

**Request for Non-Substantive Change to the
2020 Public Use Microdata Areas Program
OMB Control No. 0607-1017
U.S. Department of Commerce
U.S. Census Bureau**

Purpose

Public Use Microdata Areas (PUMAs) are non-overlapping, statistical geographic areas that partition each state or equivalent entity into geographic areas containing no fewer than 100,000 people each. They cover the entirety of the United States, the Commonwealth of Puerto Rico, Guam, and the U.S. Virgin Islands. PUMAs are a higher level of geography than census tract, or even county in some instances, and provide all data users with another level of geography for data analysis.

The Census Bureau is the only federal agency to create PUMAs. Every ten years the Census Bureau offers State Data Centers the opportunity to delineate PUMAs for the tabulation and dissemination of decennial census and American Community Survey (ACS) Public Use Microdata Sample (PUMS) data as well as for the dissemination of period estimates from both the ACS and Puerto Rico Community Survey. PUMS data are valuable to state and local planning agencies/offices, as well as students, for use in long-range planning and research projects. PUMS data contain individual records of the characteristics for a sample of persons and households. They show a full range of population and housing unit responses collected on individual ACS questionnaires, for a subsample of ACS housing units and group quarters persons. Without PUMAs and PUMS data, the data community would not be able to create custom tables and statistics not available through pre-tabulated (or summary) data products.

Approved on July 21, 2021, the current Office of Management and Budget (OMB) collection for the 2020 PUMA will expire on July 31, 2024. This non-substantive change (NSC) request provides the finalized program materials and a revised announcement email. The 2020 PUMA NSC includes the following materials:

- 2020 PUMA Summary Guide.
- 2020 PUMA Participant Guide.
- 2020 PUMA Coding Guidelines.
- 2020 PUMA Naming Guidelines.
- 2020 PUMA Frequently Asked Questions.
- 2020 PUMA Announcement Email (revised 08/16/2021).

Other documentation included in this NSC:

- Supporting Statement Part B.

Background

The Census Bureau will accept proposed PUMA delineations from State Data Centers through January 2022. Participants prepare their proposed PUMA delineations using the Geographic Update Partnership Software and submit them using the Secure Web Incoming Module. Please

note that the resulting, finalized PUMAs will be publicly available online at the conclusion of Census Bureau processing in the summer of 2022.

There are no substantive changes to the program resulting from these modifications. The finalized guides/guidelines and the revised email do not alter the content or program objective. The revisions made to the email were necessary to reflect the most current program information.

Burden

The burden for the program is unchanged by this update.

Attachments

Table 1: Final and Revised Materials for Approval

Action for this NSC	Material Identification	Description
Submit final material.	<i>2020 PUMA Summary Guide</i>	This material includes high-level instructions to delineate and submit proposed PUMAs.
Submit final material.	<i>2020 PUMA Participant Guide</i>	This material includes detailed instructions to delineate and submit proposed PUMAs.
Submit final material.	<i>2020 PUMA Coding Guidelines</i>	This material includes guidelines for assigning codes to the delineated PUMAs. Rather than incorporate this content into an already lengthy participant guide, the program managers requested a separate document, as was used for the 2010 program.
Submit final material.	<i>2020 PUMA Naming Guidelines</i>	This material includes guidelines for assigning names to the delineated PUMAs. Rather than incorporate this content into an already lengthy participant guide, the program managers requested a separate document, as was used for the 2010 program.
Submit final material.	<i>2020 PUMA Frequently Asked Questions</i>	This material contains answer to what the Census Bureau believes may be frequently asked questions regarding the program. It will reside on the 2020 PUMA web page as a resource for participants.

Action for this NSC	Material Identification	Description
Revise the previously submitted 2020 PUMA announcement email.	<i>2020 PUMA announcement email (revised 08/16/2021).</i>	This is the revised 2020 PUMA announcement email that adds mention of the Summary Guide, Coding Guidelines, and Naming Guidelines as documents to download and review. This version also incorporates the OMB Control Number and Expiration Date. All materials listed in the email will reside on the 2020 PUMA web page.

2020 Public Use Microdata Areas Program (PUMA) Summary Guide

September 2021

Getting Started

This Summary Guide provides a snapshot of the program and its most important parts. This guide contains only high-level details on the program and Geographic Update Partnership Software (GUPS) functionality. The participant guide and the final criteria documents provide the specifics and instructions that should be referenced in conjunction with this summary guide for the 2020 PUMA.

State Data Centers (SDCs) should develop a plan to delineate PUMAs. The plan should consider whether the SDC will complete the delineation on their own or will receive partial state delineations from other interested data users. The Census Bureau encourages SDCs to reach out to interested data users and stakeholders in their state to gather input on data requirements. Everyone involved with delineation (e.g., SDCs and interested data users) should download the gups.zip file and the program materials (e.g., the participant guide, final criteria, naming guidelines, coding guidelines, and 2010 PUMA names file) from the [PUMA](#) and [2020 PUMA](#) websites, and save them to a designated folder on a local computer. Everyone involved should review the program materials prior to installing GUPS.

Download and Install GUPS

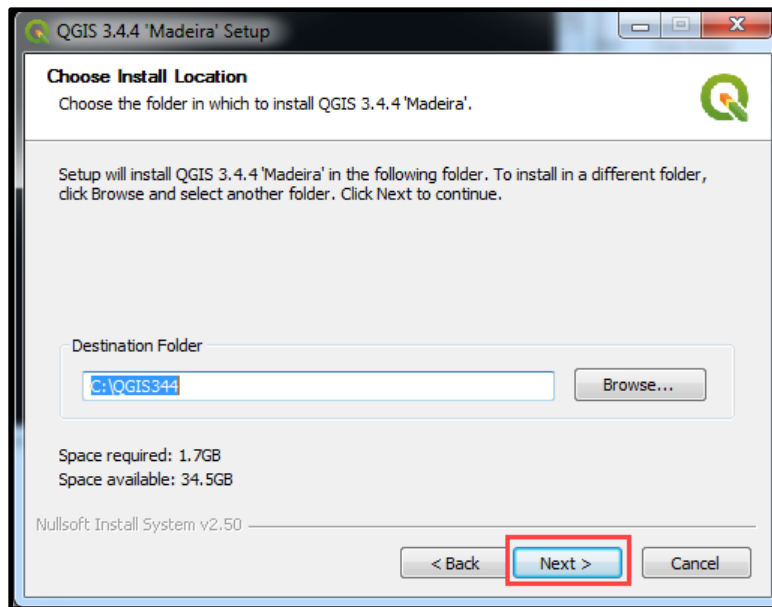
Follow the steps below to download and install GUPS. Detailed instructions are in chapter 2 of the participant guide. Please note that many agencies/organizations require certain security privileges to download and install external software. Work with your local Information Technology (IT) staff person to acquire those privileges or ask they assist with GUPS installation.

- 1) Download the **gups.zip** file from the [2020 PUMA website](#) to the computer.
- 2) Unzip the file.
- 3) Use the left mouse button to double-click the **SETUP-<version>.bat** file and start the installation. The anticipated version is 14.0.0-6.
- 4) When the installer opens, the **Welcome to the QGIS 'Madeira' Setup** window opens. Read the information on the screen and select **Next**.

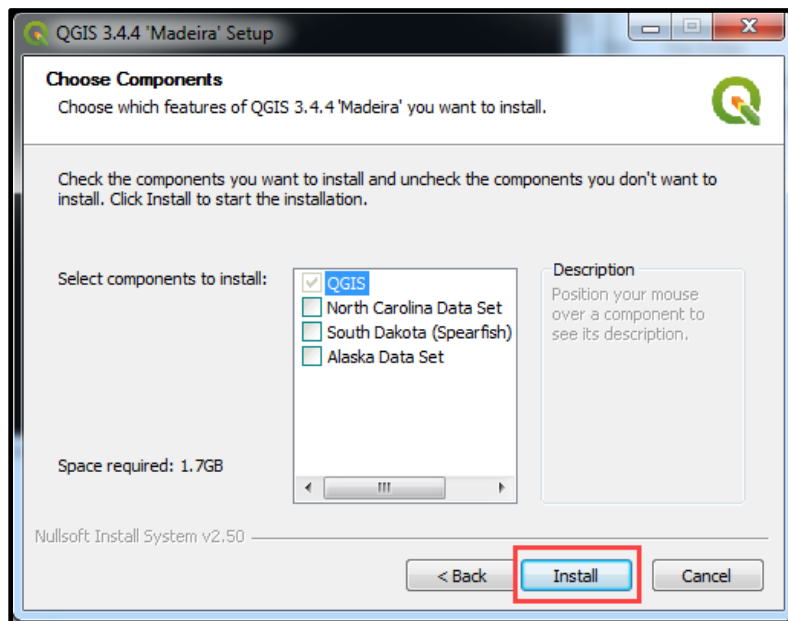


- 5) The **License Agreement** screen opens. Review the agreement and select **I Agree** to continue.

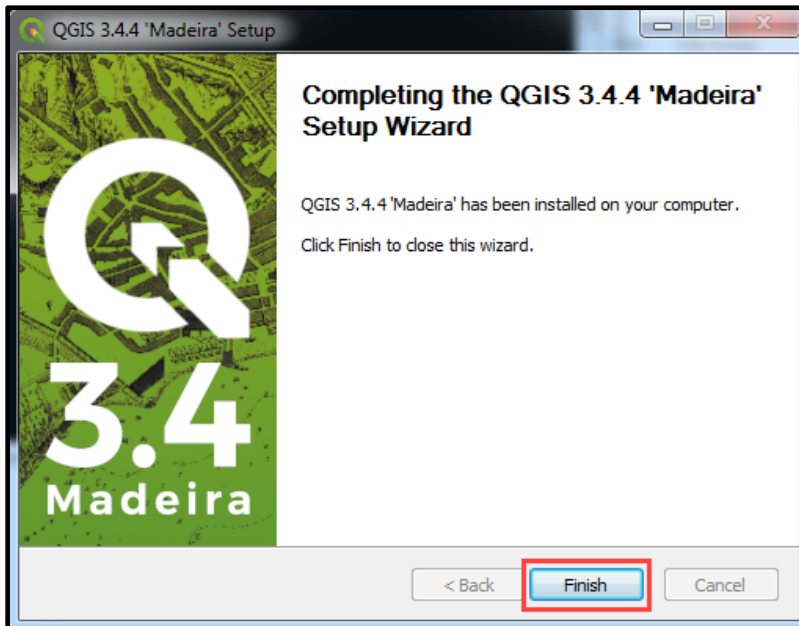
- 6) The **Choose Install Location** screen opens. The Census Bureau recommends installing GUPS at the default location (e.g., C:\QGIS344) or select **Browse** to choose the location to install GUPS. Once the location is set, select **Next** to continue installation.



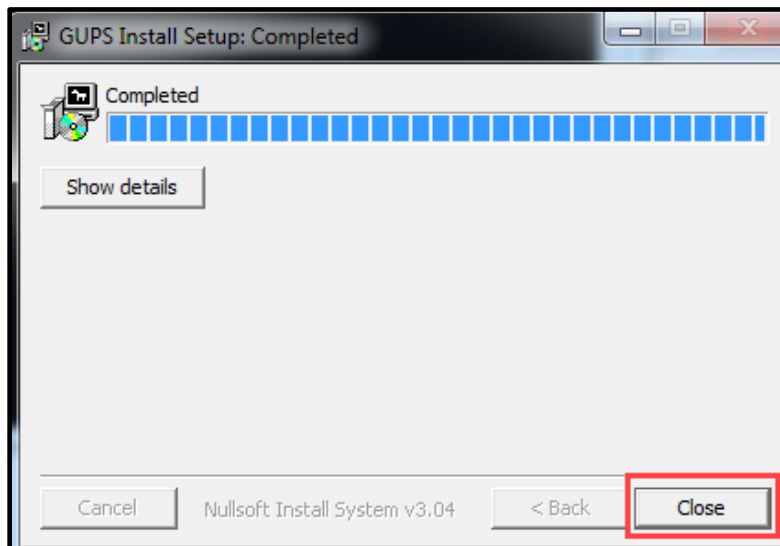
- 7) The **Choose Components** screen opens with ' QGIS' selected and grayed out in the **Select components to install** section. Select **Install** to continue.



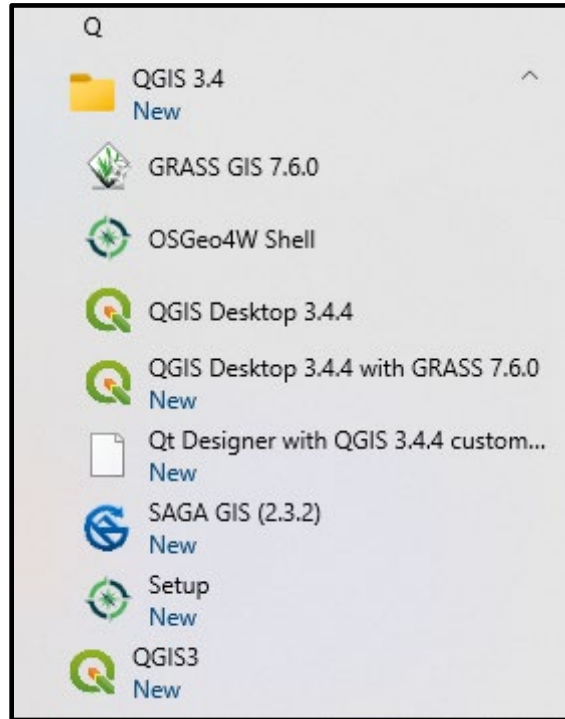
- 8) The **Completing the QGIS 3.4.4 'Madeira' Setup** screen reappears to confirm installation. To close the screen, finish the QGIS update, and launch GUPS, select **Finish**. The installation can take five to ten minutes to complete.



- 9) The **GUPS Install Setup: Completed** window opens and displays the status of the installation. Select **Close**.



10) Confirm installation by finding QGIS 3.4 in the Start Menu of the computer within the “All Programs” list. Use the **QGIS3** or the **QGIS Desktop 3.4.4** to launch GUPS.

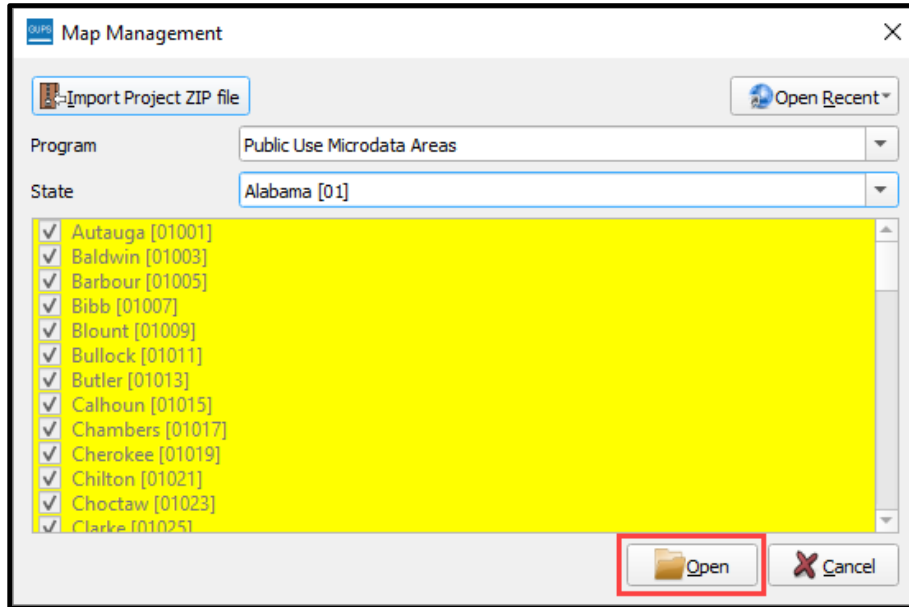


IMPORTANT: GUPS users with different security privileges other than IT staff that installed the software may encounter problems accessing the directories and plugins needed to operate GUPS. This usually occurs when the software is not installed under the user’s profile. To correct this, have the IT staff person reinstall GUPS under the user’s profile using the user’s credentials.

Start a PUMA Project

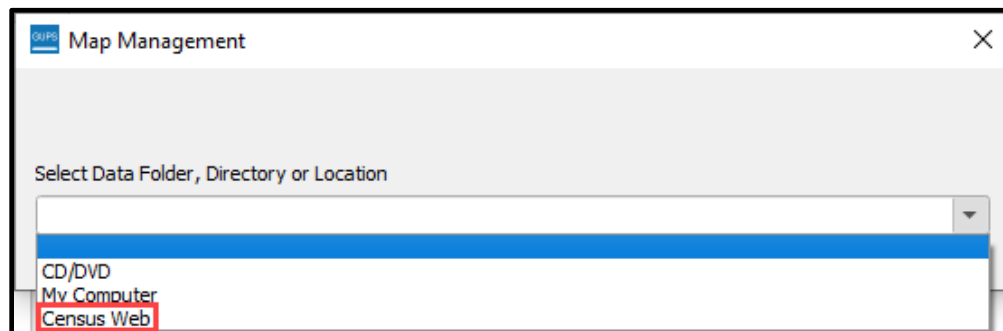
Follow the steps below to start a PUMA project using the most common options available to participants. Detailed instructions are in chapter 3 of the participant guide.

- 1) Select **QGIS3** from the Start Menu of the computer to launch GUPS. From the **Map Management** window, choose **Public Use Microdata Areas** for the **Program**, select your state for the **State** field, and then **Open**.



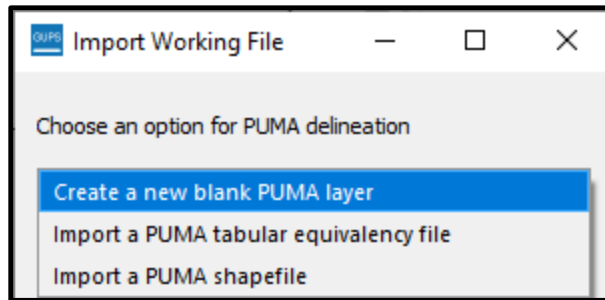
IMPORTANT: If the Map Management window does not appear, refer to appendix B of the participant guide for tips on troubleshooting the GUPS installation process.

- 2) A secondary **Map Management** window opens to choose the location of the data to use in the project. From the **Select Data Folder, Directory or Location** drop-down menu, select **Census Web**.



Note: **Census Web** loads the data needed for PUMA delineation directly from a server at the Census Bureau into the PUMA project. This is the most user-friendly option for participants because it symbolizes the layers and readies the project for delineation without added burden of downloading, extracting, and staging the necessary shapefiles. The process of downloading shapefiles and using the **My Computer** option are described in the appendix D of participant guide.

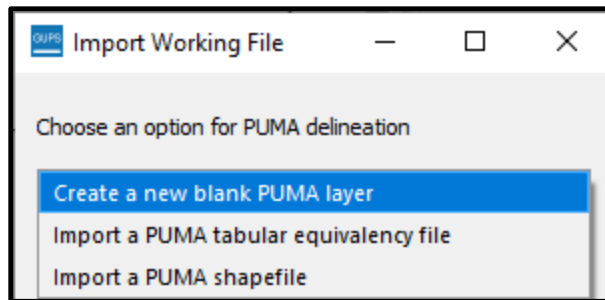
- 3) The **Import Working File** window awaits selection for how to begin PUMA delineation. Three options available for selection are: **Create a new blank PUMA layer**, **Import a PUMA tabular equivalency file**, and **Import a PUMA shapefile**.



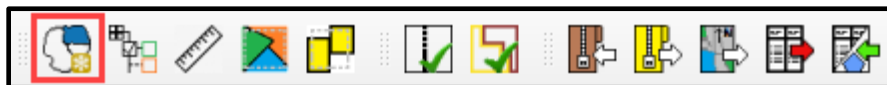
Delineate PUMAs from a Blank Layer

When using the **Create a new blank PUMA layer** option, GUPS generates an empty (i.e., blank) PUMA layer named “pumacurrent_XX” (where XX is the two-digit FIPS code for the state) when using this option. This is the layer where the PUMA delineation work is stored. In the Table of Contents, ensure the tracts2020_XX, county_XX, and the puma2010_XX layers are turned on/enabled by checking the box next to the layer name. Use these layers as reference when delineating PUMA boundaries. Follow the steps in this section to interactively delineate PUMAs using the tools in GUPS. Detailed instructions are in chapter 4.1 of the participant guide.

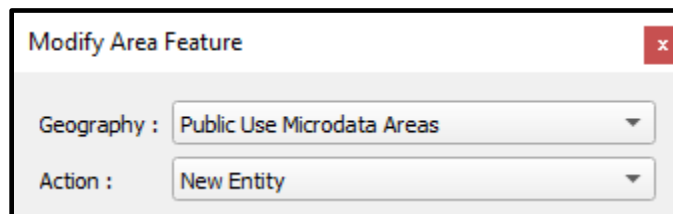
- 1) From the **Import Working File** window, select **Create a new blank PUMA layer** and then **OK**.



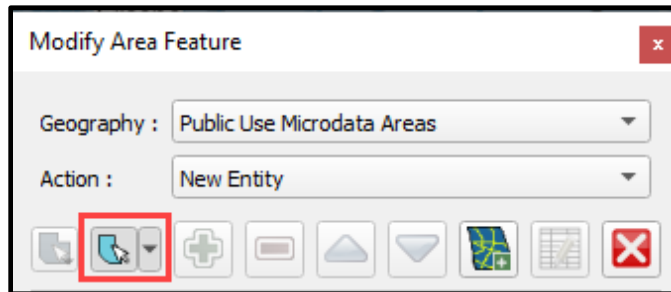
- 2) Select the **Modify Area Feature** button from the PUMA toolbar. The **Modify Area Feature** window opens. *Note: The Census Bureau staff recommend moving the window to the left or right of the Map View to dock it for later use.*



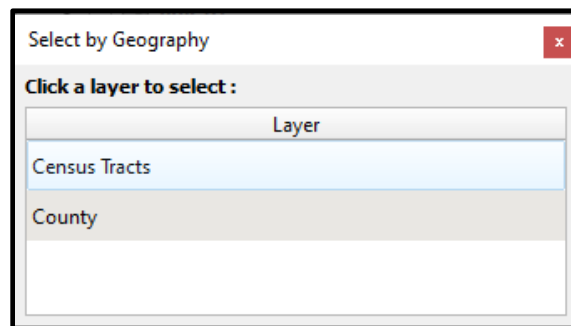
- 3) In the **Modify Area Feature** window, confirm the **Geography** menu displays **Public Use Microdata Areas**. Set the **Action** menu to **New Entity**.



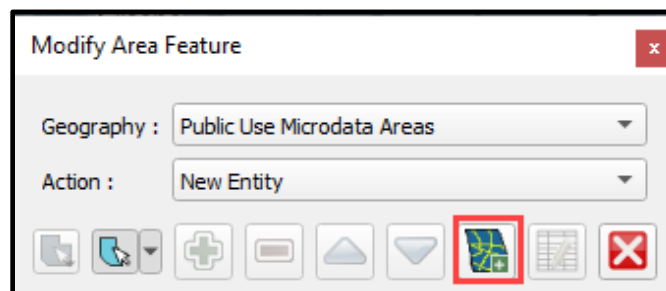
- 4) From the **Modify Area Feature** window, change the **Select Feature(s)** button to **Select Features by Geography**. Note: There are five options for selecting features; however, the summary guide only highlights this one option.



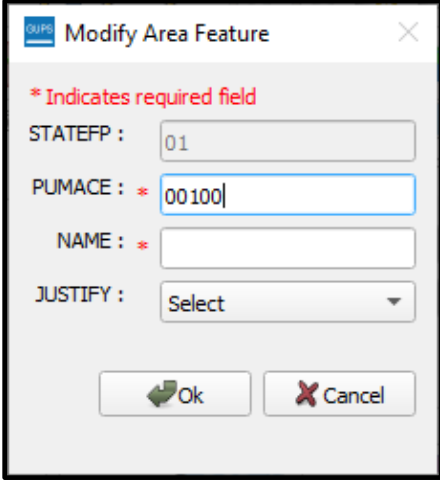
- 5) A secondary window, **Select by Geography**, opens to reveal the two layers (Census Tracts and County) available to select for the PUMA delineation. With the selection of a layer, the Table of Content updates to activate the selected layer.



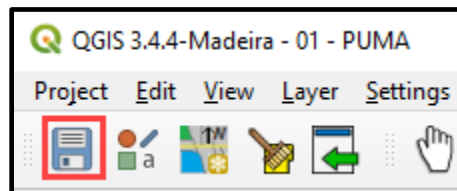
- 6) Use the mouse to select the census tracts or county(s) in the Map View. As census tracts and/or counties are selected, the Map View highlights the selected geographies and the Modify Area Feature window updates to show the Population of the selected geographies. This information assists with knowing whether the selected geographies meet the population threshold requirements for valid PUMAs.
- 7) When all the census tracts and/or counties are selected for a new PUMA, select the **Add Entity** button in the **Modify Area Feature** window.



- 8) A secondary **Modify Area Feature** window opens. GUPS automatically populates the **PUMACE** field based on the next available five-digit numeric code. Confirm the new PUMA code or enter a different code and enter the **NAME**. Both fields are required. Provide a justification in the **JUSTIFY** field if necessary.



- 9) Select the **Save Project** button from the Standard toolbar to save edits and to save the project.



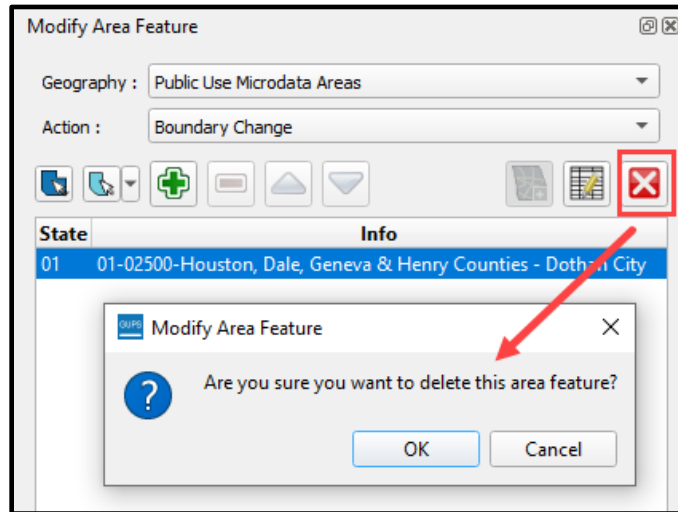
- 10) Repeat the steps above as many times as necessary to delineate new PUMAs.

Modify or Delete a PUMA

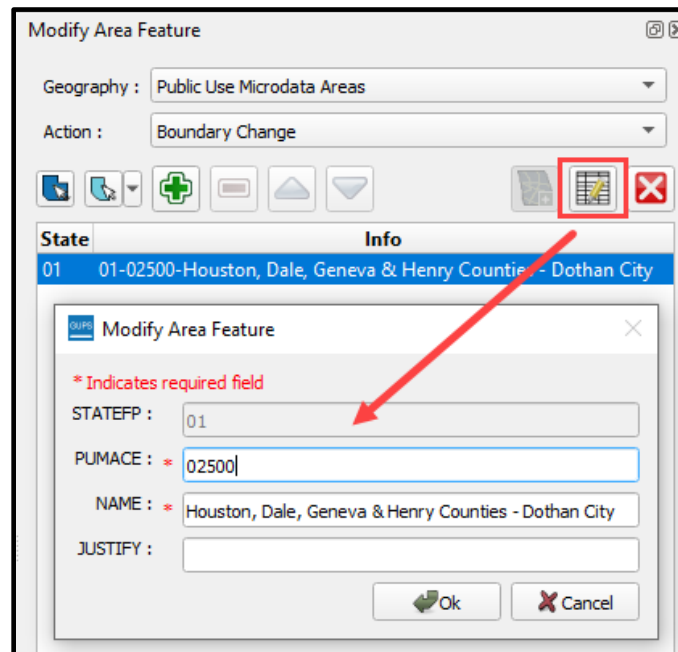
Delineated PUMAs may need boundary changes, attribute changes, or even deletion. Follow the steps in this section to learn more about these three tasks. Detailed instructions are included in chapter 4.2 of the participant guide.

- 1) In the **Modify Area Feature** window, confirm the **Geography** menu displays **Public Use Microdata Areas**. Set the **Action** menu to **Boundary Change**.

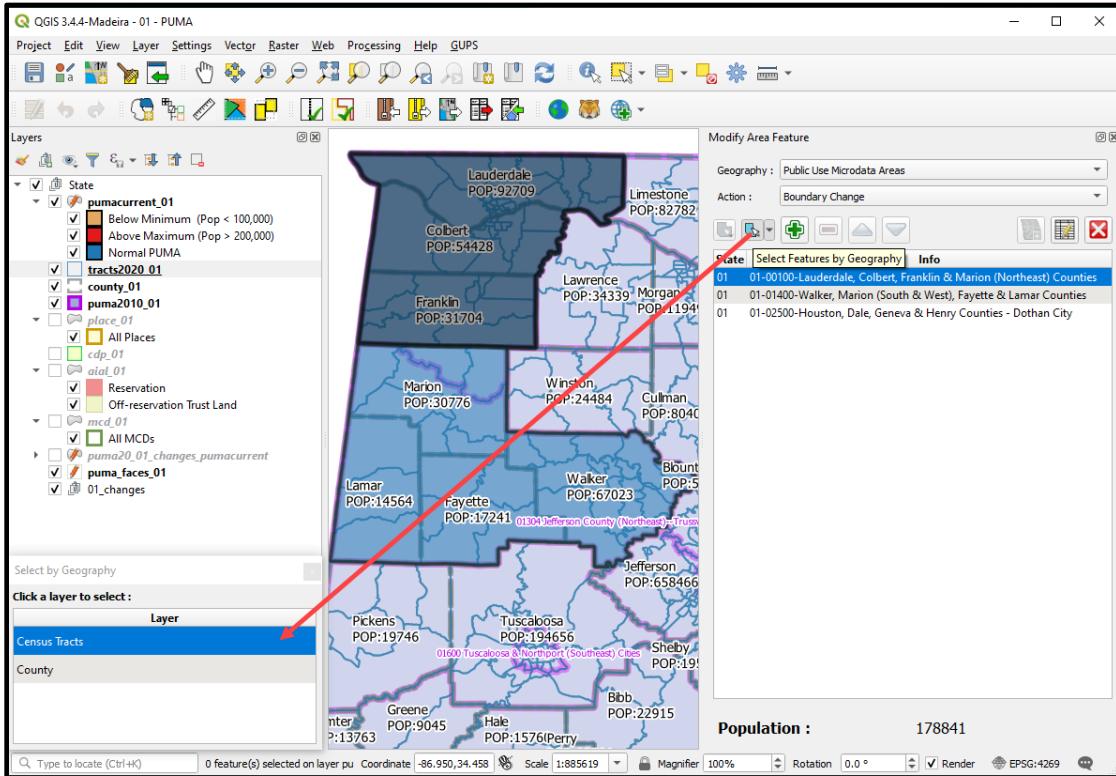
- 2) To delete a PUMA, select the PUMA from the **Modify Area Feature** window or in the Map View.
- 3) Select the **Delete Area Feature** button from the **Modify Area Feature** window. A secondary **Modify Area Feature** window appears to confirm or cancel the deletion. Choose **OK** to delete the PUMA or **Cancel** to cancel the deletion.



