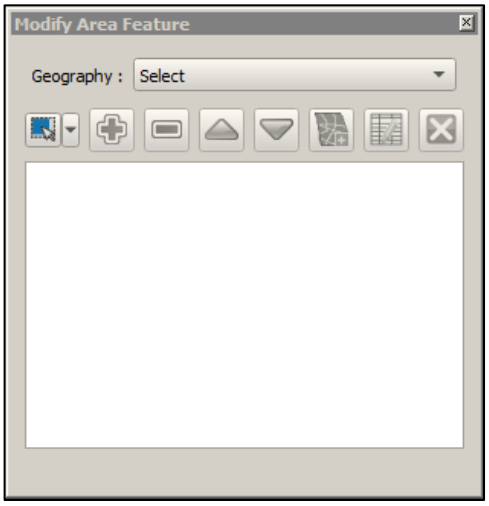
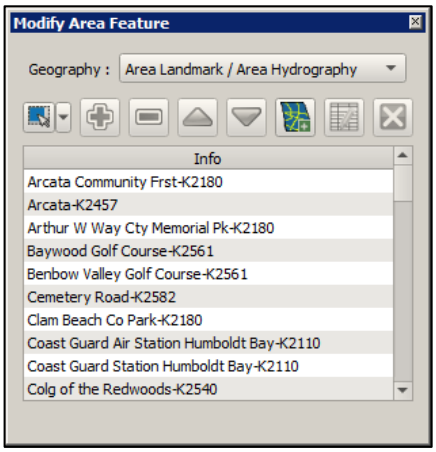
6.3.2 Deleting an Area Landmark/Hydrographic Area

To delete an area landmark or hydrographic area, follow the steps below.

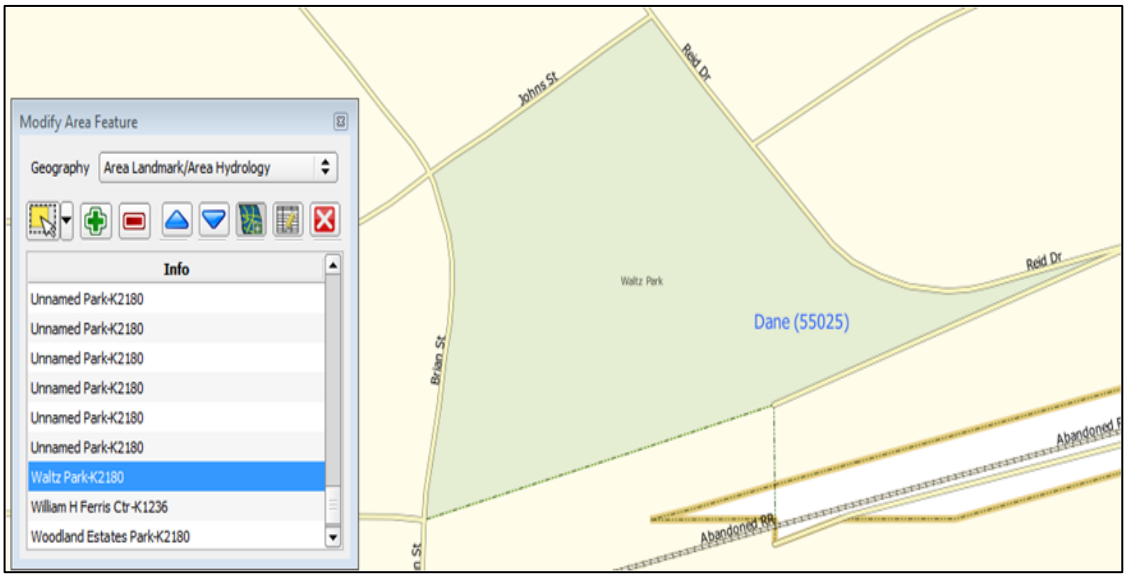
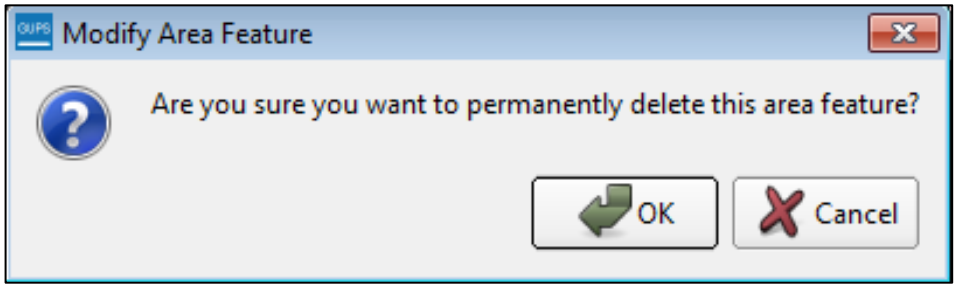
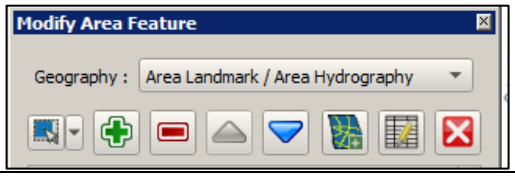
Table 35: Deleting an Area Landmark/Hydrographic Area

Step	Action and *Result*
Step 1	Open in **Map View** the county where the new landmark or hydrographic area will be deleted. Be sure the **'Area_Landmarks'** layer is checked in the **Layers Panel.**

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 
Step 3	In the **Geography** field drop-down menu, select '**Area Landmark/Area Hydrography**'. *'Area Landmark/Area Hydrography' populates the **Geography** field and a list of area landmarks and hydrological features in the county appears in the **Info** list.* 
Hint	To view all the area landmarks and hydrographic areas in the **Info** list, use the scroll bar located to the far right-hand side of the **Modify Area Feature** dialog box. To move up and down within the list, use the blue navigation arrows located on the small toolbar near the top of the dialog box.

PART 2: HOW TO USE GUPS

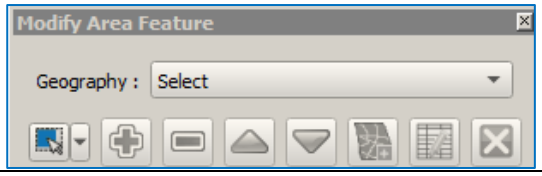
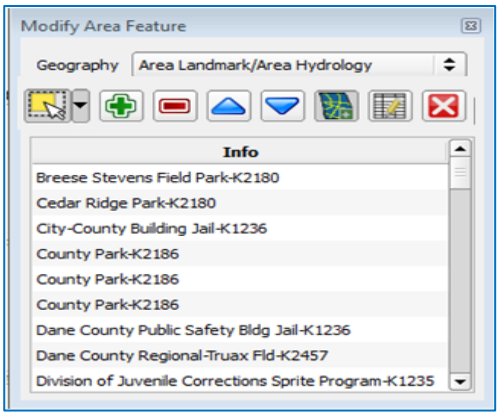
Step	Action and *Result*
Step 4	In the **Info** list, click on the area landmark/hydrographic area to be deleted. *The selected entry is highlighted in the **Info** list and the map zooms directly to the selected feature.* 
Step 5	Click the **Delete Area Feature** button on the **Modify Area Feature** dialog toolbar. *A pop-up box opens and asks to confirm deleting the feature*. 
Step 6	To delete the area landmark/area hydrography, click **OK**. *The linear feature turns gray (color may vary) on the map, and its name disappears from the **Info** list*.
Step 7	Not ready to delete? Click **Cancel** to *be returned to the **Modify Area Feature** dialog*. 

Step	Action and *Result*
Step 8	Once ready to delete the area landmark/area hydrography, click on the feature name in the **Info** list, *the buttons will reactivate*, and click the **Delete Area Feature** button.

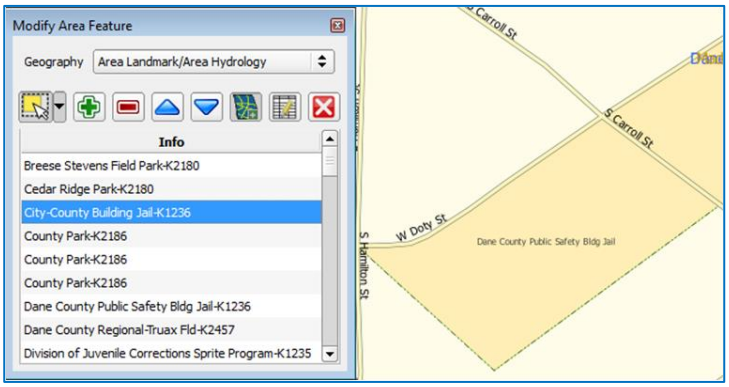
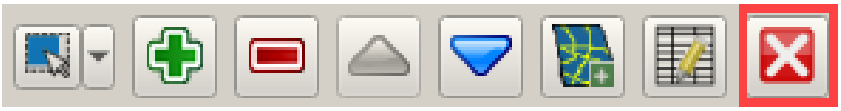
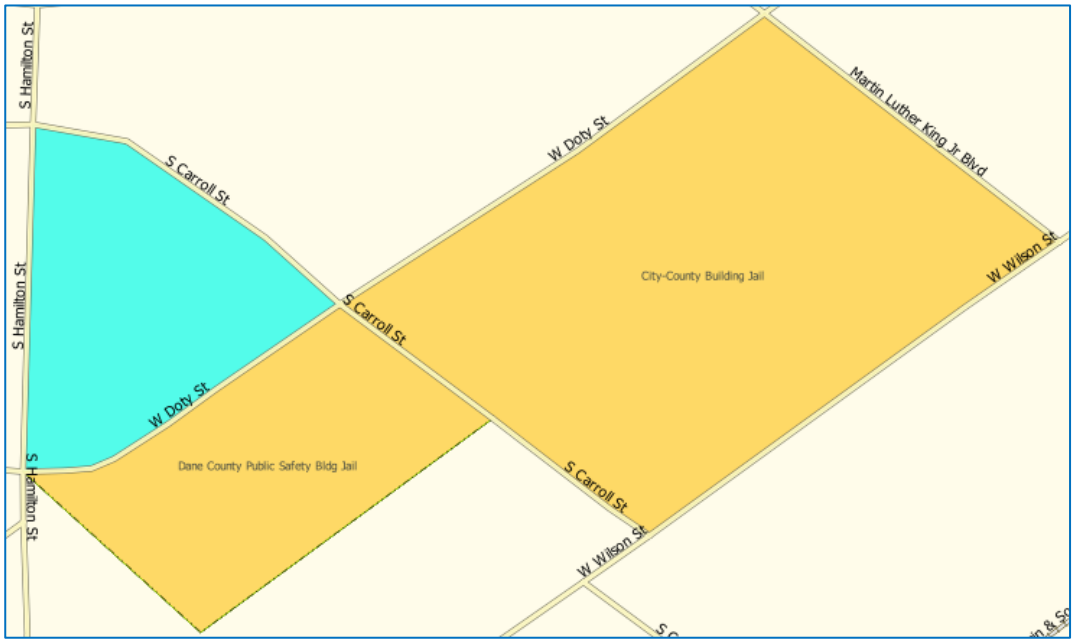
6.3.3 Adding Area to an Area Landmark or Hydrographic Area

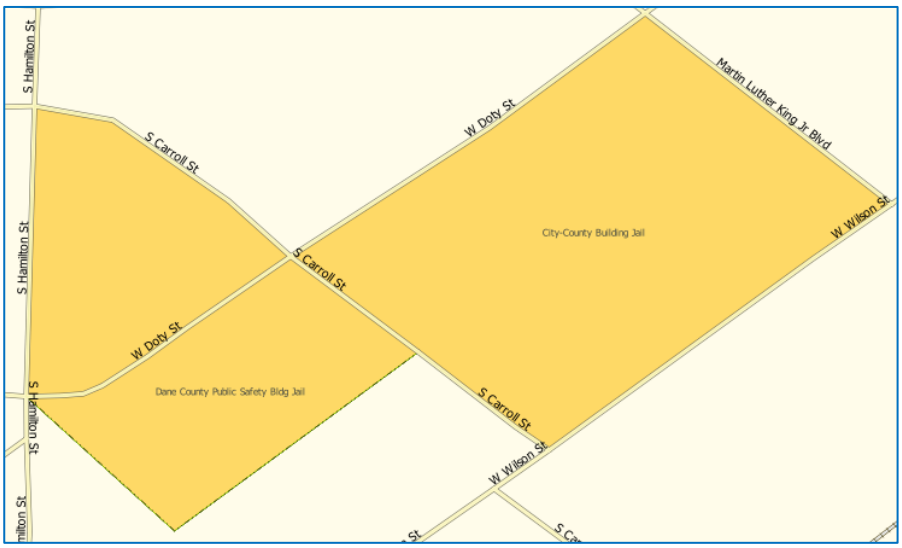
Follow the steps in **Table 36** to add area to an area landmark or hydrographic area.

Table 36: Adding Area to an Area Landmark/Hydrographic Area

Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the area landmark or hydrographic area to which area will be added. Be sure the '**Area_Landmarks'** layer is checked in the **Layers Panel.**
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**. *The **Modify Area Feature** dialog box opens.* 
Step 3	Click the down arrow next to the **Geography** field and select '**Area Landmark/Area Hydrography**' in the drop-down menu. *The selection populates the **Geography** field and a list of area landmarks/hydro features in the county appears in the **Info** list.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 4	Click the row in the list for the area landmark/area hydrography to which area will be added. *The selected entity is highlighted in the **Info** list and the map zooms to its location.* 
Step 5	To select the face(s) to add to the area landmark, click the **Select Feature** button on the **Modify Area Feature** toolbar.  Then click the face to be added to the area feature. *The added face turns cyan. (**Note:** To select more than one face, depress the **CTRL** key, and while holding it down, click the other faces.)* 

Step	Action and *Result*
Step 6	To add the face(s) selected, click the **Add Area** button on the **Modify Area Feature** dialog box toolbar. *The selected face is added to the area landmark and turns the same color as the other face(s) that make up the area landmark. The map also now shows the full extent of the area landmark.* 
	Because all geographic areas consist of faces, it may be necessary to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (see **Table 30** for instructions on how to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. The new face can now be added to the new entity.

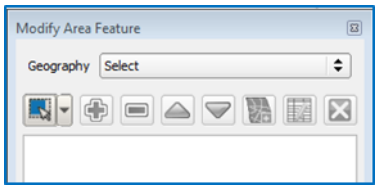
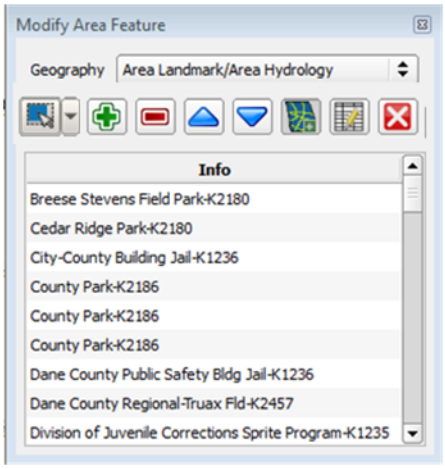
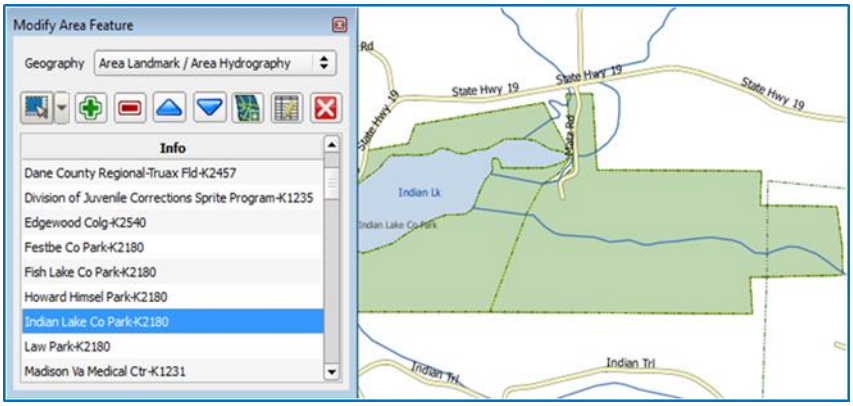
6.3.4 Removing Area from an Area Landmark/Hydrographic Area

Follow the steps in **Table 37** to remove area from an area landmark or hydrographic area.

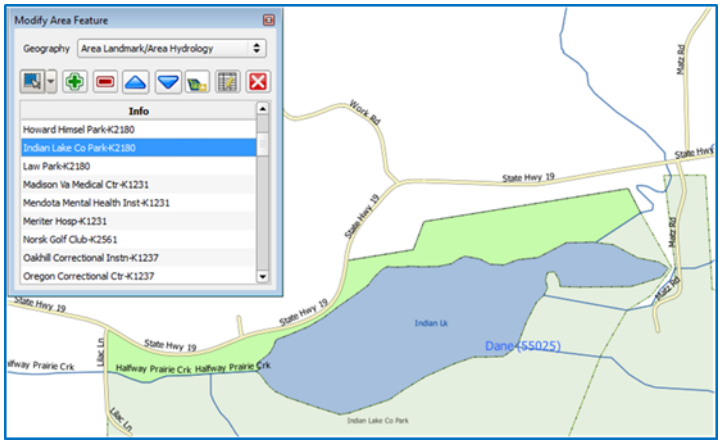
Table 37: Removing Area from an Area Landmark/Hydrographic Area

Step	Action and *Result*
Step 1	Open in **Map View** the county that contains the area landmark or hydrographic area from which area will be removed. Be sure the '**Area_Landmarks**' layer is checked in the **Layers Panel.**
Step 2	Click the **Modify Area Feature** button on the **BAS toolbar**.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	*The **Modify Area Feature** dialog box opens.* 
Step 3	In the **Geography** field drop-down menu, select '**Area Landmark/Area Hydrography**'. *'Area Landmark/Area Hydrography' populates the **Geography** field and a list of area landmarks and hydrological features in the county appears in the **Info** list.* 
Step 4	Select the area landmark/hydrography area from which area will be removed. *The selected entity is highlighted in the **Info** list and the map zooms to its location*. In this example, Indian Lake County Park is chosen. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	To select the face(s) to remove from the area landmark, click the **Select Feature** button on the **Modify Area Feature** dialog box toolbar. Then click on the first face to remove. To select additional faces, depress the **CTRL** key, and while holding it down, click the additional faces.
Step 6	To remove the face(s) selected, click the **Remove Area** button on the **Modify Area Feature** dialog box's internal toolbar. *The selected face turns light green (color may vary) on the map and is removed from the area landmark.* 
	Because all geographic areas consist of faces, it may be necessary to "split" a face to accurately reflect an entity's boundary. To split a face, digitize a new line that represents the boundary's location (see **Table 30** for instructions on how to add a linear feature) and assign it the appropriate MTFCC. This splits the original face into two faces. The new face can now be added to the new entity.

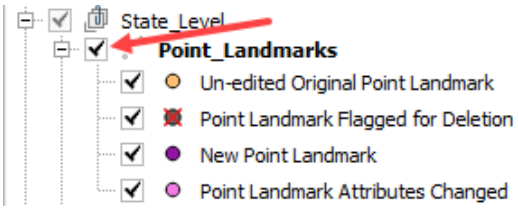
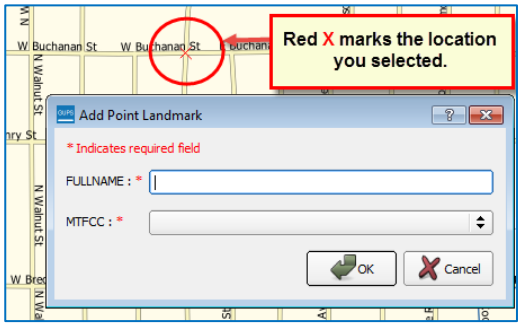
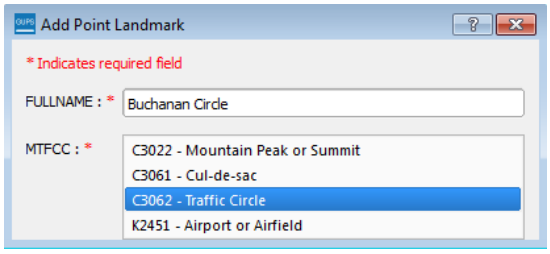
6.4 How to Update Point Landmarks

6.4.1 Adding a Point Landmark

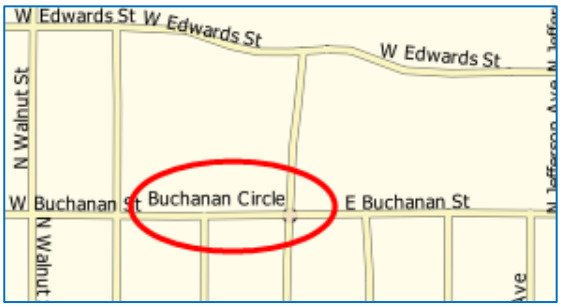
To add a point landmark, follow the steps in **Table** 38.

PART 2: HOW TO USE GUPS

Table 38: Adding a Point Landmark

Step	Action and *Result*
Step 1	Open the project in **Map View**. Be sure the '**Point Landmark**' layer is checked in the **Layers Panel** (found under the '**State_Level**' layer). 
Step 2	Click the **Add Point Landmark** button on the **BAS toolbar**.
Step 3	Click on the map where the point landmark will be added. *The **Add Point Landmark** dialog box opens and a red X marks the selected location*. 
Step 4	Type in the name for the new point landmark in the **FULLNAME** field. Then click the down arrow next to the **MTFCC** field to open the drop-down menu. 

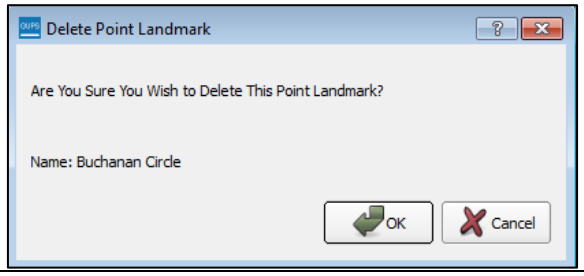
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	Select the MTFCC, then click the **OK** button at the bottom of the box. *The map updates to show the added point landmark*. In this case, a traffic circle was added and named Buchanan Circle. 

6.4.2 Deleting a Point Landmark

To delete a point landmark, follow the steps in **Table 39**.

Table 39: Deleting a Point Landmark

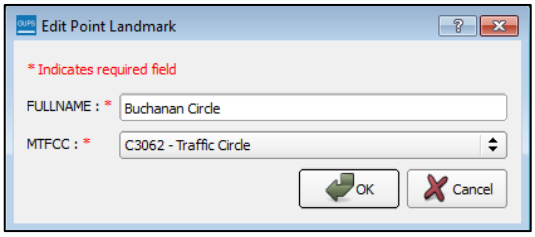
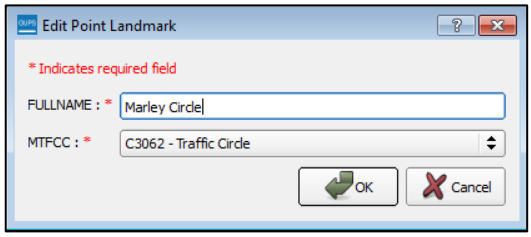
Step	Action and *Result*
Step 1	Zoom to the area on the map where a point landmark will be deleted. In this example, the traffic circle named Buchanan Circle will be deleted.
Step 2	Click the **Delete Point Landmark** button on the **BAS toolbar**.
Step 3	On the map, click on the point landmark to be deleted (Buchanan Circle). The **Delete Point Landmark** dialog box opens, and asks to confirm the deletion of the point landmark. 
Step 4	Click **OK**. *The point landmark disappears from the map and from the attribute table.*

6.4.3 Changing the Attributes of a Point Landmark

To change the attributes of a point landmark (e.g., its name, MTFCC), follow the steps in **Table 40**.

Table 40: Changing the Attributes of a Point Landmark

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 1	Zoom to the area on the map where the point landmark is located and click on the landmark. In this example, the name of Buchanan Traffic Circle will be changed.
Step 2	Click on the **Edit Point Landmark** button on the **BAS toolbar**.
Step 3	On the map, click on Buchanan Circle. *The **Edit Point Landmark** dialog box opens.* 
Step 4	To change the name, backspace over the name appearing in the **FULLNAME:** field, then type in the new name. In this example, the name is changed to Marley Circle. 
Step 5	Click **OK**. The new name of the point landmark appears on the map.

6.5 How to Use GUPS Review and Validation Tools

GUPS provides two tools—the **Geography Review** tool and the **Review Change Polygons** tool to help users review and validate the updates made in the system.

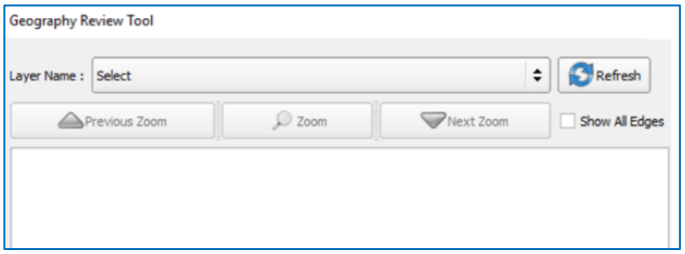
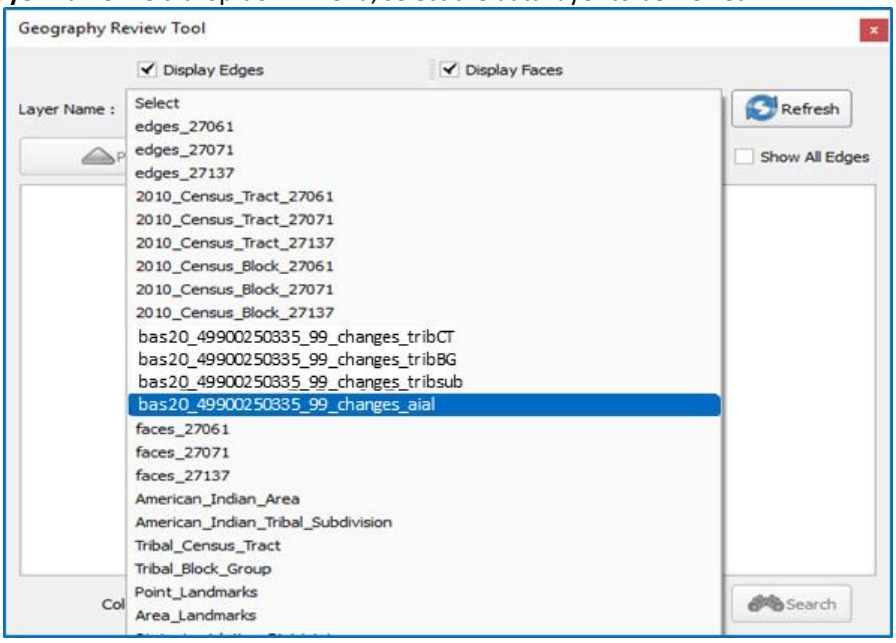
PART 2: HOW TO USE GUPS

6.5.1 Geography Review Tool

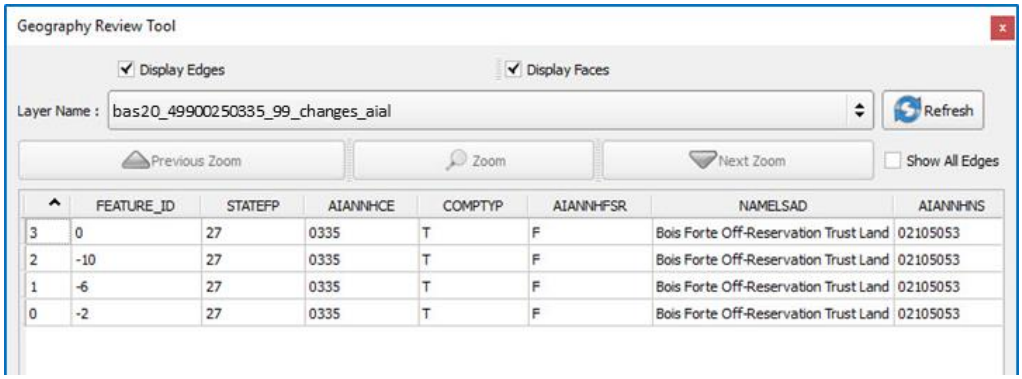
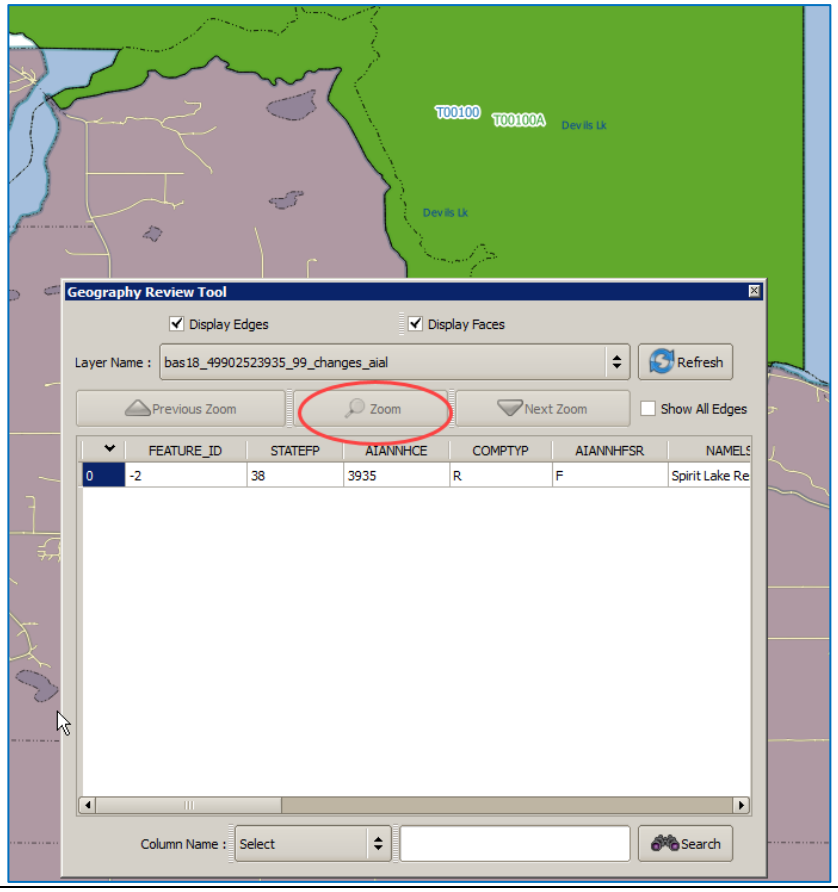
The **Geography Review** tool filters the map layers based on various fields in the attribute table. This tool can check the changes made to linear features, area landmarks, point landmarks, and legal boundaries anywhere within a county. It can also be used to view the attributes of governments, features, landmarks, and boundaries that were not changed.

Note: *Although this tool allows users to review the changes, they cannot use it to edit them*. Instructions for how to use the **Geography Review** tool information appear in **Table 41**.

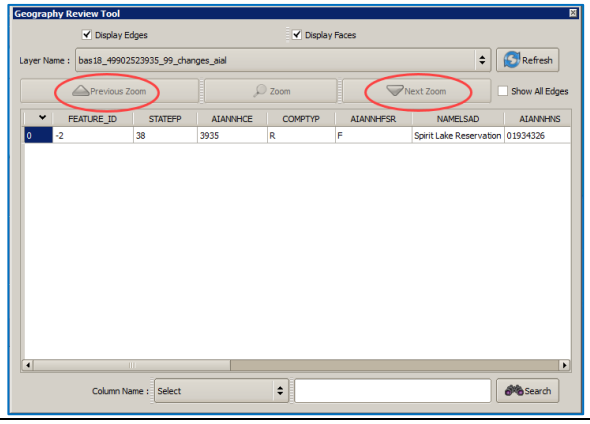
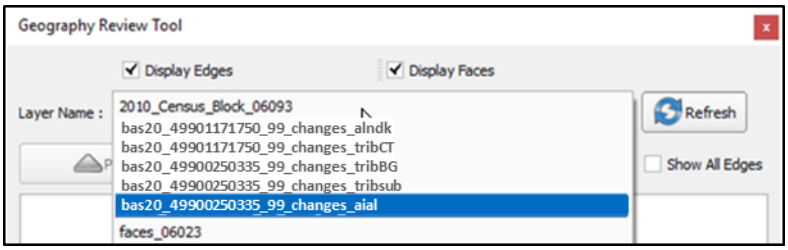
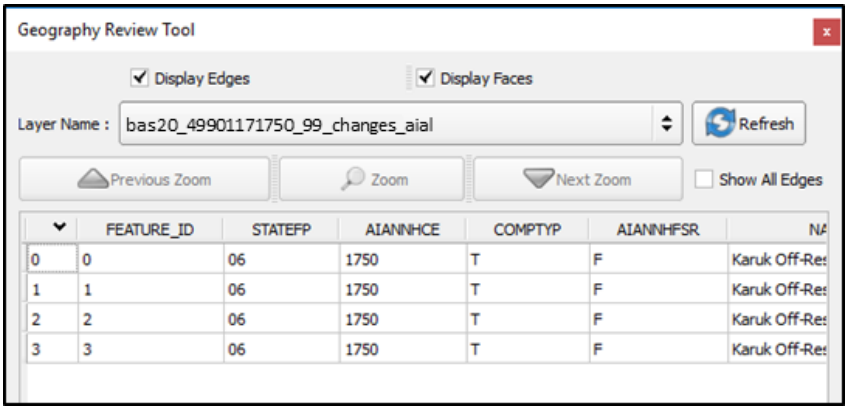
Table 41: Using the Geography Review Tool

Step	Action and *Result*
Step 1	Click on the **Geography Review** button on the **BAS toolbar**. *The **Geography Review Tool** dialog box opens.* 
Step 2	In the **Layer Name:** field drop-down menu, select the data layer to be viewed:  In this example, the file “bas18_49900250335_99_changes_aial” was selected. This is the transaction data output file for the area landmark layer (note the word “changes” in the file name to indicate the layer has been updated).

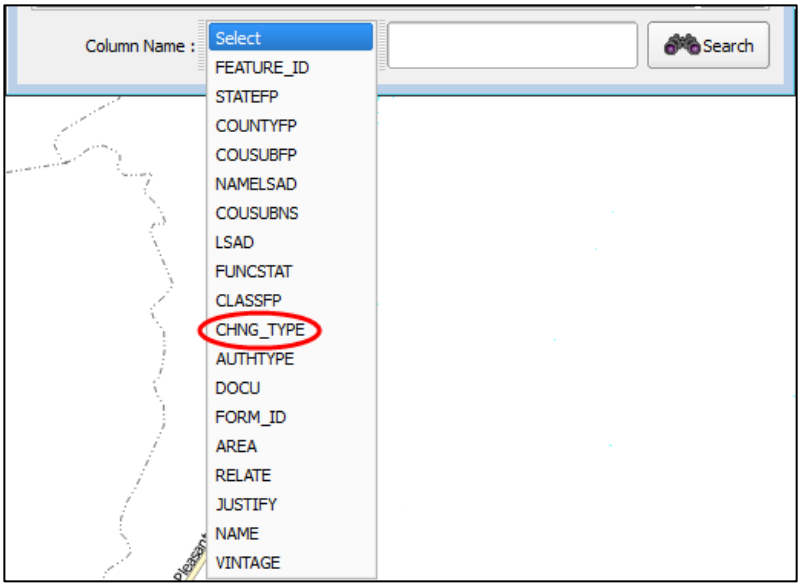
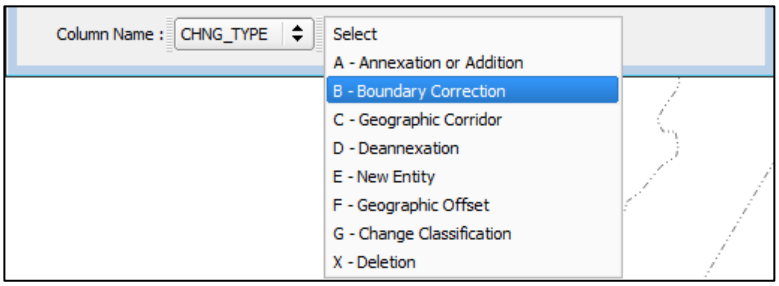
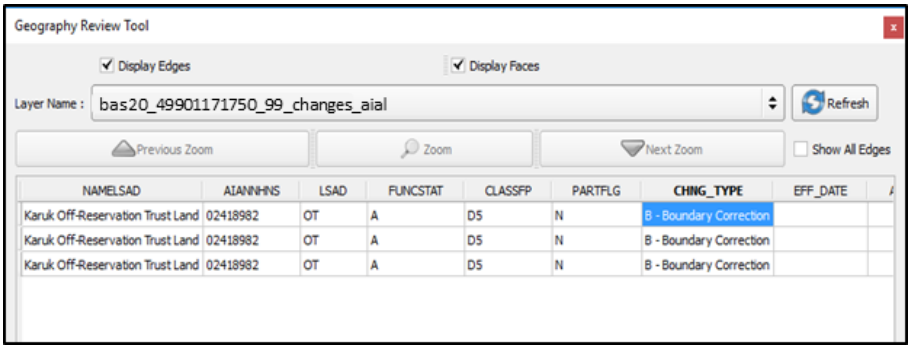
PART 2: HOW TO USE GUPS

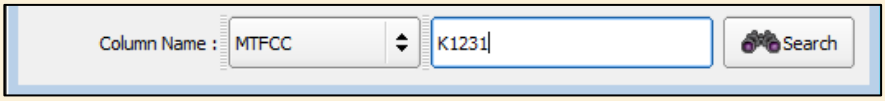
Step	Action and *Result*
Step 3	*Once the selection is made, the attribute table for the layer opens, with the attributes for each area landmark changed displayed in a separate row.* 
	If not all the columns in the attribute data table are visible, drag the edge of the dialog box outward to widen the view. Users may also move the dialog box to another location by clicking inside the box and dragging it.
Step 4	To see a tribal area on the map, click its row in the attribute table, then click the **Zoom** button (*the row is highlighted and the map automatically zooms to the area selected, which is highlighted and shows changes made in cyan*). 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	To view other features listed in the table rows, use the **Previous Zoom** and **Next Zoom** buttons. *The previous or next row highlights and the system zooms to the map for that row.* 
Step 6	Use the **Search** feature at the bottom of the dialog box to filter the table layers by specific attributes (e.g., full name, MTFCC, change type, etc.).
Step 7	First, select the layer to view (in this example, the AIAL (Tribal Area) layer is selected).  *For each feature changed for a Tribal area, the attributes of the changed feature display in the table rows. Each column gives the name of the attribute.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 8	In the **Column Name** drop-down menu, select the attribute by which to filter.  In this example, change type (**CHNG_TYPE**) is selected.
Step 9	Finally, in the **Select** drop-down, select the attribute value by which to filter, then click the **Search** button. In this example, 'Boundary Correction' is selected.  *After clicking **Search**, the attribute table is filtered to show the rows for all boundary corrections made in the AIAL (Tribal Area) layer.* 

Step	Action and *Result*
Step 10	To view an individual boundary correction, click on its row and click the **Zoom** button.
Step 11	To return to the attribute table to see the full (**unfiltered**) county subdivision layer, click the **Refresh** button in the upper right-hand corner of the dialog box.
	Note that when filtering the table by some attributes (e.g., state and county FIPS code or MTFCC), no drop-down list appears from which to make a selection. This is because some attribute codes are too numerous to make scrolling through a list practicable. Instead a blank box will appear in which search values may be entered. For example, if filtering the area landmarks layer by MTFCC to see hospitals, type in the MTFCC for hospitals (K1231), as shown below, then click **Search**. 

6.5.2 Review Change Polygons Tool

The **Review Change Polygons** tool allows users to view the transactions created from the edits made to legal governments, as well as to area landmarks and hydrographic areas. Users can review the transaction polygons that represent boundary changes, as well as new incorporations and disincorporations. The tool also allows users to make corrections to change polygons.

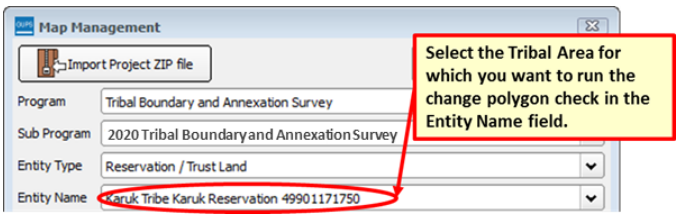
Notes on Reviewing Change Polygons

The **Review Change Polygons** tool must be run before GUPS will export a file.

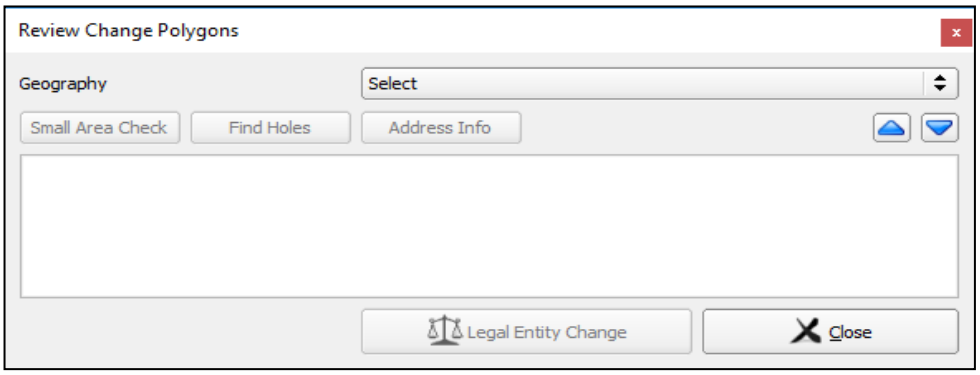
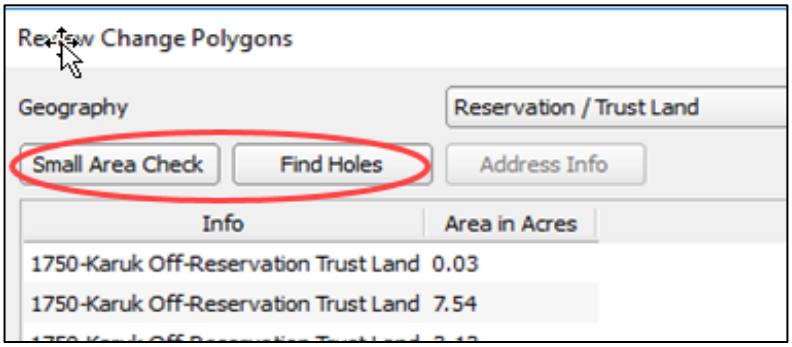
The **Review Change Polygons** tool must be run for each county in which changes were made. For example, if changes were made to the working county, but also to an adjacent county when annexing land for the tribal area, the change polygon check must be run on **both** counties.