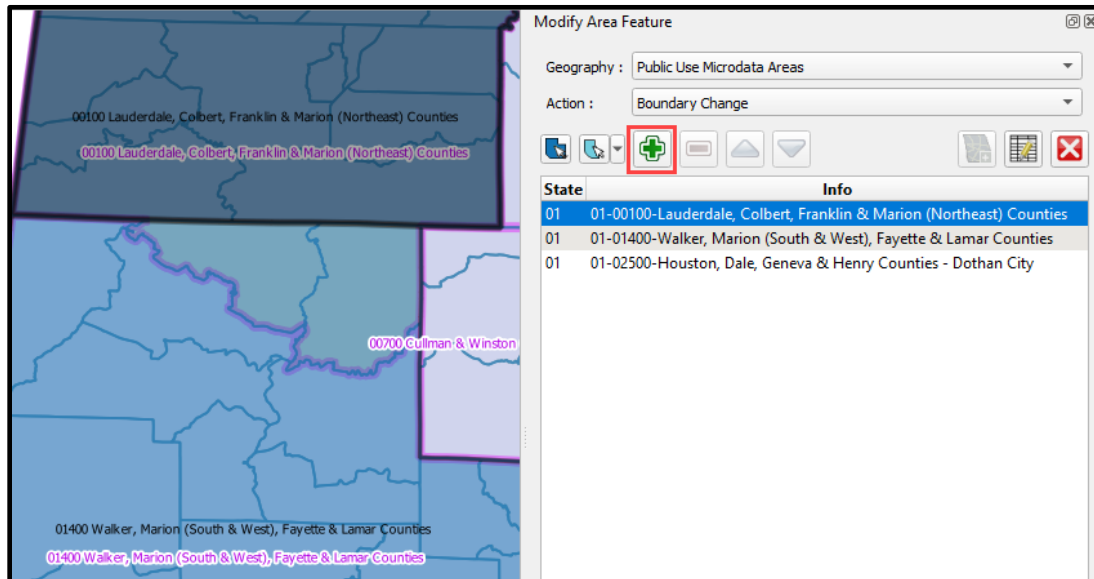
- 4) To modify a PUMA, select the PUMA from the **Modify Area Feature** window or in the Map View.
- 5) To modify a PUMA's attributes, select the **Change Attributes** button from the **Modify Area Feature** window. A secondary **Modify Area Feature** window appears to change attribution for the code or name of the selected PUMA. Choose **OK** to complete the modification of attributes or **Cancel** to cancel the modification.



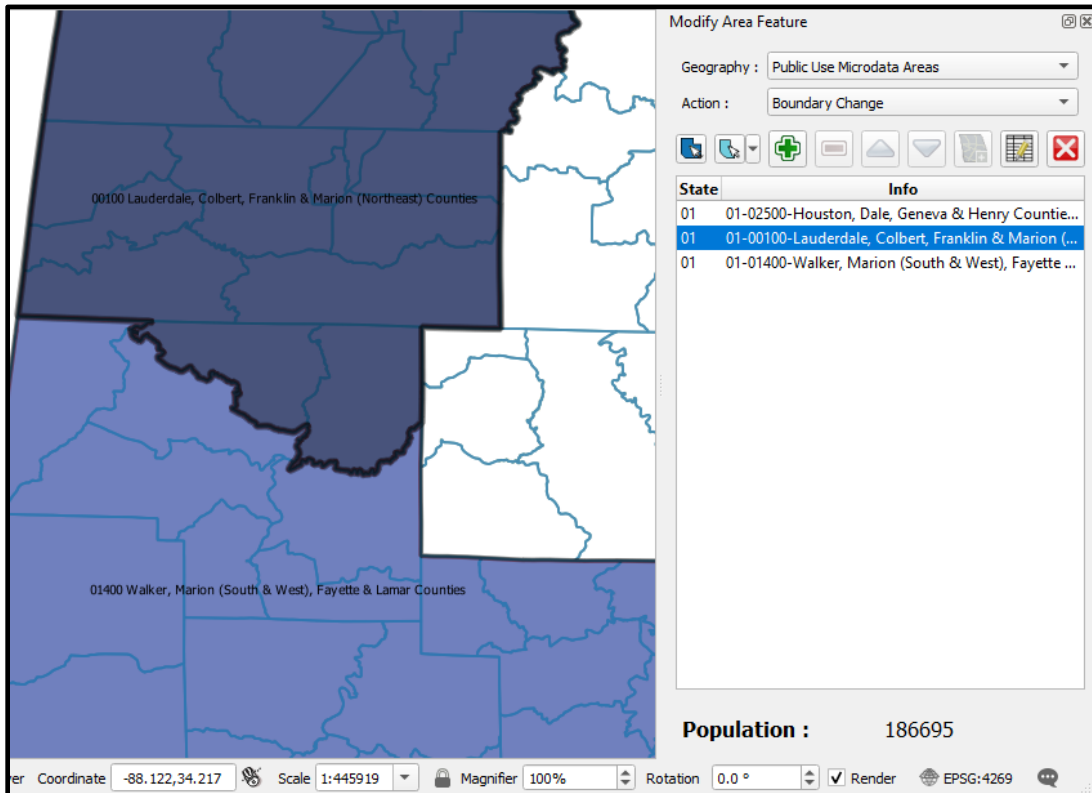
- 6) To modify a PUMA's boundary, activate the **Select Features by Geography** button in the **Modify Area Feature** window to open the **Select by Geography** secondary window. Select the appropriate geography (Census Tracts or County) to use to modify the PUMA boundary. *Note the population for the selected PUMA is 178,841.*



- 7) Use the mouse to select the geography, then select the **Add Area** button from the **Modify Area Feature** window to add the geography to the selected PUMA. *Note: Geography must be added to PUMAs, not removed from PUMAs, so for this example, census tracts were added to PUMA 00100 instead of being removed from PUMA 01400.*



- 8) Once GUPS completes the boundary modification, the new boundary appears in the Map View and the population for the modified PUMA updates in the **Modify Area Feature** window. *Note the population for the selected PUMA has changed from 178,841 to 186,695.*



- 9) Select the **Save Project** button from the Standard toolbar to save edits and to save the project.
- 10) Repeat the steps above as many times as necessary to modify or delete PUMAs.

Export PUMA Delineations

For interested data users providing delineation proposals to their SDC or for SDCs exporting whole state files when they complete their work, select the **Export Layer to Shapefile/TEF** button on the PUMA toolbar. Follow the prompts to complete the export. Interested data users must follow instructions given by the SDC for providing their exported file(s). The export process is detailed in chapter 4.3 of the participant guide.



Delineate PUMAs from a Shapefile

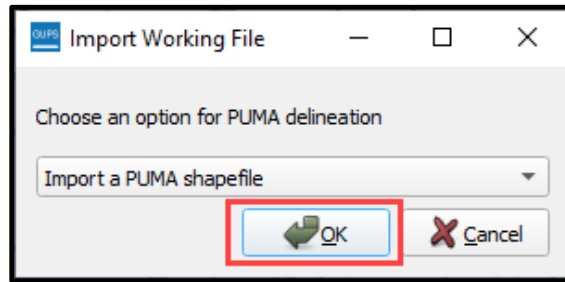
SDCs may import shapefiles from other data users into their state's PUMA project by using the **Import Working File** button from the PUMA toolbar. Details on this topic are included in chapter 4.4 of the participant guide.



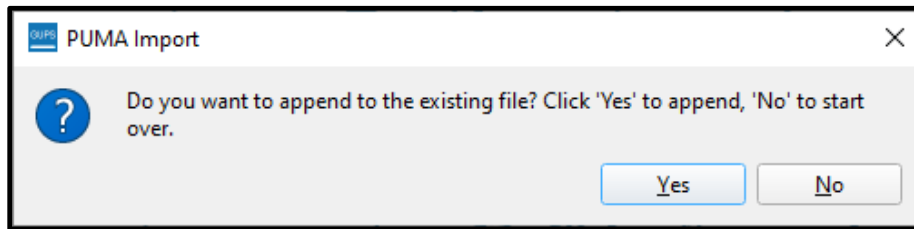
This button can be used to import an entire state of PUMA shapefiles, or it can import and append multiple shapefiles to create whole state coverage. The PUMA shapefile must contain fields for the State FIPS code, PUMA code, and PUMA name.

IMPORTANT: The Census Bureau recommends a review of the shapefiles prior to importing into the state's PUMA project. Adding a PUMA shapefile as a reference layer is detailed in chapter 4.4.1 of the participant guide.

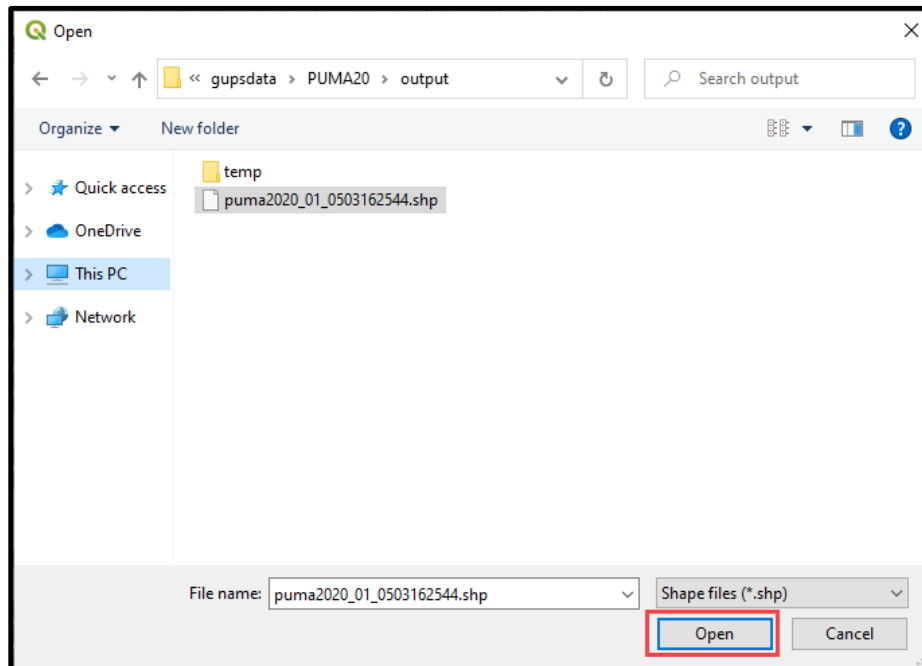
- 1) From the **Import Working File** window, select **Import a PUMA shapefile** and then **OK**.



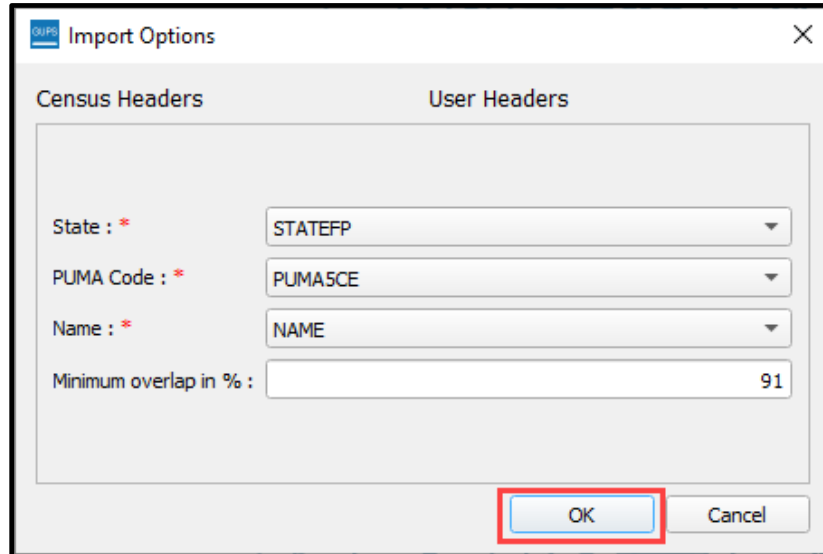
- 2) A **PUMA Import** confirmation window appears with the choice to append the shapefile to the existing project or to start over. Choosing to start over (i.e., choosing **No**) will delete all previously saved delineation work in the project.



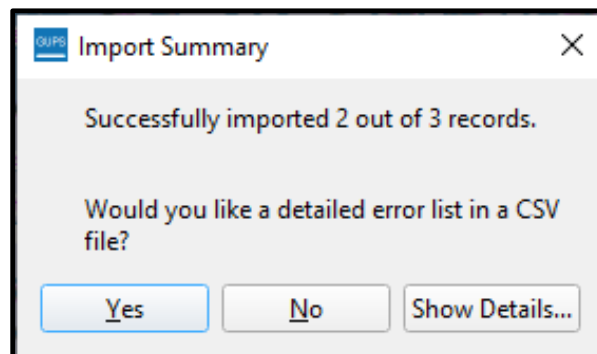
- 3) Navigate to the folder location of the exported shapefile. If the PUMAs were delineated using GUPS, the folder location is “/GUPSGIS/gupsdata/PUMA20/output”. Select the shapefile to import and then **Open** to import the shapefile into the **pumacurrent_XX** layer.



- 4) The **Import Options** window opens. Select the appropriate values for each field from the drop-down list and select **OK**.



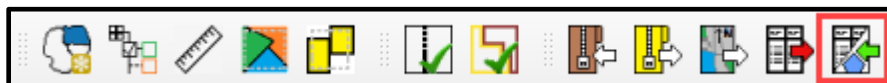
- 5) An **Import Summary** window opens after importing the file with information regarding the imported records. This window summarizes the number of successfully imported records as well as generates an error list. Choosing the **Show Details** button provides more information on the errant records. Choose **Yes** or **No** to continue.



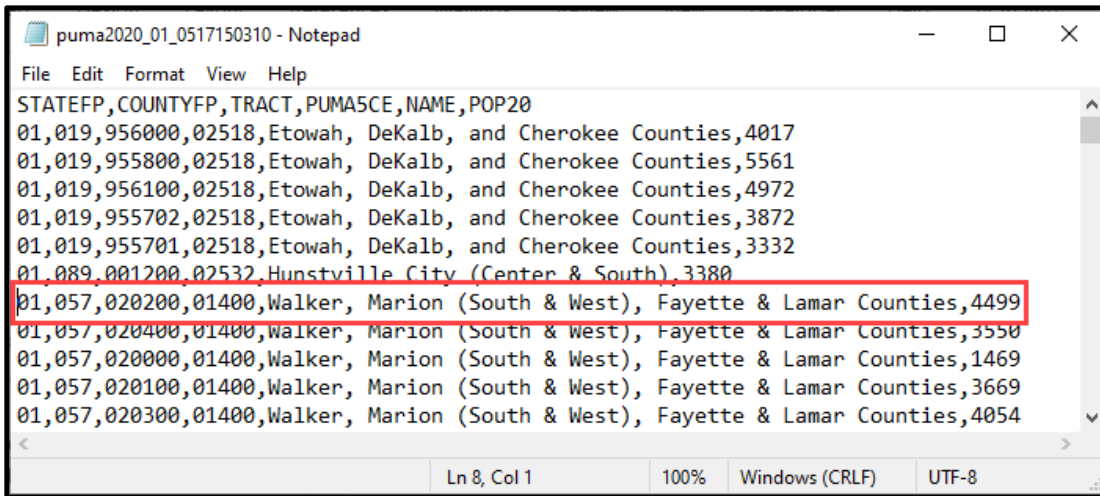
- 6) Continue to import shapefiles (and/or tabular equivalency files) or interactively create PUMAs as needed to complete work on the state's PUMA project.
- 7) Select the **Save Project** button from the Standard toolbar to save edits and to save the project.

Delineate PUMAs from a Tabular Equivalency File

SDCs may import comma-delimited, tabular equivalency files (TEFs) from other data users into their state's PUMA project by using the **Import Working File** button from the PUMA toolbar. Details on this topic are included in chapter 4.5 of the participant guide.

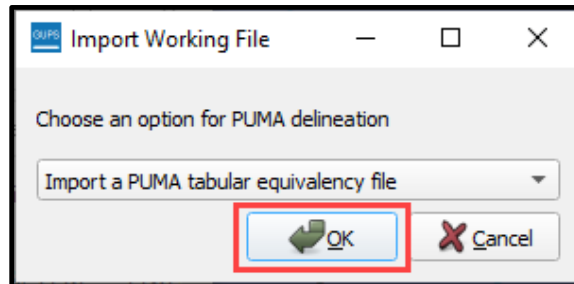


This button can be used to import a TEF that covers the entire state, or it can import and append multiple TEFs to create whole state coverage. The TEFs must contain fields for the State FIPS code, County FIPS code, Census Tract code, PUMA code, and PUMA name. Below is an example of a TEF opened in Notepad.

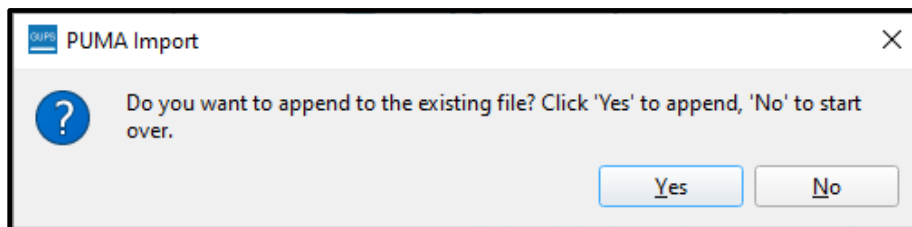


IMPORTANT: SDCs are encouraged to review the proposed PUMA TEFs they receive prior to importing them directly into their state’s PUMA project. This review will minimize import failures and prevent unnecessary edits or corrections to the PUMA project.

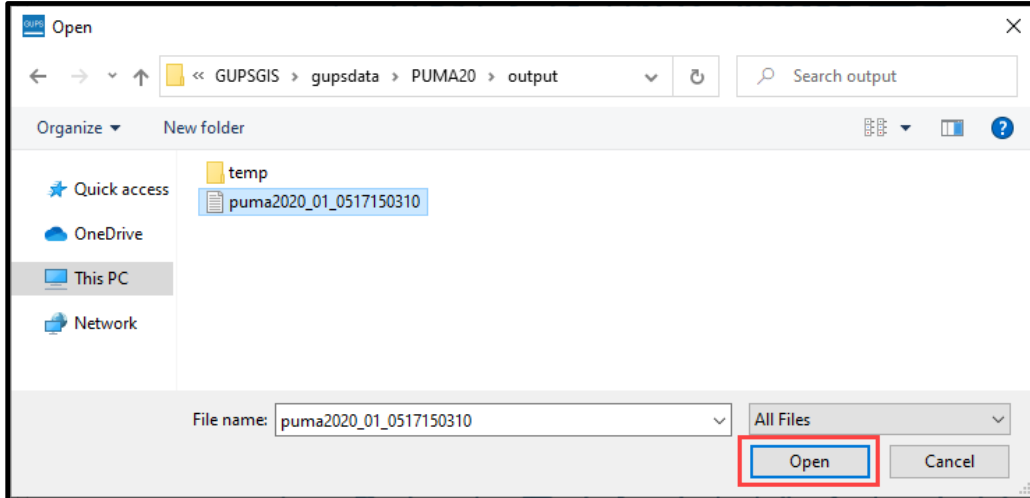
- 1) From the **Import Working File** window, select **Import a PUMA tabular equivalency file** and then **OK**.



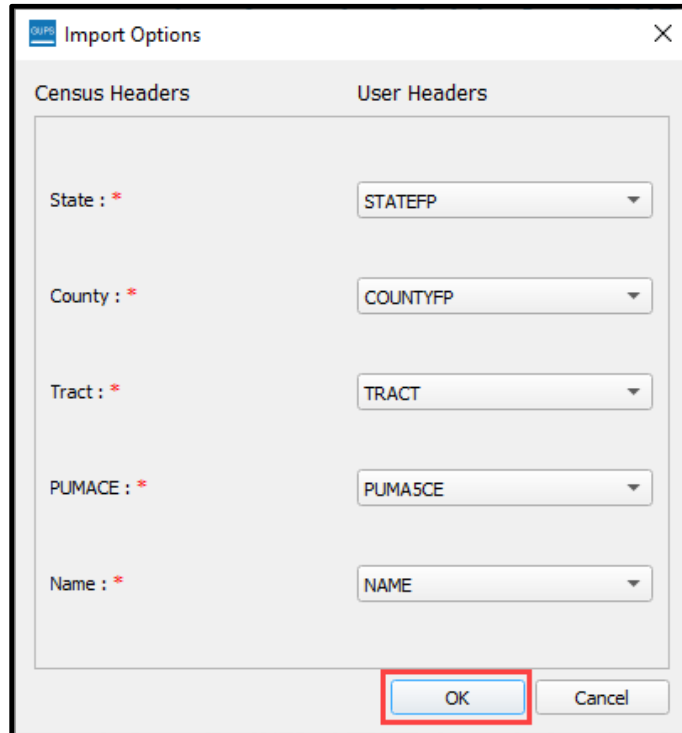
- 2) A **PUMA Import** confirmation window appears with the choice to append the TEF to the existing project or to start over. Choosing to start over (i.e., choosing **No**) will delete all previously saved delineation work in the project.



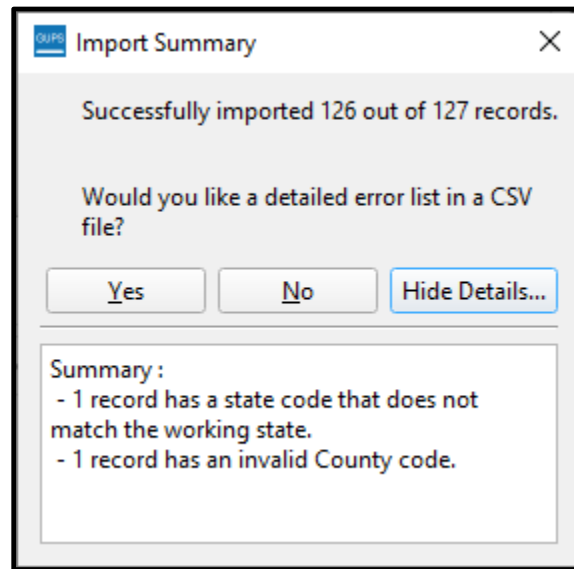
- 3) Navigate to the folder location of the exported TEF. If the PUMAs were delineated using GUPS, the folder location is “C:/GUPSGIS/gupsdata/PUMA20/output”. Select the TEF to import and then **Open**.



- 4) The **Import Options** window opens. Select the appropriate values for each field from the drop-down list and select **OK**.



- 5) An **Import Summary** window opens after importing the file with information regarding the imported records. This window summarizes the number of successfully imported records as well as generates an error list. Choose **Yes** or **No** to continue. *Note: Choosing the **Show Details** button provides more information on the errant records and changes the button name to **Hide Details**.*



- 6) Select the **Save Project** button from the Standard toolbar to save edits and to save the project.
- 7) Continue to import TEFs (and/or shapefiles) or interactively create PUMAs as needed to complete work on the state's PUMA project.

Conduct Quality Checks and Criteria Review

Follow the guidance in this section to conduct quality checks and criteria review on the delineated PUMAs. Details on these topics are included in chapter 5 of the participant guide.

The Census Bureau recommends all participants conduct basic quality checks to review their project and its PUMAs for issues that integrated GUPS tools cannot identify. These checks are beneficial prior to executing the **PUMA Criteria Review** tool. Some basic quality checks include:

- Confirm the name accurately reflects the delineated area and follows the naming guidelines.
- Confirm the name is relative to the geography included within the PUMA.
- For PUMAs covering more than one county/city, confirm the order of name is correct.
- Confirm the name is spelled correctly.
- Confirm the code follows the coding guidelines.
 - Is the PUMA code maintained from previous vintage or new?
- Confirm the justifications provide adequate explanation for the requested exception.
 - PUMAs with justifications supplied during initial delineation will not appear as a criteria failure after executing the **PUMA Criteria Review** tool; therefore it is very important to conduct a thorough quality check of each PUMA justification prior to export.

With the basic quality checks complete, conduct criteria review by executing the **PUMA Criteria Review** tool. This tool is programmed with the 2020 PUMA final criteria and guidelines. It identifies three categories of criteria failures: Errors, Warnings, and Information only.

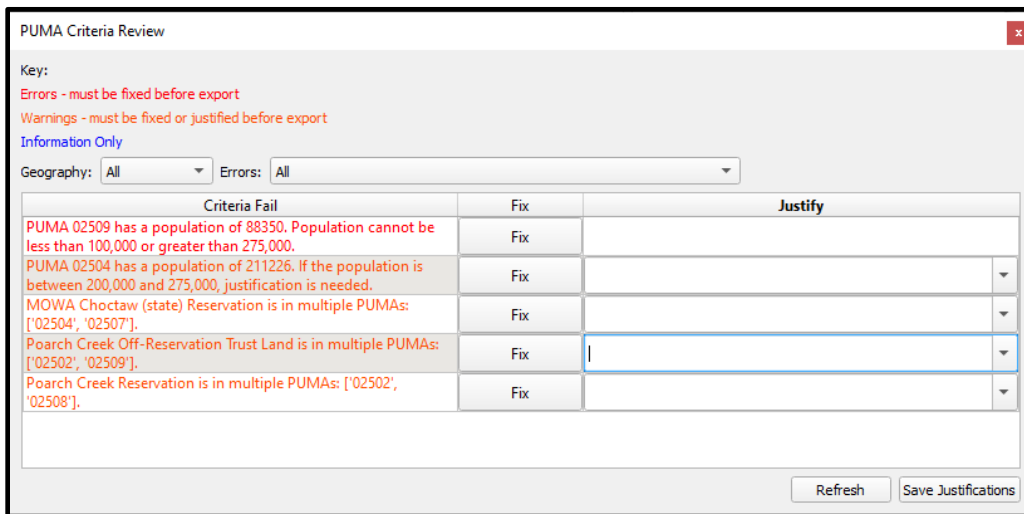
PUMA Criteria Review tool failures include the following:

- Unassigned geographies (i.e., no PUMA assigned). These are labeled as “faces” in the review tool.
- PUMAs that fall above/below population threshold requirement.
- PUMAs with overlapping geographies (most common when importing files, not possible with interactive delineation).
- PUMAs with noncontiguous boundaries.
- PUMAs that cross county boundaries with the census tracts having population of less than 10,000.

1) Select the **PUMA Criteria Review** button from the PUMA toolbar.



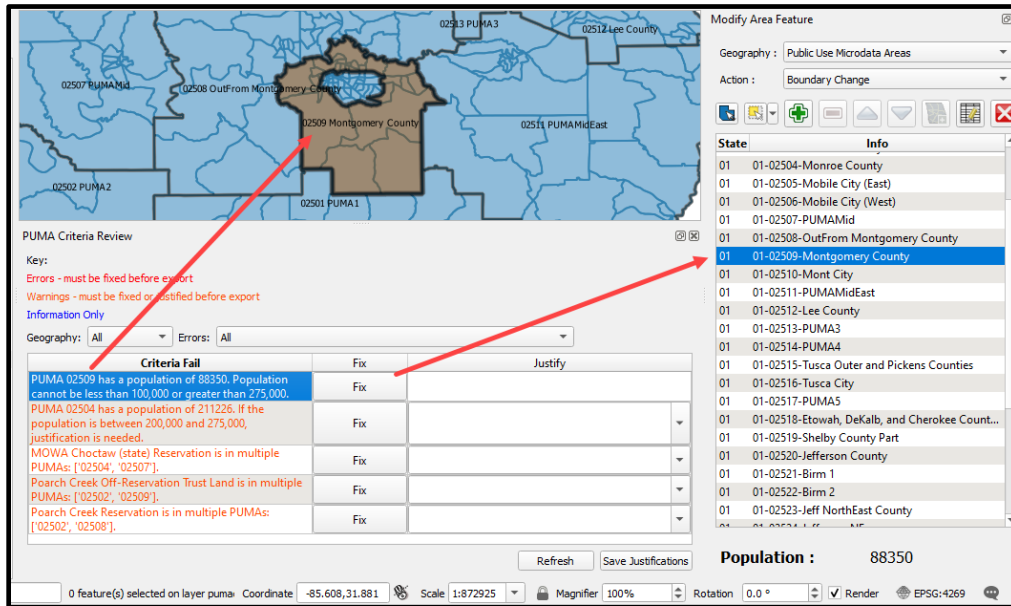
2) The tool runs and the **PUMA Criteria Review** window opens with the criteria failures listed. *Note: The Census Bureau staff recommend moving the window to the left or right of the Map View to dock it for later use.*



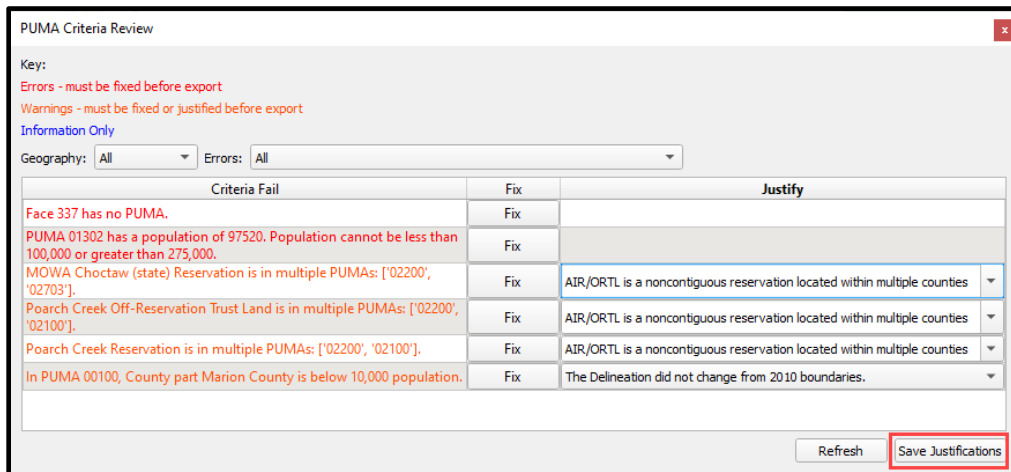
Note: **Errors** appear in red font and must be fixed prior to exporting the project for submission. Participants cannot provide a justification for an error. Review and correct these first. **Warnings** appear in orange font and must be fixed or justified before exporting the project. **Information only** items appear in blue font and should be reviewed to confirm they are as expected.

3) To locate a PUMA with a criteria failure, select the PUMA in the **PUMA Criteria Review** window. The Map View zooms to the selected PUMA. Conduct a review of the delineation to determine whether to fix or justify the error.

- 4) To modify the PUMA to resolve a failure, ensure the failure is selected in the **PUMA Criteria Review** window, then select the **Fix** button. The **Modify Area Feature** window opens. To make the modification, follow the guidance in the **Modify or Delete a PUMA** section from earlier in this guide or in chapter 4.2 of the participant guide. *Note: The failure will not disappear from the list once resolved. Participants must save the project and choose the **Refresh** button or re-run the **PUMA Criteria Review** tool.*

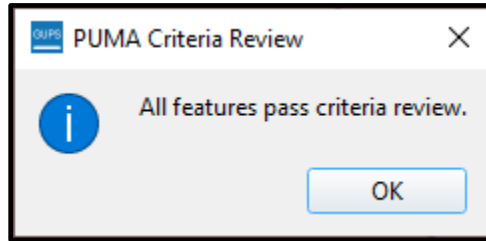


- 5) To retain the PUMA and provide a justification for a **Warning** or **Information Only** failure, enter a justification in the **Justify** field or use the drop-down menu to reveal and select a standardized justification options.



- 6) Select the **Save Justifications** button to save the work. The **PUMA Criteria Review** window closes and returns a confirmation window with information about the saved records.

- 7) Save the project and re-run the **PUMA Criteria Review** tool to confirm all failures are resolved. If the project is free from failures, a confirmation window opens for the participant to dismiss by choosing **OK**.



IMPORTANT: A project must be free of failures prior to submission to the Census Bureau; however, partial projects (like for interested data users that are working only part of a state) can include criteria failures when sharing with the SDC. The SDC will correct all failures prior to finalizing the state's project. More details on this topic are found in chapter 5.1.1 of the participant guide.

Export and Submit a PUMA Project

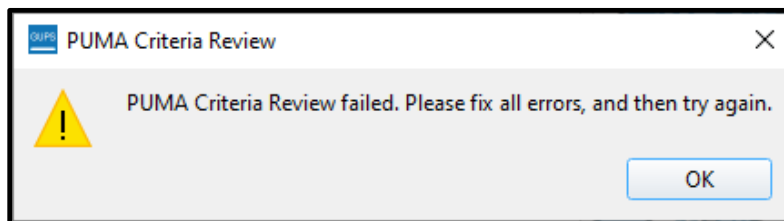
GUPS includes two project export options for 2020 PUMA: **Export for Census** and **Share with Another Participant**. This guide describes the **Export for Census** option used by SDCs to prepare their completed submission for the Census Bureau. Both options are described in detail in the participant guide, chapters 4.3.3 for sharing with others and chapter 6 for exporting for Census.

Note: The **Share with Another Participant** option exports the entire project and is beneficial for review of whole projects, not parts of the state's project. Supervisors or co-workers in the same office can use this option to review and approve whole project proposals prior to submission. Interested data users who may be working on part of a state, export and share their delineation work by using **Export Layer to Shapefile/TEF**.

- 1) Select the **Export to Zip** button on the PUMA toolbar.



- 2) Choose the **Export for Census** option and then **OK**. The export tool executes criteria checks and may take time to complete.
- 3) If criteria failures exist, a warning message with instructions to correct the errors, then export the project again. To correct the errors, re-run the **PUMA Criteria Review** tool and follow the guidance outlined in the previous section.