To use the **Review Change Polygons** tool, follow the steps in Table 42.

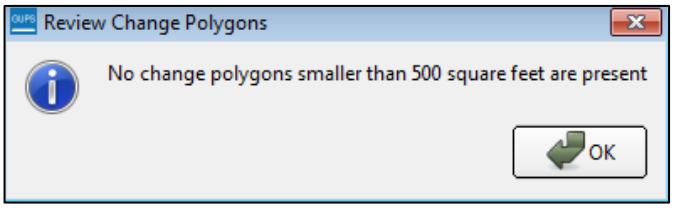
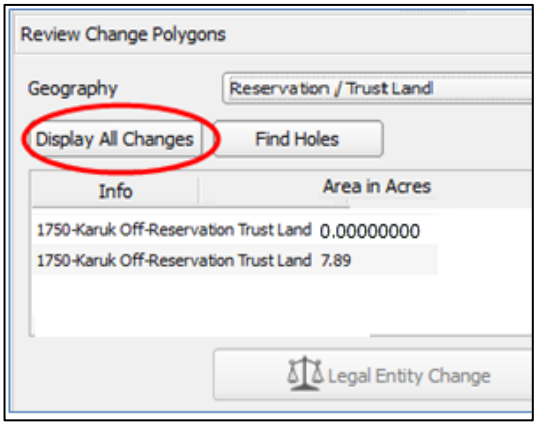
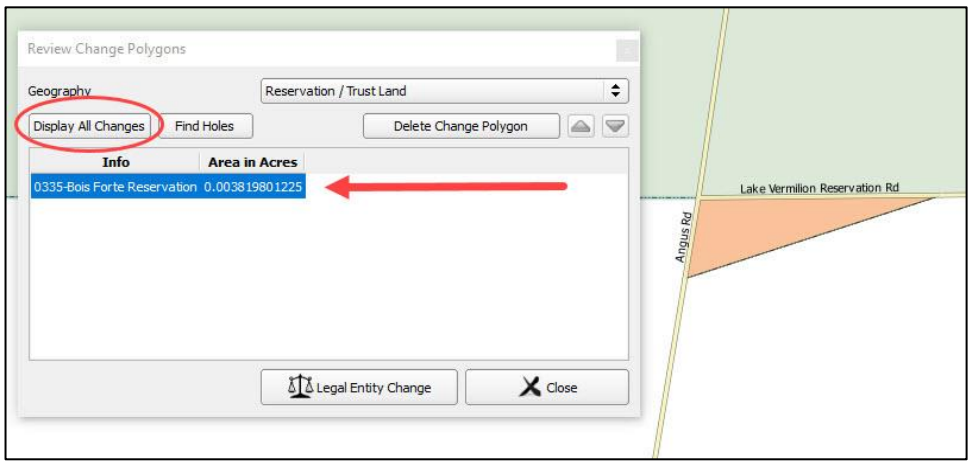
Table 42: Reviewing Change Polygons

Step	Action and *Result*
Step 1	In the **Map Management** dialog box, make sure the Tribal Area for which the check is to be run appears in the **Working County** field.  Once the **Open** button at the bottom of the dialog box is clicked and the map opens in **Map View**, the **Review Change Polygons** check may be run.

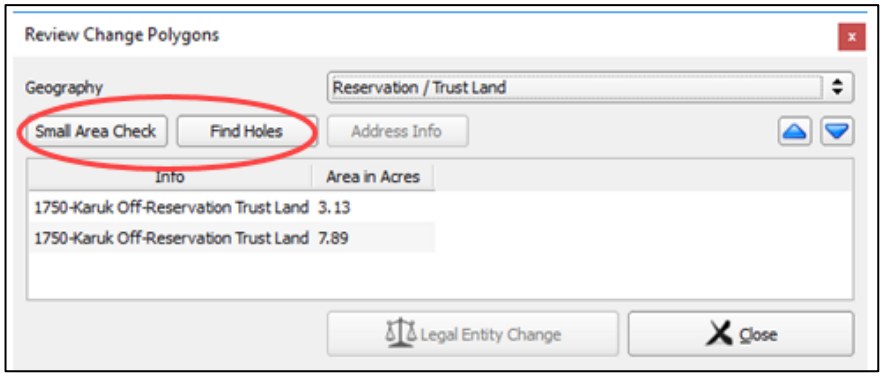
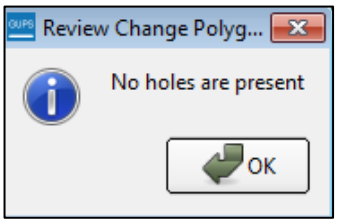
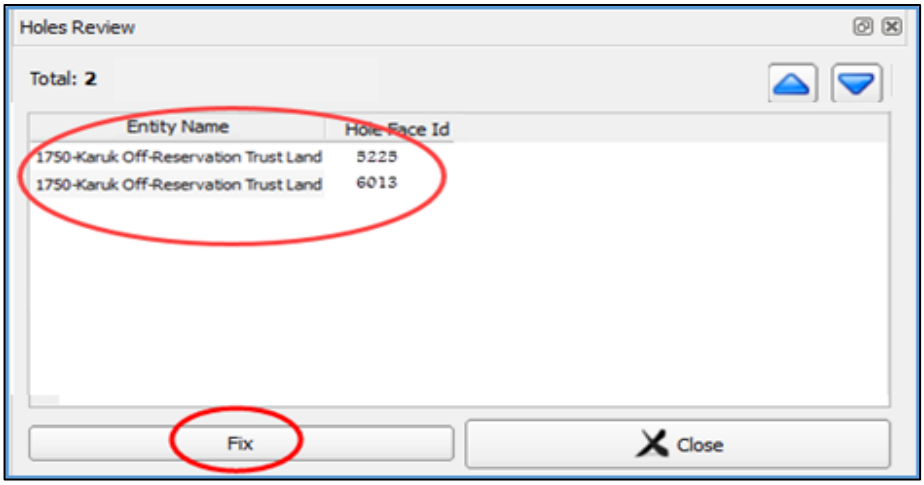
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 2	Once the entity is loaded, the change polygons review may begin. Click on the **Review Change Polygons** button on the **BAS toolbar**. *The **Review Change Polygons** dialog box opens just below the **Layers Panel.***  **Note:** This box can be dragged anywhere on the screen and docked.
Step 3	Use the **Geography** drop-down menu shown below to select the geography to review.
Step 4	*After selecting an entity type, the **Small Area Check** and **Find Holes** buttons become active and all change polygons for the entity type selected appear in the **Info** list at the bottom of the box.* 

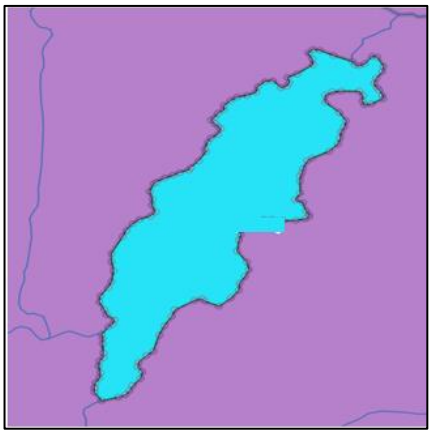
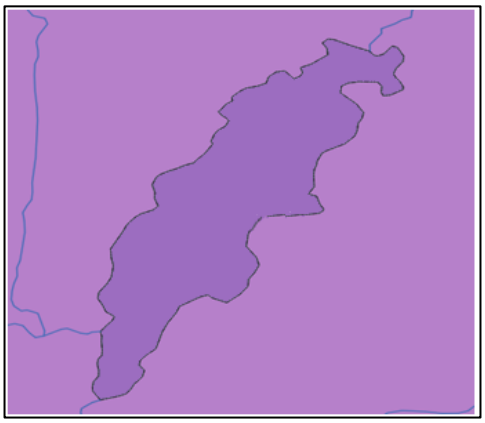
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 5	To check for small area change polygons, click the **Small Area Check** button. *If all the change polygons are of sufficient size, a pop-up box with this information appears.* 
Step 6	*If there are small area polygons within the Reservation/Trust Land, they appear in the **Info** list with their acreage noted in the **Area in Acres** column. The **Display All Changes** button also becomes active (this button allows toggling back to see all change polygons in the list).* 
Step 7	To view a polygon on the map, click the row for the polygon in the **Info** list. *The polygon is highlighted and the map zooms to the location of the polygon.*  Note in the illustration above, the **Review Change Polygons** box was moved to sit over the map. As stated earlier, the box may be moved anywhere on the page and docked.

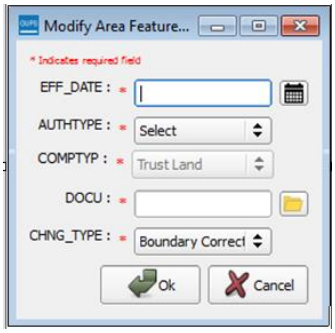
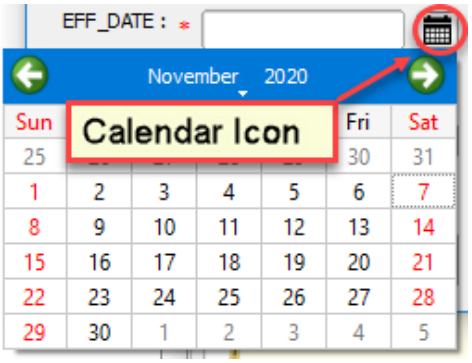
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 8	Next, review the polygons for holes (that is, two or fewer small faces missed when creating a change polygon). While still in the **Review Change Polygons** dialog box, select a geography type from the **Geography** drop-down menu. For this example, '**Reservation/Trust Lands**' is selected. *A list of change polygons for Reservations/Trust Lands populates the **Info** list and the **Display All Changes** button replaces the **Small Area** button (since this check was already run). The **Find Holes** button remains in its original location*. 
Step 9	Click on the row for the polygon in the **Info** list to see it on the map, then click the **Find Holes** button. *If no holes are present, a pop-up box with this information appears.* 
Step 10	*If holes are found, a list of polygons with holes appears in the **Holes Review** box and the **Fix** button activates at the bottom of the box.* 

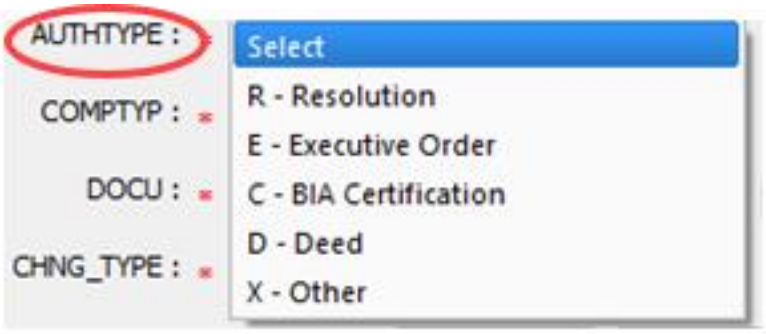
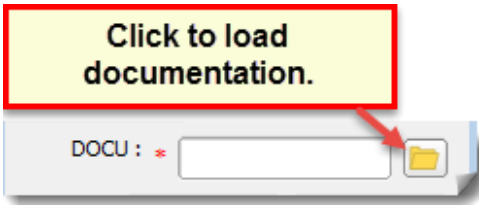
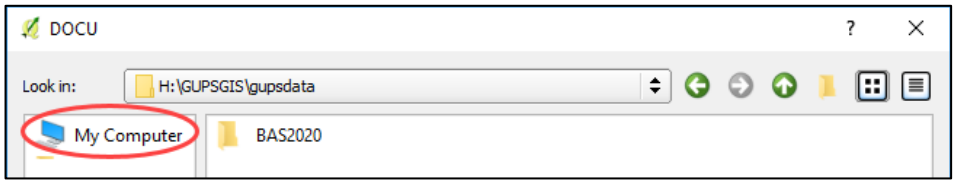
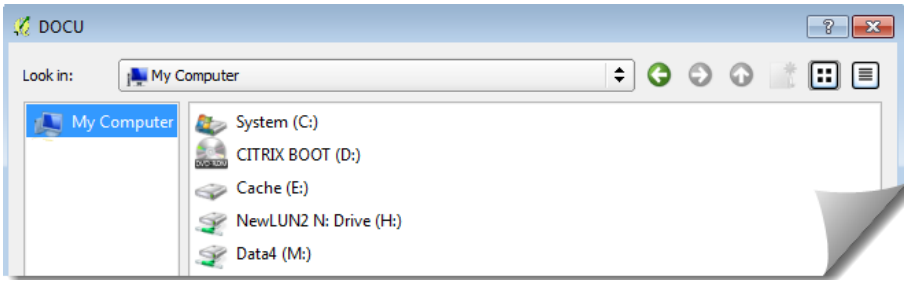
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 11	To correct a change polygon, click on its row to highlight it. *The map zooms to its location and displays all holes in cyan.* 
Step 12	Click the **Fix** button to repair the hole. *The change polygon is corrected and the correction displays on the map (i.e., the hole is changed to the same color as the remainder of the polygon).* 
Step 13	Before the **Find Holes** check is complete, repeat the steps above ***for each*** geography type for which change polygons were created.
Step 14	After reviewing for small areas and holes, use the **Review Change Polygons** tool to check the general accuracy of the change polygons. To do so, select the entity type in the **Geography** drop-down menu. *A full list of change polygons for the geography type selected displays in the **Info** list.*
Step 15	Click on the row for each polygon to see it on the map and review the changes. If there is a mistake on the map (e.g., a new incorporated place was created with five faces rather than intended six), click on the **Modify Area Feature** button on the **BAS toolbar** and make the correction.

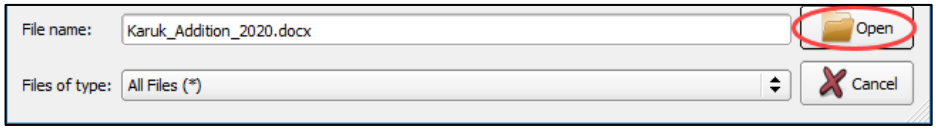
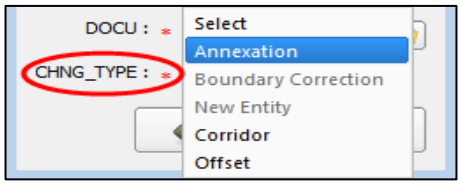
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 16	To review boundary changes, select the entity type to be reviewed in the **Geography** drop-down menu at the top of the **Review Change Polygons** dialog box. In this example, '**Reservation/Trust Land**' is selected. *All boundary change polygons for the entity type selected populate the **Info** list.* To review a boundary change, click on the change polygon in the list, then click the **Legal Entity Change** button at the bottom of the **Review Change Polygons** dialog box, shown below. *The map zooms to where the change was made and a box opens displaying the information that was entered when the change was coded. Here, because the change was a boundary correction, the effective date, authority type, and documentation fields are not filled.*  If this change was mistakenly coded as a boundary correction, and should have been a legal change instead, correct the error here. In this example a change polygon mistakenly coded as a boundary correction rather than an addition is corrected.
Step 17	Click the calendar icon next to the **EFF_DATE** field to select an effective date for the addition. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 18	Use the drop-down menu for the **AUTHTYPE** field to select the authority type for the change. 
Step 19	In the **DOCU** field, type in the ordinance or other legal documentation number authorizing the Addition, or upload legal documentation for the change. To upload documentation, click the folder icon next to the **DOCU** field.  When the ***DOCU*** window opens, click on the icon for 'My Computer' (or simply 'Computer' in some Windows versions) to open the directory where the documentation is saved.  *The directories display, as shown below*. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	Select the appropriate directory and navigate to the file to be uploaded. Click the file. Then, to upload it, click the **Open** button at the bottom of the **DOCU** window.  *GUPS uploads the file and the file name appears in the DOCU field.*
Step 20	Finally, in the **CHNG_TYPE** field drop-down menu, change 'Boundary Correction' to the correct change type ('Annexation', 'Corridor', or 'Offset'). Here 'Annexation' is selected. 
Step 21	Click the **OK** button. *The correction is made*.
Step 22	When *all reviews* are completed (for small areas, holes, and boundary changes) for *all entity types*, and all needed corrections have been made, click the **Save** button on the **BAS toolbar**. *All corrections are saved. The Review Change Polygons check is complete.*

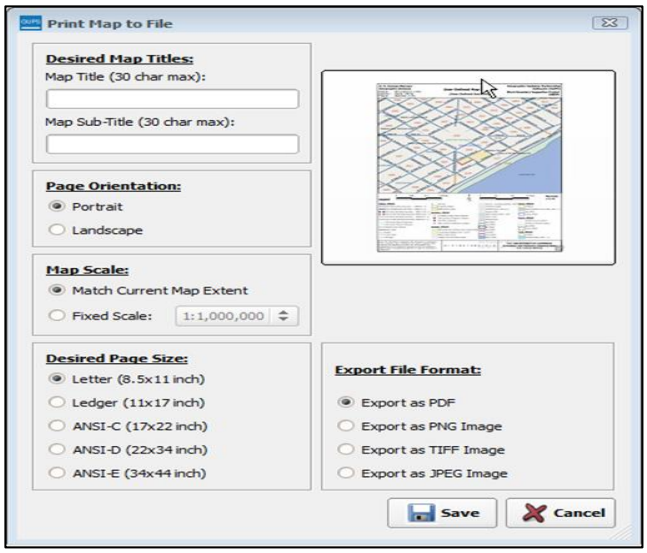
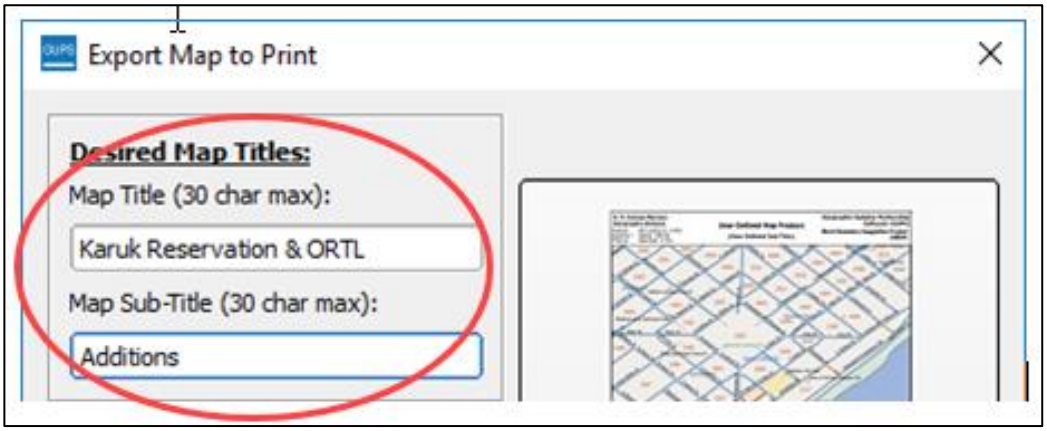
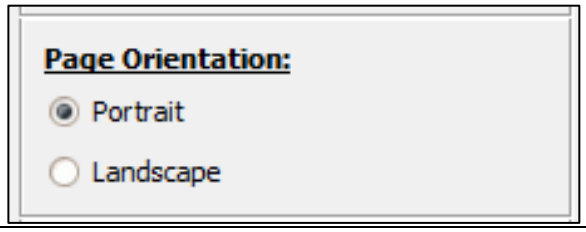
6.6 Exporting a Printable Map

GUPS allows users to generate printable maps in four formats (.pdf, .png., .tiff, and .jpeg). The maps can be created in portrait or landscape view, on letter or ledger (legal) size paper, and at various scales. To export a printable map from GUPS, follow the steps below.

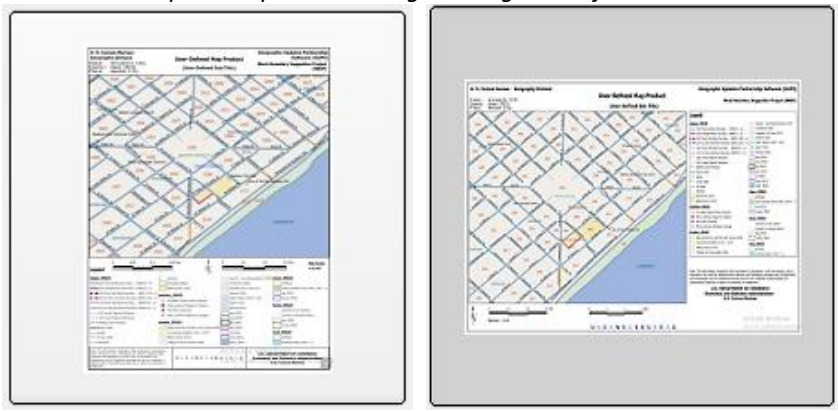
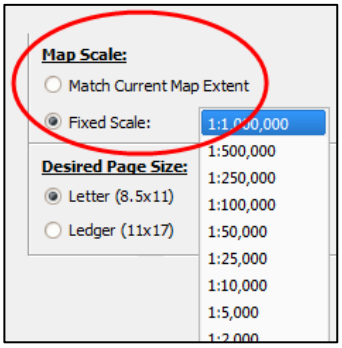
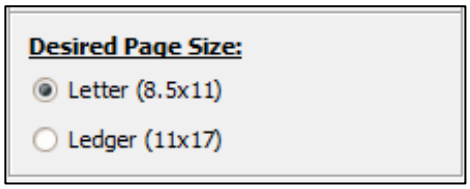
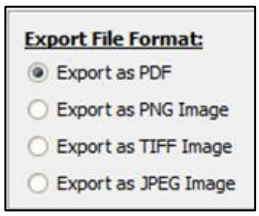
Table 43: Exporting a Printable Map

Step	Action and *Result*
Step 1	Click on the **Export to ZIP** button on the **BAS toolbar**.