- 4) If no quality or criteria errors are found, the **GUPS User Contact Information** window appears to enter SDC contact person information. Once the form is complete, the export process continues for approximately 2-5 minutes before generating a .zip file of the completed project.
- 5) The exported .zip file is placed in the **/GUPSGIS/gupsdata/PUMA20/output** folder. This is the file to submit to the Census Bureau.

The Census Bureau provides one option for submission of the proposed PUMAs for 2020, the Secure Web Incoming Module (SWIM). Follow the instructions in chapter 7 of the participant guide for submitting the .zip file created from the **Export for Census** option.

Delete a PUMA Project and Restart Delineation

GUPS provides an option to delete a PUMA project and begin delineation work again. This action may be necessary to ensure a successful import of a shared PUMA project or to resolve GUPS issues that cannot be resolved otherwise.

Follow the steps in appendix E of the participant guide to remove the existing working project from your GUPSGIS folder. Please be aware that this action permanently removes all PUMA delineation work. If questions arise about whether this is the right option for your situation, please contact the Census Bureau to discuss the problems you may be encountering and seek input prior to executing the **GUPS Data Settings** tool.

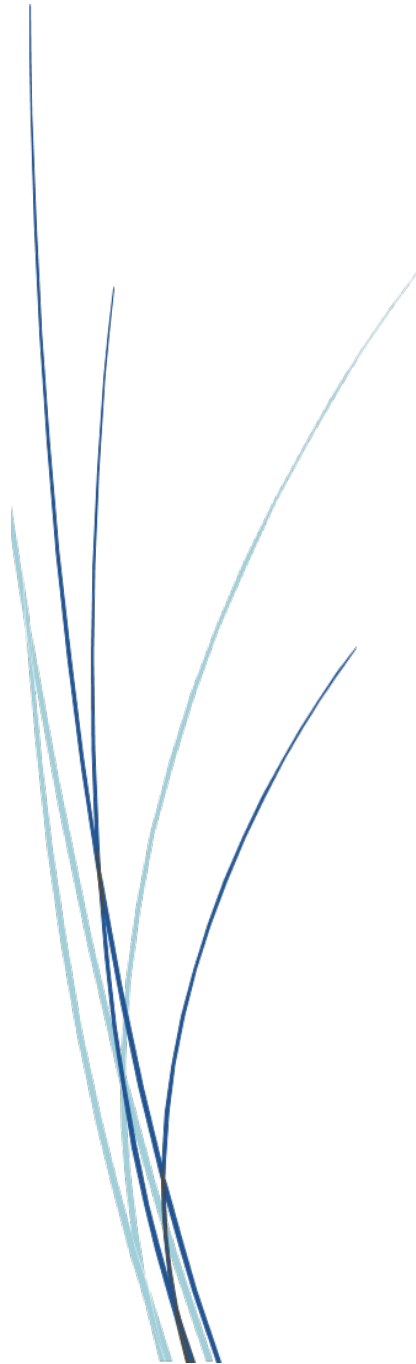
Contact Information

Contact the Census Bureau staff involved with the 2020 PUMA by email at <geo.puma@census.gov>.

2020 Public Use Microdata Areas Program (PUMA) Participant Guide Participant Guide

Instructions for Geographic Update Partnership Software (GUPS) Participants

September 2021



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INTRODUCTION

A. Overview

Public Use Microdata Areas (PUMAs) are non-overlapping, statistical geographic areas that partition each state or equivalent entity into geographic areas containing no fewer than 100,000 people each. They cover the entirety of the United States, the Commonwealth of Puerto Rico, Guam, and the U.S. Virgin Islands and are a higher level of geography than census tract, or even county in some instances. They provide data users with another level of geography for data analysis.

PUMAs are defined for the tabulation and dissemination of decennial census and American Community Survey (ACS) Public Use Microdata Sample (PUMS) data. Additionally, the ACS and Puerto Rico Community Survey use them to disseminate their respective period estimates. PUMS data are valuable to state and local planning agencies/offices, as well as students, for use in long-range planning and research projects. PUMAs and PUMS data allow the data community to create custom tables and statistics not available through pre-tabulated (or summary) data products. Without PUMAs and PUMS data, data users could not create those custom tables and statistics.

The U.S. Census Bureau announced the 2020 Public Use Microdata Areas Program (2020 PUMA) through an email to the State Data Centers (SDCs) from each state, the District of Columbia, and Puerto Rico. In the announcement email, the Census Bureau invited SDCs to delineate PUMAs using the specific standards and criteria, and specifically using the census population counts and updated census tracts from the 2020 Census as critical inputs. Participation in the 2020 PUMA is voluntary. The Census Bureau provides SDCs with a 90-day review period to delineate, review, and submit their PUMAs.

Participants can maintain the PUMA boundaries that do not need revision for historical comparisons. Where modifications are needed, participants are encouraged to make revisions based on geographical knowledge and projected geographical changes in the next decade. The Census Bureau anticipates all SDCs will submit proposals for their 2020 PUMAs. If a state does not make a submission, the Census Bureau will complete the work to the best of our ability.

The Census Bureau encourages the SDCs to involve other interested data users, such as those in tribal, state, and local (e.g., county, incorporated place, and town/township) governments, as well as regional planning agencies or organizations to ensure that the PUMAs meet the needs of a variety of data users. Collaboration between SDCs and other interested data users is especially important for areas with population exceeding 100,000. Though collaboration is encouraged, the SDCs are the official participants for this program and must coordinate the delineation work suggested or prepared from others. The Census Bureau only accepts a single set of proposed PUMA delineations from each state's respective SDC.

The Geographic Update Partnership Software (GUPS), required for the preparation of the state’s PUMA project, is a user-friendly, self-contained, customized GIS software application provided to participants by the Census Bureau for use in completing many of their geographic programs and operations. Each geographic program supported by GUPS includes a unique set of tools built to run within the QGIS environment. For the 2020 PUMA, GUPS is programmed to allow for the sharing of work performed by multiple participants to facilitate a collaborative delineation effort and to prepare standardized output files of the delineated PUMAs for submission to the Census Bureau. GUPS ensures the submission is valid and allows for easier processing once received by the Census Bureau. While it does not require an internet connection to function, an internet connection is necessary to use the recommended “Census Web” option and the built-in imagery server.

B. Getting Help and Using this Guide

The [PUMA website](#)¹ provides a useful overview of PUMAs and historical reference information from previous PUMA programs. The [2020 PUMA website](#)² contains the key materials to support the 2020 program. To answer questions not covered in the materials or to clarify the criteria, guidelines, and procedures, contact the Census Bureau by email at [<geo.puma@census.gov>](mailto:geo.puma@census.gov).

Note: If errors or unexpected results occur within a PUMA project, close GUPS to reset the software prior to contacting the Census Bureau.

This guide provides specific instruction through “Step – Action and *Result(s)*” tables, where the Action is usually a command or action to perform a task and the *Result(s)* of the action(s) display in *italics*. Hyperlinks appear as [underlined, light blue text](#). Readers can navigate the guide’s chapters, tables, figures, and appendices by use of the Table of Contents and by use of cross-referenced links shown in **bold blue font**. Part 1 covers getting started with planning for delineation and software/project setup. Part 2 provides the details for creating a PUMA project. Part 3 closes the guide by supplying the information for submitting a PUMA project to the Census Bureau. Lastly, the appendices supply important, additional information.

¹ The URL for the PUMA website is [<www.census.gov/programs-surveys/geography/guidance/geo-areas/pumas.html>](http://www.census.gov/programs-surveys/geography/guidance/geo-areas/pumas.html).

² The URL for the 2020 PUMA website is [<www.census.gov/programs-surveys/geography/guidance/geo-areas/pumas/2020pumas.html>](http://www.census.gov/programs-surveys/geography/guidance/geo-areas/pumas/2020pumas.html).

PART 1 GETTING STARTED

This part of the guide discusses the steps necessary to begin PUMA delineation. **Figure 1** illustrates the PUMA project workflow. The first section of the diagram includes the steps for getting started. The second section shows the steps for delineating PUMAs and the third section depicts the steps for submitting a PUMA project. Each of the steps shown in the workflow, except for the download and review of program documents, becomes a chapter within this guide.

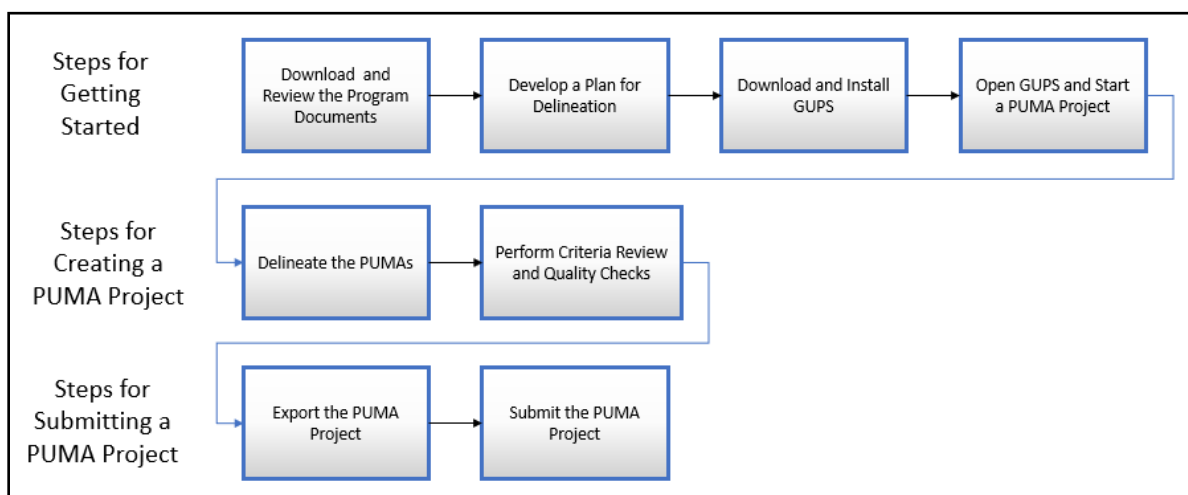


Figure 1: PUMA Project Workflow

Download the program documents from the [2020 PUMA website](#). At a minimum, the program documents include this participant guide, the final criteria, the coding guidelines, and the naming guidelines. A summary of these additional program materials is included in **Appendix A**. The Census Bureau recommends a thorough review of these documents to lay the foundation for the delineation process and provide an understanding of the program. Additional resource materials, such as a summary guide and a frequently asked questions document are also available online.

IMPORTANT: GUPS, the PUMA websites, and other materials for the 2020 PUMA were in the final stages of development when this guide was created. While the images may differ, the overall instruction, actions, and results remain consistent with what is anticipated in the finalized versions. One notable difference is that the population figures and census tracts used within the examples are from 2010 and not 2020.

CHAPTER 1 DEVELOP A PLAN FOR DELINEATION

Developing a plan for delineation is an essential step to PUMA delineation. As part of developing a plan, each SDC should consider how they will conduct the work, including incorporating work performed by other interested data users (i.e., in-state data stakeholders) to determine the best delineation method(s) for their state or specific situation. If others are completing PUMA delineation work for their specific section of the state, the SDC must be prepared to import the work received into their PUMA project or load it into their project for reference and review. It is the responsibility of the SDC to determine what delineation manner works best for their state/situation and to communicate with the others assisting with delineation about how to complete the work.

IMPORTANT: The Census Bureau recommends SDCs create a folder on their computer or network, separate from the directory created by GUPS, to store the proposed PUMA delineation work (e.g., shapefiles, tabular equivalency files, text files, maps, etc.) they receive from others that are helping with delineation. Keeping them separate protects the information received should GUPS malfunction.

Review the list below to prepare for delineation.

- Communicate with other interested data users (regional organizations, council of governments, large metro counties/cities, etc.) to identify who intend to assist with delineation work .
- Download and review the PUMA documentation from the 2020 PUMA website to understand the program and expectations for participation.
- Download and install GUPS.
- Share information regarding program materials, software, and trainings with other interested data users.
- Attend a PUMA training webinar. Current plans are for three sessions (two in October and one in December).
- Maintain contact with the non-SDC staff assisting with delineation work throughout the program.
- Establish contact with the Census Bureau to answer questions.

Understanding the plan for delineation will help readers navigate the content in this guide. For example, interested data users that prepare delineations for part of a state, do not need to review the instructions in Part 3, as those are only applicable to SDCs since they make the official submission.

There are three different options for delineating PUMAs within GUPS. Participants can choose to create them from a blank layer (i.e., Create a new blank PUMA layer), import them from a from a shapefile (i.e., Import a PUMA shapefile) or census tract equivalency file (i.e., Import a PUMA tabular equivalency file). GUPS offers additional flexibility by allowing the use of more than one option for delineation which allows SDCs to assemble various sub-state level delineations into the whole state project. These three options are detailed in Chapter 4.

IMPORTANT: Regardless of the delineation option, participants are required to use the data prepared by the Census Bureau while completing the PUMA delineations. These files are the 2021 Partnership shapefiles that have been updated to include the 2020 Census population numbers (POP20 attribute) within the state-based census tract (i.e., tracts2020) layer. To confirm use of the correct version, these files will include “PVS_21_v1” in their file name and have an updated date stamp from September 2021.

Review the next chapter for instructions on downloading and installing GUPS.

CHAPTER 2 DOWNLOAD AND INSTALL GUPS

Participants with previous versions of GUPS installed for use with other Census Bureau programs must install the new version of GUPS (v14.0.0-6) to delineate PUMAs. This chapter includes the hardware and operating system requirements necessary to use GUPS, instructions for downloading and installing the software, and the basics of opening GUPS and starting a new PUMA project.

Many agencies/organizations require certain security privileges to download and install external software. Work with your local Information Technology (IT) staff person to acquire those privileges or ask they assist with GUPS installation. Please note that GUPS users with different security privileges other than the IT staff person that installed the software may encounter problems accessing the directories and plugins needed to operate GUPS. This usually occurs when the software is not installed under the user's profile. To correct this, have the IT staff person reinstall GUPS under the user's profile using the user's credentials. If installation problems remain, contact the Census Bureau by email at <geo.puma@census.gov> for assistance.

IMPORTANT: While the SDCs are the primary participant and tasked with making their state's PUMA submission, others that intend to help with delineation work (SDC staff or other interested data users) must download, install, and use GUPS to share delineation work.

Refer to [Table 1](#) for the requirements necessary to download and install GUPS, as well as the supported internet browser versions to use the Secure Web Incoming Module (SWIM).

Table 1: Requirements for Using GUPS and SWIM

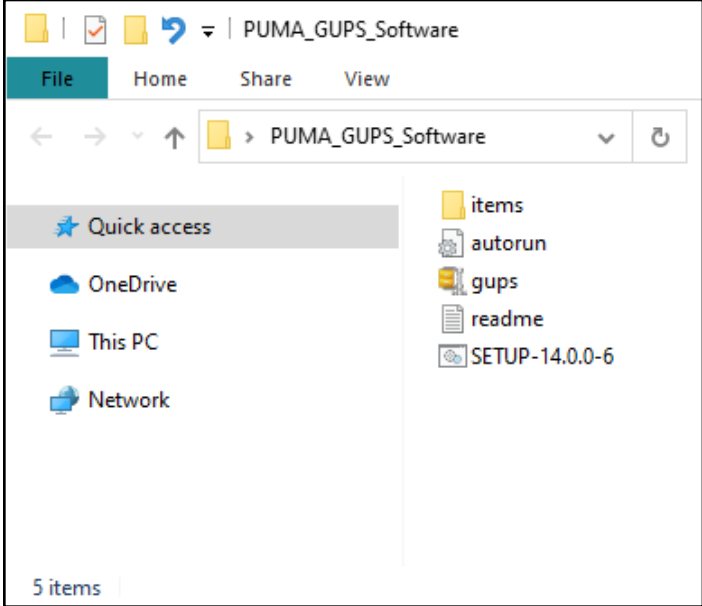

Hardware	Operating System	Supported Browser
<p>Disk Space Required to Run GUPS: 4 GB (very important!)</p> <p>Disk Space Needed to Store Shapefiles: Shapefile sizes vary. To view the size of the shapefiles, using the mouse select a file/folder, right-click, and select Properties in the drop-down menu. The Files Properties box opens and displays the file/folder sizes. Select multiple files/folders in the list to view their properties via the same method.</p> <p>RAM: 4 GB minimum; 8 GB or more recommended for optimal performance.</p>	<p>Windows®: To run GUPS, Windows users need one of the following operating systems:</p> <ul style="list-style-type: none"> • Windows 8® • Windows 10® <p>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 Boot Camp at: <www.apple.com/support/bootcamp/getstarted/></p> <p>IMPORTANT: Since Boot Camp requires a restart of the computer to set up the bridge, be sure to print the instructions from URL above before beginning installation.</p>	<p>SWIM runs on the two most recent versions of each of these major internet browsers:</p> <ul style="list-style-type: none"> • Microsoft Internet Explorer® • Microsoft Edge® • Google Chrome® • Mozilla Firefox® • Apple Safari®

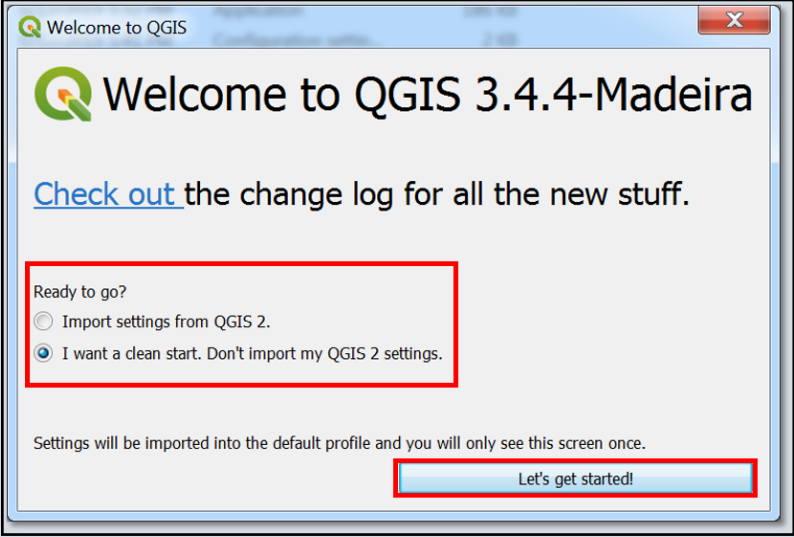
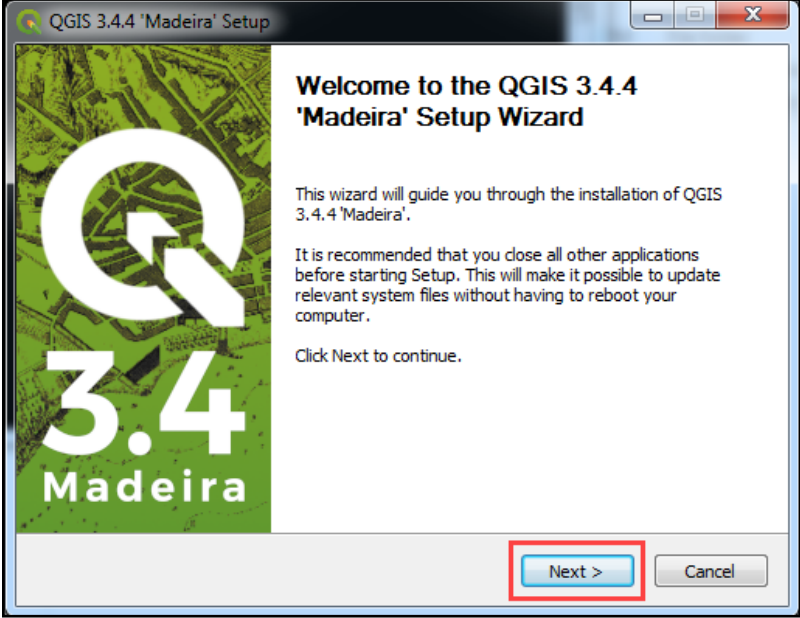

Note: The dialog boxes in GUPS may vary based on operating system. Screenshots in this guide were created using Windows 10. As a result, the screenshots in this guide that feature GUPS actions may differ slightly from what a participant using Windows 8 or Boot Camp.

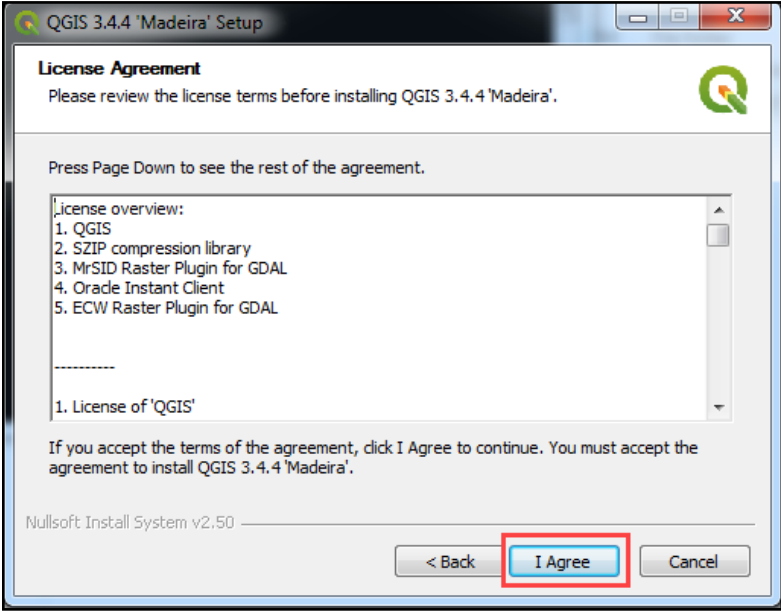
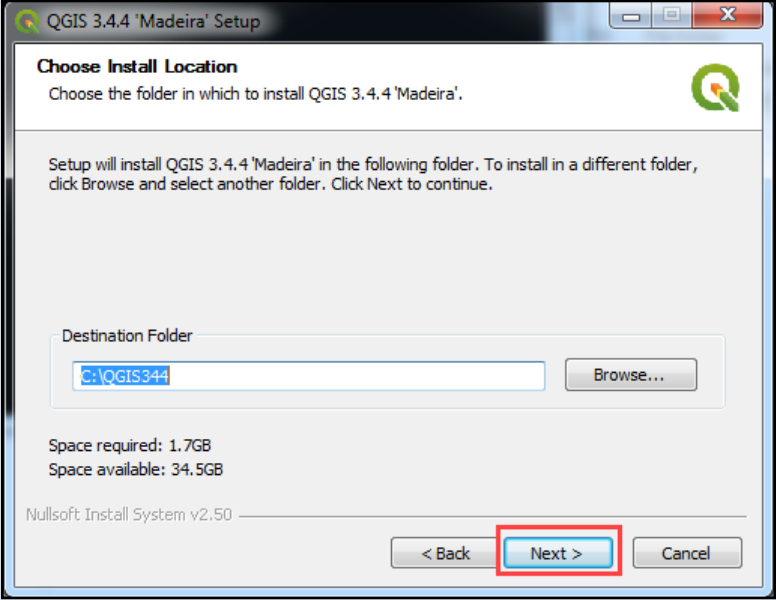
Follow the steps outlined below in [Table 2](#) to download and install GUPS.

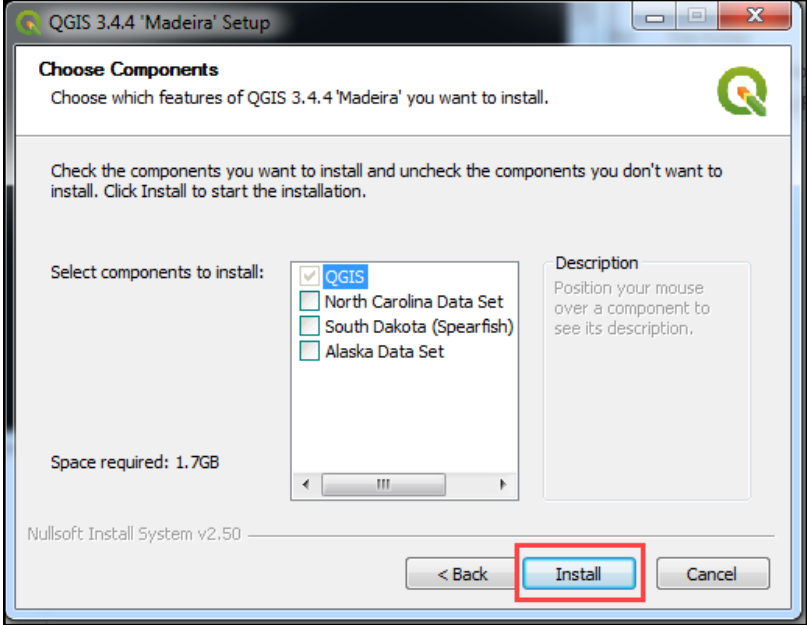

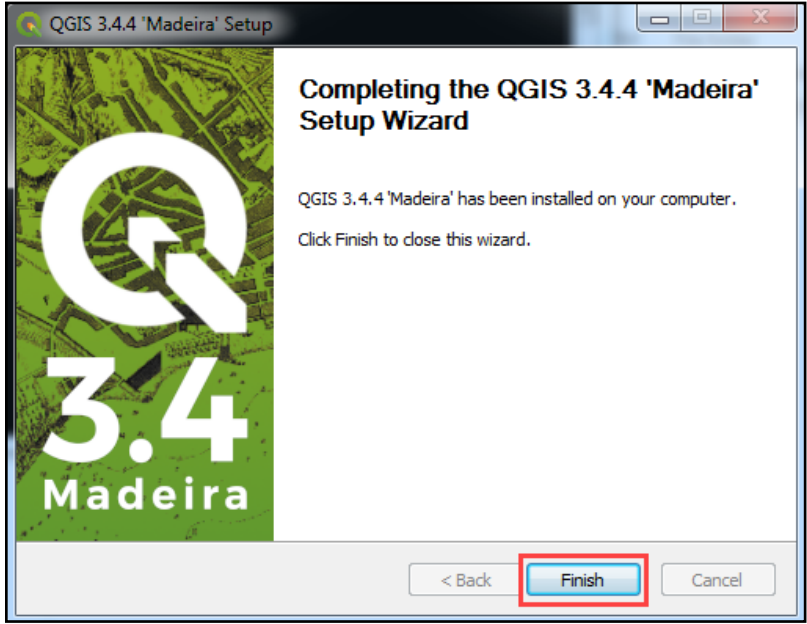
Table 2: Steps to Download and Install GUPS

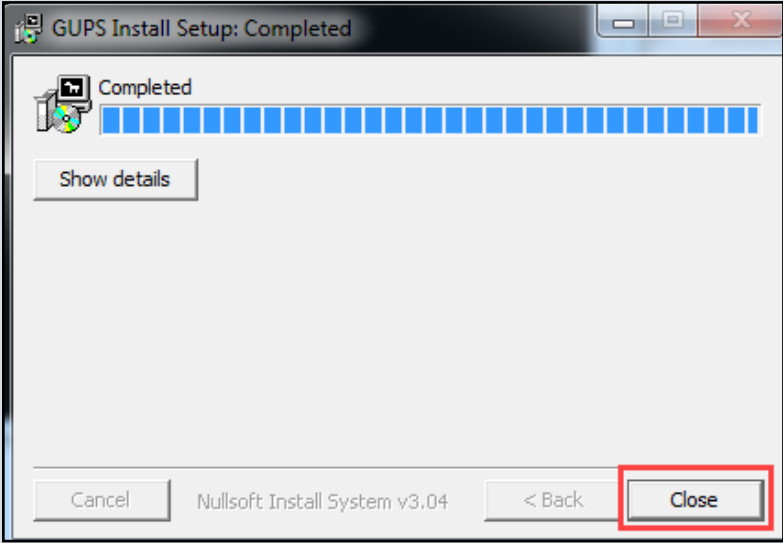
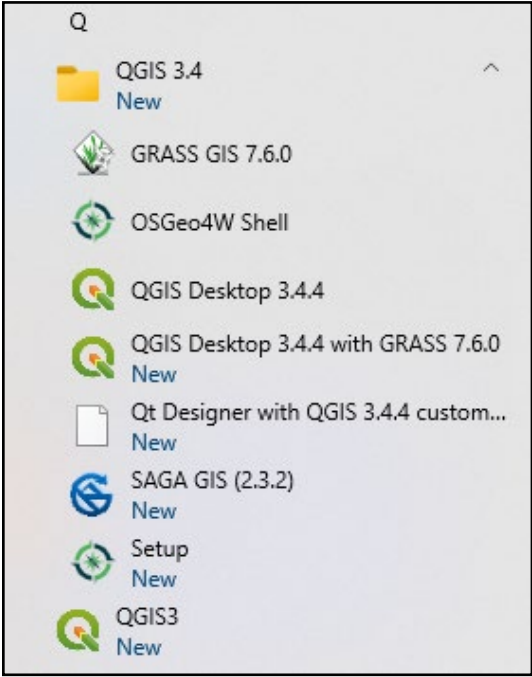
Step	Action and <i>Result(s)</i>
Step 1	Navigate to the 2020 PUMA website and scroll to the Geographic Update Partnership Software (GUPS) section.
Step 2	Choose the Download GUPS link. Select Save As rather than Save to navigate to a local folder to download and save the gups.zip file.

Step	Action and <i>Result(s)</i>
Step 3	<p>Navigate to the local folder where the downloaded gups.zip file resides and unzip the file to extract the contents. When complete, it should resemble this example.</p>  <p>The screenshot shows a Windows File Explorer window titled 'PUMA_GUPS_Software'. The address bar shows the current location is 'PUMA_GUPS_Software'. The left sidebar shows 'Quick access' with links to 'OneDrive', 'This PC', and 'Network'. The main pane displays five items: a folder named 'items', a file named 'autorun', a folder named 'gups', a file named 'readme', and a file named 'SETUP-14.0.0-6'. The status bar at the bottom indicates '5 items'.</p>
Step 4	<p>From the local folder where the gups.zip file extracted, use the mouse to double-click the SETUP-<version>.bat file to start installation. The anticipated version number is 14.0.0-6.</p>
	<p>Regardless of the version number, there will be only one SETUP .bat file to choose.</p>

Step	Action and Result(s)
Step 5	<p>The Welcome to QGIS screen appears that allows a participant to import their previous settings from QGIS 2 or starting clean.</p>  <p>Choose the option for a “clean start” and select Let's get started to proceed. If a new version of GUPS that uses QGIS 3 is already installed for use with other census programs, the previously mentioned window may not appear.</p>
Step 6	<p>When the installer opens, the Welcome to the QGIS 3.4.4 'Madeira' Setup Wizard screen appears.</p>  <p>Before proceeding with installation, close all other programs or applications. Once other programs and applications are closed, choose the Next button.</p>
	<p>The version needed for the 2020 PUMA is QGIS 3.4.4 Madeira. If the exact same version of QGIS exists on the computer, an instruction to uninstall and reinstall may appear. Participants may retain other versions of QGIS that may be in use for other programs, but the Census Bureau suggests reinstalling if the same version exists on the computer to ensure installation of the latest update.</p>

Step	Action and Result(s)
Step 7	<p>The License Agreement screen appears.</p>  <p>Read the License Agreement and choose the I Agree button to continue.</p>
Step 8	<p>The Choose Install Location screen opens. For performance and stability, the Census Bureau recommends installation to the default folder (e.g., C:\QGIS344) even though the Browse button allows for changing of the installation folder.</p>  <p>Choose the Next button to continue.</p>

Step	Action and Result(s)
Step 9	<p>The Choose Components screen opens. The '☑QGIS' in the Select components to install section is checked and grayed out since it is the default.</p>  <p>Choose the Install button to continue.</p>
	<p>To review a previous screen or reread the license agreement, choose the <Back button (each screen contains this button).</p>
Step 10	<p>The Completing the QGIS 3.4.4 'Madeira' Setup Wizard screen appears to confirm installation.</p>  <p>Choose the Finish button to finish the QGIS update and launch the GUPS update. The installation can take five to 10 minutes to complete.</p>

Step	Action and Result(s)
Step 11	<p>The GUPS Install Setup: Completed screen opens and displays the status of the installation.</p>  <p>Choose the Close button to close the window.</p>
Step 12	<p>Once installed, QGIS 3.4 appears in the Start Menu's <i>All Programs</i> list. Please note depending on operating system, the image shown below may vary slightly.</p>  <p>Use QGIS Desktop 3.4.4 or the QGIS3 icon to launch GUPS. Disregard the other software installed. They are not needed for the 2020 PUMA.</p>

After successfully installing GUPS and QGIS for use in the 2020 PUMA, participants are ready to begin their delineation work. Review the next chapter for instructions on opening GUPS and starting a new PUMA project.

CHAPTER 3 OPEN GUPS AND START A PUMA PROJECT

After successfully downloading and installing GUPS, PUMA delineation may begin. There are two options to access the data within GUPS: Census Web and My Computer. The CD/DVD option is not a valid option. [Figure 2](#) provides a visual of the Map Management window with all three options shown.

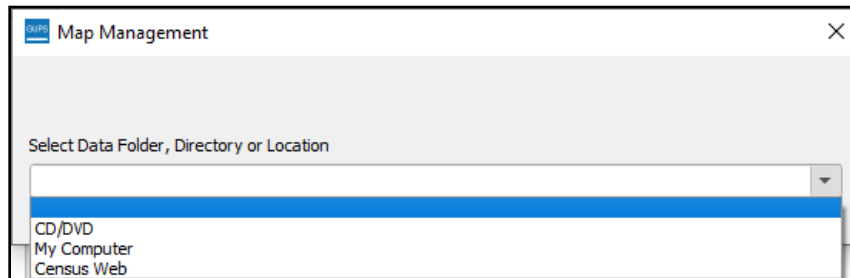
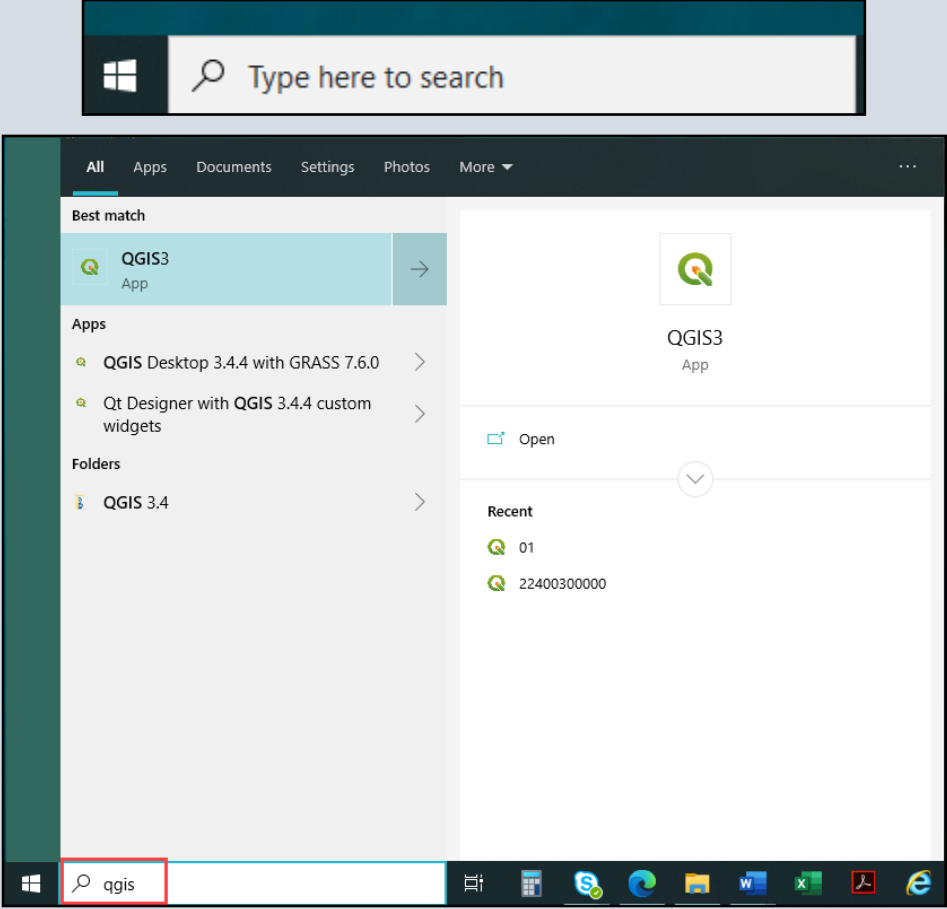


Figure 2: Map Management Window

The Census Web option downloads the appropriate shapefiles directly into GUPS from the Census Bureau's servers. This is the recommended for the 2020 PUMA. Follow steps listed in [Table 3](#) to open GUPS and start a new PUMA project using the Census Web option. The My Computer option is not recommended but is available if a participant is unable to use the Census Web option. Refer to [Appendix D](#) for details on using the My Computer option.

Table 3: Steps to Open GUPS and Start a PUMA Project Using Census Web

Step	Action and Result(s)
<p>Step 1</p>	<p>To open GUPS, select the QGIS3 icon from the Start Menu.</p>  <p><i>The QGIS splash screen appears.</i> Depending on the age of the computer and amount of RAM, the application may require a few moments to load and open.</p> 

Step	Action and <i>Result(s)</i>
	<p data-bbox="345 226 1349 289">A participant can also locate QGIS by typing 'qgis' in the Search area at the bottom left of the screen, near the Start button, in Windows 10.</p>  <p>The screenshot shows the Windows 10 search interface. At the top, there is a search bar with the text 'Type here to search'. Below this, the search results are displayed in a list view. The 'Best match' section shows 'QGIS3 App' with a right-pointing arrow. Under the 'Apps' section, there are three entries: 'QGIS Desktop 3.4.4 with GRASS 7.6.0', 'Qt Designer with QGIS 3.4.4 custom widgets', and 'QGIS 3.4'. The 'Recent' section shows two recent searches: '01' and '22400300000'. The search bar at the bottom left of the screen contains the text 'qgis' and is highlighted with a red box. The taskbar at the bottom shows various application icons including the Start button, File Explorer, Edge, and several other programs.</p>

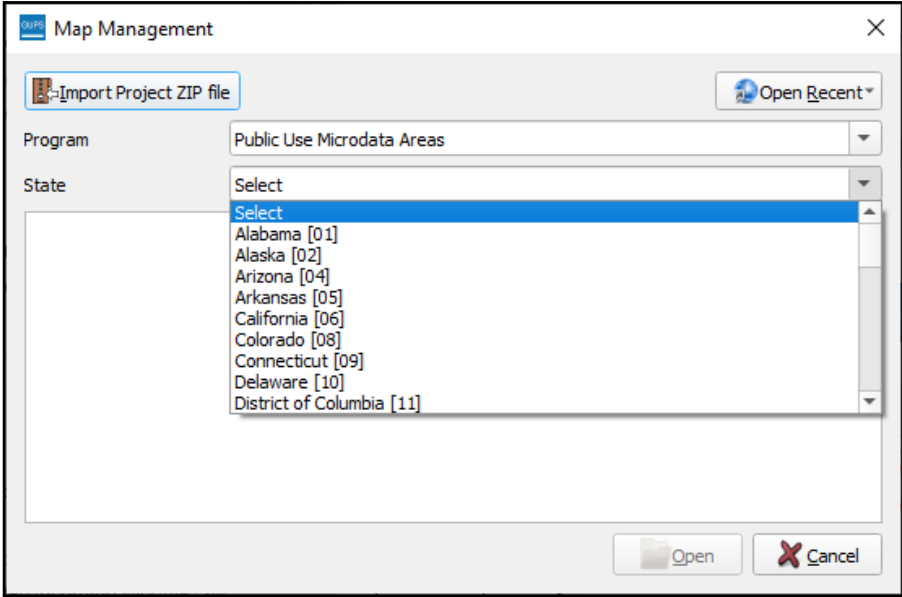
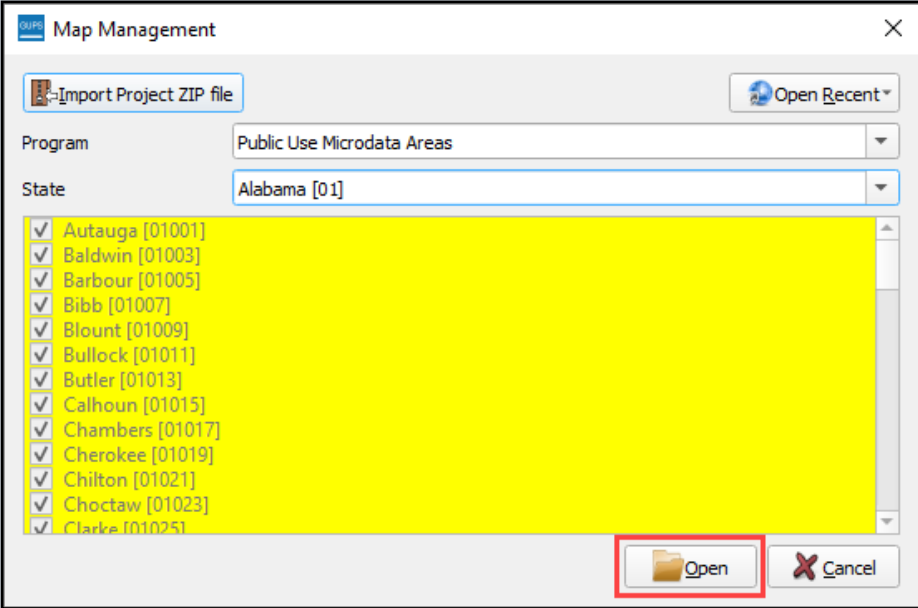
Step	Action and Result(s)
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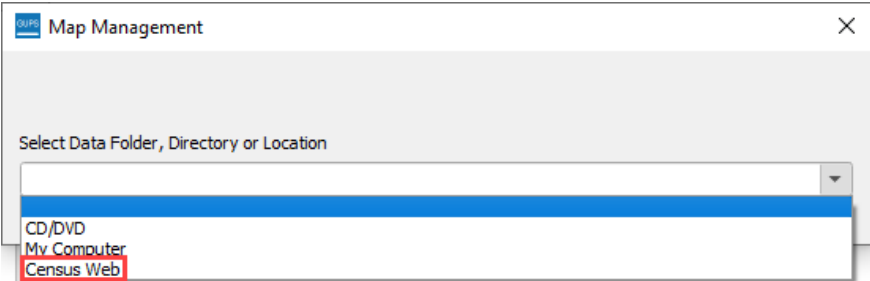
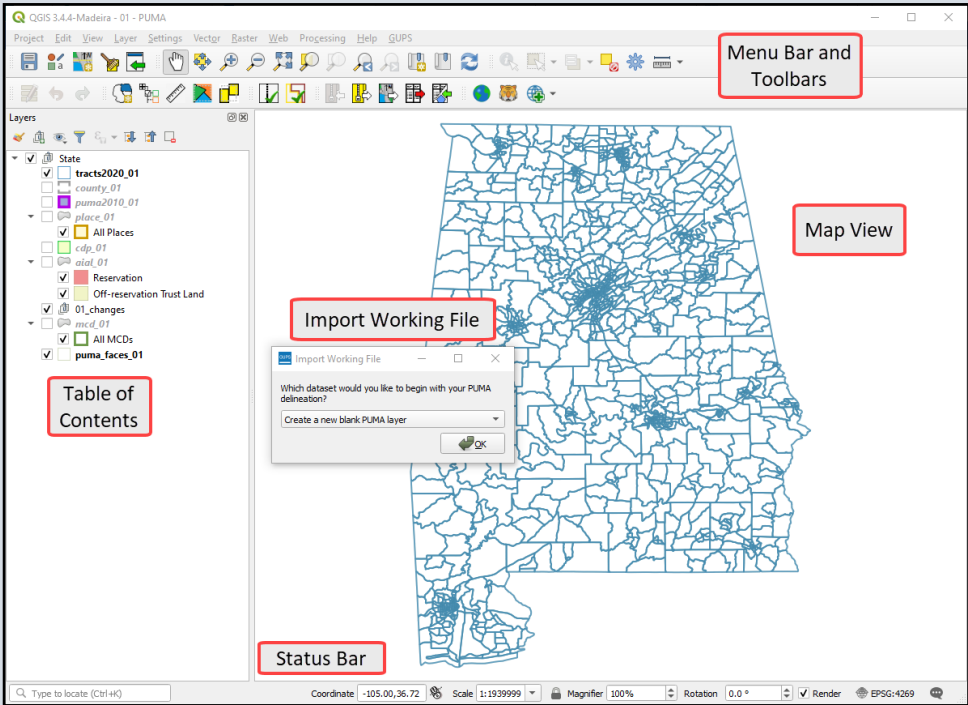

The **Map Management** window appears.

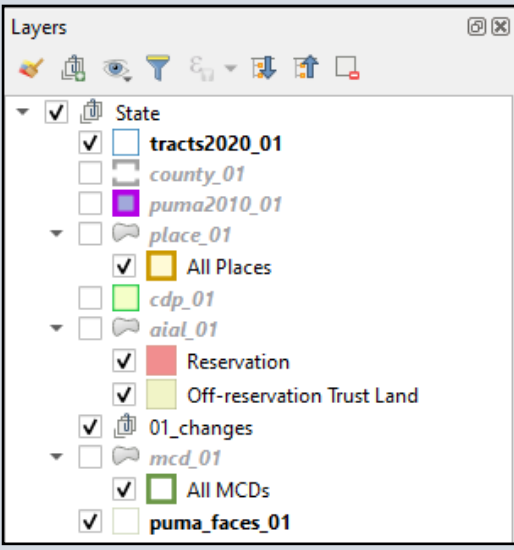
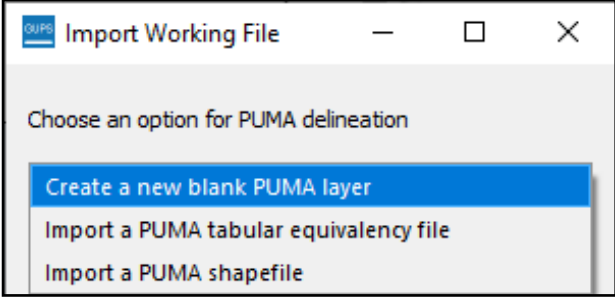
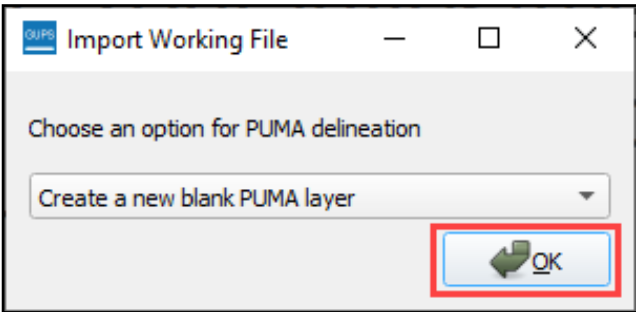
Step 2


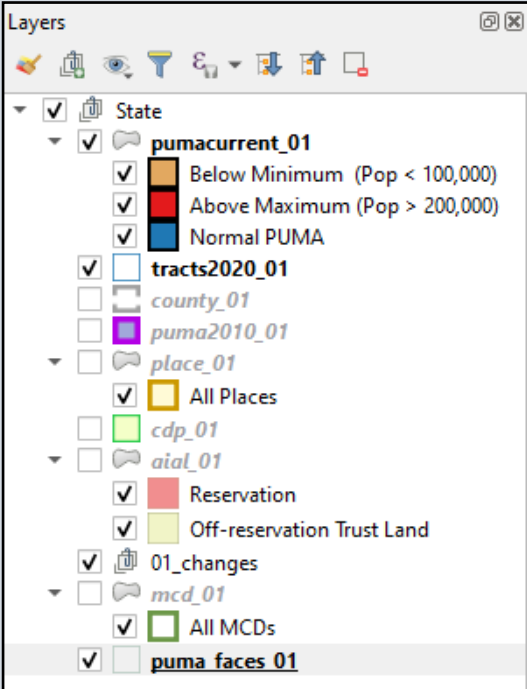

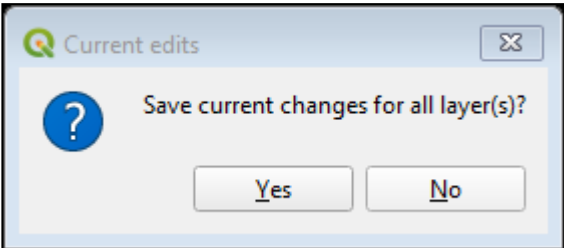
Use the drop-down menu next to the **Program** field to select **Public Use Microdata Areas**.


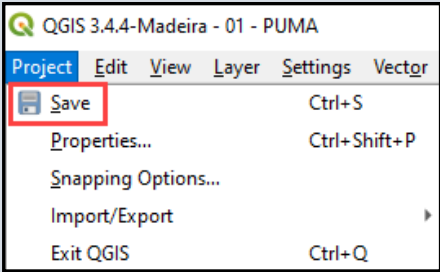
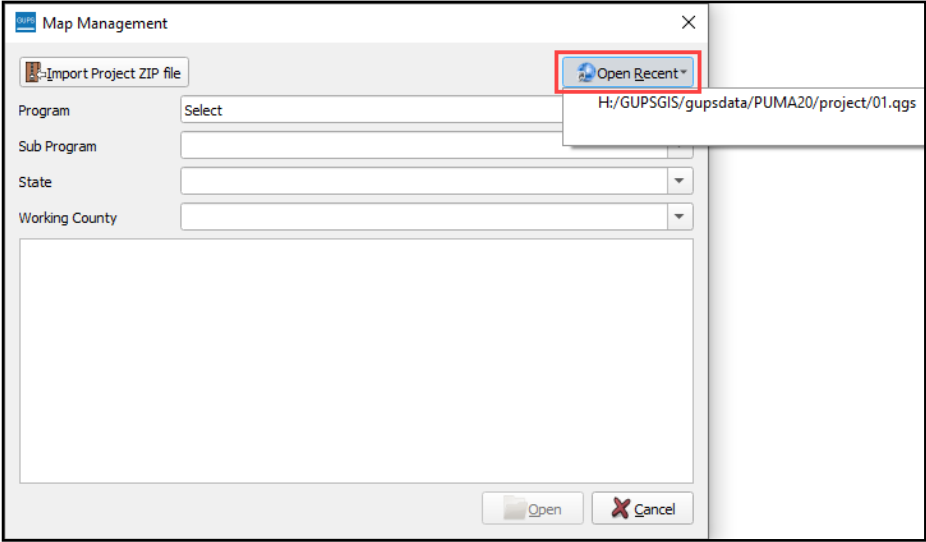
If the Map Management window does not appear, choose the Map Management button from the Standard toolbar (shown below highlighted by a red rectangle). If it still does not appear, refer to [Appendix B](#) for troubleshooting tips.

Step	Action and Result(s)
Step 3	<p>Choose the state from the State drop-down menu.</p> 
Step 4	<p>With the state selected, the Open button activates for selection. <i>All counties for the state appear in the window below the state name and are selected to open.</i></p>  <p>Choose the Open button to continue.</p>

Step	Action and Result(s)
Step 5	<p>A secondary Map Management window appears to select the data source. From this secondary Map Management window, choose Census Web from the Select Data Folder, Directory or Location drop-down menu to download the shapefile data layers with preset symbology and labels directly into GUPS.</p>  <p>Reminder: The Census Bureau recommends the use of the Census Web option to download the shapefiles directly into GUPS, but for those participants that choose to download the shapefiles onto their local computer or network, refer to Appendix D for steps to use the My Computer option. The CD/DVD option will not be used.</p>
Step 6	<p>After the data loads into GUPS, the Table of Contents populates and symbolizes according to preset styles. The Map View fills with the working state. The Menu Bar and Toolbars appear along the top and the Status Bar appears at the bottom of the screen. The Import Working File window awaits the participant's selection for how to begin PUMA delineation. Refer to sub-chapter 3.1 for high-level information on the main page elements and default layout.</p> 
	<p>The QGIS 3.4.4 Madeira and PUMA display at the very top left of the application window, along with the two-digit FIPS code of the state. This information helps a participant confirm use of the newer QGIS version and selection of the correct state and program.</p>

Step	Action and Result(s)
Step 7	<p>Basic data layers initially load into the Table of Contents before choosing how to begin delineation. They are shown below.</p> 
Step 8	<p>Participants choose how to begin their delineation work from one of three options in the Import Working File window: Create a new blank PUMA layer; Import a PUMA tabular equivalency file; or Import a PUMA shapefile. Each option is detailed in Chapter 4.</p>  <p>Choose an option and the OK button to proceed.</p> 

Step	Action and Result(s)
	<p>The Table of Contents updates to include additional data layers for delineation. In this case, the “pumacurrent_01” data layer is added since the Create a new blank PUMA layer option was selected.</p>  <p>The symbolization of the “pumacurrent” layer is vital to understanding the acceptable delineations in the Map View. PUMA delineations that fall below the minimum threshold appear in gold/tan while those that fall above the threshold are symbolized with red. Use of color brings a visual aid to the delineation process.</p>
<p>Step 9</p>	<p>To save a project, use the Save Project button on the Standard toolbar. Otherwise, delineation work will be lost.</p>  <p>The Current edits confirmation dialog box appears. Choose the Yes button to save or the No button to cancel without saving the project.</p> 

Step	Action and Result(s)
	<p>Participants may also use the Save option beneath the Project tab on the Menu bar to save the project.</p> 
Step 10	<p>To reopen a saved project, expand the menu beneath the Open Recent button in the Map Management window. <i>The drop-down list provides a list of current projects created using GUPS to reopen.</i></p> 

With the steps for opening GUPS and starting a PUMA project using Census Web presented, proceed to the sub-chapter for an introduction to the GUPS menus and toolbars.

3.1 GUPS Menus and Toolbars

The GUPS main page elements introduced above in Step 6 of Table 3, and shown below in [Figure 3](#), are further explained in this sub-chapter to build familiarity with the software and the default layout.

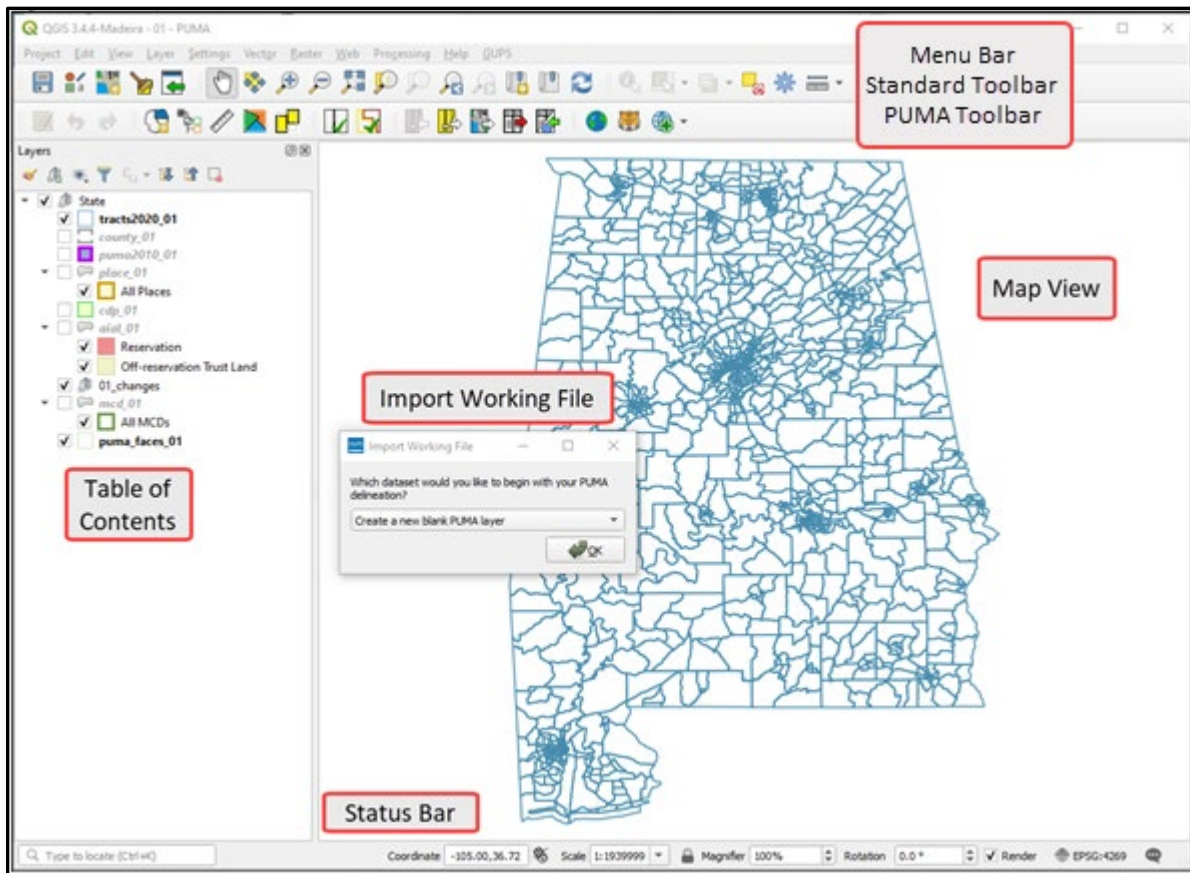


Figure 3: GUPS Main Page Elements and Default Layout

Refer to [Table 4](#) for high-level information about the elements that comprise the main page once PUMA GUPS is opened. Detailed descriptions and functions of menus, sub-menus, and toolbars is in [Appendix C](#).

Table 4: GUPS Main Page Elements and Their Function/Description

Page Element	Function/Description
Menu Bar	Permits access to QGIS and GUPS features using a standard hierarchical menu. Offers basic features such as Settings and Help; tools to manage the Map View. Almost all functions available in Menu bar are available in toolbars. Refer to sub-appendix C1 for more details.
Standard Toolbar	Provides navigation functions and other tools needed to interact with the Map View and layers. Refer to sub-appendix C2 for more details.
PUMA Toolbar	Provides tools for specific to the 2020 PUMA as well as some tools from previous Census Bureau programs. See sub-section 3.1.1 below for descriptions of the buttons.
Map View	Displays the default data layers for the 2020 PUMA. Reflects the colors and symbology of layers in the Table of Contents.

Page Element	Function/Description
Table of Contents	Depicts the layers in the Map View. Layers have been pre-styled and arranged for optimal use as part of the Census Web option. However, layers can be managed by manipulating the visibility (i.e., check/uncheck the layer) or reorganized using tools from the Table of Contents toolbar that appears at the top of the Table of Contents. Refer to sub-appendix C3 for more details.
Status Bar	Displays information on the coordinates, map scale, magnification, rotation, and projection. Allows for adjustment of the display. Refer to sub-appendix C4 for more details.

3.1.1 PUMA Toolbar


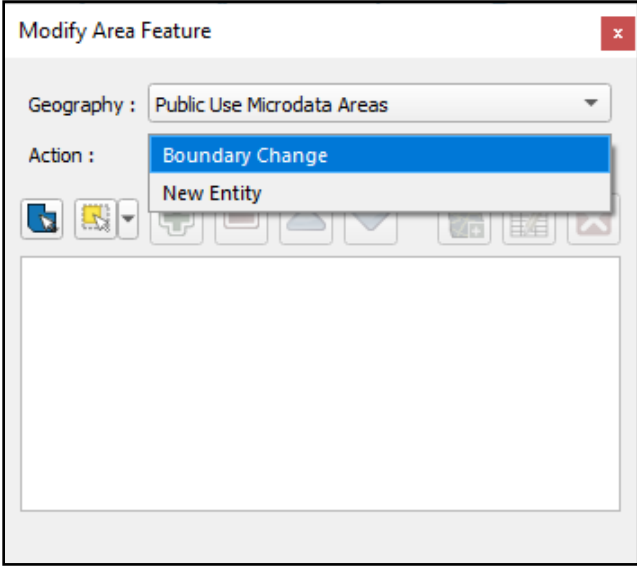

The PUMA toolbar, shown in [Figure 4](#), includes buttons used specifically for PUMA delineation.





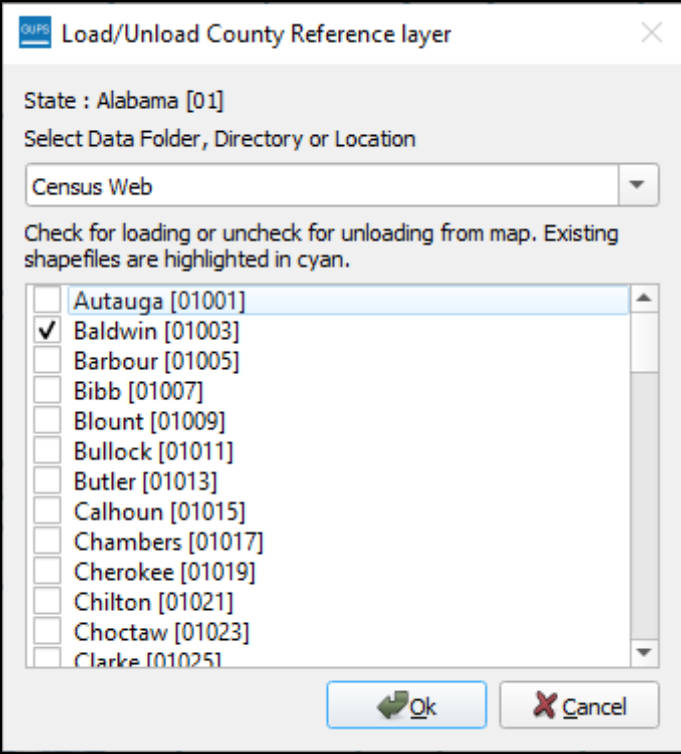
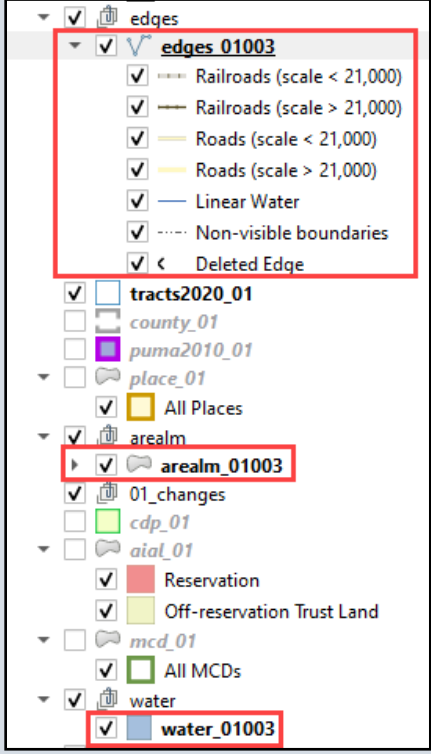
Figure 4: PUMA Toolbar

[Table 5](#) defines each button’s use, while Chapter 4 illustrates their use.

Table 5: PUMA Toolbar Buttons and Their Function/Description

Button	Name	Function/Description
	Modify Area Feature	Chooses the geography (e.g., Public Use Microdata Areas) and action (e.g., Boundary Change or New Entity) for the delineation. This button is a major component of PUMA delineation work and is used extensively in Chapter 4. 
	Show/Hide Legend	Shows or hides the legend (e.g., Table of Contents). It may be helpful to close the legend to make more screen space for the Map View.