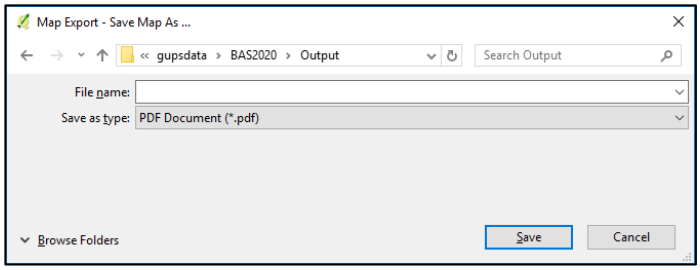
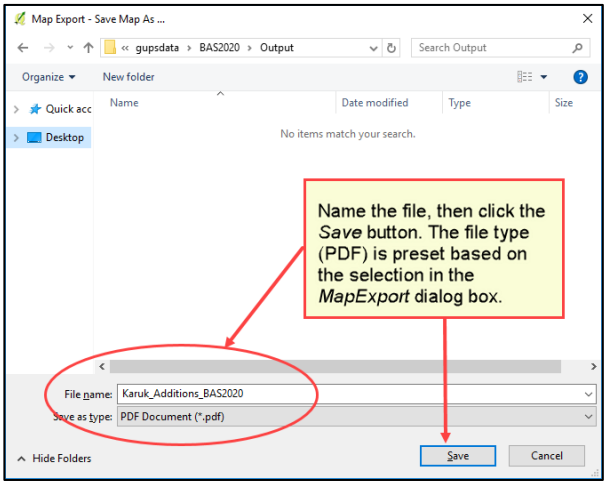
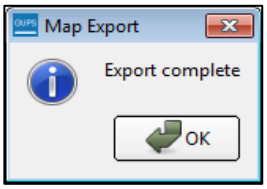
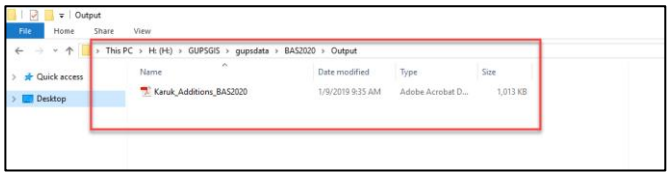
PART 2: HOW TO USE GUPS

Step	Action and *Result*
	*The **Print Map to File** dialog box opens.* 
Step 2	In the **Desired Map Titles** section, type in a map title and sub-title. 
Step 3	Under **Page Orientation**, click the radio button next to 'Portrait' or 'Landscape' to select the map's orientation on the page when printed. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	The map orientation in the preview pane to the right changes to reflect the selection.  *Portrait View (left) and Landscape View (right).*
Step 4	Under **Map Scale**, click the appropriate radio button to select the map scale (use the current map extent or set a fixed scale). To select a fixed scale, click the radio button next to 'Fixed Scale', then click the down arrow to open the drop-down menu. In the drop-down list, click on the desired scale. 
Step 5	Under **Desired Paper Size**, click the radio button next to 'Letter' for 8½ by 11-inch paper or the 'Ledger' button for 11 by 17-inch paper. 
Step 6	When ready to export the file, under **Export File Format**, click the radio button next to the desired format. The file may be exported in .pdf, .png, .tiff, or .jpeg format. 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	Click the **Save** button. *The **Map Export – Save Map As…** window opens.*  **Note:** GUPS automatically selected the "output" folder for BAS2020 as the save location. This folder was created on the computer by the GUPS installer. To save the file to a different location, navigate to the location first before saving.
Step 8	After selecting the location, type in the name to give the file, then click **Save**. 
Step 9	*The file is saved and a pop-up message appears confirming that the export is complete.* 
Step 10	To save the file, click **OK**. *The file is saved either in the default BAS2020 output location or in the alternate location specified. Here file is saved in the default location.* 

PART 2: HOW TO USE GUPS

6.6.1 How to Export ZIP Files to Share/Submit

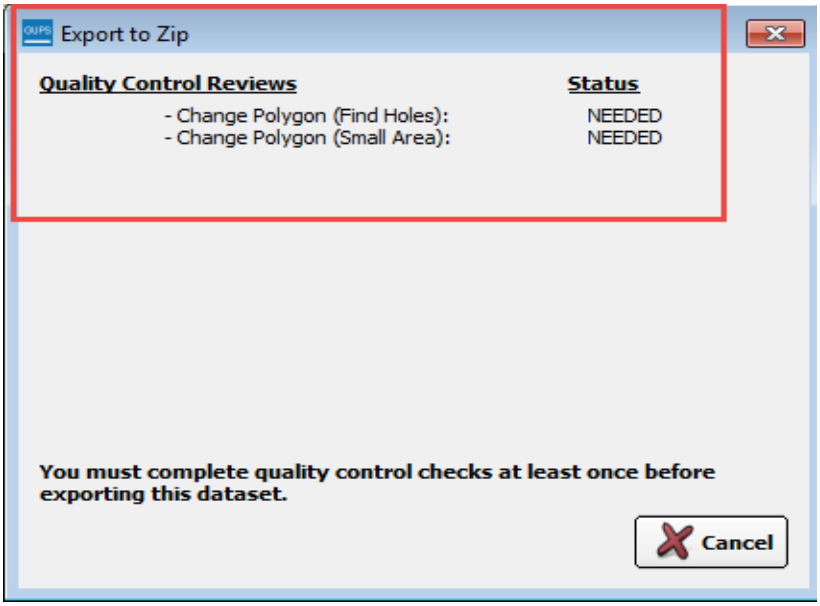
When creating ZIP files to export, users have two options—exporting the file to share with other users or exporting the file for submission to the Census Bureau. In either case, GUPS automatically names the output ZIP file. It packages all the files required by the Census Bureau (including any documentation uploaded) into the ZIP file and saves it in a preset location created on the computer during the installation process.

> ***Important Note***
> If changes were made to more than one working county, separate ZIP file must be exported for each county.

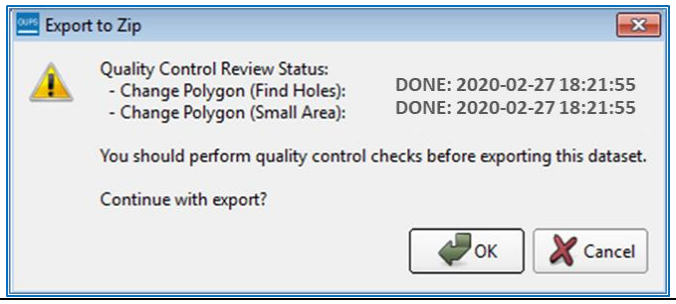
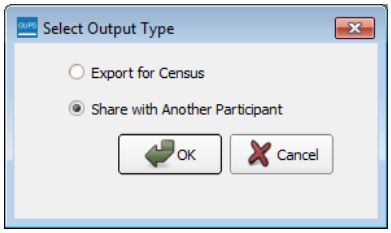
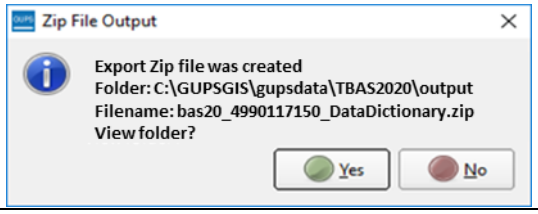
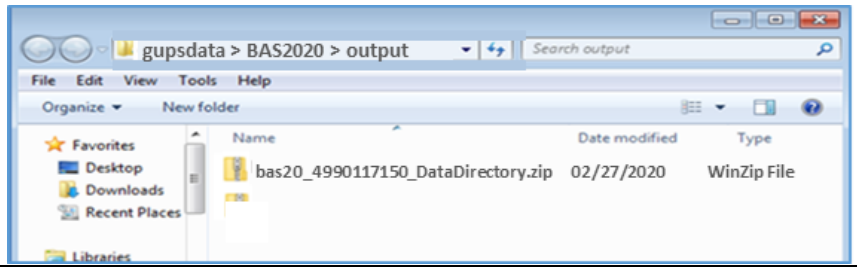
6.6.2 Exporting a File to Share

To export a file to share with another user, follow the steps in **Table 44**.

Table 44: Exporting Files to Share with Another User

Step	Action and *Result*
Step 1	Click on the **Export to ZIP** button on the **BAS toolbar**.
Step 2	*After clicking the **Export to Zip** button, one of two results may occur, depending on whether the changes were validated using the **Review Change Polygons** tool. If the tool was not used to check the work, the **Export to ZIP** pop-up box appears and lists the specific checks that need to be run before the file can be exported.*  If this message appears, click the **Cancel** button and run the **Review Change Polygons** check. Then repeat the initial export steps again.

PART 2: HOW TO USE GUPS

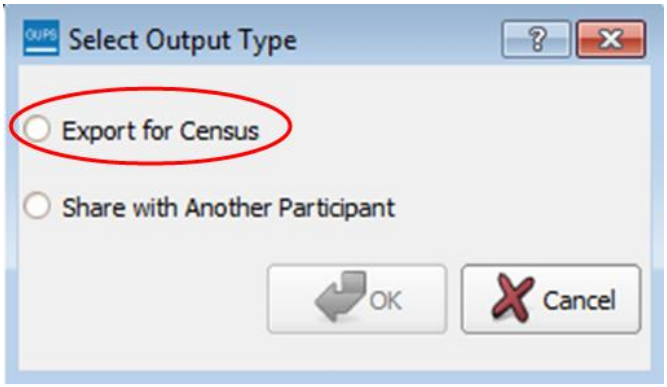
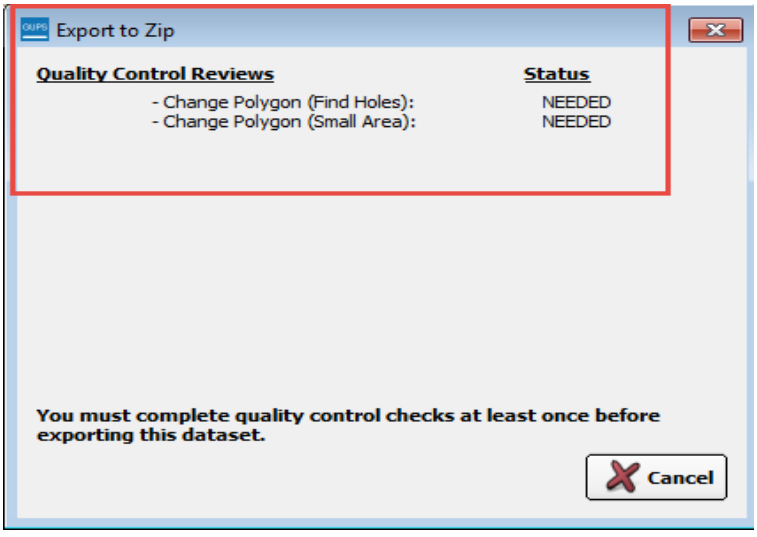
Step	Action and *Result*
Step 3	*If the **Review Change Polygon** check **was already run**, the **Export to ZIP** pop-up box displays the status of the checks and the date and time they were made, as shown below.* 
Step 4	Look carefully at the run times listed. If any additional changes were made after these times, click **Cancel** and run the **Review Change Polygons** check again. Then repeat the export steps.
Step 5	*The **Select Output Type** dialog box opens.*  To prepare ZIP file to be shared with another user, select the "Share with Another Participant" radio button. Click **OK**.
Step 6	*The **ZIP File Output** dialog box opens. It informs that the ZIP file was created and asks "if you want to view the folder".* 
Step 7	*If **Yes** is clicked, the directory opens and displays the folder location where GUPS placed the file.* **Note:** GUPS automatically saves the file to an output folder that the GUPS installer placed on the computer during the installation process. 

Step	Action and *Result*
Step 8	The file may now be shared with another user.

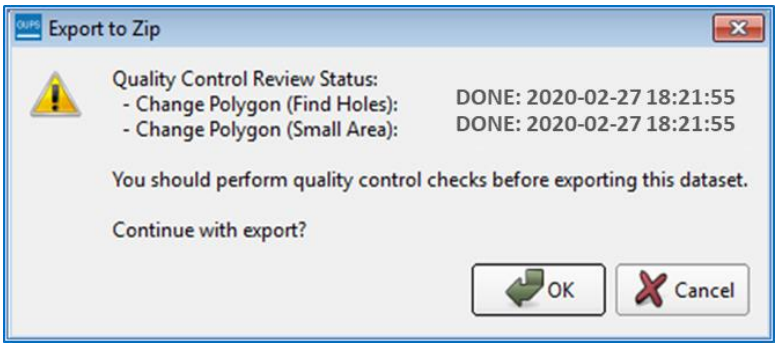
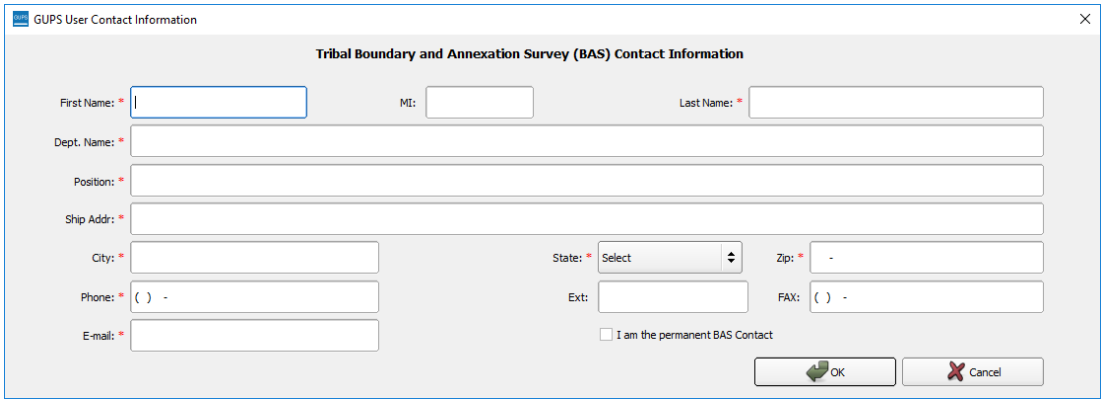
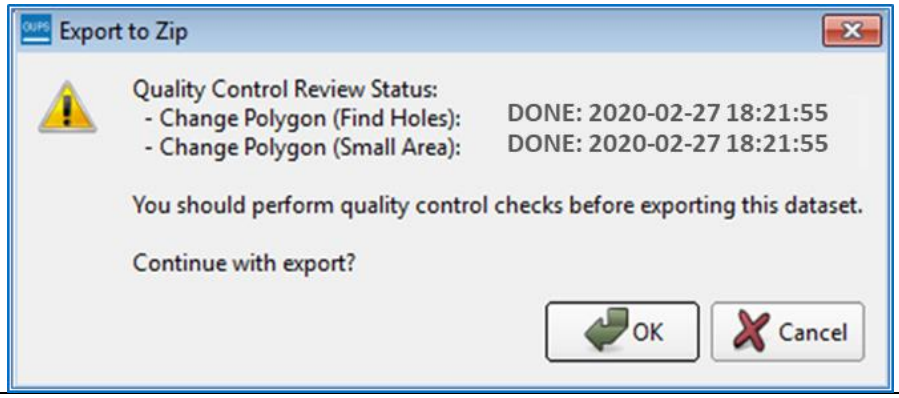
6.6.3 Exporting a File to Submit to the Census Bureau

To export a file to submit to the Census Bureau, follow the steps in **Table 45**.

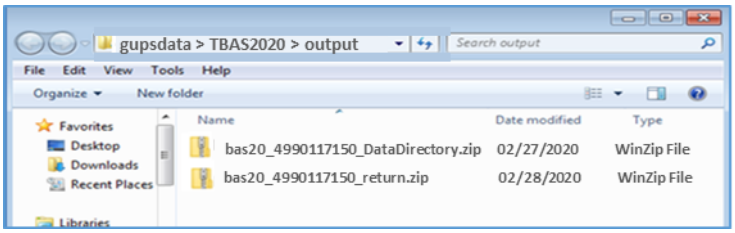
Table 45: Exporting Files for Submission to the Census Bureau

Step	Action and *Result*
Step 1	Click on the **Export to ZIP** button on the **BAS toolbar**. *The **Select Output Type** dialog box opens.*  Click the **Export for Census** radio button. Then click **OK**.
Step 2	*After clicking the **OK** button, one of two results may occur, depending on whether the changes were validated using the **Review Change Polygons** tool. If the tool was not used to check the work, the **Export to ZIP** pop-up box appears and lists the specific checks that need to be run before the file can be exported.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	If this message appears, click the **Cancel** button and run the **Review Change Polygons** check. Then repeat the initial export steps again.
Step 4	*If the **Review Change Polygon** check was already run, the **Export to ZIP** pop-up box displays the status of the checks and the date and time they were made, as shown below.* 
Step 5	Look carefully at the run times listed. If any additional changes were made after these times, click **Cancel** and run the **Review Change Polygons** check again. Then repeat the export steps.
Step 6	Otherwise, click **OK**. *The **GUPS User Contact Information** dialog box opens up*. Complete the required fields and click **OK**.  *The **ZIP File Output** dialog box opens. It informs the user that the ZIP file was created and asks if they want to view the folder.* 

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 7	*If **Yes** is clicked, the directory opens* and displays the folder location where GUPS placed the file. **Note:** GUPS automatically saves the file to an output folder that the GUPS installer created during the installation process. 
Step 8	The file is now ready to be uploaded to the Census Bureau through SWIM. See **Section 7, Submitting Files to the Census Bureau through SWIM**.

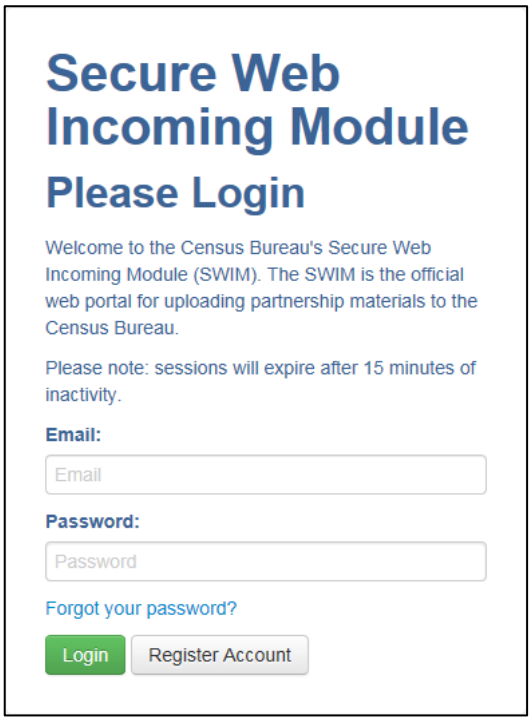
PART 2: HOW TO USE GUPS

SECTION 7. SUBMITTING FILES TO THE CENSUS BUREAU THROUGH SWIM

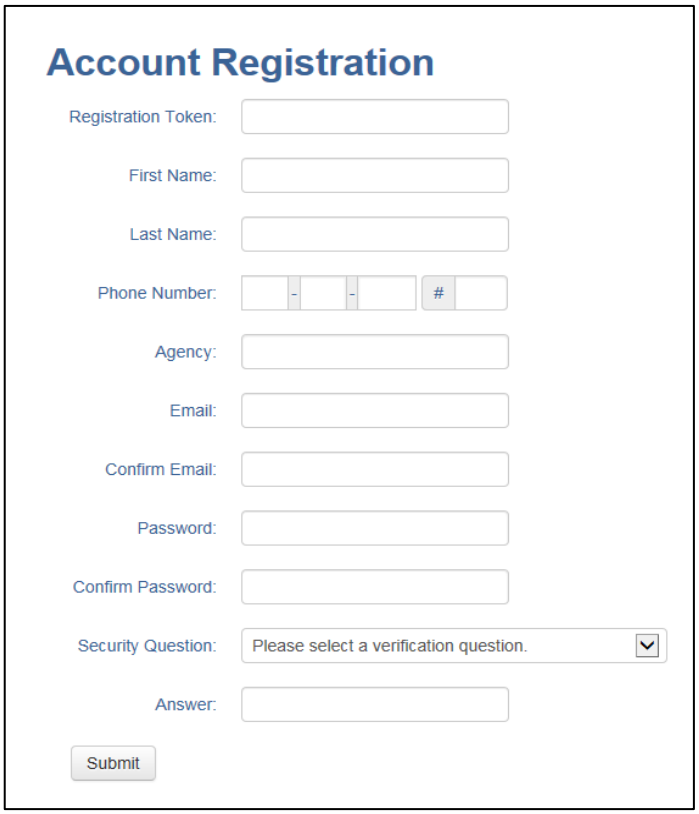
To upload and transmit update files to the Census Bureau, participants must access their accounts in the SWIM, as shown in **Table 46**.

Note: Participants **with existing SWIM** accounts, should use their user name (email address) and password. If participants indicated on their BAS Annual Response Form that they wished to receive or use the GUPS application, they automatically receive the SWIM URL and a registration token via email. The email should arrive five days after the Annual Response is completed online (or five business days after the Census Bureau receives the paper form). Participants **without existing SWIM** accounts, should contact the Census Bureau at geo.bas@census.gov to obtain a 12-digit registration token needed to create an account. Once a token has been assigned, participants can create their SWIM accounts.