Button	Name	Function/Description
	Scale Bar Tool	Permits the selection of units of measure to display in the scale bar as well as the color of the scale bar to display in the Map View.
	Load/Unload County Reference Layer	<p>Permits loading and unloading of county-level reference layers into the PUMA project for any county within the state. This button permits loading of census spatial layers for the selected county(s). Reference layers (e.g., roads, railroads, area landmarks, water, etc.) may prove useful for participants to better orient themselves within a county with multiple PUMAs.</p> <p>The same three options, CD/DVD, My Computer, and Census Web, available when opening the project are used to load reference layers.</p> <div data-bbox="711 661 1393 1409" data-label="Image"> </div> <p>The Census Bureau strongly advises participants use the Census Web option to automatically upload the shapefiles on the census servers into the PUMA project.</p>

Button	Name	Function/Description
		 <p>The loaded layers (edges, area landmarks, water, etc.) appear in the Table of Contents nested in their respective layers with the inclusion of the state and county FIPS code.</p> 

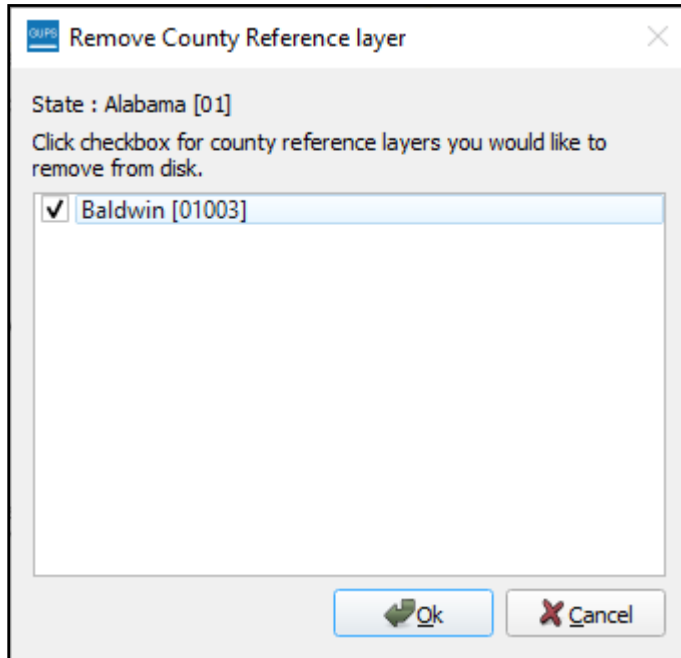
Button	Name	Function/Description
		<p>Scale dependency, as shown for the edges layer above, prevents the layers from displaying in the Map View until the specific scale is reached.</p> <p>To unload a layer from the PUMA project, simply choose the button again and check the county to unload. Loaded counties appears at the top of the list and in the color of cyan.</p> <p>The unload option removes the layer from the PUMA project, but does not delete the data that is stored in the GUPS working directories.</p> <div data-bbox="716 552 1395 1297" style="border: 1px solid black; padding: 5px;"> </div> <p>Select the OK button to unload the county.</p>



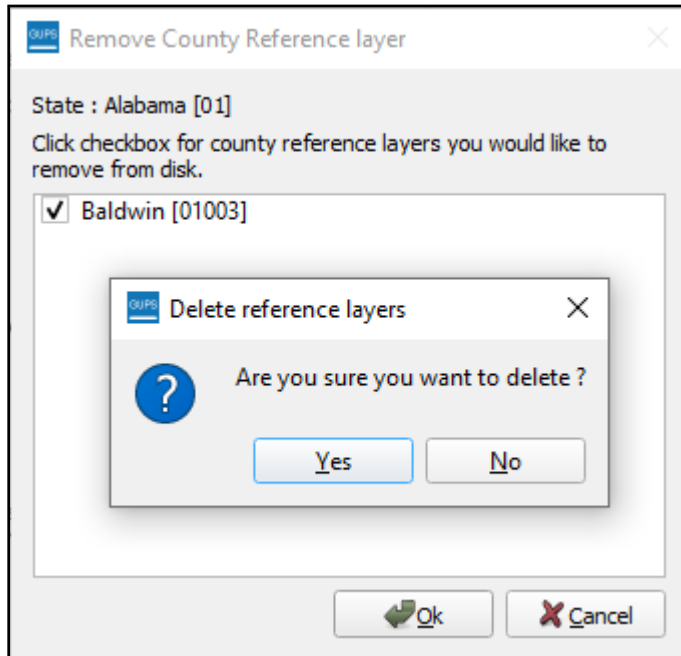
Remove County Reference Layer

Removes a loaded county reference layer from the project and deletes the data from the computer. Participants use this button when they determine they no longer need to reference the county level data. Once a county is removed, participants would use the **Load/Unload County Reference Layer** button to load the county-reference layers back into the project.



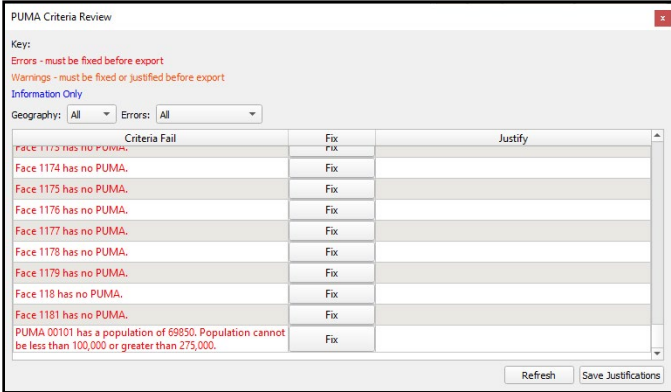

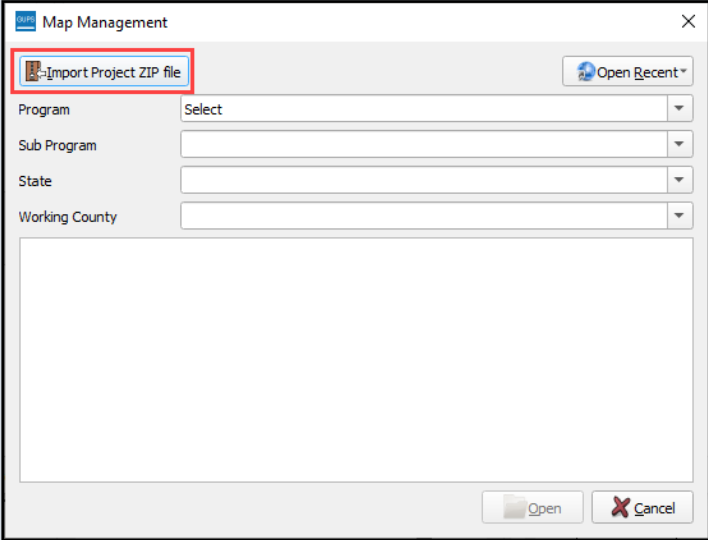
Add a checkmark to the county(s) that appears on the list to remove them from the project.


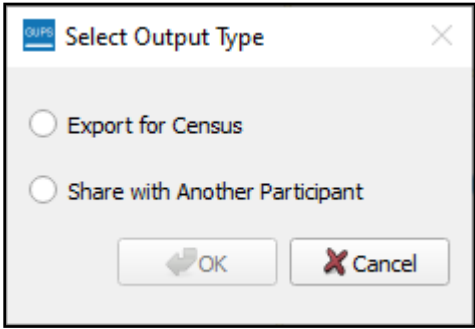

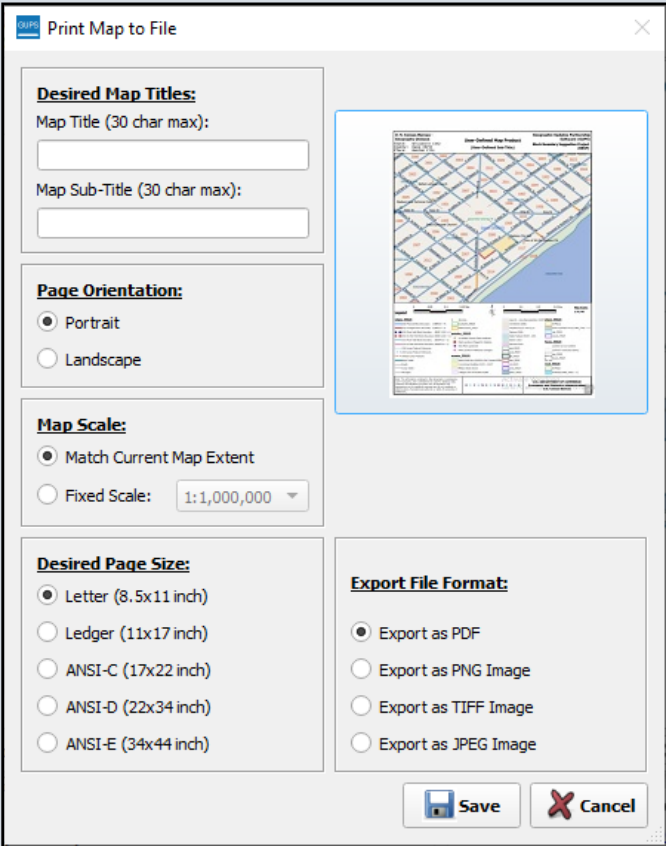



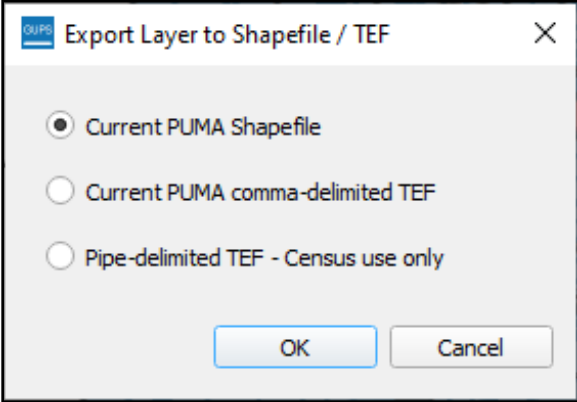


After selecting **OK**, a warning appears to confirm deletion.






Choose **Yes** to remove/delete the county from the project or **No** to return to the previous window.

Button	Name	Function/Description
	Geography Review	Not used for the 2020 PUMA. Filters a layer based on field values in the attribute table. It provides access to the attributes of the selected layers. This button does not allow for changes to the geography.
	PUMA Criteria Review	<p>Generates a list of criteria threshold failures and allows for corrections to or justifications for the failures. This mandatory check is required before exporting the file for submission. This button can be executed throughout the delineation process or at the end of work, prior to exporting for submission to the Census Bureau.</p> 
	Import State Zip	<p>Imports another participant’s “DataDirectory” output .zip file for review or editing by another person. GUPS generates this .zip file as part of the Export to Zip – Share with Another Participant option. This file is the whole state’s PUMA project and cannot be used if the same project is open in GUPS.</p> <p>This button will not work if the same project is open. As an alternative, use the Import Project ZIP file button on the Map Management window prior to opening any project.</p> 

Button	Name	Function/Description
	Export to Zip	<p>Includes two export options: Export for Census and Share with Another Participant.</p>  <p>Use Export for Census option to create the .zip file of the PUMA project that contains all required data for submission to the Census Bureau.</p> <p>Use Share with Another Participant option to share work with others. This method of sharing, rather than exporting and importing files, permits staff in the same office to review an entire project.</p>
	Print Map to File	<p>Exports a printable map in *.pdf, *.png, *.tiff, or *.jpeg format. This tool allows users to assign a map title and sub-title and to set the page orientation, scale, and page size.</p> 

Button	Name	Function/Description
	Export Layer to Shapefile/TEF	<p>Exports the current PUMA layer or PUMA faces layer in the PUMA project either to a shapefile or to a tabular equivalency file (TEF), respectively. This button is used to share PUMA delineation work and can be used to share all or part of the state.</p> 
	Import Working File	<p>Serves two functions: 1) Begins the delineation of PUMAs and 2) Imports PUMA delineation work for some/all PUMAs in a state. Initially this window appears when starting a project and is how a participant begins their delineation work, but the button is also used to import work of other participants if work for the state was shared among interested data users.</p> <p>For example, if a state that is working with a regional planning agency to prepare part of the state’s PUMAs:</p> <ul style="list-style-type: none"> • The regional planning agency would perform their delineation work in GUPS and use the Export Layer to Shapefile/TEF button once they completed their work. • The SDC would then use the Import Working Files button to import the exported shapefile for TEF that represents the portion of the state’s delineations created by the regional planning agency into their PUMA project or the SDC would add the shapefile as a reference layer using the Add Layer menu from the Menu bar.
	Internet Map Service	<p>Opens a GIS map service from the internet (i.e., Google Maps or Bing Maps) after selecting a point in the Map View. The intent of this tool is to provide visual assistance from an external source. An internet connection is required for this button to function.</p>

Button	Name	Function/Description
	TIGERweb Map Service	<p>Permits loading of census spatial data from Census Bureau’s TIGERweb Map Service (WMS). The selected data layers load into the Table of Contents of the project. To remove the loaded layers, relaunch the button and uncheck the selected layers.</p> <div data-bbox="837 373 1269 737" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> </div> <p>Because participants can use the Load/Unload County Reference Layer button, they may not find this button necessary.</p>
<div data-bbox="207 848 443 1016" style="border: 1px solid black; padding: 2px;">  Add Esri Imagery Add USGS Imagery Add Census Imagery </div> <div data-bbox="207 1037 326 1115" style="border: 1px solid black; padding: 2px; margin-top: 5px;">  </div>	Add Imagery / Remove Imagery	<p>Adds imagery to the PUMA project. The imagery loads near the bottom of the Table of Contents, so it underlies other layers. The button includes three imagery options: Add Esri Imagery, Add USGS Imagery, or Add Census Imagery.</p> <p>Remove imagery by using the same button. It will change to include a red negative symbol, or participants can remove imagery by using the mouse to right-click on the imagery layer in the Table of Contents.</p> <p>IMPORTANT: The Census Bureau recommends turning off or removing the imagery prior to saving the PUMA project.</p>

PART 2 CREATING A PUMA PROJECT

This part of the guide provides the technical instruction for delineating PUMAs using GUPS. The chapters include details on the various options for delineation as well as information on the quality checks performed on the PUMA project. Everyone who delineates PUMAs should review the content in this part of the guide.

CHAPTER 4 DELINEATE THE PUMAS

This chapter includes three sub-chapters that describe the technical details and steps for the each of the three delineation options, as well as two sub-chapters that describes modifying or deleting a PUMA and exporting PUMA delineations.


Note: GUPS' programming adheres to criteria and guidelines set forth by the Census Bureau for PUMAs. If any delineation steps violate these criteria and guidelines, GUPS will generate pop-up windows with information regarding the failure(s) and provide options to meet the established criteria and guidelines. Locate a copy of the criteria and guidelines document from the [2020 PUMA website](#) for use during delineation.

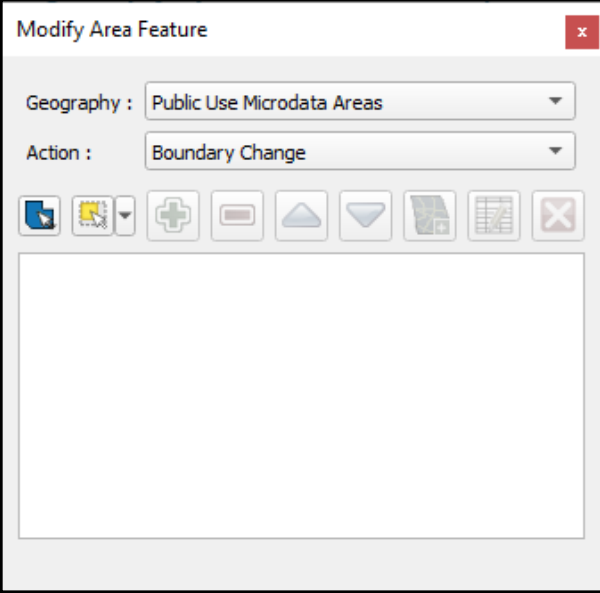
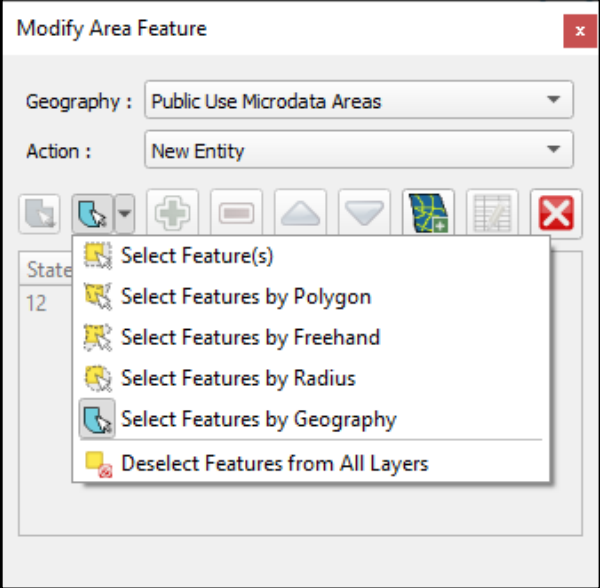

4.1 Delineate from a Blank Layer

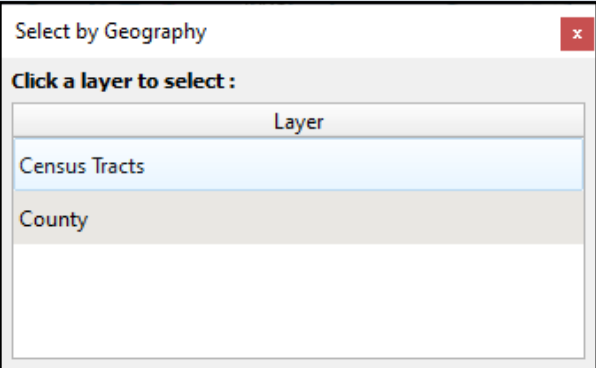
The Create a New Blank PUMA Layer option is used to interactively delineate PUMAs using census tracts and counties. This option populates a blank layer (e.g., the pumacurrent layer) in the PUMA project with the PUMA code and name. Review [Table 6](#) for the specifics on this delineation option.

Note: If the state includes American Indian reservations (either federal or state legal reservations), check the "aial_01" layer in the Table of Contents. This will make the layer visible and assist with delineation by allowing for a visual inspection of reservations that may be split among more than one PUMA.

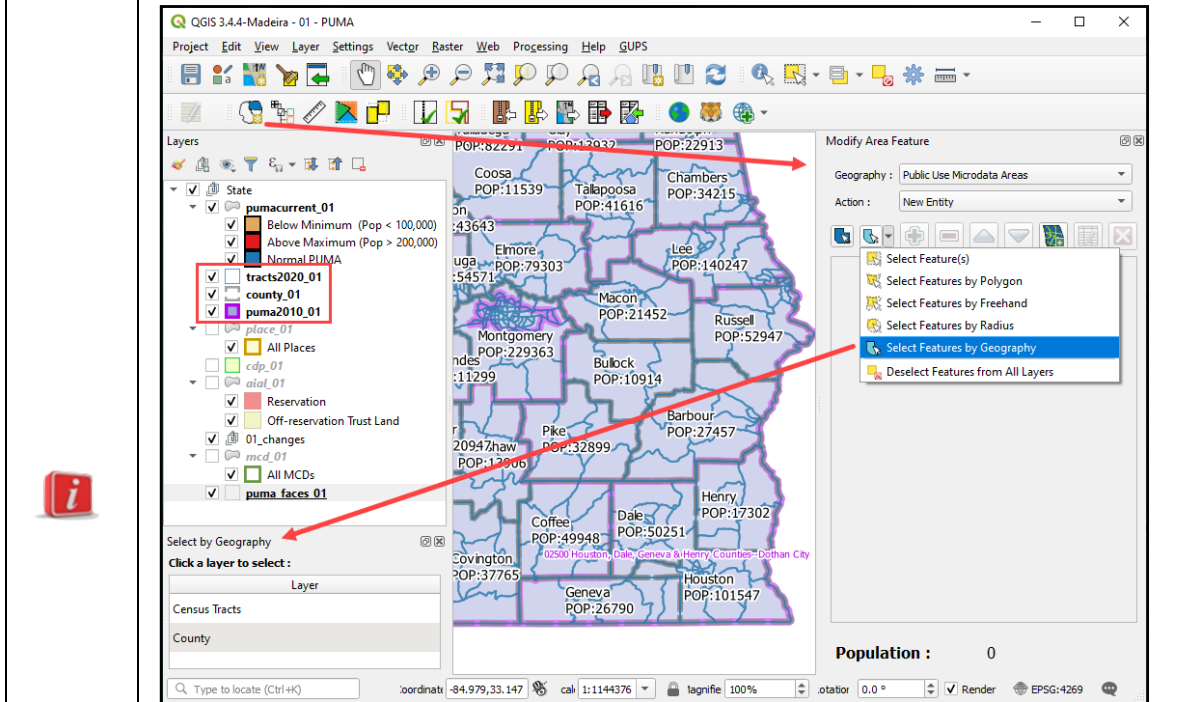
Table 6: Steps to Delineate PUMAs Using the Create a New Blank Layer Option

Step	Action and <i>Result(s)</i>
Step 1	<p>With the steps in Table 3 complete and the PUMA project open, select the Modify Area Feature button from the PUMA toolbar.</p> 

Step	Action and Result(s)
<p>Step 2</p>	<p>The Modify Area Feature window appears with the Geography field set to Public Use Microdata Areas and the Action field set to Boundary Change.</p>  <p>To create PUMAs, change the Action field from Boundary Change to New Entity and expand the Select Feature(s) button to expose all the options for selection during delineation.</p> 
	<p>The Census Bureau recommends the Select Features by Geography option for PUMA delineation because it permits the selection of whole county or census tract, the building blocks of PUMAs. Other options for delineation are not described in this table. Their use is intuitive, but contact <geo.puma@census.gov> if questions arise on their use.</p>

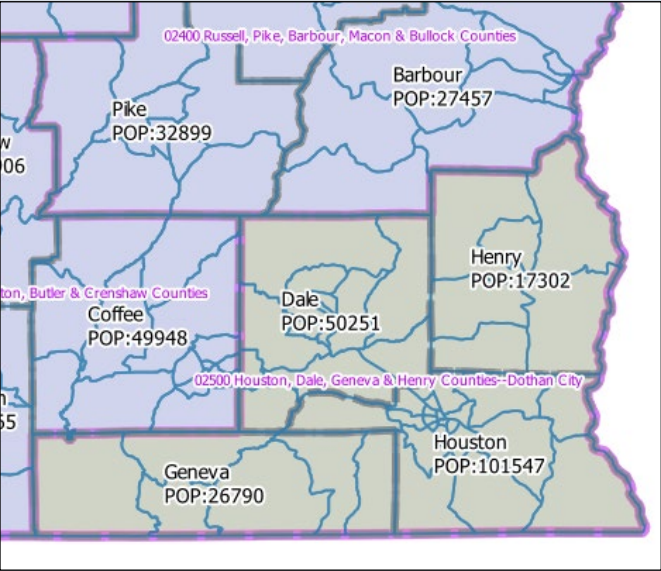

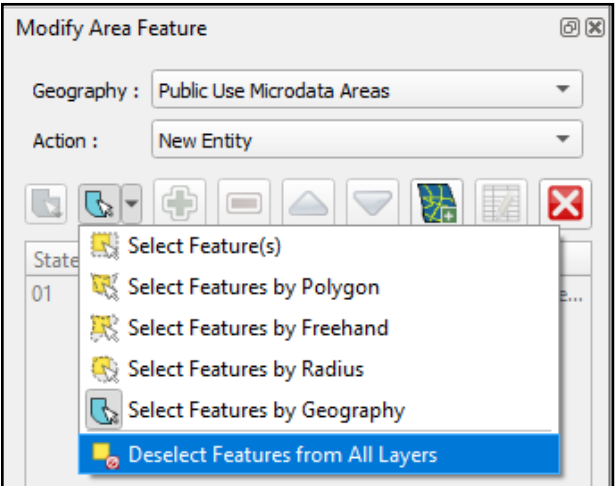

Step	Action and Result(s)
Step 3	<p>After the selection of Select Features by Geography, a Select by Geography window appears.</p> 

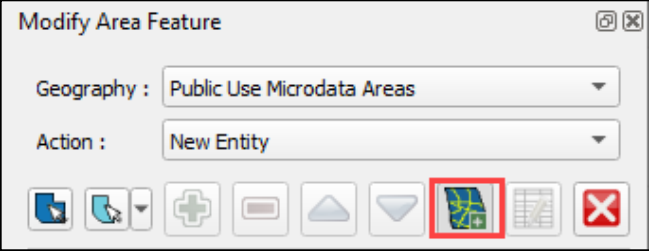
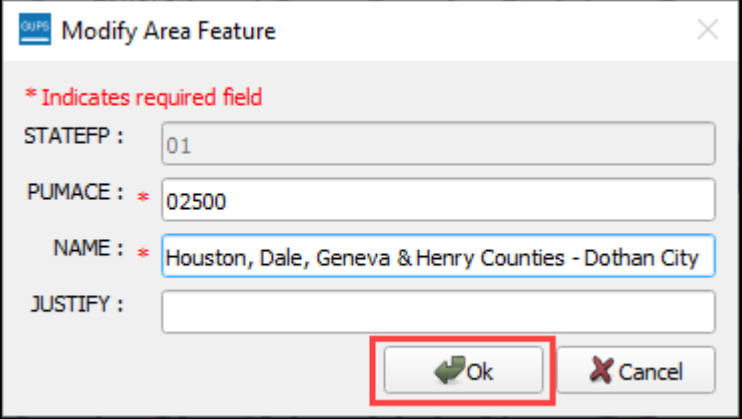

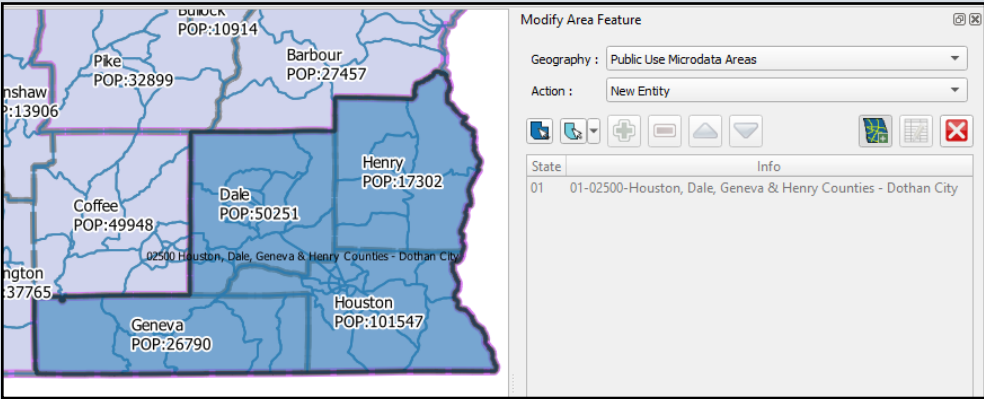
Both the **Select by Geography** window and the **Modify Area Feature** window are floating windows that can be moved outside of the project window, across monitors, or docked within the PUMA project.



Beneficial layers to use for visual guidance during delineation include the tracts2020 layer, the county layer, and the puma2010 layer. All three layers are highlighted by red rectangle in the image above. To make them visible, select the box next to the layer name in the Table of Contents to add a checkmark. To hide their visibility, select the box again to remove the checkmark. If the state includes American Indian reservations or maintains unique relationships with places and minor civil divisions, those layers are available for reference as well.

All three layers have scale dependent labels. The tracts2020 labels appear below the 1:50000 scale and label the tract number and its 2020 population. The county labels appear below the 1:1800000 scale and label the county name and 2020 population. The puma2010 labels appear below 1:2000000 scale and label the 2010 PUMA code and name.

Step	Action and Result(s)
Step 4	<p>From the Select by Geography window, choose the layer to use for delineation and use the mouse to select the county(s) or census tracts to include in the PUMA. Use the Shift or Ctrl keys on the keyboard to select more than one county or census tract. <i>The selected geography appears in a different shade to show its selection.</i></p>  <p>Both layers can be used for delineation within the same project. This feature is beneficial for counties that have multiple PUMAs. Selection of County activates the “puma_faces” layer in the Table of Contents while selection of Census Tracts activates the “tracts2020” layer.</p>
	<p>To deselect some of the selected features, use the Shift or Ctrl keys on the keyboard to choose the selected census tract or county. To deselect all features from the PUMA selection (i.e., county or census tract), use the Deselect Features from All Layers option from the Select Feature(s) button in the toolbar of the Modify Area Feature window.</p>  <p>This same button appears on the Standard toolbar, shown below. Both options work for deselecting.</p> 

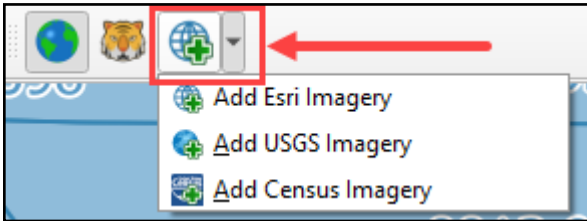
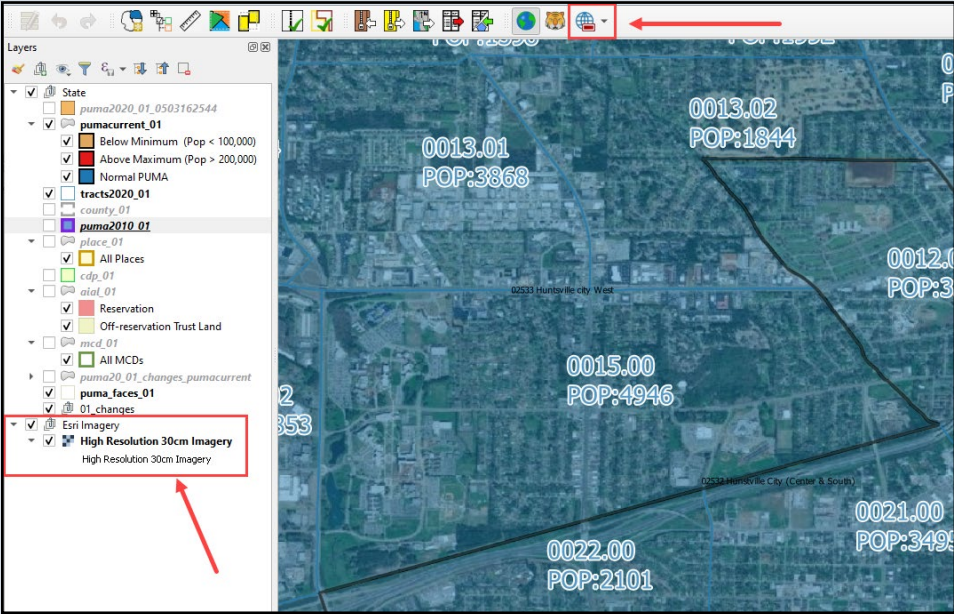

Step	Action and Result(s)
Step 5	<p>With the selection(s) made, choose the Add Entity button from toolbar of the Modify Area Feature window.</p>  <p>A secondary window appears to enter the PUMA code (PUMACE) and PUMA name (NAME).</p>  <p>Choose OK to continue.</p>
	<p>The 2010 PUMA Names file on the PUMA website may be helpful to use for copying/pasting if no changes are needed to the code or name. If the geography changed for 2020, use of the code or name from 2010 may not be applicable.</p>
Step 6	<p>Once added, the new PUMA appears within the main Modify Area Feature window and in the Map View.</p> 
Step 7	<p>Continue to use the New Entity action and Select Feature(s) tools to delineate additional PUMAs and the Add Entity button to assign a code and name.</p>

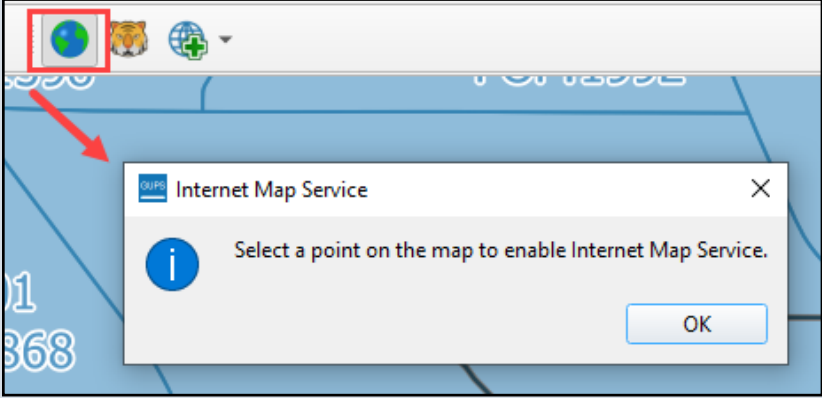


4.1.1 Add Imagery or Open an Internet Map Service

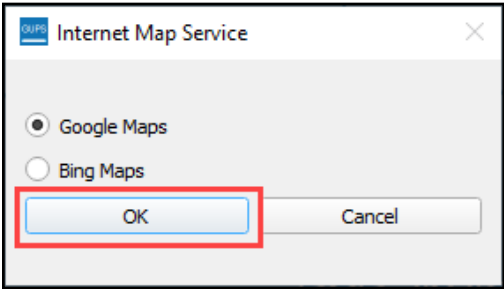
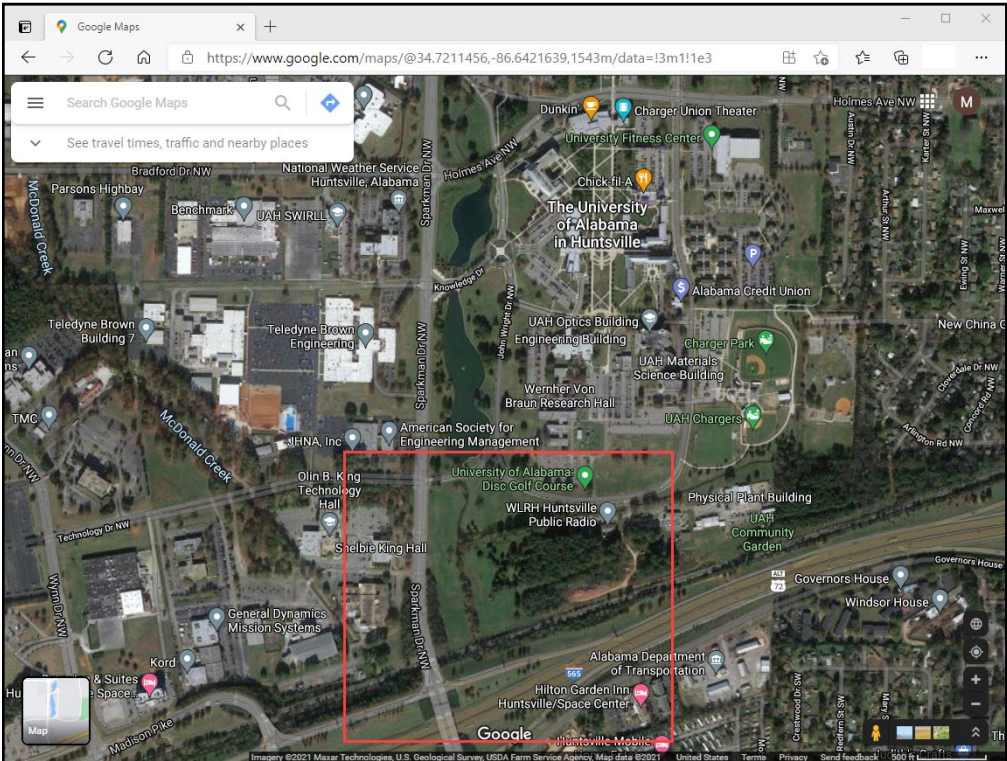
For PUMAs delineated by census tract(s), it may be useful to add imagery and/or open an internet map service to provide visual assistance with the delineation. The functionality described in [Table 7](#) may prove useful for all three delineation options.

IMPORTANT: Participants cannot change the boundary of census tracts as part of PUMA, nor add features to be used as PUMA boundaries. The purpose of the two tools described in this sub-section is to provide a visual reference for the census tract boundaries.

Table 7: Steps to Add Imagery or Open an Internet Map Service

Step	Action and Result(s)
Step 1	<p>To add imagery, select the choices arrow adjacent to the Add Imagery button from the PUMA toolbar to expose the three options for imagery to add to the project.</p>  <p>Select the vintage of imagery to load into the project. Selecting the Add Imagery button instead of the choices arrow will open the first option, Add Esri Imagery.</p>
Step 2	<p>Once added, the Add Imagery button changes from a green plus sign to a red negative sign and the imagery loads into the project as the last layer in the Table of Contents. This allows the imagery to underlie the other layers.</p> 
	<p>The Census Bureau recommends turning off the imagery or removing it from the project prior to saving. This action allows GUPS to reopen the project successfully. To remove the imagery from the project, choose the Add Imagery button again (i.e., the red negative sign). To turn the imagery off from within the Table of Contents, select the checkmark next to the layer name.</p>

Step	Action and Result(s)
Step 3	<p>To open an internet map service, select the Internet Map Service button from the PUMA toolbar. An Internet Map Service pop-up window appears that instructs the participant to select a point on the map to enable the Internet Map Service.</p>  <p>Select OK to proceed with selecting a point in the Map View.</p>
Step 4	<p>Use the mouse to select a point in the Map View to open the map service. It is from this point that the map service will include in its view when it opens.</p> 
	<p>The image above is used to illustrate the general vicinity of the point selected by highlighting the area with a red rectangle. The red rectangle is not part of the selection process.</p>

Step	Action and Result(s)
Step 5	<p>Once a point is selected, the Internet Map Service window opens for the participant to choose either Google Maps or Bing Maps.</p>  <p>Select OK to proceed or Cancel to return to Map View. <i>Google Maps</i> opens in an internet browser window to include the point selected from the Map View.</p> 

With these two tools described, proceed to the next sub-chapter for instructions to modify or delete a PUMA.

4.2 Modify or Delete a PUMA

As PUMAs are delineated, participants may find the need to modify their boundary, code, or name. For some, it may be easier to delete the PUMA and begin again. These three GUPS tasks are described in this sub-chapter.

If a change is needed to the boundary, code, or name of a delineated PUMA, ensure the Action field is set to Boundary Change and select a PUMA from the list of PUMAs that appear in the main Modify Area Feature window. As shown in [Figure 5](#), the selected PUMA appears as a

darker color in the Map View and shows as selected in the main Modify Area Feature window for a participant to confirm they have selected the correct PUMA to modify.

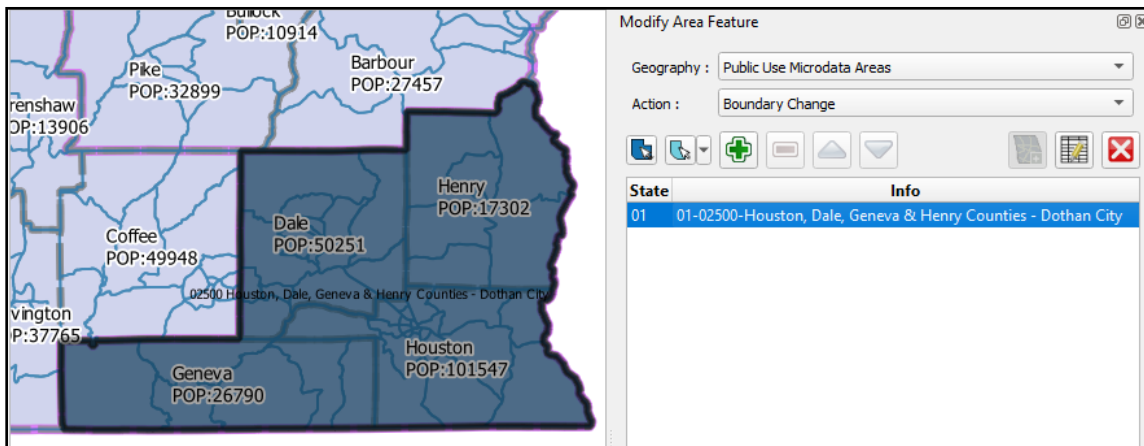


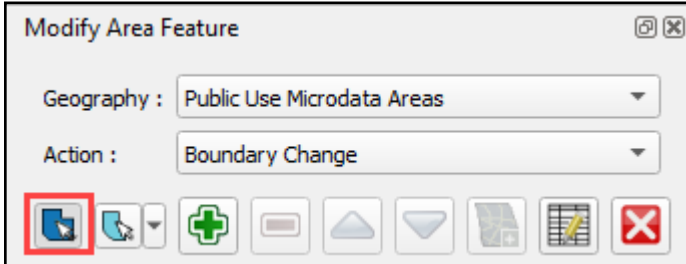
Figure 5: Example of a Selected PUMA in the Map View and Modify Area Feature Window

4.2.1 Modify a PUMA Boundary

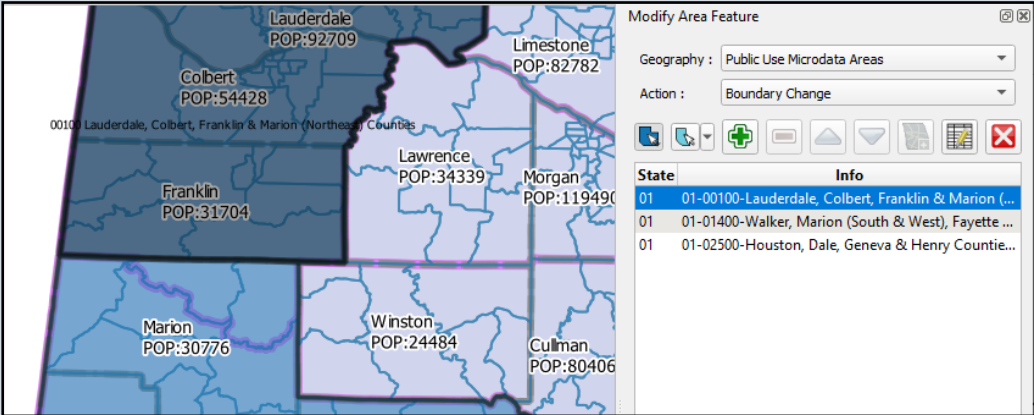
Participants must use the Add Area button to add area to another delineated PUMA rather than removing area from a delineated PUMA. In other words, a boundary, more specifically an area (county or census tract), must have a PUMA to be modified into, not removed from. For example, in [Figure 5](#) a participant could not remove Geneva County from PUMA 02500 because there is no other PUMA to assign to Geneva County. To modify the boundary of the PUMA, follow the steps in [Table 8](#).

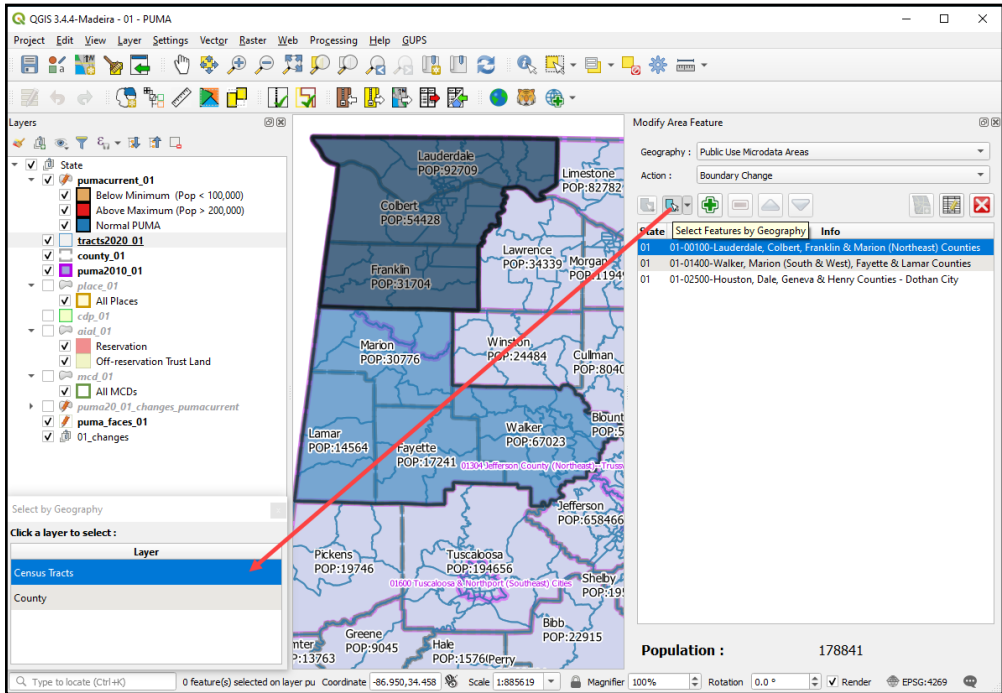
Note: The Remove Area button appears as a grayed-out negative (-) sign to the right of the Add Area button on the Modify Area Feature window toolbar, but does not activate for the 2020 PUMA.

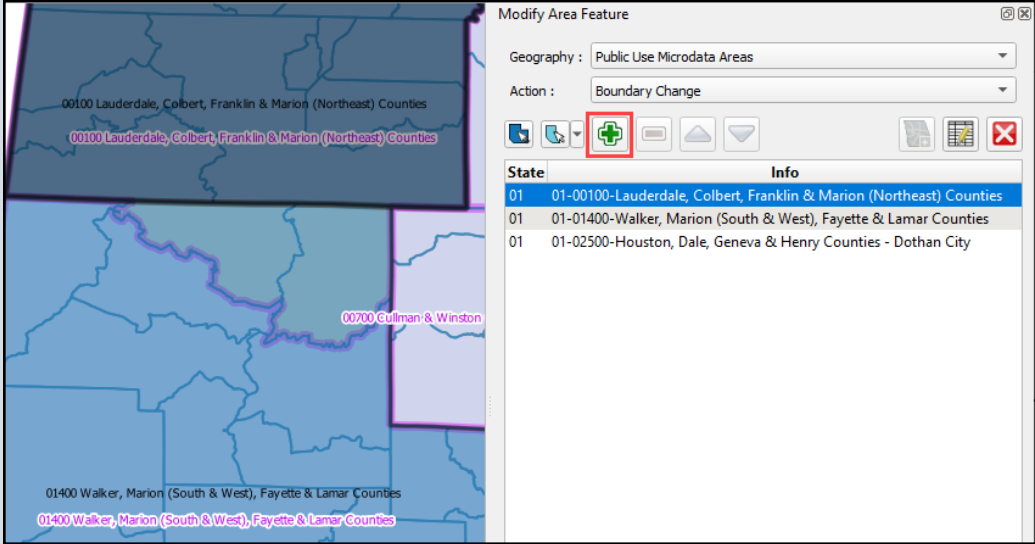
Table 8: Steps to Modify a PUMA Boundary

Step	Action and Result(s)
Step 1	<p>Select the PUMA to modify from the list of PUMAs in the Modify Area Feature window or by choosing the Select Target Area button from the Modify Area Features toolbar. The latter permits the interactive selection of the PUMA from the Map View rather than from the list of PUMAs that appear in the Modify Area Feature window.</p> 

Step	Action and Result(s)
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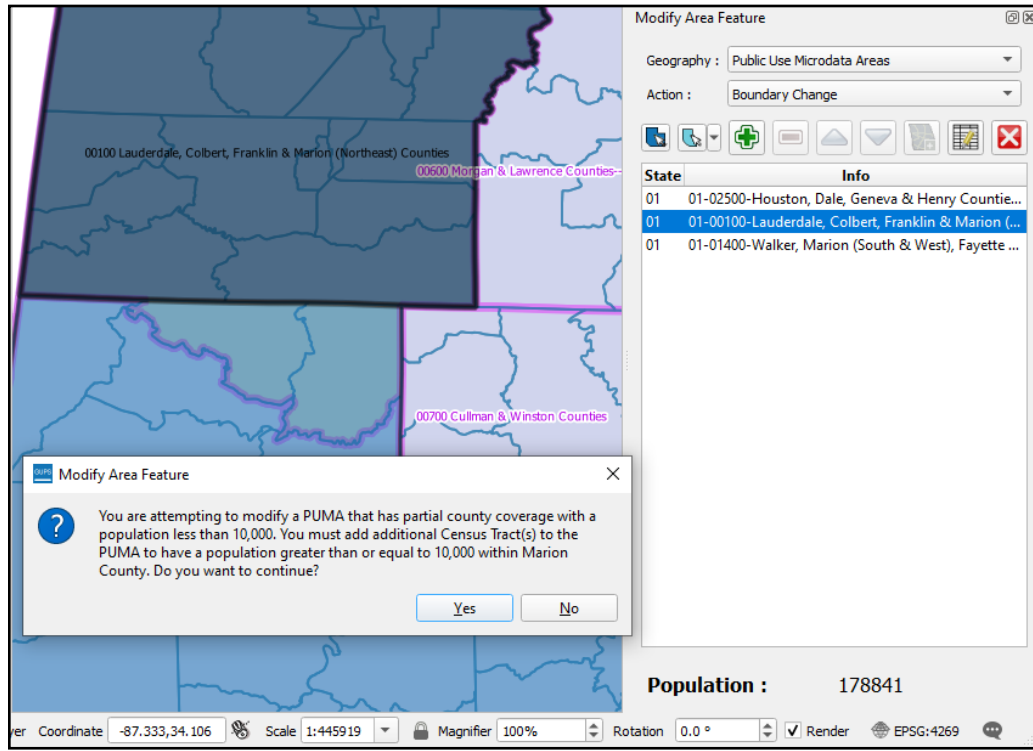
Step 2	<p>After choosing the Select Target Area button, a crosshair appears for the mouse cursor. With the mouse, select the PUMA to modify in the Map View. <i>The selected PUMA highlights in the PUMA list and in the Map View.</i></p> 
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Step 3	<p>Activate the Select Features by Geography window to open the Select by Geography window and select either Census Tracts or County.</p>  <p>In this example, since we want to modify the boundary of PUMA 00100 to include two census tracts in northeast Marion County, choose Census Tracts.</p>
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Step	Action and Result(s)								
Step 4	<p>Use the mouse to select the two census tracts currently assigned to PUMA 01400 in northeast Marion County (as highlighted from the 2010 PUMA by a pink border). Once selected, choose the Add Area button from the toolbar in the Modify Area Feature window to add the census tracts to PUMA 00100.</p>  <p>The screenshot shows the 'Modify Area Feature' window with the following details:</p> <ul style="list-style-type: none"> Geography: Public Use Microdata Areas Action: Boundary Change Toolbar: The 'Add Area' button (green plus sign) is highlighted with a red box. Info Panel: <table border="1"> <thead> <tr> <th>State</th> <th>Info</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>01-00100-Lauderdale, Colbert, Franklin & Marion (Northeast) Counties</td> </tr> <tr> <td>01</td> <td>01-01400-Walker, Marion (South & West), Fayette & Lamar Counties</td> </tr> <tr> <td>01</td> <td>01-02500-Houston, Dale, Geneva & Henry Counties - Dothan City</td> </tr> </tbody> </table> 	State	Info	01	01-00100-Lauderdale, Colbert, Franklin & Marion (Northeast) Counties	01	01-01400-Walker, Marion (South & West), Fayette & Lamar Counties	01	01-02500-Houston, Dale, Geneva & Henry Counties - Dothan City
State	Info								
01	01-00100-Lauderdale, Colbert, Franklin & Marion (Northeast) Counties								
01	01-01400-Walker, Marion (South & West), Fayette & Lamar Counties								
01	01-02500-Houston, Dale, Geneva & Henry Counties - Dothan City								

Step	Action and Result(s)
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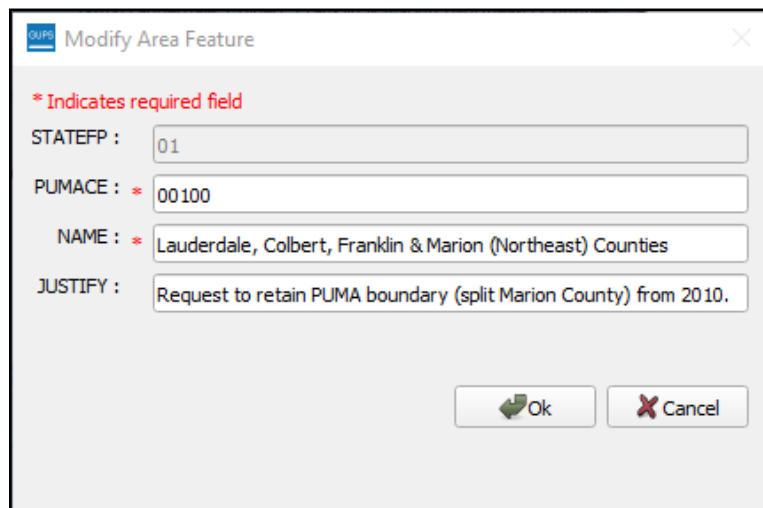
The resulting modification produces a warning message for partial county coverage. Choose **Yes** to continue or **No** to close the window and cancel the modification.

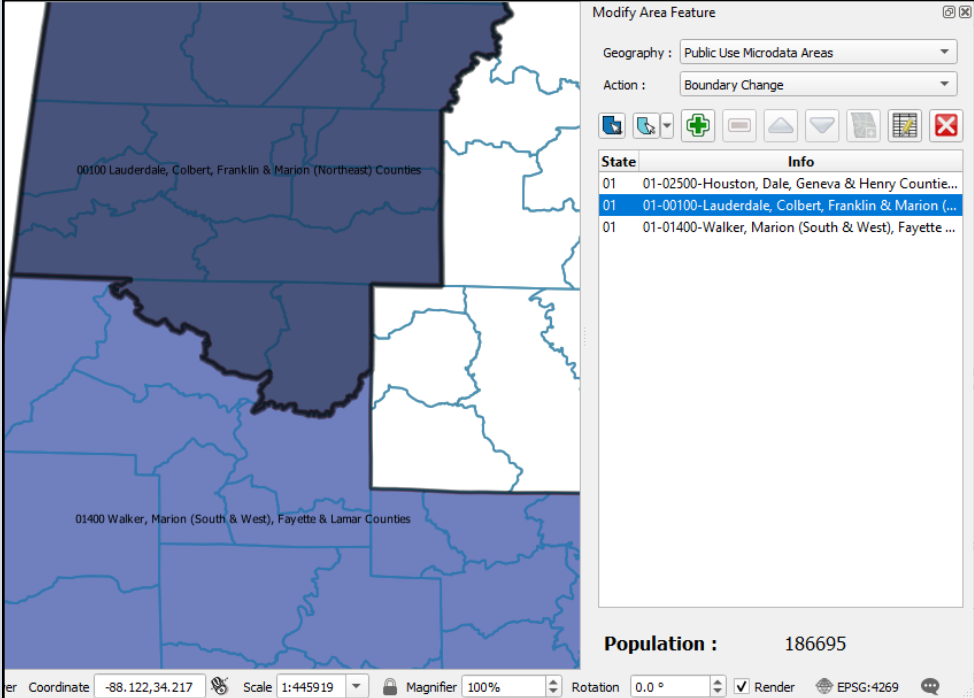


Step 5

In this example, the two census tracts have a population less than 10,000. Because these two census tracts were in PUMA 00100 for 2010, the Census Bureau will allow the retention of this split county PUMA if a justification is supplied during the criteria review. Otherwise, participants must add additional census tracts to attain or surpass the 10,000-population requirement (new requirement for 2020).

Rather than waiting to run the PUMA criteria review tool, a justification can be supplied as part of the **Change Attributes** button functionality described in greater detail in the next section.



Step	Action and Result(s)
Step 6	<p>Once complete, the new boundary appears in the project and the population for the PUMA updates (i.e., from 178,841 to 186,695).</p> 

With the modification of a boundary presented, proceed to the next sub-section to learn about modifying the PUMA code and/or name.

4.2.2 Modify a PUMA Code and/or Name

IMPORTANT: Refer to the *2020 PUMA Coding Guidelines* and *2020 PUMA Naming Guidelines* documents located on the [2020 PUMA website](#) for details.

Follow steps 1 and 2 from [Table 8](#) to select the PUMA to modify. To modify the code or name of the PUMA, choose the Change Attributes button, as shown in [Figure 6](#), from the toolbar in the Modify Area Feature window. A secondary Modify Area Feature window appears to change attribution for the code or name of the selected PUMA.

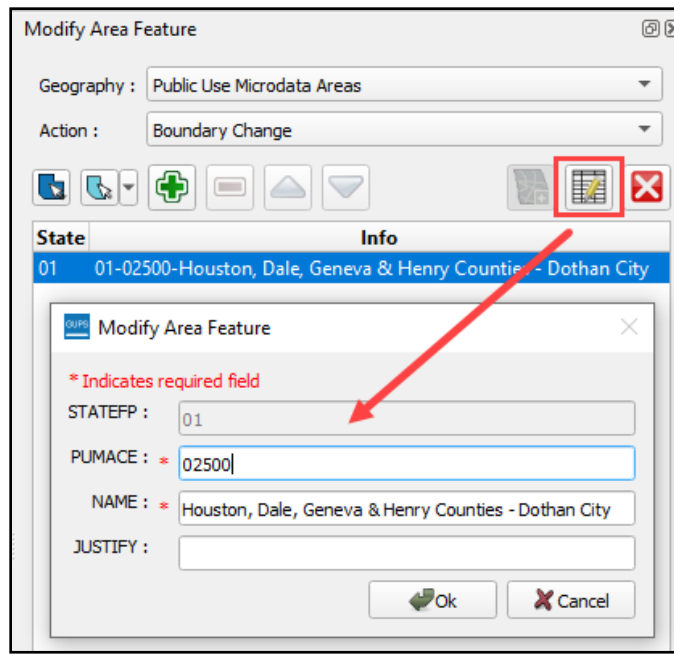


Figure 6: Example of Modifying the Attributes of a PUMA

Edit the code in the PUMACE field and/or the name in the NAME field. Choose OK or Cancel to close the secondary window and return to the previous menu. Save the project using the Save Project button on the Standard toolbar or the Save option beneath the Project tab on the Menu bar.

Note: A justification can be supplied in the **JUSTIFY** field within this window to explain issues with the PUMA that may involve criteria, naming, size, etc. Supplying a justification at this stage will prevent PUMAs that otherwise fail criteria from showing after running the PUMA Criteria Review tool.

4.2.3 Delete a PUMA

Follow steps 1 and 2 from [Table 8](#) to select the PUMA to delete. To delete the PUMA in its entirety, choose the Delete Area Feature button, as shown in [Figure 7](#), from the toolbar in the Modify Area Feature window.

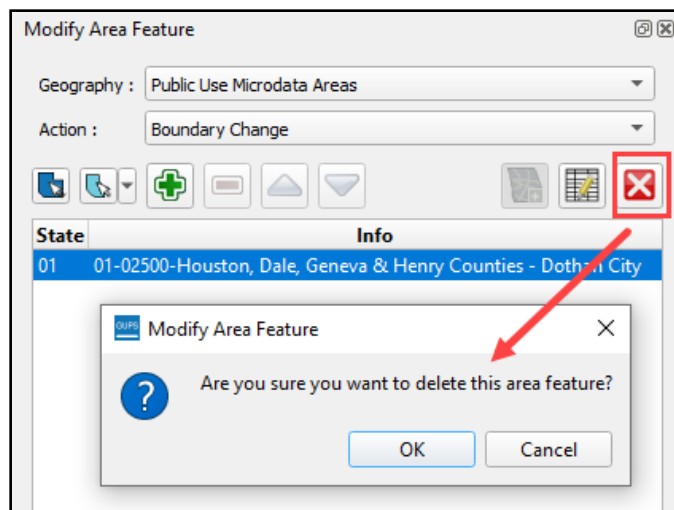


Figure 7: Example of Deleting a PUMA

A Modify Area Feature confirmation window appears to confirm or cancel deletion of the selected PUMA. To delete, choose OK or Cancel to close the confirmation window and return to the previous menu. Save the project using the Save Project button on the Standard toolbar or the Save option beneath the Project tab on the Menu bar.

Note: Participants do not delete a portion of a PUMA. If an area (census tract and/or county) has been assigned to a PUMA incorrectly, it must be reassigned through the Boundary Change action as described in sub-section [4.2.1](#), not deleted or removed from an existing PUMA.

4.3 Export PUMA Delineations


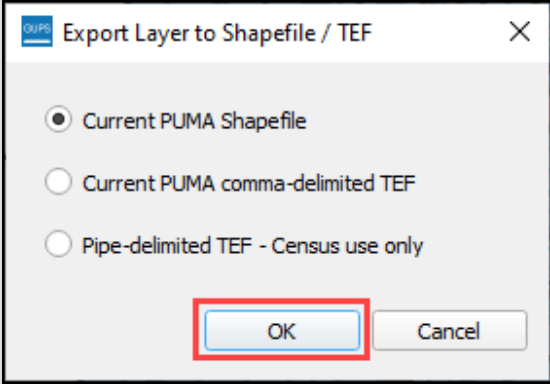
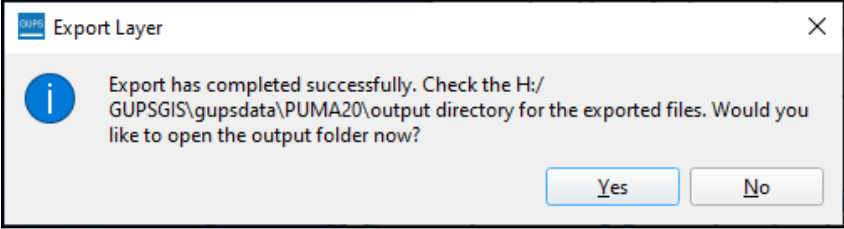
As participants complete their delineation work, they may need or want to export their work to create a shapefile or a tabular equivalency file (TEF). For example, interested data users who are assisting their SDCs with delineation may only be delineating a portion of the state and may need to provide their work to their SDC for inclusion in the state's PUMA project. They use the export options described in this sub-chapter to generate their files to share with their SDC. SDCs receiving files from interested data users must define for interested data user how they wish to receive these exported files (e.g., email, secure FTP, or other manner).

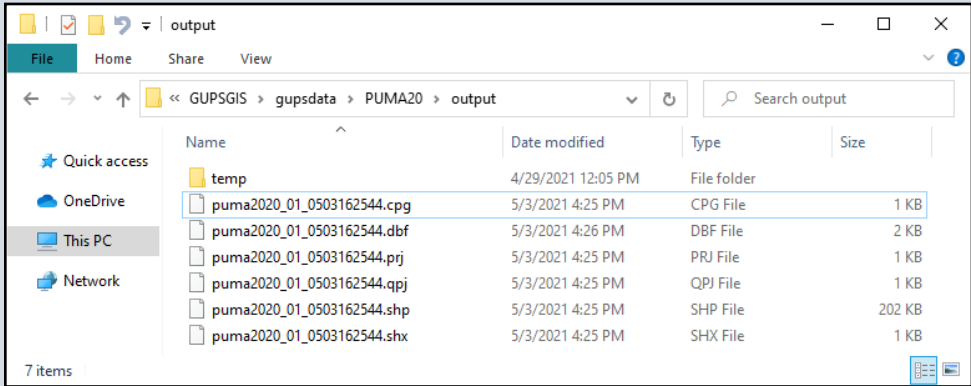

Upon completion of all delineation work, and separate from their submission to the Census Bureau, SDCs are encouraged to closely review their proposed delineations. To do so, SDCs may generate a shapefile of the proposed PUMA geography with the PUMA codes and names or create a text file (i.e., a TEF) of census tracts with the PUMA codes and names for their state. Review the next sub-section for instructions on exporting the delineations to a shapefile. Skip to sub-section [4.3.2](#) for instructions on exporting the delineations to a TEF.

4.3.1 Export to a Shapefile

To export the delineations to a shapefile, follow the steps described in [Table 9](#) below.

Table 9: Steps to Export PUMAs to a Shapefile

Step	Action and <i>Result(s)</i>
Step 1	<p>Select the Export Layer to Shapefile/TEF button from the PUMA toolbar.</p> 
Step 2	<p>From the Export Layer to Shapefile/TEF window that appears, choose Current PUMA Shapefile.</p>  <p>Select OK to proceed or Cancel to return to the Map View.</p>
Step 3	<p>When the export completes, an Export Layer confirmation window appears that lists the location of the exported file and a question to open the output folder.</p>  <p>Select Yes to open the output folder or No to close the window.</p>


Step	Action and Result(s)
Step 4	<p>The selection of Yes opens the <i>GUPSGIS/gupsdata/PUMA20/output</i> folder where the <i>puma2020</i> shapefile is located.</p>  <p>The file name is comprised of the program name (<i>puma2020</i>), the state FIPS code (<i>01</i>), the month (<i>05</i>), date (<i>03</i>), hours (<i>16</i>, or <i>4pm</i>), minutes (<i>25</i>), and seconds (<i>44</i>) in the form of a military timestamp (e.g., <i>puma2020_01_0503162544</i>).</p>
	<p>The shapefile (and all its components) of PUMAs contains PUMA codes and PUMA names can be shared with SDCs as they prepare the whole state’s delineations. SDCs may also choose to export the whole state once all delineation work is complete.</p>

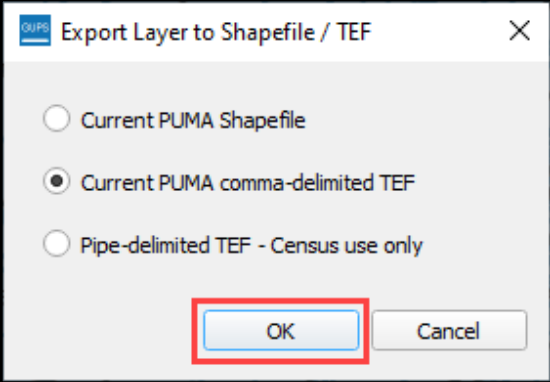

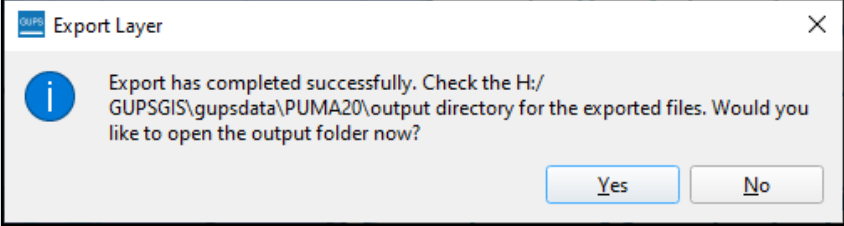
Skip to sub-chapter [4.4](#) for instructions to import this shapefile into a PUMA project or to sub-section [4.4.1](#) to add this shapefile as a reference to an existing PUMA project. Review the next sub-section for instructions on exporting the delineations to a tabular equivalency file.