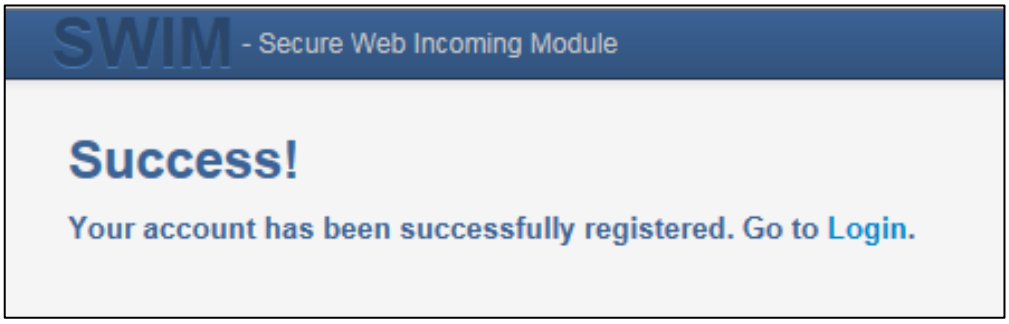
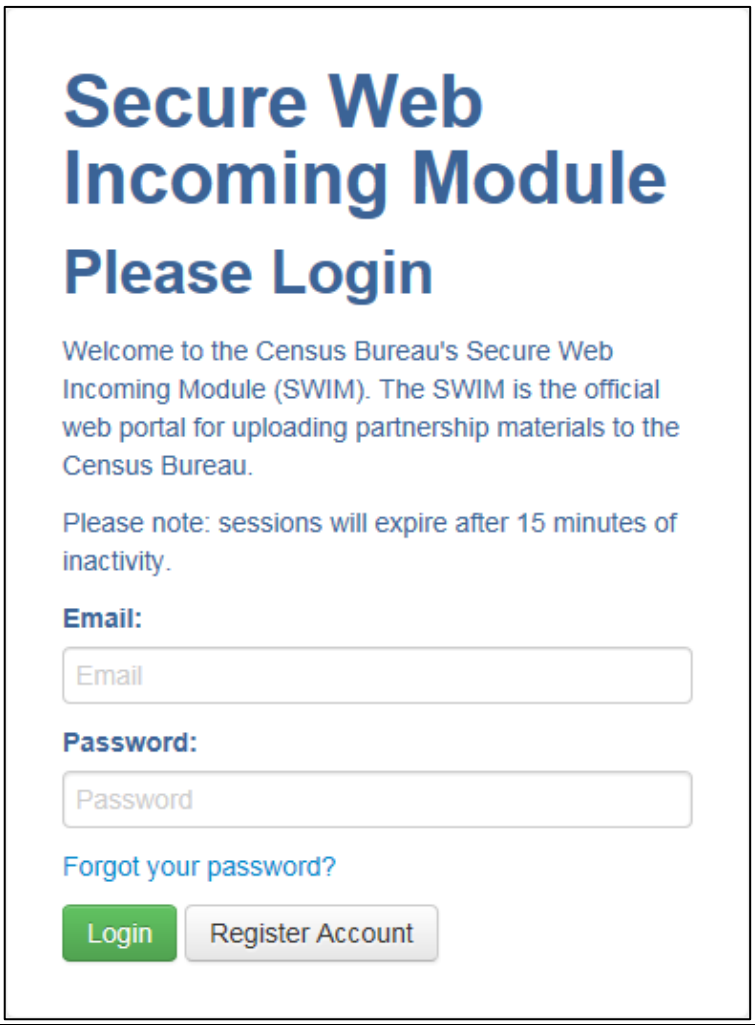
Table 46: Transmitting Files to the Census Bureau Using SWIM

Step	Action and *Result*
Step 1	Open a new browser window and enter the URL <https://respond.census.gov/swim/>. The SWIM login screen opens. 
Step 2	Users that already have a SWIM account should enter their email address and password. Click the **Login** button. *The **Welcome** screen opens*. **Go to Step 8.**

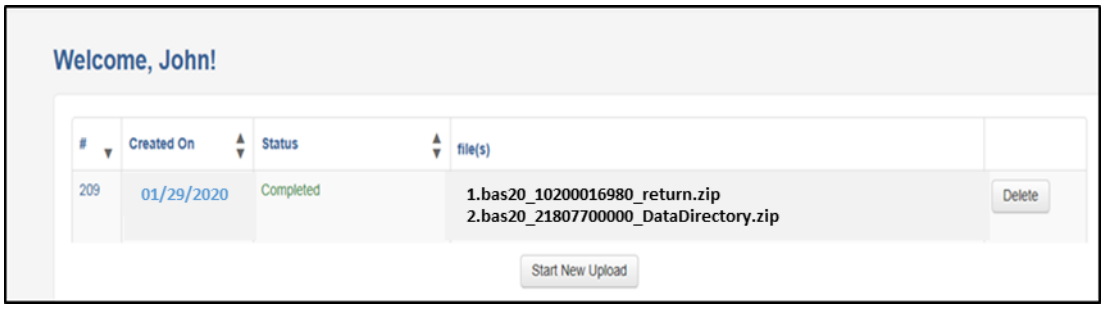
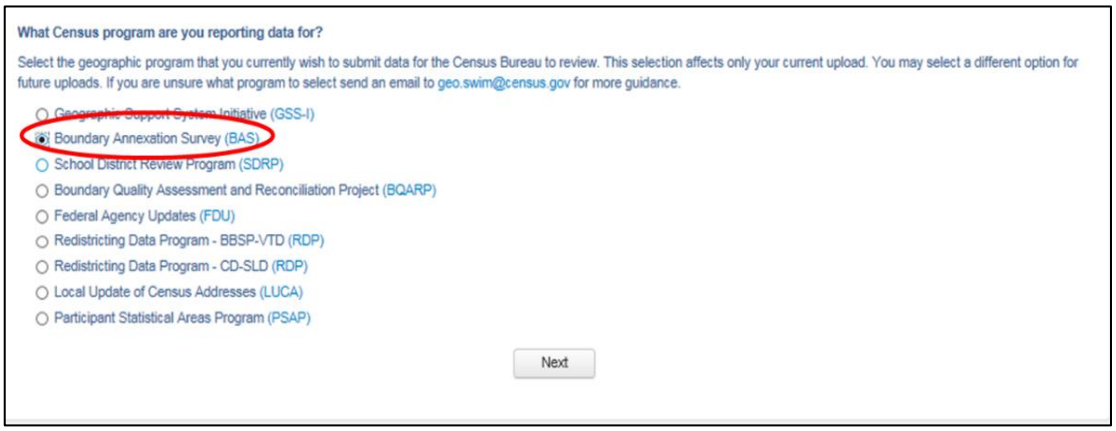
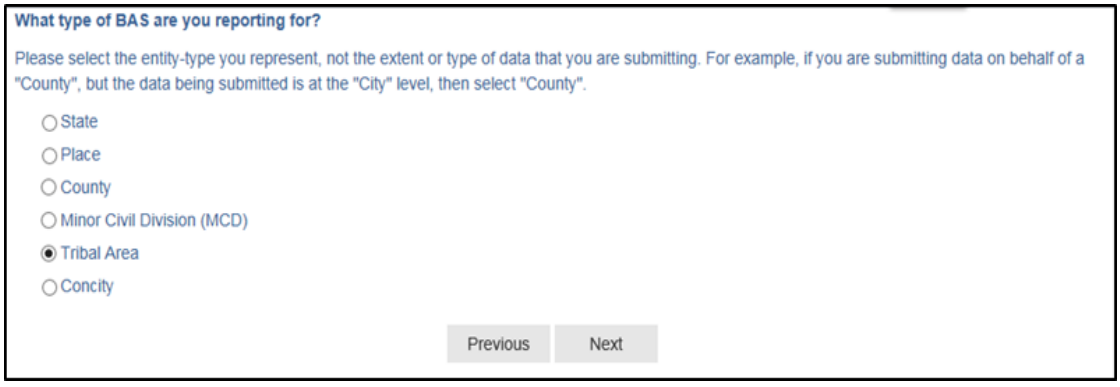
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 3	Users without a SWIM account must register. Click the **Register Account** button. *The **Account Registration** screen opens.* 
	All fields on the **Account Registration** screen are required.
Step 4	On the **Account Registration** screen, first, enter the 12-digit token provided by the Census Bureau. Then enter contact name, agency, and email in the appropriate fields.
Step 5	Create a password. The password must meet the five criteria below: 1. It must be at least 8 characters in length 2. It must have at least one upper case character 3. It must have at least one lower case character 4. It must have at least one number 5. It must have at least one special character (valid special characters are: #, !, $, *, &, ?, ~). **Note:** The commas shown immediately above are to separate the special characters listed. A comma is not a valid character for the password.

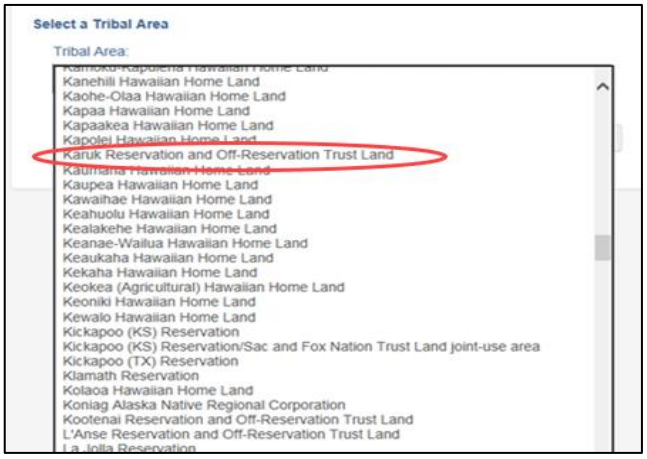
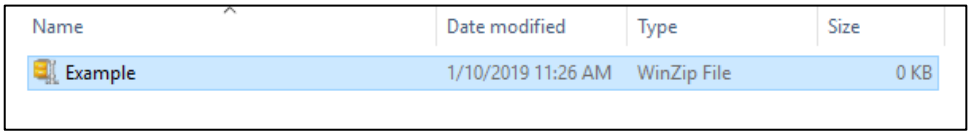
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 6	Set up a security question (click the arrow on the right of the **Security Question** box and select a question in the drop-down list, then enter an answer in the **Answer** box). When finished, click the **Submit** button. *A screen opens to confirm that the account has been successfully registered.*  On the **Confirmation** screen, click **Login**, and *be returned to the Login screen*.
Step 7	Login screen. 

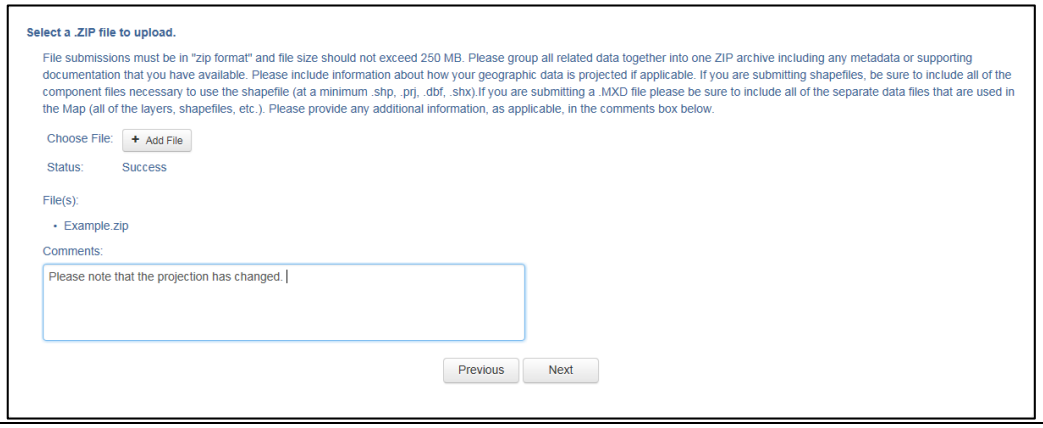
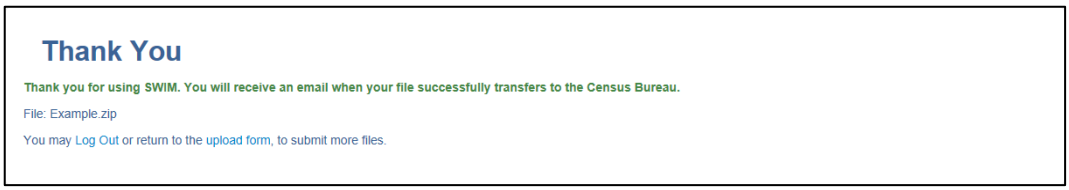
PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 8	On the **Login** screen, enter the email and password then click the green **Login** button. *The **Welcome** screen opens. A list of previously uploaded files is visible with the following information, the creation date of the file, the name of the file, and its corresponding zip size.* To make modifications, click on the file to be edited then select the **Start Now Upload** button. 
Step 9	To begin an upload, click the **Start New Upload** button. Select the **Boundary Annexation Survey (BAS)** radio button, and then click **Next** at the bottom of the screen. 
Step 10	*A screen opens asking "**What type of BAS are you reporting for?**"* Click the radio button next to the governmental unit for which data is being reported, then click the **Next** button. In this example, **Tribal Area** is selected. 

PART 2: HOW TO USE GUPS

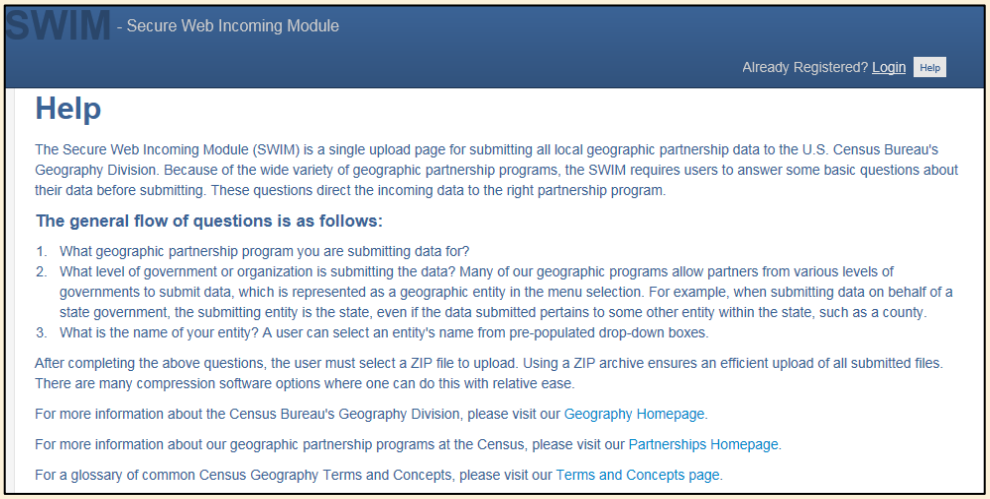
Step	Action and *Result*
Step 11	*A screen opens that allows selection of the Tribal Area for which data is being reported.* Scroll through the drop-down menu and select the Tribal Area. Then click the **Next** button. 
Step 12	The **Select a .ZIP file to upload** screen opens. Choose a zip file to upload. **Note:** All files must be a zip file. The zip file cannot contain another zip file. To upload a file, click the **+ Add File** button on the screen.
Step 13	*The **Choose File to Upload** window opens*.  Locate the ZIP file to upload then double-click it. **Note:** Only one file can be added at a time.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
Step 14	*Once the file upload is complete, the **Status** field shows '**Success**.' The name of the file appears in the **File(s)** field*. To add another file, click the **+ Add File** and the upload process will repeat. In this example, there are two files uploaded. 
Step 15	After uploading the file(s), type any comments (including pertinent information about data projection or supporting documentation for shapefiles) in the **Comments** field. Click **Next**.
Step 16	*The **Thank You** screen appears and confirms the receipt of the submission*. 
Step 17	To submit files for a different entity, click on the '**Upload Form**' link in the phrase "You may Log Out or return to the upload form, to submit more files." This choice returns to the **Welcome** screen. To log out, click on **Log Out**. The Census Bureau will acknowledge the receipt of the uploaded file.

PART 2: HOW TO USE GUPS

Step	Action and *Result*
	SWIM sessions deactivate after 15 minutes of inactivity. **Note:** While working in SWIM, the participant may obtain help by clicking on the **Help** button on any screen. After clicking the button, a screen opens with links to help resources.



APPENDICES

This page intentionally left blank

APPENDIX A BAS CONTACT INFORMATION AND RESOURCES

Table 47: BAS Contact Information and Resources

Action/Question	Resource	Contact
Request shapefiles on DVD	Geography Division	Call: 1-800-972-5651 Email: geo.bas@census.gov
BAS materials questions	Geography Division	Call: 1-800-972-5651 Email: geo.bas@census.gov
Legal boundary questions	Geography Division	Call: 1-301-763-1099 Email: geo.bas@census.gov Fax: 1-800-972-5652
Ask guidance on areas under legal dispute	Census Bureau Legal Office	Call: 1-301-763-9844
GUPS technical support	Geography Division	Call: 1-800-972-5651 Email: geo.bas@census.gov Be sure to have the number for the version of GUPS being run ready. To find this number, go to the **Help** tab on the main **Menu** in GUPS and click 'About GUPS' in the drop-down menu. A pop-up box will provide the number.
SWIM token questions	Geography Division	Call: 1-800-972-5651 Email: geo.bas@census.gov
SWIM technical support	Geography Division	Email: geo.swim@census.gov
Submit output files on DVD (if Internet access is unavailable)	National Processing Center	Send to: U.S. Census Bureau National Processing Center ATTN: BAS Returns, Bldg 63E 1201 East 10th Street Jeffersonville, IN 47132

APPENDIX B TERMS

Areal Feature - is a prominent and identifying feature of a landscape significant enough to warrant name recognition, such as a lake, park, school, military base, or cemetery, etc. This type of feature class is only assigned to a face geometry. Any face can be assigned to multiple features. For example, a water body can also be part of a park.

Edge - is a one-dimensional object (legacy 1-cell), bounded by two nodes: a start node and an end node. Its geometry is distinguished by the coordinates of the start and end nodes, and additional coordinates that are ordered and serve as vertices (or shape points) between the two nodes. An edge is a primitive feature in the Oracle database.

Effects of having **Edge** features in the MAF/TIGER Database(MTDB):

- Represents an invisible boundary line for various geometry, geographic, and statistical data and can stand alone.
- A linear feature always occupies the same space as an edge and there are attributes on an edge that are lone relevant when a linear feature exists.

Face - is a two-dimensional object (legacy 2-cell) bounded by two or more edges. Its boundary includes not only the edges that separate it from other faces, but also any interior edges (two-dimensional topological primitives) contained within the area of the face.

Geographic Area - is a demarcated area used for the collection and/or tabulation of Census Bureau data.

Geographic Corridors - is an area that includes only a road (or other feature's) right-of-way and does not contain any structures. **Figure 13.** Annexed Area Corridor and Unincorporated shows a corridor that has been created where an incorporated place annexed the road right-of-way, but not the housing units assigned to either side of the road (these belong instead to an unincorporated area). If it is important to the incorporated place that its ownership and/or maintenance of the road and/or its right-of-way be displayed on Census Bureau's maps, a geographic corridor should be created. However, the Census Bureau does not require places to report rights-of-way: maintaining geographic corridors in a nationwide database is difficult and impractical, and the right-of-way should only be included if it is crucial to the place, or if state or local laws require it. The Census Bureau would actually prefer that the area simply not be assigned to the place at all.

Figure 14. shows an example where the right-of-way belongs in an unincorporated area, while the housing units along it are included in an incorporated place (shown in color). While depicting this corridor may be important for local purposes, it is not relevant for Census Bureau tabulations and is not easy to depict in the Census nationwide database. This type of corridor should not be included in a BAS response.

Please note that the Census Bureau does not require places to display rights-of-way or road maintenance corridors that do not contain or potentially contain housing or population. If local or state law does not require depiction of these geographic features, the Census Bureau prefers that they be left off BAS submissions. However, if it is necessary for the place to depict them, then they must be submitted as a geographic corridor.

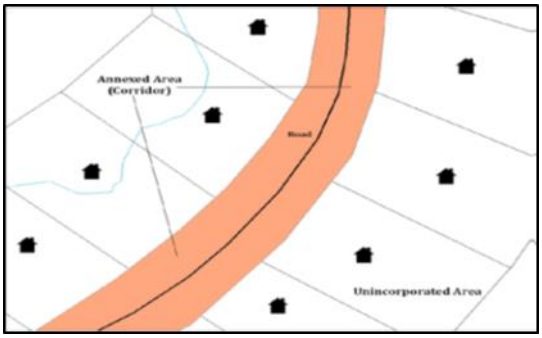


Figure 13. Annexed Area Corridor and Unincorporated Area

A corridor that has been created where an incorporated place annexed the road right-of-way, but not the housing units assigned to either side of the road.

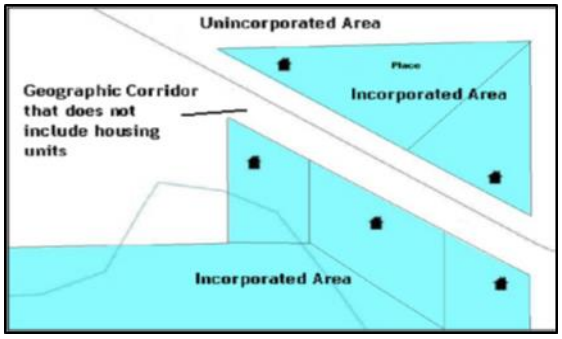


Figure 14. Incorporated Area and Unincorporated Area

The right-of-way belongs in an unincorporated area, while the housing units along it are included in an incorporated place.