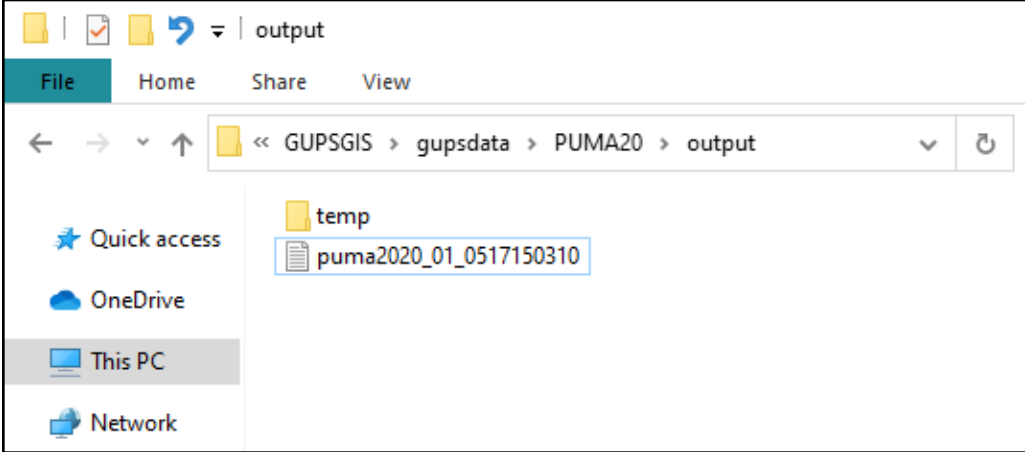
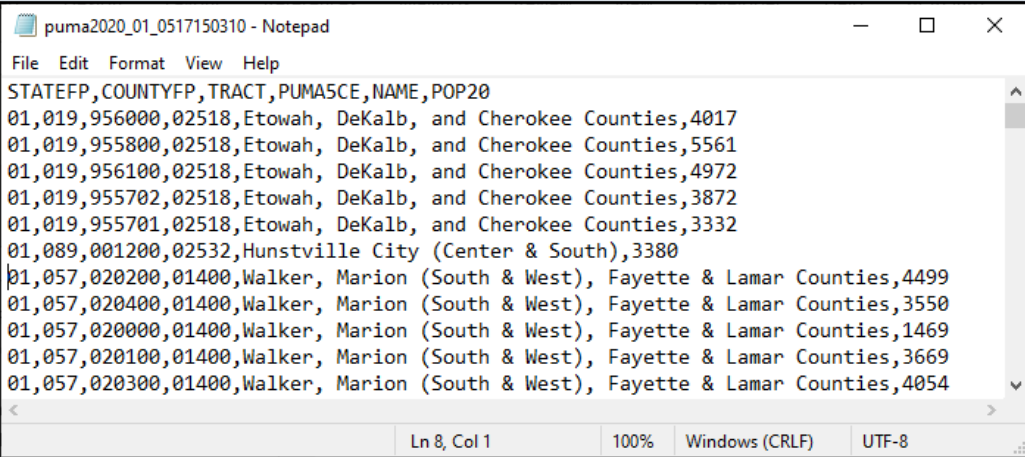

4.3.2 Export to a Tabular Equivalency File

To export the delineations to a tabular equivalency text file, follow the steps in [Table 10](#).

Table 10: Steps to Export PUMAs to a Tabular Equivalency File

Step	Action and Result(s)
Step 1	<p>Select the Export Layer to Shapefile/TEF button from the PUMA toolbar.</p> 

Step	Action and <i>Result(s)</i>
Step 2	<p>From the Export Layer to Shapefile/TEF window that appears, choose Current PUMA comma delimited TEF.</p>  <p>Select OK to proceed or Cancel to return to the Map View.</p>
	<p>GUPS only imports comma-delimited files. The final export option shown above is used by the Census Bureau during their processing of submissions and is not used by participants that intend to use GUPS to import a TEF.</p>
Step 3	<p>When the export completes, an Export Layer confirmation window appears that lists the location of the exported file and a question to open the output folder.</p>  <p>Select Yes to open the output folder or No to close the window.</p>

Step	Action and Result(s)
Step 4	<p>The selection of Yes opens the <i>GUPSGIS/gupsdata/PUMA20/output</i> folder where the <i>puma2020 tabular equivalency file (.txt)</i> is located.</p>  <p>The file name is comprised of the (puma2020), the state FIPS code (01), the month (05), date (17), hours (15, or 3pm), minutes (03), and seconds (10) in the form of a military timestamp (e.g., puma2020_01_0517150310).</p>
Step 5	<p>To view the file properly, open in Notepad or WordPad.</p> 
	<p>This text file of census tracts, PUMA codes, and PUMA names can be shared with SDCs as they prepare the whole state’s delineations. Additionally, SDCs may also choose to export the whole state once all delineation work is complete.</p>

Skip sub-chapter [4.5](#) to import this TEF into a PUMA project. Review the next sub-section for instructions on exporting the entire PUMA project to share with another participant.

4.3.3 Export to Share Entire PUMA Project


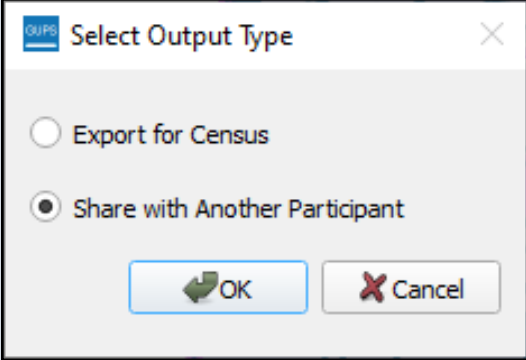
For participants that wish to share their PUMA project with others, perhaps their supervisor or other colleagues in their office or with the SDC, they may use Export to Zip – Share with Another Participant. When used, the entire project is organized and zipped for importing into another GUPS session. Exporting the entire GUPS project permits another person to review the delineations prior to finalizing them for submission. Often staff in the same office use this tool

as a mechanism to conduct their own review of the work performed by another person. Depending on the size of the state and number of PUMAs, this can be a lengthy, time-consuming export task.

Refer to [Table 11](#) for instructions on completing this task.

Note: This exported file cannot be used in conjunction with an existing PUMA project for reference. It becomes the PUMA project when imported.

Table 11: Steps to Export the PUMA Project to Share with Another Participant

Step	Action and Result(s)
Step 1	<p>With the PUMA project open, select the Export to Zip button on the PUMA toolbar.</p> 
Step 2	<p>The <i>Select Output Type</i> window appears. Select the Share with Another Participant option.</p>  <p>Choose the OK button to continue. Be patient. The export process takes time to prepare the file.</p>

4.4 Delineate from a Shapefile


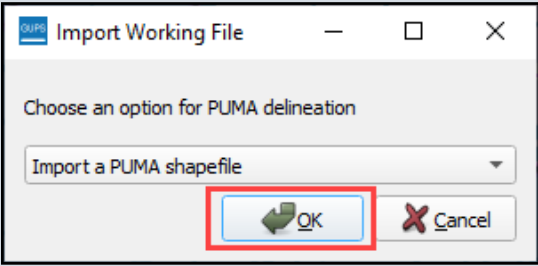
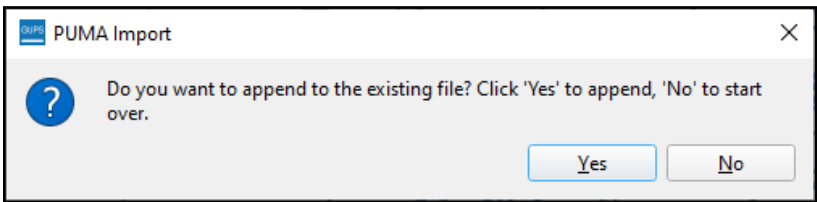

This sub-chapter is written from the perspective of a SDC who has received delineation assistance from other interested data users and needs to import their work; however, other participants may use this option for PUMA delineation. One example of this situation may be a Council of Governments that is working with a major city to delineate PUMAs within their city. The city may wish to provide an exported shapefile to the Council of Governments. The procedures described in the table below remain the same regardless of who is using the tool.

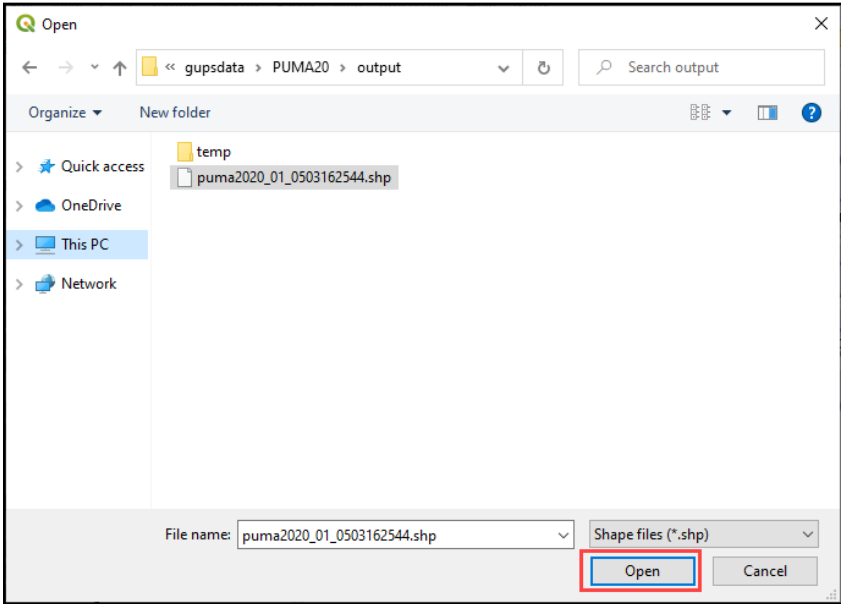
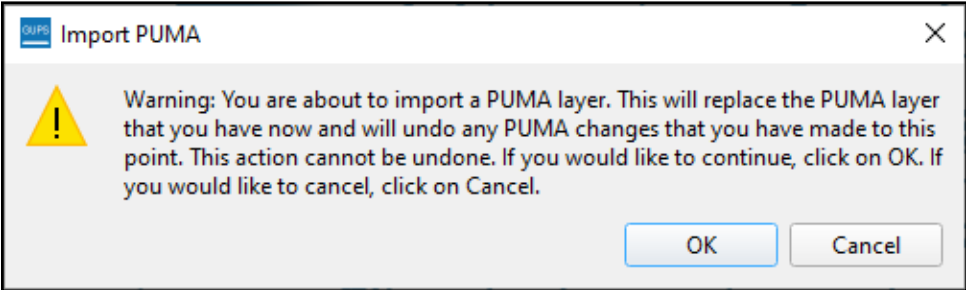

Participants that exported their delineation work from GUPS as a shapefile using the Export Layer to Shapefile/TEF button or those that created their PUMAs in their own GIS may provide their shapefile to the SDC for consideration and inclusion in the state's PUMA project. SDCs use the Import Working File button from the PUMA toolbar to import the work from others into their PUMA project.

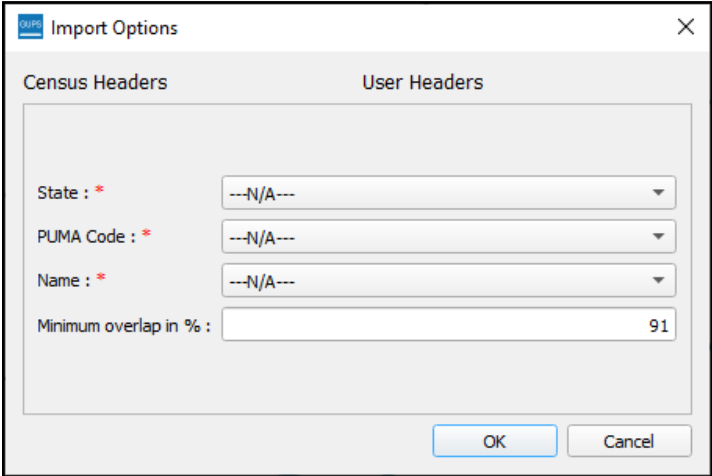
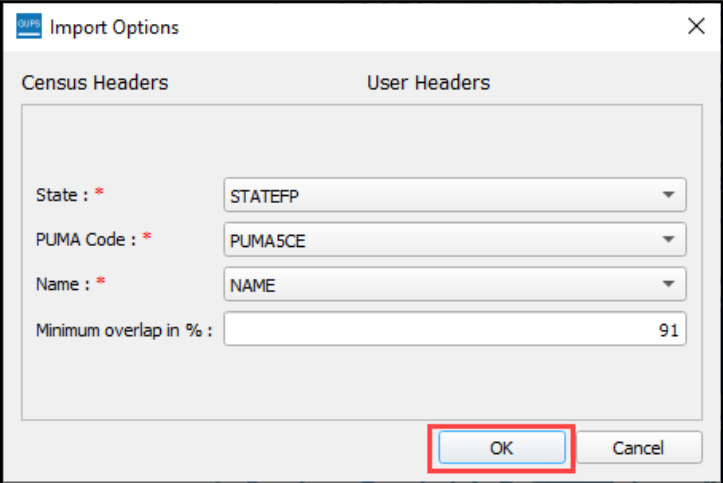
SDCs are encouraged to conduct a review the PUMA shapefiles they receive prior to importing them directly into their state's PUMA project. This likely will minimize import failures and prevent unnecessary edits or corrections to the PUMA project. For instructions on adding the shapefiles as a reference, skip to sub-section [4.4.1](#). Once shapefiles are reviewed and deemed acceptable, review the information in [Table 12](#).

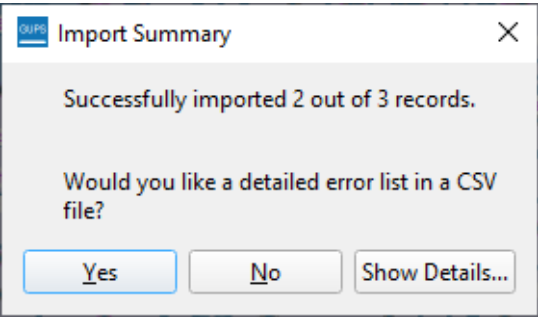
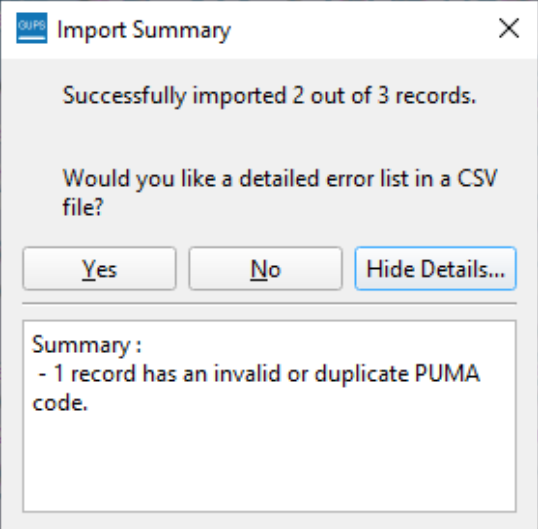
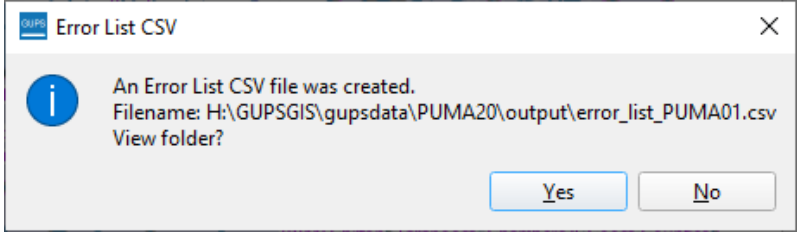
IMPORTANT: Participants that wish to use their own GIS must use the 2021 Partnership shapefiles that have been updated to include the 2020 Census population numbers (POP20 attribute) within the state-based census tract layer (i.e., tracts2020). To confirm use of the correct version, these files will include "PVS_21_v1" in their file name and have an updated date stamp from September 2021. The shapefile of PUMAs must include fields for the two-digit state FIPS code, the five-digit PUMA code, and a PUMA name (maximum of 85-characters). Except for the PUMA name field, all other fields must not omit leading or trailing zeros from their coding.

Table 12: Steps to Import a PUMA Shapefile


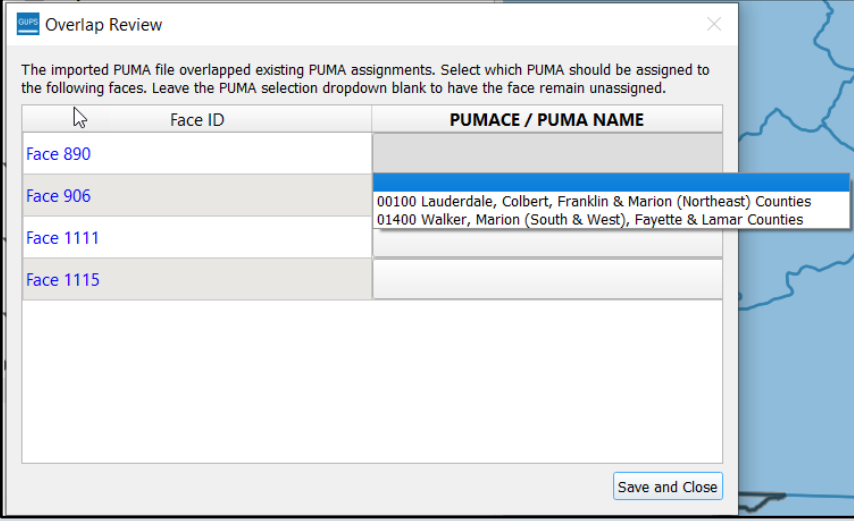
Step	Action and Result(s)
Step 1	<p>With the state’s PUMA project open in GUPS, select the Import Working File button from the PUMA toolbar.</p> 
Step 2	<p>The Import Working File window opens. Choose Import a PUMA shapefile from the drop-down menu of options.</p>  <p>Select OK to continue or Cancel to close the window.</p>
Step 3	<p>The PUMA Import confirmation window appears. Choose Yes to append the shapefile to the existing PUMA project or No to replace the existing project.</p> 
	<p>Choosing No will delete all previously saved delineation work in the existing project.</p>

Step	Action and Result(s)
<p>Step 4</p>	<p>With the selection of Yes, a window opens for the selection of the shapefile. This example uses the shapefile created in Table 9.</p>  <p>Depending how the shapefile was created, the file can be in a variety of locally managed directories/folders. The output folder shown in this location is the default location for files exported from GUPS using the Export Layer to Shapefile/TEF button.</p> <p>With the selection of No, a warning window appears seeking confirmation for the replacement of the existing delineations.</p>  <p>Select OK to continue and navigate to the file location as shown above or Cancel to return to the Map View.</p>
	<p>There is no restoration of any work in the existing PUMA project once OK is selected.</p>

Step	Action and <i>Result(s)</i>
Step 5	<p>Once the file is chosen, an Import Option window appears.</p>  <p>This window is used to select the fields in the shapefile that correspond to the three required fields in the PUMA project to achieve a successful import. The minimum overlap field defaults to 91%. Do not change this percentage.</p>
Step 6	<p>After the selection of the fields, choose the OK button to proceed or Cancel to close the window and begin again.</p> 

Step	Action and Result(s)
	<p>If an error(s) occurs with the import process, an Import Summary window appears with information about the problematic records.</p>  <p>To see more details about the error(s), select the Show Details button to expand the window.</p>  <p>To show less details, select the Hide Details button. Select the Yes button to generate a .csv file of the error(s) or select the No button to close the window without generating the file. This file is useful to discover more about the error(s) since they are not imported into the project.</p>  <p>The errant PUMAs do not import into GUPS. If multiple errors occurred a participant might wish to correct the shapefile and reimport instead of making the updates using GUPS.</p>



Step	Action and Result(s)
	<p>Additionally, if an overlap occurs for a face, the Overlap Review window appears to allow the participant to interactively assign the correct PUMA.</p> 
Step 7	To work interactively in GUPS to add the PUMAs that were not imported from the shapefile, select the Modify Area Feature button from the PUMA toolbar and follow the steps described in sub-chapter 4.2
Step 8	Save the project using the Save Project button on the Standard toolbar or the Save option beneath the Project tab on the Menu bar .

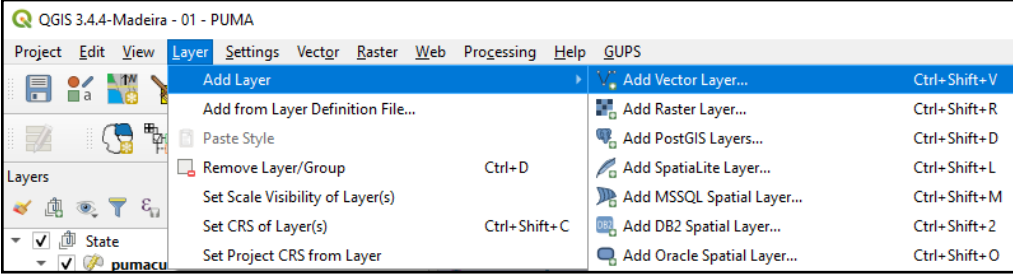
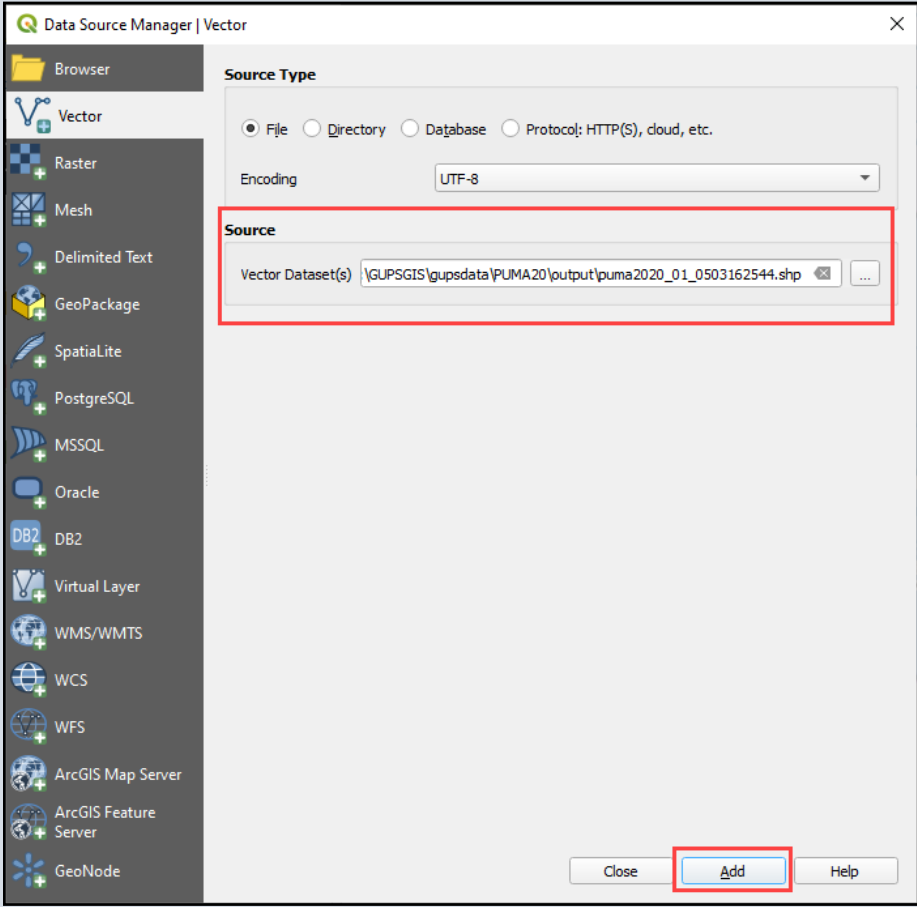
If the delineation work for the state is complete, proceed to [Chapter 5](#) for guidance on performing quality checks and criteria review. If delineation work remains, continue delineating interactively in GUPS by using the Modify Area Feature button, or by importing additional shapefiles or PUMA tabular equivalency files, as described in the sub-chapter [4.5](#).

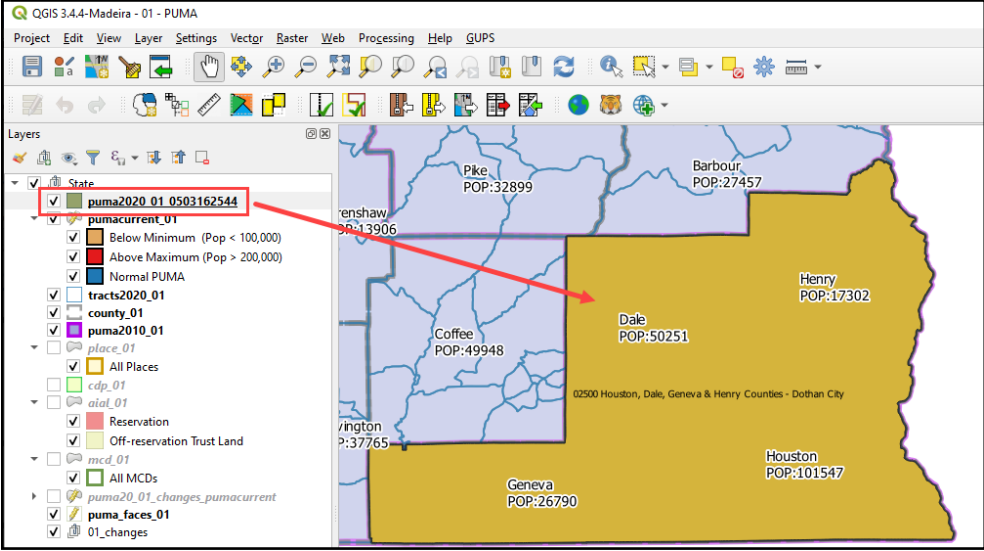
4.4.1 Add a PUMA Shapefile as a Layer for Reference

As mentioned in the beginning of this sub-chapter, prior to importing a PUMA shapefile into the project and appending or overwriting existing delineation work, SDCs (or other participants that are sharing files) may wish to add a PUMA shapefile as a layer for reference. This action may apply to participants that generated PUMAs using their own GIS or to those that may want to review multiple delineation proposals for an area. Refer to the steps described in [Table 13](#) for instructions on adding a PUMA shapefile as a reference layer.

Note: Use these same steps outlined below to add other reference layers (e.g., a shapefile of the state’s regional planning district/council of government boundaries, a locally generated shapefile of roads, a locally generated shapefile of PUMAs using the 2010 census tracts, etc.) that may be helpful during delineation.

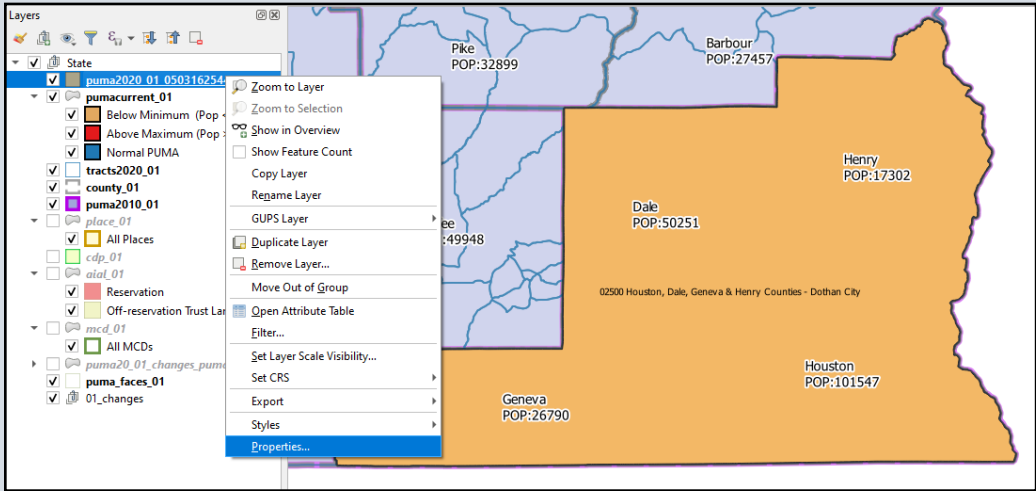
Table 13: Steps to Add a PUMA Shapefile for Reference

Step	Action and Result(s)
Step 1	<p>With the state’s PUMA project open in GUPS, select Layer → Add Layer → Add Vector Layer from the Menu bar.</p>  <p>The screenshot shows the QGIS 3.4.4-Madeira interface. The 'Layer' menu is open, and the 'Add Layer' sub-menu is selected. Within 'Add Layer', the 'Add Vector Layer...' option is highlighted. Other options in the 'Add Layer' sub-menu include 'Add from Layer Definition File...', 'Paste Style', 'Remove Layer/Group', 'Set Scale Visibility of Layer(s)', 'Set CRS of Layer(s)', and 'Set Project CRS from Layer'. The 'Layers' panel on the left shows the 'State' layer selected.</p>
Step 2	<p><i>A Data Source Manager Vector window appears.</i></p>  <p>The screenshot shows the 'Data Source Manager Vector' dialog box. The 'Source Type' is set to 'File'. The 'Encoding' is set to 'UTF-8'. The 'Source' field contains the path: '\\GUPSGIS\gupsdata\PUMA20\output\puma2020_01_0503162544.shp'. The 'Add' button at the bottom right is highlighted with a red box.</p> <p>Navigate to the folder where the PUMA shapefile is located to add as a reference in the Source field and select Add.</p>

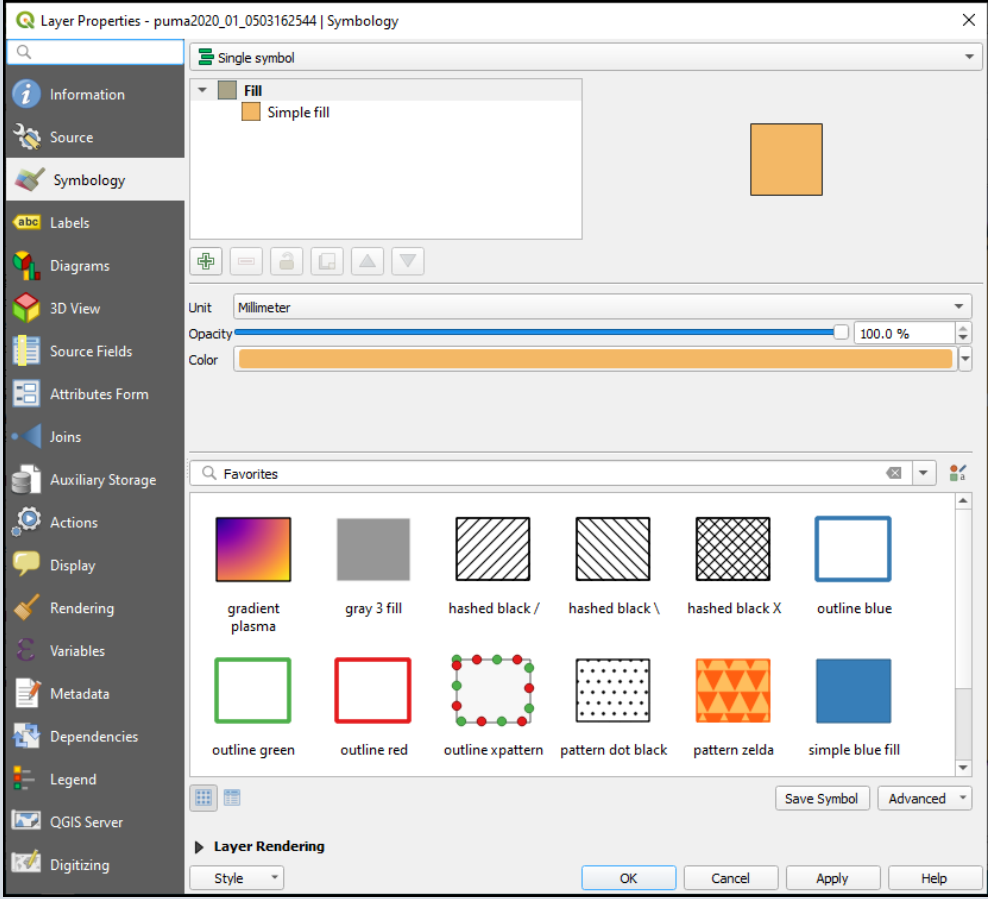
Step	Action and Result(s)
Step 3	<p data-bbox="354 226 1144 262"><i>The shapefile is added to the PUMA project and displays in the Map View.</i></p>  <p data-bbox="354 842 1396 934">The layer's placement in the Table of Contents will affect how it overlays with the other layers in the project. In this example, the added layer is the first/top layer, so it overlays all the other layers present in the project.</p>

Step	Action and Result(s)
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Participants can modify the properties of the layer by selecting the layer in the Table of Contents and using the right mouse button to open Properties for the layer.