To recap, when a participant has a case where a road right-of-way is legally included in the boundary, but the adjacent parcels/houses are not, there are two options. Either do not include the area in the place at all (Scenario A in **Figure 15**), or include it in the place and flag it as a corridor (Scenario C in **Figure 15**). Nevers include such areas within the place boundary without flagging them as corridors (Scenario B in **Figure 15**).

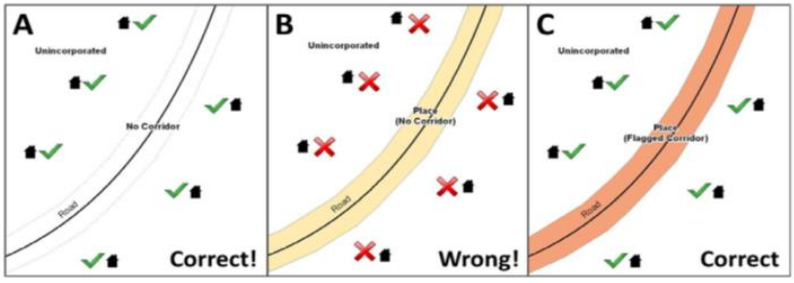


Figure 15. Participant Responses

Figure 15 – (A): The respondent did not include place ownership of the road or the right-of-way, allowing houses along the road to be geocoded correctly. (B): The respondent chose to show place ownership of the road, but did not flag it as a corridor, causing houses along the road to be incorrectly geocoded. (C): The respondent chose to show place ownership of the road, and flagged that ownership as a corridor, allowing the houses to be geocoded correctly. Both A and C are acceptable.

Geographic Offsets

A geographic offset is an area (either within or outside of a geographic area) that is only on one side of a road (unlike corridors, which involve both sides of the road) and does not include structures addressed to that side of the road. Much of the same guidelines regarding corridors also holds true for offsets.

The Census Bureau is aware that many governments base their legal boundaries on cadastral (parcel-based) right-of-way mapping. Census Bureau maps are based on spatial data that are topologically integrated which makes maintenance of geographic offsets inefficient. Using the road centerline wherever possible will help to establish more accurate population counts. If a boundary follows a front-lot-line, the Census Bureau strongly prefers that the road centerline be used as the boundary. If a boundary is at the rear of a lot, then it should be depicted as such. If it is unclear whether a particular line is a front-lot line or something else, please contact the BAS team for assistance. As a rule, if a house or building could not conceivably be built in the area between the potential line and the centerline of the road, then the line can be considered a front-lot line. **Figure 16** depicts a cadastral (parcel-based) boundary map and **Figure 17** shows how the boundary should be represented when it is sent to the Census Bureau.

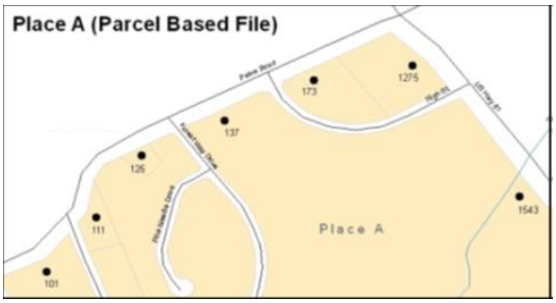


Figure 16. A Cadastral (Parcel-Based) Boundary Map

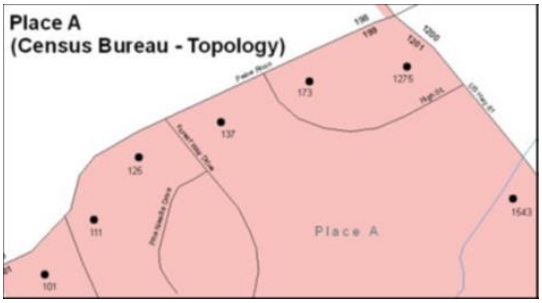


Figure 17. How a Boundary Should be Represented When Sent to the Census Bureau

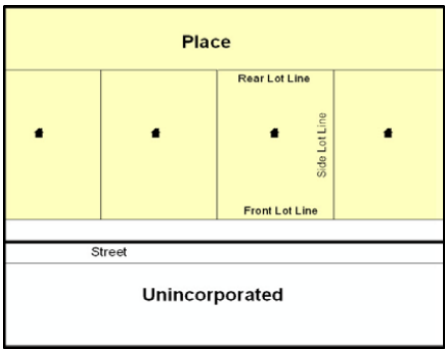


Figure 18. Place Boundary – Front-Lot-Line

Shows a situation in which the place boundary is along the front-lot-line. In this example, the respondent must either use the road centerline as the boundary (preferred), or create an offset.

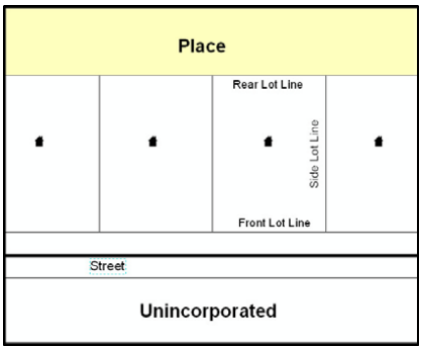


Figure 19. Place Boundary – Rear-Lot-Line

The place boundary is on the rear-lot-line, so the respondent should of course not use the road centerline or create an offset, but should rather digitize in a new boundary following the rear-lot-line.

The Census Bureau has included an "offset" shapefile in the BAS materials (bas_2020_offset_<ssccc>.shp), so that the jurisdiction can be checked for any existing corridors or offsets. While the Census Bureau prefers that new offsets are not created (see above), this information can be helpful in determining if current boundaries are correct.

Linear Feature - is a single dimension feature (Road/Path, Hydro, Rail, or Miscellaneous) along one or more edges.

Point Feature - is an isolated node not connected to an edge. The XY coordinate point is where a structure resides. Point Feature structures include housing units and legacy point landmark of public facilities such as libraries, police stations, schools, churches, malls, and some monuments.

APPENDIX C MTFCC DESCRIPTIONS

The MAF/TIGER Feature Classification Code (MTFCC) is a five-digit code assigned by the Census Bureau to classify and describe geographic objects or features in Census Bureau MAF/TIGER products.

Table 48: MTFCC Descriptions

MTFCC	Feature Class	Feature Class Description
C3022	Mountain Peak or Summit	A prominent elevation rising above the surrounding level of the Earth's surface.
C3023	Island	An area of dry or relatively dry land surrounded by water or low wetland [including archipelago, atoll, cay, hammock, hummock, isla, isle, key, moku and rock].
C3024	Levee	An embankment flanking a stream or other flowing water feature to prevent overflow.
C3026	Quarry (not water-filled), Open Pit Mine or Mine	An area from which commercial minerals are or were removed from the Earth; not including an oilfield or gas field.
C3027	Dam	A barrier built across the course of a stream to impound water and/or control water flow.
C3061	Cul-de-sac	An expanded paved area at the end of a street used by vehicles for turning around. For mapping purposes, the Census Bureau maps it only as a point feature.
C3062	Traffic Circle	A circular intersection allowing for continuous movement of traffic at the meeting of roadways.
C3066	Gate	A movable barrier across a road.
C3067	Toll Booth	A structure or barrier where a fee is collected for using a road.
C3071	Lookout Tower	A manmade structure, higher than its diameter, used for observation.
C3074	Lighthouse Beacon	A manmade structure, higher than its diameter, used for transmission of light and possibly sound generally to aid in navigation.
C3075	Tank/Tank Farm	One or more manmade structures, each higher than its diameter, used for liquid (other than water) or gas storage or for distribution activities.
C3076	Windmill Farm	One or more manmade structures used to generate power from the wind.
C3077	Solar Farm	One or more manmade structures used to generate power from the sun.
C3078	Monument or Memorial	A manmade structure to educate, commemorate, or memorialize an event, person, or feature.
C3079	Boundary Monument Point	A material object placed on or near a boundary line to preserve and identify the location of the boundary line on the ground.
C3080	Survey Control Point	A point on the ground whose position (horizontal or vertical) is known and can be used as a base for additional survey work.
C3081	Locality Point	A point that identifies the location and name of an unbounded locality (e.g., crossroad, community, populated place or locale).
C3085	Alaska Native Village Official Point	A point that serves as the core of an Alaska Native village and is used in defining Alaska Native village statistical areas.
G2100	American Indian Area	A legally defined state- or federally recognized reservation and/or off-reservation trust land (excludes statistical American Indian areas).
G2120	Hawaiian Home Land	A legal area held in trust for the benefit of Native Hawaiians.
G2130	Alaska Native Village Statistical Area	A statistical geographic entity that represents the residences, permanent and/or seasonal, for Alaska Natives who are members of or receiving governmental services from the defining legal Alaska Native Village corporation.

MTFCC	Feature Class	Feature Class Description
G2140	Oklahoma Tribal Statistical Area	A statistical entity identified and delineated by the Census Bureau in consultation with federally recognized American Indian tribes that have no current reservation, but had a former reservation in Oklahoma.
G2150	State-designated Tribal Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a state-appointed liaison for a state-recognized American Indian tribe that does not currently have a reservation and/or lands in trust.
G2160	Tribal Designated Statistical Area	A statistical geographic entity identified and delineated for the Census Bureau by a federally recognized American Indian tribe that does not currently have a reservation and/or off-reservation trust land.
G2170	American Indian Joint Use Area	An area administered jointly and/or claimed by two or more American Indian tribes.
G2200	Alaska Native Regional Corporation	Corporate entities established to conduct both business and nonprofit affairs of Alaska Natives pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). There are twelve geographically defined ANRCs and they are all within and cover most of the State of Alaska (the Annette Island Reserve-an American Indian reservation-is excluded from any ANRC). The boundaries of ANRCs have been legally established.
G2300	Tribal Subdivision	Administrative subdivisions of federally recognized American Indian reservations, off-reservation trust lands, or Oklahoma tribal statistical areas (OTSAs). These entities are internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations, off-reservation trust lands, or OTSAs.
G2400	Tribal Census Tract	A relatively small and permanent statistical subdivision of a federally recognized American Indian reservation and/or off-reservation trust land, delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G2410	Tribal Block Group	A cluster of census blocks within a single tribal census tract delineated by American Indian tribal participants or the Census Bureau for the purpose of presenting demographic data.
G3100	Combined Statistical Area	A grouping of adjacent metropolitan and/or micropolitan statistical areas that have a degree of economic and social integration, as measured by commuting.
G3110	Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using whole counties and equivalents.
G3120	Metropolitan Division	A county or grouping of counties that is a subdivision of a Metropolitan Statistical Area containing an urbanized area with a population of 2.5 million or more.
G3200	Combined New England City and Town Area	A grouping of adjacent New England city and town areas that have a degree of economic and social integration, as measured by commuting.
G3210	New England City and Town Metropolitan and Micropolitan Statistical Area	An area containing a substantial population nucleus together with adjacent communities having a high degree of economic and social integration with that core, as measured by commuting. Defined using Minor Civil Divisions (MCDs) in New England.

MTFCC	Feature Class	Feature Class Description
G3220	New England City and Town Division	A grouping of cities and towns in New England that is a subdivision of a New England City and Town Area containing an urbanized area with a population of 2.5 million or more.
G3500	Urban Area	Densely settled territory that contains at least 2,500 people. The subtypes of this feature are Urbanized Area (UA), which consists of 50,000 + people and Urban Cluster, which ranges between 2,500 and 49,999 people.
G4000	State or Equivalent Feature	The primary governmental divisions of the United States. The District of Columbia is treated as a statistical equivalent of a state for census purposes, as is Puerto Rico.
G4020	County or Equivalent Feature	The primary division of a state or state equivalent area. The primary divisions of 48 states are termed County, but other terms are used such as Borough in Alaska, Parish in Louisiana, and Municipio in Puerto Rico. This feature includes independent cities, which are incorporated places that are not part of any county.
G4040	County Subdivision	The primary divisions of counties and equivalent features for the reporting of Census Bureau data. The subtypes of this feature are Minor Civil Division, Census County Division/Census Subarea, and Unorganized Territory. This feature includes independent places, which are incorporated places that are not part of any county subdivision.
G4050	Estate	Estates are subdivisions of the three major islands in the United States Virgin Islands (USVI).
G4060	Subbarrio (Subminor Civil Division)	Legally defined divisions (subbarrios) of minor civil divisions (barrios-pueblo and barrios) in Puerto Rico.
G4110	Incorporated Place	A legal entity incorporated under state law to provide general-purpose governmental services to a concentration of population. Incorporated places are generally designated as a city, borough, municipality, town, village, or, in a few instances, have no legal description.
G4120	Consolidated City	An incorporated place that has merged governmentally with a county or minor civil division, but one or more of the incorporated places continues to function within the consolidation. It is a place that contains additional separately incorporated places.
G4210	Census Designated Place	A statistical area defined for a named concentration of population and the statistical counterpart of an incorporated place.
G4300	Economic Census Place	The lowest level of geographic area for presentation of some types of Economic Census data. It includes incorporated places, consolidated cities, census designated places (CDPs), minor civil divisions (MCDs) in selected states, and balances of MCDs or counties. An incorporated place, CDP, MCD, or balance of MCD qualifies as an economic census place if it contains 5,000 or more residents, or 5,000 or more jobs, according to the most current data available.
G5020	Census Tract	Relatively permanent statistical subdivisions of a County or equivalent feature delineated by local participants as part of the Census Bureau's Participant Statistical Areas Program.
G5030	Block Group	A cluster of census blocks having the same first digit of their four-digit identifying numbers within a Census Tract. For example, block group 3 (BG 3) within a Census Tract includes all blocks numbered from 3000 to 3999.

MTFCC	Feature Class	Feature Class Description
G5035	Block Area Grouping	A user-defined group of islands forming a single census tabulation block. A BAG must: (1) consist of two or more islands, (2) have a perimeter entirely over water, (3) not overlap, and (4) not cross the boundary of other tabulation geographies, such as county or incorporated place boundaries.
G5040	Tabulation Block	The lowest-order census defined statistical area. It is an area, such as a city block, bounded primarily by physical features but sometimes by invisible city or property boundaries. A tabulation block boundary does not cross the boundary of any other geographic area for which the Census Bureau tabulates data. The subtypes of this feature are Count Question Resolution (CQR), current, and census.
G5200	Congressional District	The 435 areas from which people are elected to the U.S. House of Representatives. Additional equivalent features exist for state equivalents with nonvoting delegates or no representative. The subtypes of this feature are 106th, 107th, 108th, 109th, and 111th Congressional Districts, plus subsequent Congresses.
G5210	State Legislative District (Upper Chamber	Areas established by a state or equivalent government from which members are elected to the upper or unicameral chamber of a state governing body. The upper chamber is the senate in a bicameral legislature, and the unicameral case is a single house legislature (Nebraska).
G5220	State Legislative District (Lower Chamber)	Areas established by a state or equivalent government from which members are elected to the lower chamber of a state governing body. The lower chamber is the House of Representatives in a bicameral legislature.
G5240	Voting District	The generic name for the geographic features, such as precincts, wards, and election districts, established by state, local, and tribal governments for the purpose of conducting elections.
G5400	Elementary School District	A geographic area within which officials provide public elementary grade-level educational services for residents.
G5410	Secondary School District	A geographic area within which officials provide public secondary grade-level educational services for residents.
G5420	Unified School District	A geographic area within which officials provide public educational services for all grade levels for residents.
G6120	Public-Use Microdata Area	A decennial census area with a population of at least 100,000 or more persons for which the Census Bureau provides selected extracts of household-level data that are screened to protect confidentiality.
G6300	Traffic Analysis District	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data. A Traffic Analysis District (TAD) consists of one or more Traffic Analysis Zones (TAZs).
G6320	Traffic Analysis Zone	An area delineated by Metropolitan Planning Organizations (MPOs) and state Departments of Transportation (DOTs) for tabulating journey-to-work and place-of-work data.
G6330	Urban Growth Area	An area defined under state authority to manage urbanization that the Census Bureau includes in the MAF/TIGER® System in agreement with the state.

MTFCC	Feature Class	Feature Class Description
G6350	ZIP Code Tabulation Area (Five-Digit)	An approximate statistical-area representation of a U.S. Postal Service (USPS) 5-digit ZIP Code service area.
G6400	Commercial Region	For the purpose of presenting economic statistical data, municipios in Puerto Rico are grouped into commercial regions.
H1100	Connector	A known, but nonspecific, hydrographic connection between two nonadjacent water features.
H2025	Swamp/Marsh	A poorly drained wetland, fresh or saltwater, wooded or grassy, possibly covered with open water [includes bog, cienega, marais and pocosin].
H2030	Lake/Pond	A standing body of water that is surrounded by land.
H2040	Reservoir	An artificially impounded body of water.
H2041	Treatment Pond	An artificial body of water built to treat fouled water.
H2051	Bay/Estuary/Gulf/Sound	A body of water partly surrounded by land [includes arm, bight, cove and inlet].
H2053	Ocean/Sea	The great body of salt water that covers much of the earth.
H2060	Gravel Pit/Quarry filled with water	A body of water in a place or area from which commercial minerals were removed from the Earth.
H2081	Glacier	A body of ice moving outward and down slope from an area of accumulation; an area of relatively permanent snow or ice on the top or side of a mountain or mountainous area [includes ice field and ice patch].
H3010	Stream/River	A natural flowing waterway [includes anabranch, awawa, branch, brook, creek, distributary, fork, kill, pup, rio, and run].
H3013	Braided Stream	A natural flowing waterway with an intricate network of interlacing channels.
H3020	Canal, Ditch or Aqueduct	An artificial waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft [includes lateral].
K1225	Crew-of-Vessel Location	A point or area in which the population of military or merchant marine vessels at sea are assigned, usually being at or near the home port pier.
K1231	Hospital/Hospice/Urgent Care Facility	One or more structures where the sick or injured may receive medical or surgical attention [including infirmary].
K1235	Juvenile Institution	A facility (correctional and non-correctional) where groups of juveniles reside; this includes training schools, detention centers, residential treatment centers and orphanages.
K1236	Local Jail or Detention Center	One or more structures that serve as a place for the confinement of adult persons in lawful detention, administered by a local (county, municipal, etc.) government.
K1237	Federal Penitentiary, State Prison, or Prison Farm	An institution that serves as a place for the confinement of adult persons in lawful detention, administered by the federal government or a state government.
K1238	Other Correctional Institution	One or more structures that serve as a place for the confinement of adult persons in lawful detention, not elsewhere classified or administered by a government of unknown jurisdiction.

MTFCC	Feature Class	Feature Class Description
K1239	Convent, Monastery, Rectory, Other Religious Group Quarters	One or more structures intended for use as a residence for those having a religious vocation.
K1246	Community Center	Community Center.
K2110	Military Installation	An area owned and/or occupied by the Department of Defense for use by a branch of the armed forces (such as the Army, Navy, Air Force, Marines, or Coast Guard), or a state owned area for the use of the National Guard.
K2165	Government Center	A place used by members of government (either federal, state, local, or tribal) for administration and public business.
K2167	Convention Center	An exhibition hall or conference center with enough open space to host public and private business and social events.
K2180	Park	Parkland defined and administered by federal, state, and local governments.
K2181	National Park Service Land	Area—National parks, National Monuments, and so forth—under the jurisdiction of the National Park Service.
K2182	National Forest or Other Federal Land	Land under the management and jurisdiction of the federal government, specifically including areas designated as National Forest, and excluding areas under the jurisdiction of the National Park Service.
K2183	Tribal Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of an American Indian tribe.
K2184	State Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a state government.
K2185	Regional Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a regional government.
K2186	County Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a county government.
K2187	County Subdivision Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a minor civil division (town/township) government.
K2188	Incorporated Place Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a municipal government.
K2189	Private Park, Forest, or Recreation Area	A privately owned place or area set aside for recreation or preservation of a cultural or natural resource.
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of some other type of government or agency such as an independent park authority or commission.
K2191	Post Office	An official facility of the U.S. Postal Service used for processing and distributing mail and other postal material.
K2193	Fire Department	Fire Department.

MTFCC	Feature Class	Feature Class Description
K2194	Police Station	Police Station.
K2195	Library	Library.
K2196	City/Town Hall	City/Town Hall.
K2400	Transportation Terminal	A facility where one or more modes of transportation can be accessed by people or for the shipment of goods; examples of such a facility include marine terminal, bus station, train station, airport and truck warehouse.
K2424	Marina	A place where privately owned, light-craft are moored.
K2432	Pier/Dock	A platform built out from the shore into the water and supported by piles. This platform may provide access to ships and boats, or it may be used for recreational purposes.
K2451	Airport or Airfield	A manmade facility maintained for the use of aircraft [including airstrip, landing field and landing strip].
K2452	Train Station, Trolley or Mass Transit Rail Station	A place where travelers can board and exit rail transit lines, including associated ticketing, freight, and other commercial offices.
K2453	Bus Terminal	A place where travelers can board and exit mass motor vehicle transit, including associated ticketing, freight, and other commercial offices.
K2454	Marine Terminal	A place where travelers can board and exit water transit or where cargo is handled, including associated ticketing, freight, and other commercial offices.
K2455	Seaplane Anchorage	A place where an airplane equipped with floats for landing on or taking off from a body of water can debark and load.
K2456	Airport—Intermodal Transportation Hub/Terminal	A major air transportation facility where travelers can board and exit airplanes and connect with other (i.e. non-air) modes of transportation.
K2457	Airport—Statistical Representation	The area of an airport adjusted to include whole 2000 census blocks used for the delineation of urban areas.
K2458	Park and Ride Facility/Parking Lot	A place where motorists can park their cars and transfer to other modes of transportation.
K2459	Runway/Taxiway	A fairly level and usually paved expanse used by airplanes for taking off and landing at an airport.
K2460	Helicopter Landing Pad	A fairly level and usually paved expanse used by helicopters for taking off and landing.
K2540	University or College	A building or group of buildings used as an institution for post-secondary study, teaching, and learning [including seminary].
K2543	School or Academy	A building or group of buildings used as an institution for preschool, elementary or secondary study, teaching, and learning [including elementary school and high school].
K2545	Museum, Visitor Center, Cultural Center, or Tourist Attraction	An attraction of historical, cultural, educational or other interest that provides information or displays artifacts.
K2561	Golf Course	A place designed for playing golf.
K2582	Cemetery	A place or area for burying the dead [including burying ground and memorial garden].

MTFCC	Feature Class	Feature Class Description
K2586	Zoo	A facility in which terrestrial and/or marine animals are confined within enclosures and displayed to the public for educational, preservation, and research purposes.
K3544	Place of Worship	A sanctified place or structure where people gather for religious worship; examples include church, synagogue, temple, and mosque.
L4010	Pipeline	A long tubular conduit or series of pipes, often underground, with pumps and valves for flow control, used to transport fluid (e.g., crude oil, natural gas), especially over great distances.
L4020	Powerline	One or more wires, often on elevated towers, used for conducting high-voltage electric power.
L4031	Aerial Tramway/Ski Lift	A conveyance that transports passengers or freight in carriers suspended from cables and supported by a series of towers.
L4110	Fence Line	A man-made barrier enclosing or bordering a field, yard, etc., usually made of posts and wire or wood, used to prevent entrance, to confine, or to mark a boundary.
L4121	Ridge Line	The line of highest elevation along a ridge.
L4125	Cliff/Escarpment	A very steep or vertical slope [including bluff, crag, head, headland, nose, palisades, precipice, promontory, rim and rimrock].
L4130	Point-to-Point Line	A line defined as beginning at one location point and ending at another, both of which are in sight.
L4140	Property/Parcel Line (Including PLSS)	This feature class may denote a nonvisible boundary of either public or private lands (e.g., a park boundary) or it may denote a Public Land Survey System or equivalent survey line.
L4150	Coastline	The line that separates either land or Inland water from Coastal, Territorial or Great Lakes water. Where land directly borders Coastal, Territorial or Great Lakes water, the shoreline represents the Coastline. Where Inland water (such as a river) flows into Coastal, Territorial or Great Lakes water, the closure line separating the Inland water from the other class of water represents the Coastline.
L4165	Ferry Crossing	The route used to carry or convey people or cargo back and forth over a waterbody in a boat.
P0001	Nonvisible Linear Legal/Statistical Boundary	A legal/statistical boundary line that does not correspond to a shoreline or other visible feature on the ground.
P0002	Perennial Shoreline	The more-or-less permanent boundary between land and water for a water feature that exists year-round.
P0003	Intermittent Shoreline	The boundary between land and water (when water is present) for a water feature that does not exist year-round.
P0004	Other non-visible bounding Edge (e.g., Census water boundary, boundary of an aerial feature)	A bounding Edge that does not represent a legal/statistical boundary, and does not correspond to a shoreline or other visible feature on the ground. Many such Edges bound area landmarks, while many others separate water features from each other (e.g., where a bay meets the ocean).
R1011	Railroad Feature (Main, Spur, or Yard)	A line of fixed rails or tracks that carries mainstream railroad traffic. Such a rail line can be a main line or spur line, or part of a rail yard.

MTFCC	Feature Class	Feature Class Description
R1051	Carline, Streetcar Track, Monorail, Other Mass Transit	Mass transit rail lines (including lines for rapid transit, monorails, streetcars, light rail, etc.) that are typically inaccessible to mainstream railroad traffic and whose tracks are not part of a road right-of-way.
R1052	Cog Rail Line, Incline Rail Line, Tram	A special purpose rail line for climbing steep grades that is typically inaccessible to mainstream railroad traffic. Note that aerial tramways and streetcars (which may also be called "trams") are accounted for by other MTFCCs and do not belong in R1052.
S1100	Primary Road	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
S1200	Secondary Road	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.
S1400	Local Neighborhood Road, Rural Road, City Street	Generally, a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.
S1500	Vehicular Trail (4WD)	An unpaved dirt trail where a four-wheel drive vehicle is required. These vehicular trails are found almost exclusively in very rural areas. Minor, unpaved roads usable by ordinary cars and trucks belong in the S1400 category.
S1630	Ramp	A road that allows controlled access from adjacent roads onto a limited access highway, often in the form of a cloverleaf interchange. These roads are unaddressable and do not carry a name in the MAF/TIGER System.
S1640	Service Drive usually along a limited access highway	A road, usually paralleling a limited access highway, that provides access to structures along the highway. These roads can be named and may intersect with other roads.
S1710	Walkway/Pedestrian Trail	A path that is used for walking, being either too narrow for or legally restricted from vehicular traffic.
S1720	Stairway	A pedestrian passageway from one level to another by a series of steps.
S1730	Alley	A service road that does not generally have associated addressed structures and is usually unnamed. It is located at the rear of buildings and properties and is used for deliveries.
S1740	Private Road for service vehicles (logging, oil fields, ranches, etc.)	A road within private property that is privately maintained for service, extractive, or other purposes. These roads are often unnamed.
S1750	Internal U.S. Census Bureau use	Internal U.S. Census Bureau use.
S1780	Parking Lot Road	The main travel route for vehicles through a paved parking area.
S1820	Bike Path or Trail	A path that is used for manual or small, motorized bicycles, being either too narrow for or legally restricted from vehicular traffic.

MTFCC	Feature Class	Feature Class Description
S1830	Bridle Path	A path that is used for horses, being either too narrow for or legally restricted from vehicular traffic.
S2000	Road Median	The unpaved area or barrier between the carriageways of a divided road.
Note: The information in this table was last updated in November 2017.		

APPENDIX D STANDARD STREET TYPE ABBREVIATIONS

Table 49: Standard Street Type Abbreviations

Street Name Type	Standard Abbreviation
ALLEY	ALY
ANEX	ANX
ARCADE	ARC
AVENUE	AVE
BAYOU	BYU
BEACH	BCH
BEND	BND
BLUFF	BLF
BLUFFS	BLFS
BOTTOM	BTM
BOULEVARD	BLVD
BRANCH	BR
BRIDGE	BRG
BROOK	BRK
BROOKS	BRKS
BURG	BG
BURGS	BGS
BYPASS	BYP
CAMP	CP
CANYON	CYN
CAPE	CPE
CAUSEWAY	CSWY
CENTER	CTR
CENTERS	CTRS
CIRCLE	CIR
CIRCLES	CIRS
CLIFF	CLF
CLIFFS	CLFS
CLUB	CLB
COMMON	CMN
COMMONS	CMNS
CORNER	COR
CORNERS	CORS
COURSE	CRSE
COURT	CT
COURTS	CTS
COVE	CV
COVES	CVS
CREEK	CRK
CRESCENT	CRES
CREST	CRST
CROSSING	XING
CROSSROAD	XRD
CROSSROADS	XRDS
CURVE	CURV
DALE	DL

Street Name Type	Standard Abbreviation
DAM	DM
DIVIDE	DV
DRIVE	DR
DRIVES	DRS
ESTATE	EST
ESTATES	ESTS
EXPRESSWAY	EXPY
EXTENSION	EXT
EXTENSIONS	EXTS
FALL	FALL
FALLS	FLS
FERRY	FRY
FIELD	FLD
FIELDS	FLDS
FLAT	FLT
FLATS	FLTS
FORD	FRD
FORDS	FRDS
FOREST	FRST
FORGE	FRG
FORGES	FRGS
FORK	FRK
FORKS	FRKS
FORT	FT
FREEWAY	FWY
GARDEN	GDN
GARDENS	GDNS
GATEWAY	GTWY
GLEN	GLN
GLENS	GLNS
GREEN	GRN
GREENS	GRNS
GROVE	GRV
GROVES	GRVS
HARBOR	HBR
HARBORS	HBRS
HAVEN	HVN
HEIGHTS	HTS
HIGHWAY	HWY
HILL	HL
HILLS	HLS
HOLLOW	HOLW
INLET	INLT
ISLAND	IS
ISLANDS	ISS
ISLE	ISLE
JUNCTION	JCT
JUNCTIONS	JCTS
KEY	KY
KEYS	KYS

Street Name Type	Standard Abbreviation
KNOLL	KNL
KNOLLS	KNLS
LAKE	LK
LAKES	LKS
LAND	LAND
LANDING	LNDG
LANE	LN
LIGHT	LGT
LIGHTS	LGTS
LOAF	LF
LOCK	LCK
LOCKS	LCKS
LODGE	LDG
LOOP	LOOP
MALL	MALL
MANOR	MNR
MANORS	MNRS
MEADOW	MDW
MEADOWS	MDWS
MEWS	MEWS
MILL	ML
MILLS	MLS
MISSION	MSN
MOTORWAY	MTWY
MOUNT	MT
MOUNTAIN	MTN
MOUNTAINS	MTNS
NECK	NCK
ORCHARD	ORCH
OVAL	OVAL
OVERPASS	OPAS
PARK	PARK
PARKS	PARK
PARKWAY	PKWY
PARKWAYS	PKWY
PASS	PASS
PASSAGE	PSGE
PATH	PATH
PIKE	PIKE
PINE	PNE
PINES	PNES
PLACE	PL
PLAIN	PLN
PLAINS	PLNS
PLAZA	PLZ
POINT	PT
POINTS	PTS
PORT	PRT
PORTS	PRTS
PRAIRIE	PR

Street Name Type	Standard Abbreviation
RADIAL	RADL
RAMP	RAMP
RANCH	RNCH
RAPID	RPD
RAPIDS	RPDS
REST	RST
RIDGE	RDG
RIDGES	RDGS
RIVER	RIV
ROAD	RD
ROADS	RDS
ROUTE	RTE
ROW	ROW
RUE	RUE
RUN	RUN
SHOAL	SHL
SHOALS	SHLS
SHORE	SHR
SHORES	SHRS
SKYWAY	SKWY
SPRING	SPG
SPRINGS	SPGS
SPUR	SPUR
SPURS	SPUR
SQUARE	SQ
SQUARES	SQS
STATION	STA
STRAVENUE	STRA
STREAM	STRM
STREET	ST
STREETS	STS
SUMMIT	SMT
TERRACE	TER
THROUGHWAY	TRWY
TRACE	TRCE
TRACK	TRAK
TRAFFICWAY	TRFY
TRAIL	TRL
TRAILER	TRLR
TUNNEL	TUNL
TURNPIKE	TPKE
UNDERPASS	UPAS
UNION	UN
UNIONS	UNS
VALLEY	VLY
VALLEYS	VLYS
VIADUCT	VIA
VIEW	VW
VIEWS	VWS
VILLAGE	VLG

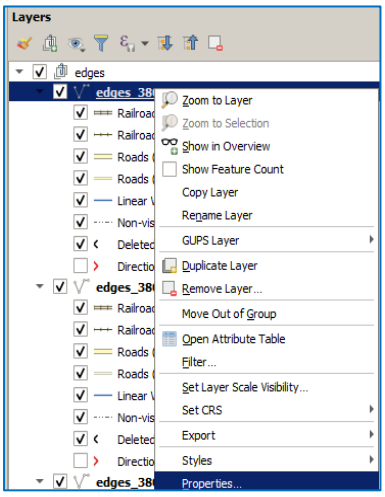
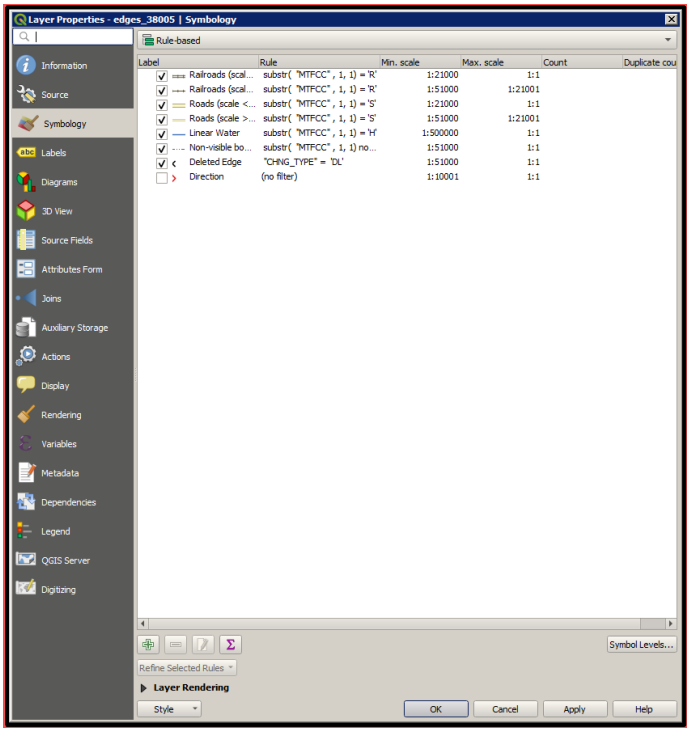
Street Name Type	Standard Abbreviation
VILLAGES	VLGS
VILLE	VL
VISTA	VIS
WALK	WALK
WALKS	WALK
WALL	WALL
WAY	WAY
WAYS	WAYS
WELL	WL
WELLS	WLS

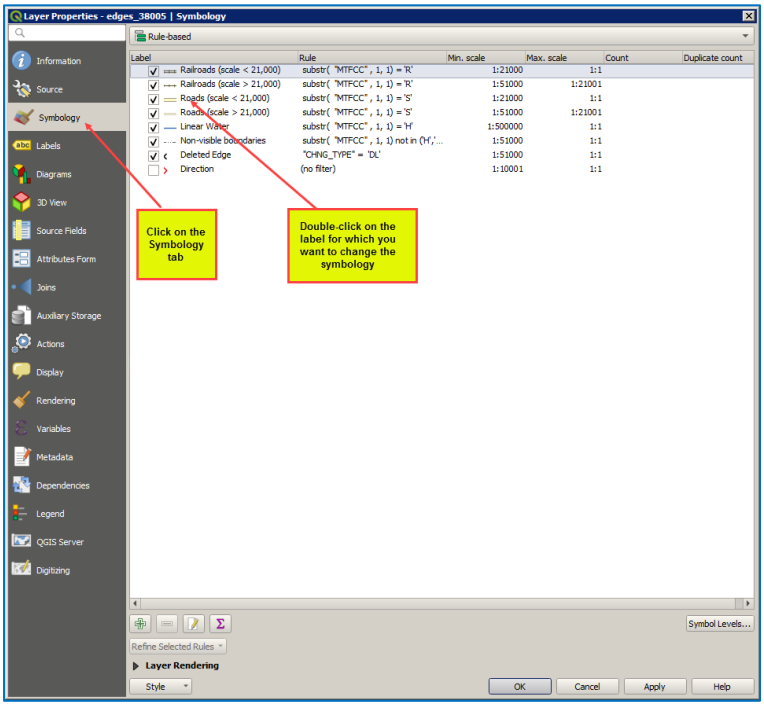
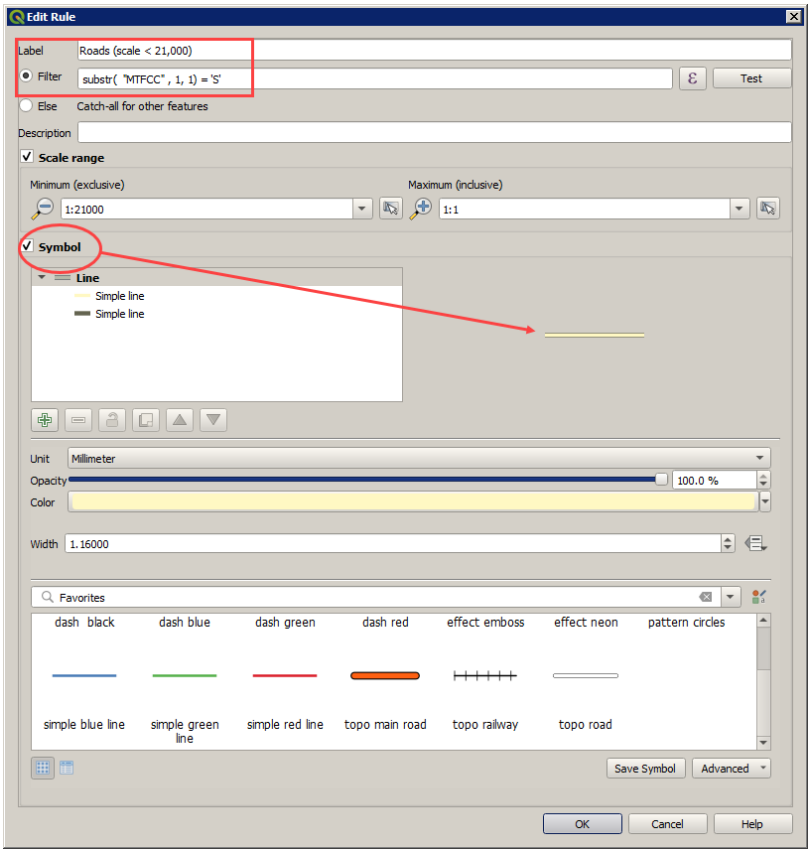
APPENDIX E GUPS TOOLS

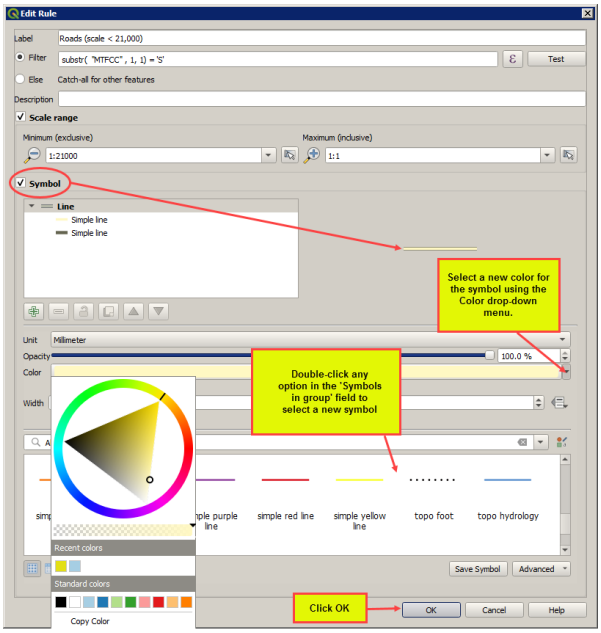
E.1 Set Layer Symbology

GUPS loads a default layer symbology established for each Census Bureau geographic partnership program. The default symbology can be changed to suit users' preferences. To change the default symbology for a layer in GUPS, follow the instructions in **Table 50**.

Table 50: Reset Layer Symbology

Step	Action and *Result*
Step 1	Right-click on the layer in the **Layers Panel** (in this example, the Edges layer is selected). *The **Layers** drop-down menu opens*. 
Step 2	In the drop-down menu, choose 'Properties'. *The **Layer Properties** screen opens*. 

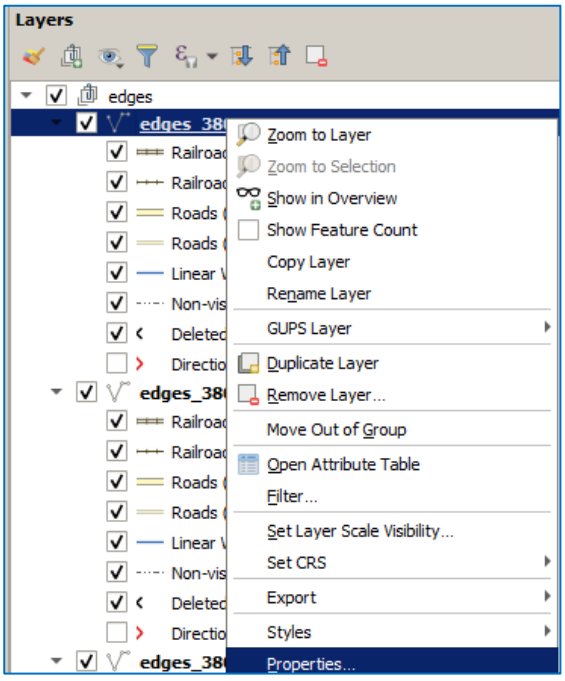
Step	Action and *Result*
Step 3	In the left-hand pane, click on **Style**, then double-click the symbol to be edited in the layers list. In this example, 'Roads, substr ("MTFCC, 1,1) = S1100' is selected.  *The **Rule Properties** dialog box opens and the **Label** and **Filter** fields display the item chosen. The **Symbol** pane shows the current symbology (yellow line).* 

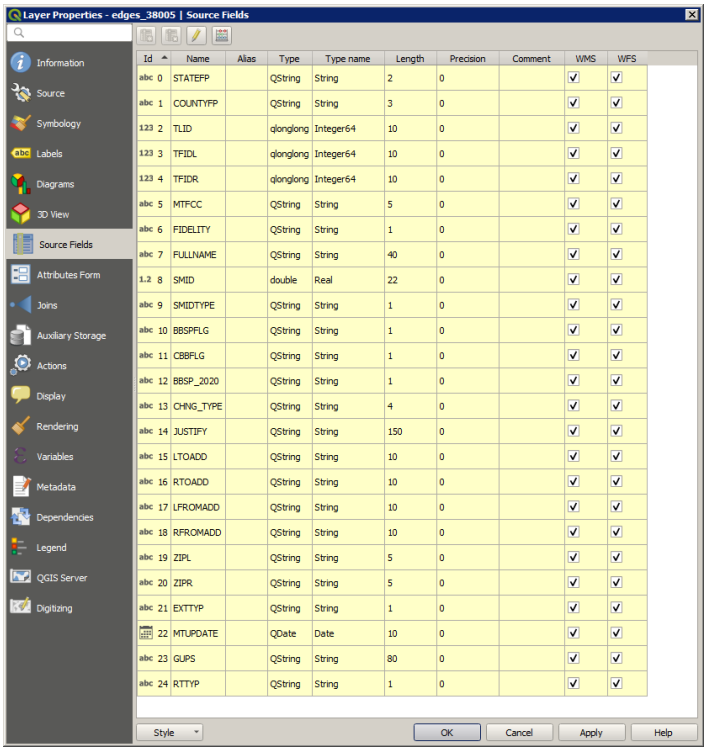
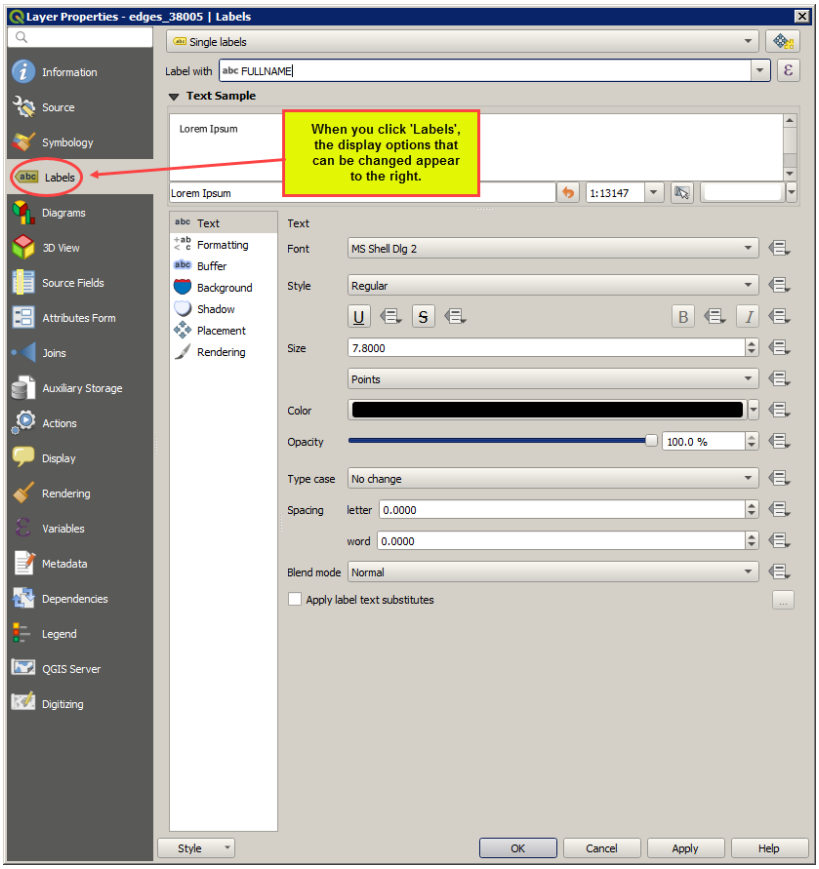
Step	Action and *Result*
Step 4	Choose a new color from the **Color** drop-down menu, or select a different symbol for the layer altogether by double-clicking any symbol in the **Symbols in Group** field. Click **OK**. *The new symbology will display in the **Layers Panel** and in **Map View**.* 

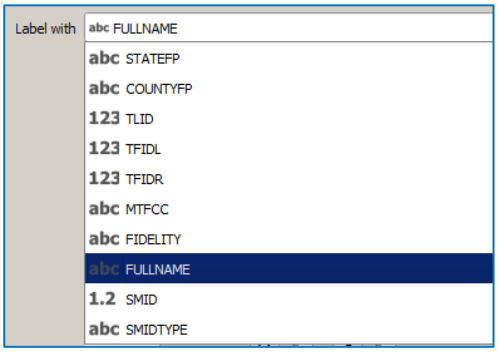
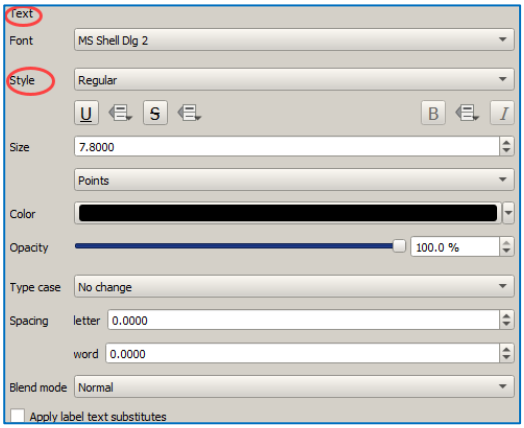
E.2 Change Label Display

To change the default labeling for a layer, follow the steps in **Table 51**.

Table 51: Change Default Labeling

Step	Action and *Result*
Step 1	Right click on the layer (the edges layer is selected) in the **Layers Panel.** *The Layers drop-down menu opens*. 

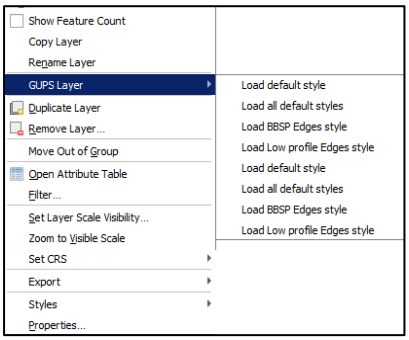
Step	Action and *Result*
Step 2	In the drop-down menu, choose 'Properties'. *The **Layer Properties** dialog box opens.* 
Step 3	In the far left-hand pane, click **Labels**. *The options to change the label display properties open in the main window*. 

Step	Action and *Result*
Step 4	To change the attribute field, click on the drop-down menu for 'Label this layer with' at the top of the screen, and select the desired option.  **Text style** options change the font, style, size, color, transparency, type case, and spacing of layer labels. Shown below are the drop-down options for style. 

E.3 Restoring Default Label Display Settings

To restore the default labeling for a layer, follow the steps in **Table 52**.

Table 52: Restoring Default Labeling

Step	Action and *Result*
Step 1	Right-click on the layer that was changed in the **Layers Panel.** *The layer's drop-down menu opens*.
Step 2	In this example, the Edges layer is selected. In the drop-down menu, click on the arrow to the right of '**GUPS Layer**'. Four options appear: '**Load default style**', '**Load all default style**', '**Load BBSP Edges style**', '**Load Low profile Edges style**', '**Load default style**', '**Load all default styles**', '**Load BBSP Edges style**', and '**Load Low profile Edges style**'. 

Step	Action and *Result*
Step 3	Select '**Load default style**' to restore the selected layer's original properties OR select '**Load all default style**' to reset *ALL* the layers to their original settings.

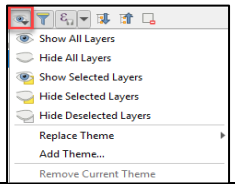
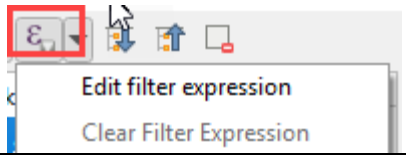
E.4 Using the Layers Panel Toolbar to Manage Layers

Using the buttons on the toolbar located at the top of the Layers Panel, users can add and remove layers or groups, manage layer visibility, filter the legend by map content, expand or contract all sections of the Layers Panel list at once, and group layers.

The Layers Panel Layers toolbar contains the items shown below in **Figure 20**.
Table 53: Layers Panel Toolbar Buttons describes the function of each of the buttons on the toolbar.

Figure 20. Layers Panel Toolbar

Table 53: Layers Panel Toolbar Buttons

Button	Name	Function/Description
	Open the Layer Styling Panel	Customize symbology and labels of a selected layer.
	Add Group	Organize layers in the **Layers Panel** into groups.
	Manage Map Themes	 Allows the user various view options for **Layers**.
	Filter Legend by Map Content	Removes from the **Layers Panel** display any layers that are not currently in the **Map View** extent. This feature ensures that the **Layers Panel** does not contain entries for items not currently in the map view.
	Filter Legend by Expression	 Provides functions which aggregate values over layers and fields.
	Expand All	Expands the **Layers Panel** menus (+) to display all layers under each group's menu.
	Collapse All	Collapses the **Layers Panel** menus (-) to show only groups.
	Remove Layer/Group	Remove a layer or group from the **Layers Panel.**

APPENDIX F MAF/TIGER FEATURE CLASSIFICATION

Table 54: MAF/TIGER Feature Classification

MTFCC	FEATURE NAME
S1100	Interstate Highway or Primary Road with limited access
S1200	Primary Road without limited access, US Highway, State Highway, or County Highway, Secondary and connecting roads
S1400	Local Neighborhood Road, Rural Road, City Street
S1500	Vehicular Trail (4WD)
S1630	Ramp
S1640	Service Drive usually along a limited access highway
S1710	Walkway/Pedestrian Trail
S1720	Stairway
S1730	Alley
S1740	Private Road for service vehicles (logging, oil fields, ranches, etc.)
S1750	Private Driveway
H3010	Stream/River
H3013	Braided Stream
H3020	Canal, Ditch or Aqueduct
R1011	Railroad Feature (Main, Spur, or Yard)
R1051	Carline, Streetcar Track, Monorail, Other Mass Transit Rail
R1052	Cog Rail Line, Incline Rail Line, Tram
P0001	Nonvisible Legal/Statistical Boundary
L4010	Pipeline
L4020	Power Transmission Line
L4110	Fence Line
L4121	Ridge Line
L4031	Aerial Tramway/Ski Lift
K2451	Airport or Airfield
L4140	Property/Parcel Line
L4165	Ferry Crossing

APPENDIX G SHAPEFILE NAMES

State Shapefile Names - PVS_19_v2_<layername>_<SS>.shp, where <SS> is the number corresponding to the state, for example, "24" and <layername> is the abbreviation for the shapefile layer, describe in detail below.

Table 55: State Shapefiles Names

Shapefile Layer	<layername>
American Indian Areas (AIA) – Legal	aial
2010 American Indian Areas (AIA) – Legal	aial2010
American Indian Areas (AIA) – Statistical	aias
American Indian Tribal Subdivisions (AITS) - Legal	aitsl
American Indian Tribal Subdivisions (AITS) - Statistical	aitss
Block Area Group	bag
Metropolitan Statistical Area/Metropolitan Statistical Area	cbsa
Congressional Districts	cd
Census Designated Place	cdp
Counties and Equivalent Areas	county
2010 Counties and Equivalent Areas	county2010
Elementary School Districts	elsd
County Subdivisions - Legal	mcd
New England City and Town Areas	necta
Incorporated Places	place
2010 Public Use Microdata Areas	puma2010
Secondary School Districts	scsd
State Legislative Districts Lower	sldl
State Legislative District Upper Chambers	sldu
State	state
Tribal Block Groups	tbg
Tribal Census Tracts	tct
2010 Census Tracts	tracts2010
Urban Area	uac
Unified School District State-Based	unsd

County Shapefile Names - PVS_19_v2_<layername>_<SSCCC>.shp, where <SSCCC> is the number corresponding to the state and county, for example, "24001" and <layername> is the abbreviation for the shapefile layer, describe in detail below.

Table 56: County Shapefiles Names

Shapefile Layer	<layername>
American Indian Areas (AIA) – Legal	aial
American Indian Areas (AIA) – Statistical	aias
American Indian Tribal Subdivisions (AITS) - Legal	aitsl
American Indian Tribal Subdivisions (AITS) - Statistical	aitss
Alaska Native Regional Corporations (ANRC)	anrc
Area Landmark	arealm
Block Area Groups	bag
Block Groups	bg
Metropolitan Statistical Area/Metropolitan Statistical Area	cbsa
Census County Division	ccd
Congressional Districts	cd
Census Designated Place	cdp
Consolidated Cities	concity
Counties and Equivalent Areas	county
Census Tracts - Current	curtracts
All Lines	edges
Elementary School Districts	elsd
Hawaiian Home Lands (HHL)	hhl
County Subdivisions - Legal	mcd
New England City and Town Areas	necta
Offsets	offset
Incorporated Places	place
Point Landmarks	pointlm
2010 Public Use Microdata Areas	puma2010
Secondary School Districts	scsd
State Legislative Districts Lower	sldl
State Legislative Districts Upper	sldu
Subbarrios	submcd
Census Blocks - Current	tabblock
2010 Census Blocks	tabblock2010

Shapefile Layer	<layername>
2010 Traffic Analysis Delineation	tad2010
2010 Traffic Analysis Zones	taz2010
Tribal Block Groups	tbg
Tribal Census Tracts	tct
2010 Census Tracts	tracts2010
Census Urban Areas	uac
Urban Growth Area	uga
Hydrography - Area	water
Unified School Districts	unsd
Relationship Tables	
Address Ranges	addr
Topological Faces (2-cells with all geocodes)	faces
Topological Faces - Area Landmark Relationship	areafaces
Topological Faces - Area Hydrography Relationship	hydrofaces
Linear Feature Names - Fielded	allnames

APPENDIX H SHAPEFILE LAYOUTS

Table 57: Edges Shapefile (PVS_19_v2_edges)

Attribute Field	Length	Type	Description
STATEFP	2	String	FIPS state code
COUNTYFP	3	String	FIPS county code
TLID	10	Double	Permanent edge ID
TFIDL	10	Double	Permanent face ID (left)
TFIDR	10	Double	Permanent face ID (right)
MTFCC	5	String	MAF/TIGER Feature Class Code
FIDELITY	1	String	Indication to a respondent when their entity boundary has changed through spatial enhancement
FULLNAME	40	String	Decoded feature name with abbreviated qualifier, direction, and feature type
SMID	22	String	Spatial Theta ID
SMIDTYPE	1	String	SMIDTYPE code
BBSPFLG	1	String	Redistricting data project participant's submitted request of an EDGE for selection as a block boundary
CBBFLG	1	String	Indicates the status of an EDGE for a selection as a block boundary
BBSP_2020	1	String	New BBSP flag
CHNG_TYPE	4	String	Type of linear feature update
JUSTIFY	150	String	Justification of change
LTOADD	10	String	Left To address
RTOADD	10	String	Right To address
LFROMADD	10	String	Left From address
RFROMADD	10	String	Right From address
ZIPL	5	String	Left zip code
ZIPR	5	String	Right zip code
EXTTYP	1	Char	Extension type
MTUPDATE	10	Date	Date of last update to the edge

Table 58: Address Ranges Attribute File (PVS_19_v2_addr)

Attribute Field	Length	Type	Description
OID	8	STRING	OBJECT ID
TLID	22	Integer	TIGER LINE ID
STATEFP	2	String	FIPS STATE CODE
COUNTYFP	3	String	FIPS COUNTY CODE
FROMHN	12	String	FROM HOUSE NUMBER
TOHN	12	String	TO HOUSE NUMBER
SIDE	1	String	SIDE INDICATOR FLAG
ZIP	5	String	5-DIGIT ZIP CODE
PLUS4	4	String	ZIP+4 CODE
LFROMADD	10	String	LEFT FROM ADDRESS
LTOADD	10	String	LEFT TO ADDRESS
RFROMADD	10	String	RIGHT FROM ADDRESS
RTOADD	10	String	RIGHT TO ADDRESS
ZIPL	5	String	LEFT 5-DIGIT ZIP CODE
ZIPR	5	String	RIGHT 5-DIGIT ZIP CODE
ZIP4L	4	String	LEFT ZIP+4 CODE
ZIP4R	4	String	RIGHT ZIP+4 CODE

Table 59: Census Block Shapefile (PVS_19_v2_tabblock2010)

Attribute Field	Length	Type	Description
BLKSZIND	1	String	BLOCK SIZE INDICATOR
BLOCK	4	String	BLOCK NUMBER
BLOCKCE	4	String	TABULATION BLOCK NUMBER
BLOCKID	15	String	FIPS STATE CODE, FIPS COUNTY CODE, CENSUS TRACT CODE, BLOCK NUMBER
COUNTYFP	3	String	CENSUS COUNTY FIPS CODE
COUNTYFP10	3	String	FIPS COUNTY CODE
FID	10	Integer	PERMANENT FACE ID
NCELIGBLE	1	String	NEW CONSTRUCTION PROGRAM ELIGIBLE
PARTFLG	1	String	PART FLAG INDICATOR
Shape	7	String	TYPE OF SHAPE
STATEFP	2	String	CENSUS STATE FIPS CODE
STATEFP10	2	String	FIPS STATE CODE
SUFFIX1CE	2	String	CENSUS BLOCK SUFFIX 1

Attribute Field	Length	Type	Description
SUFFIX2CE	2	String	CENSUS BLOCK SUFFIX 2
TRACTCE10	6	String	CENSUS TRACT CODE

Table 60: Census Tract Shapefile (PVS_19_v2_curtracts)

Attribute Field	Length	Type	Description
CHNG_TYPE	2	String	TYPE OF AREA UPDATE
COUNTYFP	3	String	FIPS COUNTY CODE
EFF_DATE	8	String	EFFECTIVE DATE OR VINTAGE
FID	10	Integer	PERMANENT FACE ID
JUSTIFY	150	Char	JUSTIFICATION
NAME	100	String	NAME
NEW_CODE	2	String	NEW CONGRESSIONAL DISTRICT CODE
RELATE	120	String	RELATIONSHIP DESCRIPTION
Shape	7	String	TYPE OF SHAPE
STATEFP	2	String	FIPS STATE CODE
TRACTCE	6	String	CENSUS TRACT CODE
TRACTID	11	String	FIPS STATE CODE, FIPS COUNTY CODE, CENSUS TRACT CODE
TRACTLABEL	7	String	TRACT NUMBER USED FOR LUCA GEOCODING
TRACTTYP	1	String	TRACT CHARACTERISTIC FLAG
VINTAGE	2	String	VINTAGE UPDATED WITH RETURNED DATA

Table 61: American Indian Areas Shapefile (PVS_19_v2_aial)

Attribute Field	Length	Type	Description
AIANNHCE	4	String	Census AIANNH Code
AIANNHFSR	1	String	Flag Indicating Level of Recognition of an AIA
AIANNHNS	8	String	ANSI numeric identifier for AIA areas
AREA	10	Double	Acreage of Area Update
AUTHTYPE	1	String	Authorization Type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
CHNG_TYPE	2	String	Type of Area Update
CLASSFP	2	String	FIPS 55 Class Code Describing an Entity
COMPTYP	1	String	Indicates if Reservation, Trust Land, or both are Present
COUNTYFP	3	String	FIPS County Code
DOCU	120	String	Supporting Documentation

Attribute Field	Length	Type	Description
EFF_DATE	8	Date	Effective Date
FID	10	Integer	Permanent Face ID
FORM_ID	4	String	(MTPS and Web BAS Only)
FUNCSTAT	1	String	Functional Status
JUSTIFY	150	Char	Justification
LSAD	2	String	Legal / Statistical Area Description
NAME	100	String	AIA name
NAMELSAD	100	String	Name with Translated LSAD
PARTFLG	1	String	Part Flag Indicator
RELATE	120	String	Relationship description
Shape	7	String	Type of shape
STATEFP	2	String	FIPS State Code
VINTAGE	2	String	Vintage of the Data

Table 62: County and Equivalent Areas Shapefile (PVS_19_v2_county)

Attribute Field	Length	Type	Description
STATEFP	2	String	FIPS state code
COUNTYFP	3	String	FIPS county code
COUNTYNS	8	String	ANSI feature code for the county or equivalent feature
NAMELSAD	100	String	Name with translated LSAD code
LSAD	2	String	Legal/Statistical Area Description code
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 63: County Subdivisions Shapefile (PVS_19_v2_mcd)

Attribute Field	Length	Type	Description
STATEFP	2	String	FIPS state code
COUNTYFP	3	String	FIPS county code
COUSUBFP	5	String	FIPS 55 county subdivision code
NAMELSAD	100	String	Name with translated LSAD
COUSUBNS	8	String	ANSI feature code for the county subdivision
LSAD	2	String	Legal/Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing an entity
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L – Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data

Table 64: Incorporated Place Shapefile (PVS_19_v2_place)

Attribute Field	Length	Type	Description
STATEFP	2	String	FIPS state code
COUNTYFP	3	String	FIPS county code
PLACEFP	5	String	FIPS 55 place code
NAMELSAD	100	String	Name with translated LSAD
PLACENS	8	String	ANSI feature code for the place
LSAD	2	String	Legal / Statistical Area Description
FUNCSTAT	1	String	Functional status
CLASSFP	2	String	FIPS 55 class code describing and entity
PARTFLG	1	String	Indicates if only part of a feature is represented
CHNG_TYPE	2	String	Type of area update
EFF_DATE	8	Date	Effective date or vintage
AUTHTYPE	1	String	Authorization type (O – Ordinance, R – Resolution, L –

Attribute Field	Length	Type	Description
			Local Law, S – State Level Action, X – Other)
DOCU	120	String	Supporting documentation
FORM_ID	4	String	Record ID (GUPS only)
AREA	10	Double	Area of update
RELATE	120	String	Relationship description
JUSTIFY	150	String	Justification of change
NAME	100	String	Entity name
VINTAGE	2	String	Vintage of the data