This opens the **Layer Properties** window. Within this window modifications can be made to various default properties set for the added layer.



Participants may also “drag and drop” the layer into a different location within the Table of Contents to change the placement of the layer within the project. These visibility tips and others are described in further detail within sub-appendix **C3**.

Return to [Table 12](#) for instructions on importing a shapefile into the PUMA project.

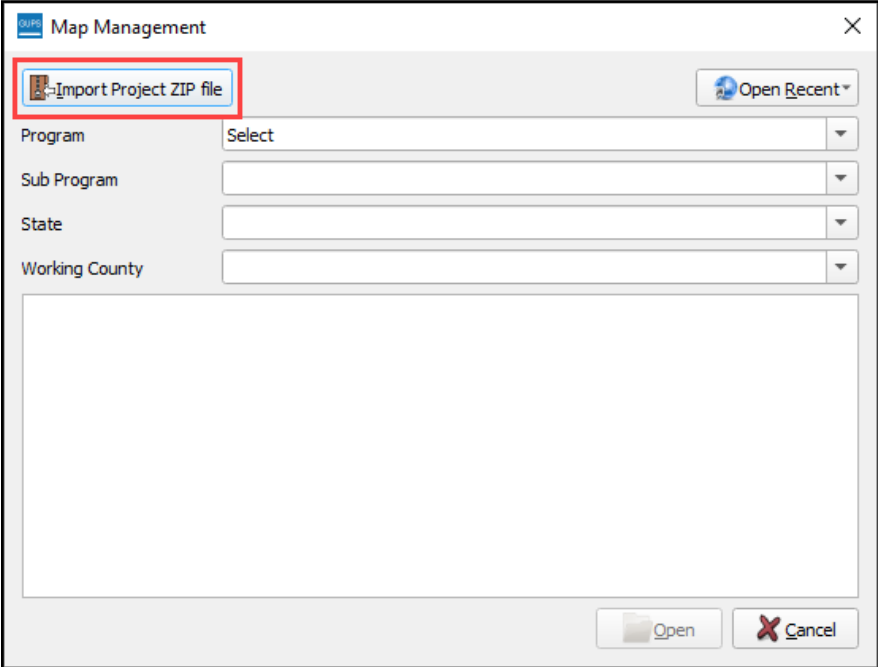
4.4.2 Import a State’s PUMA Project

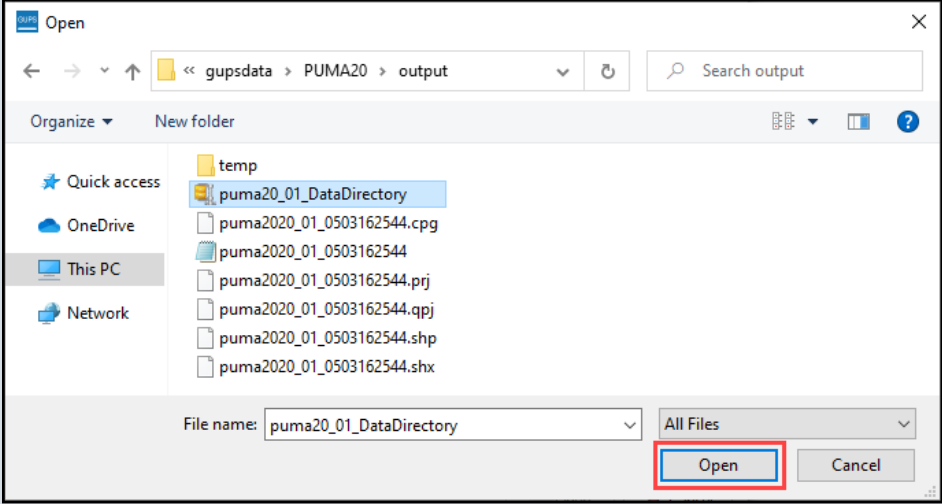

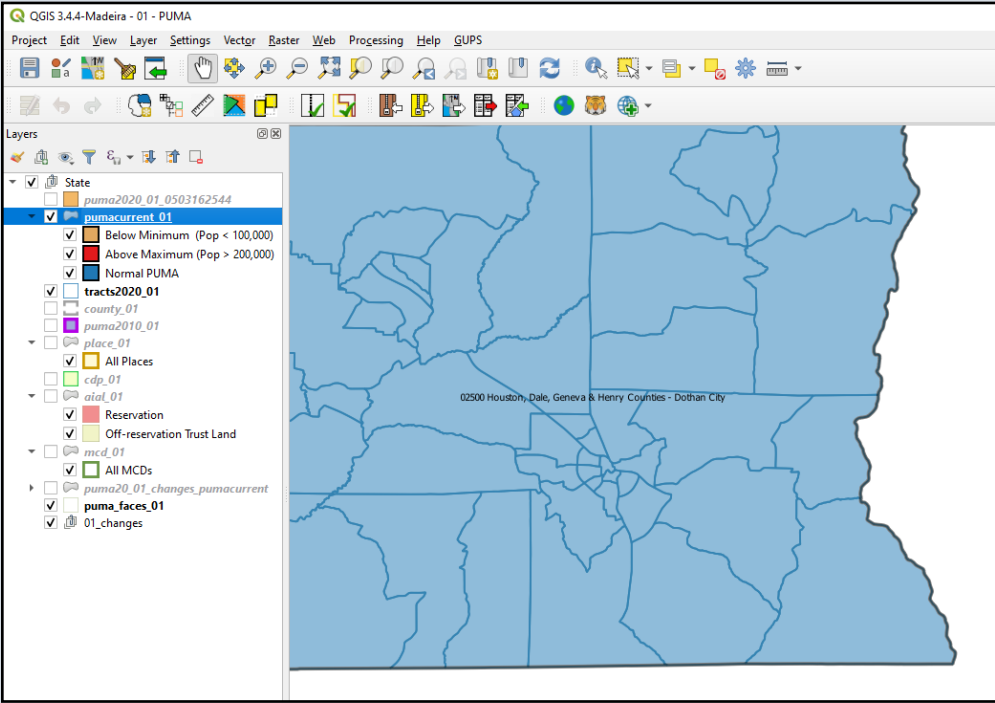
As outlined in sub-section [4.3.3](#), participants can import an entire PUMA project exported from GUPS as a means of reviewing or performing their own quality checks on the delineation work. This functionality may assist supervisors in reviewing work performed by their staff, or it may be used by SDCs to import a completed project to serve as the state’s submission.


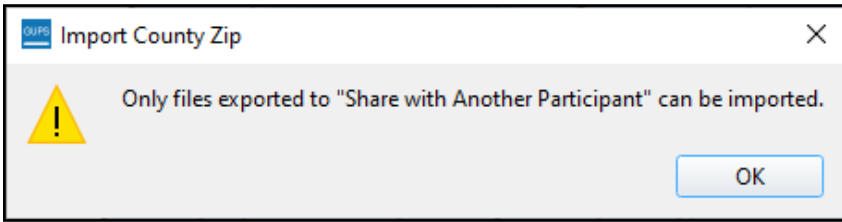
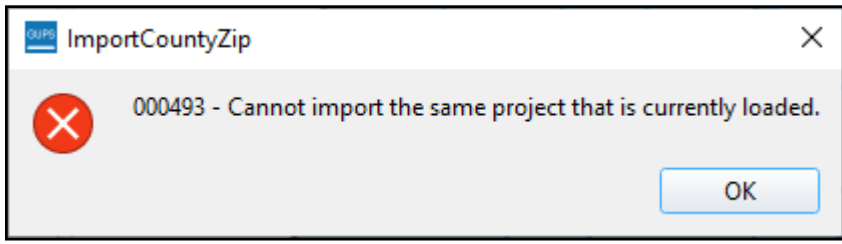
The Census Bureau recommends participants clean their project or PUMA program from GUPS if any work has been completed for the state. This ensures a successful import. Review [Appendix E](#) for instructions on using the Clean button from the Standard toolbar.

Follow the steps in [Table 14](#) for instructions on importing a state’s PUMA project.

Table 14: Steps to Import a State PUMA Project for Reference

Step	Action and Result(s)
Step 1	<p>Open in GUPS, choose the Import Project ZIP file button from the Map Management window.</p> 

Step	Action and Result(s)
Step 2	<p>Navigate to the folder from step 3 in Table 11 and select the .zip file with “DataDirectory” as part of its file name.</p>  <p>Select Open to proceed or Cancel to return to the Map View.</p>
	<p>Other files may exist within the output folder, but this tool only imports the .zip file exported from GUPS using the Export to Zip – Share with Another Participant tool, with the specific file name.</p>
Step 3	<p><i>Once imported, the Table of Contents is populated with the layers from the exported .zip file and the Map View is symbolized accordingly.</i></p>  <p>The project will open to the exact scale and position the Map View was in during export. The participant can proceed with reviewing the delineations and making modifications as needed using the Modify Area Feature tool described earlier in sub-chapter 4.2.</p>

Step	Action and Result(s)
	<p>As a reminder, GUPS only imports .zip files that are exported from its software using Export to Zip – Share with Another Participant. If a participant changes the default file name of the exported file or attempts to import other shapefiles, <i>the following error message appears.</i></p>  <p>Additionally, a participant cannot import a shared .zip file into a project that is open. <i>If so, the following error message appears.</i></p>  <p>GUPS bundles the entire project during the export process, so the imported .zip file becomes the state’s PUMA project. It’s not the same as adding a shapefile for reference.</p>

Proceed to the next sub-chapter for information on the final option for delineation, delineating PUMAs from a tabular equivalency file.

4.5 Delineate from a Tabular Equivalency File

This sub-chapter is written from the perspective of a SDC who has received delineation assistance from other interested data users and needs to import their work; however, other participants may use this option for PUMA delineation. One example of this situation may be a Council of Governments that is working with a major city to delineate PUMAs. The city may wish to provide an exported text file to the Council of Governments. The procedures described in the table below remain the same regardless of who is using the tool.

Participants that exported their delineation work from GUPS as a TEF using the Export Layer to Shapefile/TEF button or that prepared a comma-delimited spreadsheet/list of the 2020 census tracts with the PUMA codes and names may provide their text file to the SDC for consideration and inclusion in the state’s PUMA project. SDCs use the Import Working File button from the PUMA toolbar to import the work from others into their PUMA project.

SDCs are encouraged to review the text files they receive of proposed PUMAs prior to importing them directly into their state’s PUMA project. This will minimize import failures and prevent unnecessary edits or corrections to the PUMA project. A review can be conducted in Notepad, WordPad, or other spreadsheet software.

IMPORTANT: Participants that wish to use their own file of census tracts must ensure use of the 2020 census tract information, not census tracts from previous decades. The text file must be comma-delimited and must include fields for the two-digit state FIPS code, three -digit county FIPS code, six-digit 2020 census tract code (without decimal for suffix), five-digit PUMA code, and a PUMA name field (maximum of 85-characters). Except for the PUMA name field, all other fields must not omit leading or trailing zeros from their coding. Formatting the fields as “Text” maintains leading and trailing zeros that may appear in the data.

See **Figure 8** for an example of the TEF text file, exported from GUPS. In this figure, the Alabama state FIPS code is 01. Fayette County is 057. One of the census tracts assigned to PUMA 01400 is 020200. The POP20 field is not a requirement for importing, but is exported from GUPS when using the Export Layer to Shapefile/TEF button.

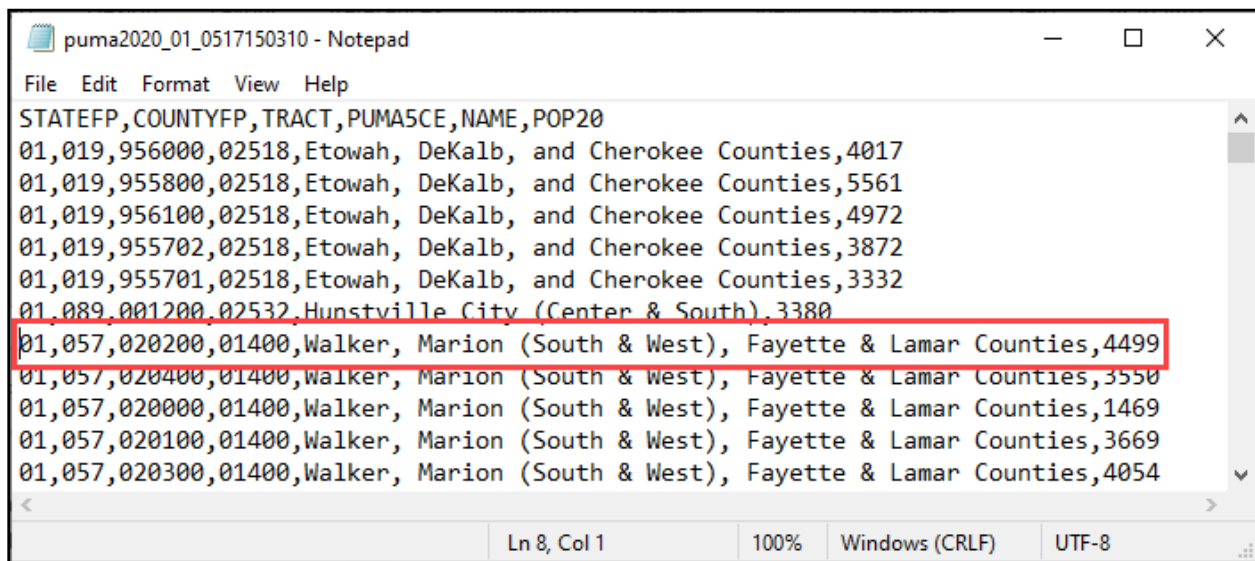

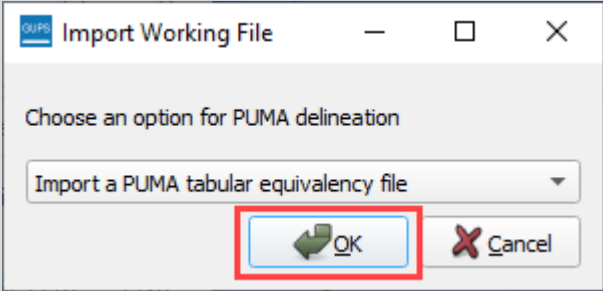
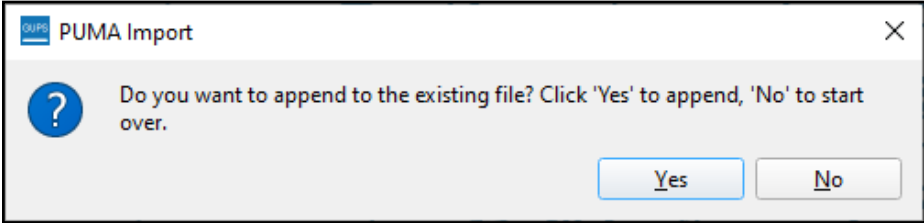



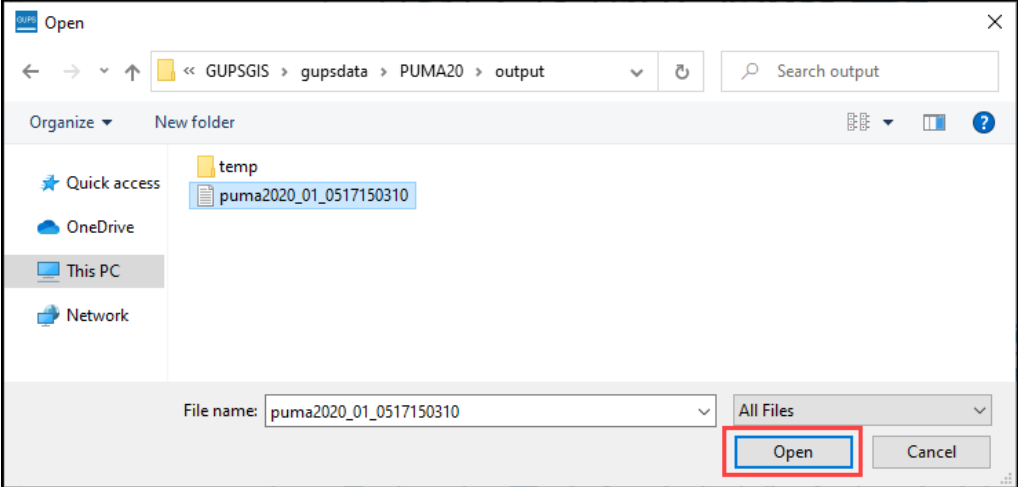
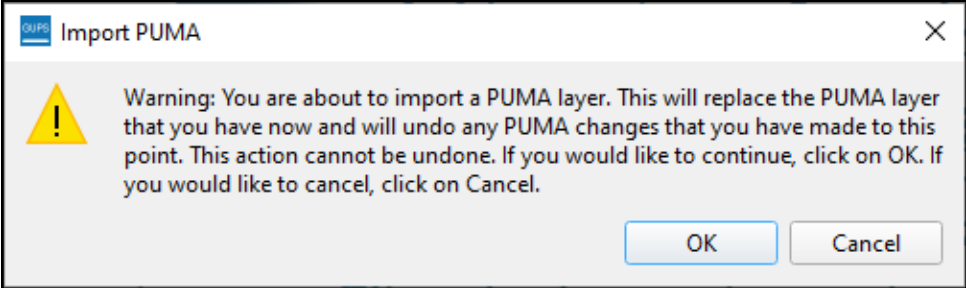

Figure 8: Example of a PUMA Tabular Equivalency File in Notepad

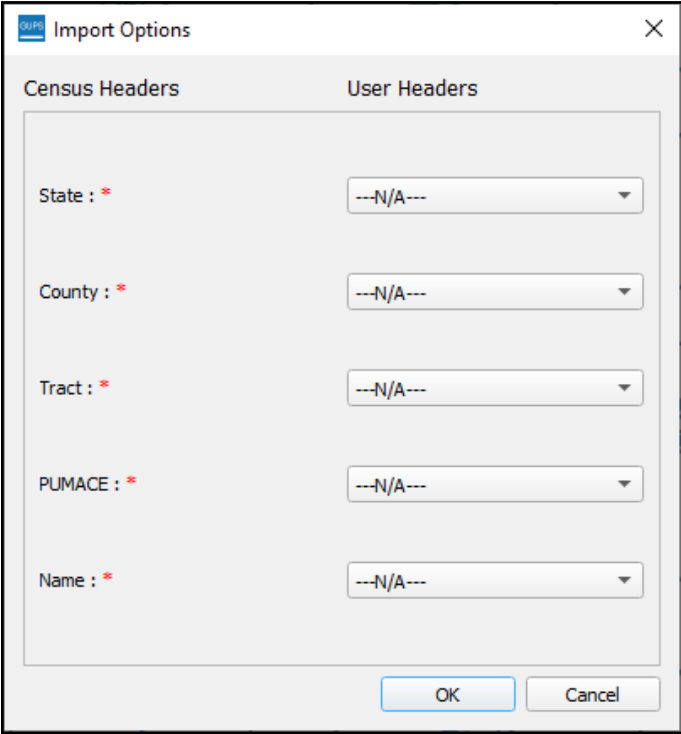
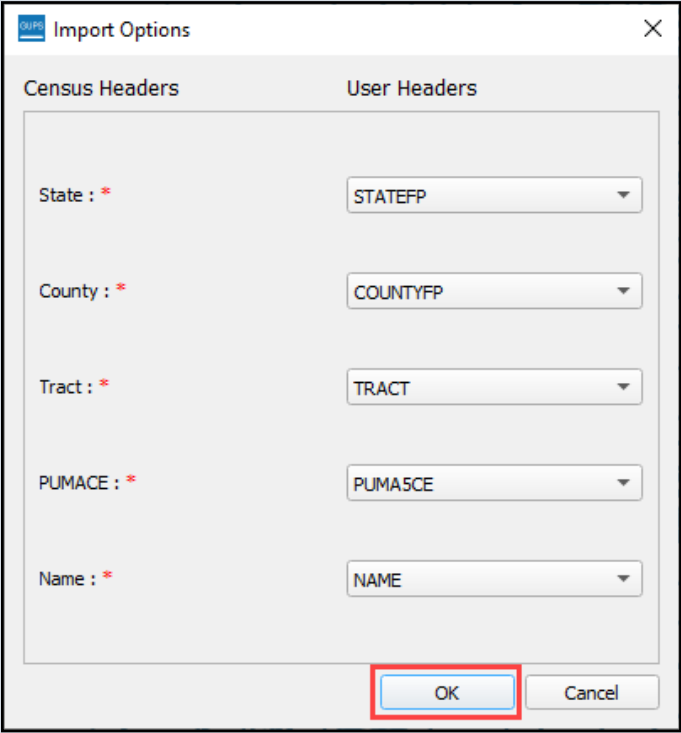
Follow the instructions in **Table 15** for steps to import this file into GUPS.

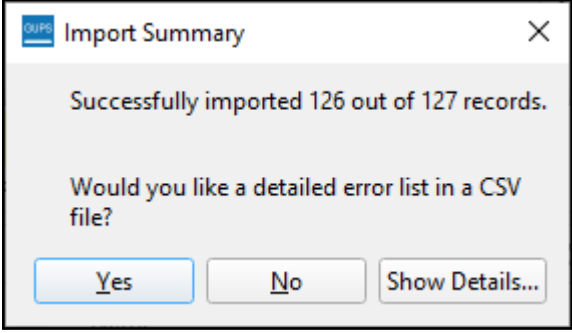
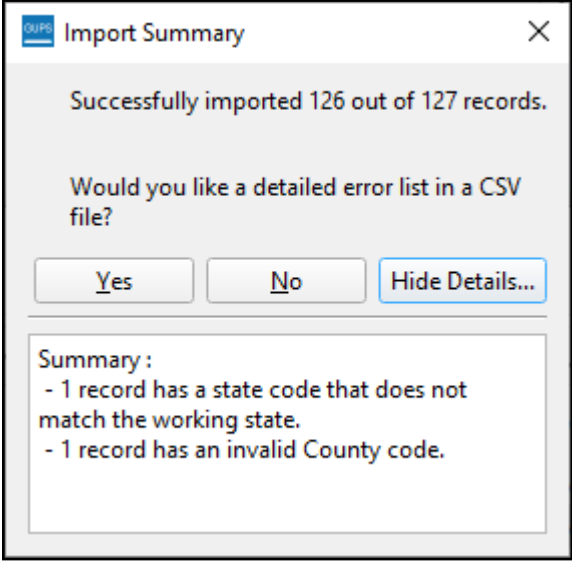
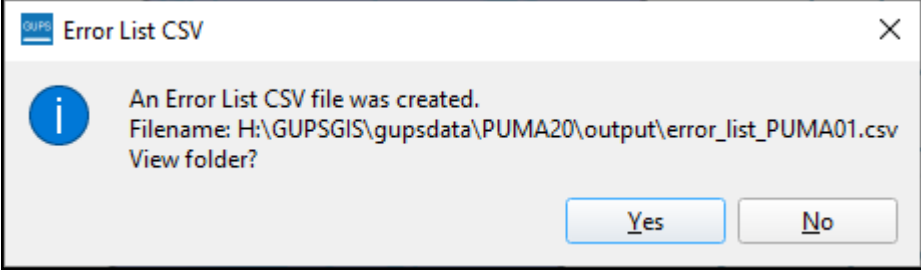
Table 15: Steps to Import a PUMA Tabular Equivalency File

Step	Action and <i>Result(s)</i>
Step 1	<p>With the state’s PUMA project open in GUPS, select the Import Working File button from the PUMA toolbar.</p> 


Step	Action and <i>Result(s)</i>
Step 2	<p>The Import Working File window opens. Choose Import a PUMA tabular equivalency file from the drop-down menu of options.</p>  <p>Select OK to continue or Cancel to close the window.</p>
Step 3	<p>The PUMA Import confirmation window appears. Choose Yes to append the TEF to the existing PUMA project or No to replace the existing project with the contents of the TEF.</p> 
	<p>Choosing No will delete all previously saved delineation work in the existing project.</p>

Step	Action and Result(s)
<p>Step 4</p>	<p>With the selection of Yes, a window opens for the selection of the TEF. This example uses the TEF created in Table 10.</p>  <p>Depending how the TEF was created, the file can be in a variety of locally managed directories/folders. The output folder shown in this location is the default location for files exported from GUPS using the Export Layer to Shapefile/TEF button.</p> <p>With the selection of No, a warning window appears seeking confirmation for the replacement of the existing delineations. There is no restoration of any work in the project once OK is selected.</p>  <p>Select OK to continue and navigate to the file location as shown above or Cancel to return to the Map View.</p>
	<p>There is no restoration of any work in the existing PUMA project once OK is selected.</p>

Step	Action and Result(s)
Step 5	<p>Once the file is chosen, an Import Option window appears.</p>  <p>This window is used to select the fields in the file that correspond to the five required fields in the PUMA project to achieve a successful import.</p>
Step 6	<p>After the selection of the fields, choose the OK button to proceed or Cancel to close the window and begin again.</p> 

Step	Action and <i>Result(s)</i>
	<p>If an error(s) occurs with the import process, an Import Summary window appears with information about the problematic records.</p>  <p>To see more details about the error(s), select the Show Details button to expand the window.</p>  <p>To show less details, select the Hide Details button. Select the Yes button to generate a .csv file of the error(s) or select the No button to close the window without generating the file. This file is useful to discover more about the error(s) since they are not imported into the project.</p>  <p>If multiple errors occurred, a participant might wish to correct the TEF and reimport instead of making the corrections using GUPS.</p>
Step 7	<p>To correct the errors interactively in GUPS, to make changes to the correctly imported PUMAs, or to continue working on unassigned geographies select the Modify Area Feature button from the PUMA toolbar and follow the steps described in sub-chapter 4.2.</p>



Step	Action and <i>Result(s)</i>
	<p>Changes that are made to the imported PUMAs launch the Modify Area Feature window to ensure the change is what the participant wants to make.</p> <div data-bbox="576 310 1177 831" style="border: 1px solid gray; padding: 10px; margin: 10px auto; width: fit-content;"> <p>GUPS Modify Area Feature ✕</p> <p><i>* Indicates required field</i></p> <p>STATEFP : <input type="text" value="01"/></p> <p>PUMACE : * <input type="text" value="02704"/></p> <p>NAME : * <input type="text" value="Southwest Alabama"/></p> <p>JUSTIFY : <input style="border: none; background-color: #f0f0f0; padding: 2px 5px; font-size: small; font-weight: normal; text-decoration: none; color: #333; width: 100%;" type="text" value="No PUMA boundary change since 2010"/></p> <p style="text-align: right; margin-top: 10px;"> <input type="button" value="Ok"/> <input type="button" value="Cancel"/> </p> </div>
Step 8	Save the project using the Save Project button on the Standard toolbar or the Save option beneath the Project tab on the Menu bar .

If the delineation work for the state is complete, proceed to [Chapter 5](#) for guidance on performing quality checks and criteria review. If delineation work remains, continue delineating interactively in GUPS by using the Modify Area Feature button, or by importing additional TEFs or shapefiles, as described in the previous sub-chapter.

CHAPTER 5 CONDUCT QUALITY CHECKS AND CRITERIA REVIEW


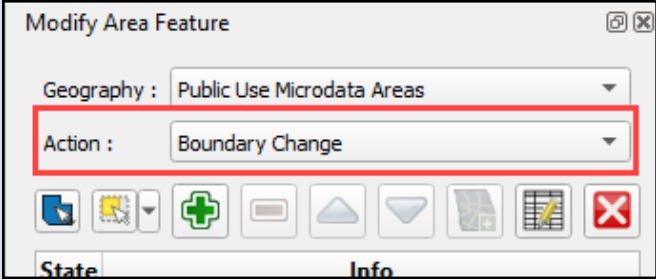
PUMAs must adhere to the finalized criteria and observe the established naming rules. GUPS is programmed to check for finalized criteria and guidelines to ensure the successful delineation of PUMAs. During delineation if a PUMA does not meet the established criteria, GUPS triggers warning messages. For some warnings, GUPS will prevent a participant from continuing, but for other, less critical warnings, participants can proceed, and the problematic PUMAs will reappear for resolution during criteria review, detailed in sub-chapter 5.1.

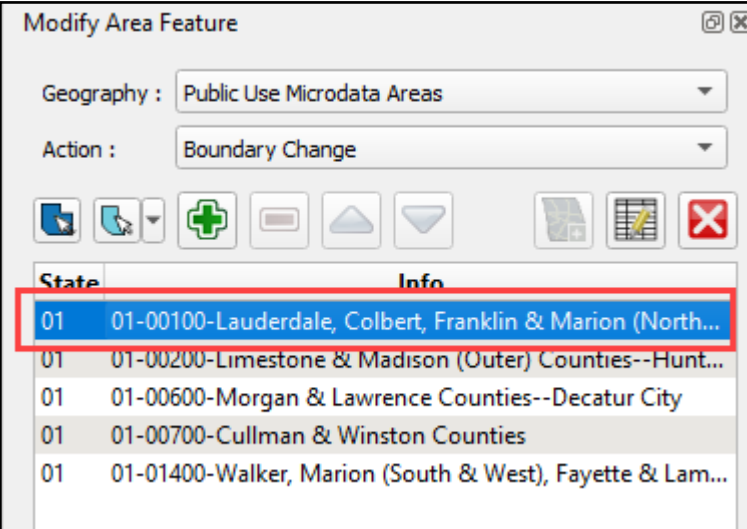
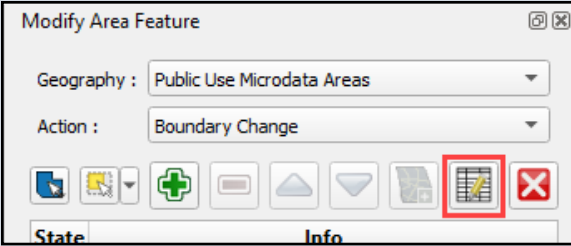
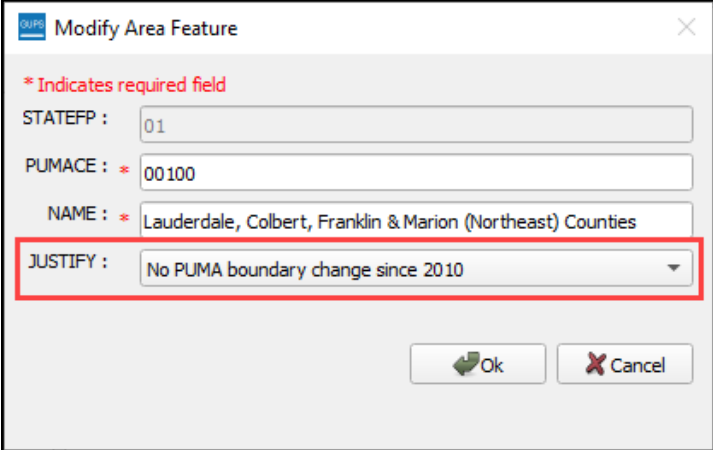
Though GUPS has an integrated criteria review, the Census Bureau recommends all participants conduct basic quality checks for issues that GUPS tools cannot identify. These checks are beneficial prior to executing the PUMA Criteria Review tool. Some basic quality checks include:

- Confirm the name accurately reflects the delineated area and follows the naming guidelines.
- Confirm the name is relative to the geography included within the PUMA.
- For PUMAs covering more than one county/city, confirm the order of name is correct.
- Confirm the name is spelled correctly.
- Confirm the code follows the coding guidelines.
 - Is the PUMA code maintained from previous vintage or new?
- Confirm the justifications provide adequate explanation for the requested exception.
 - PUMAs with justifications supplied during initial delineation will not appear as a criteria failure after executing the PUMA Criteria Review tool; therefore, it is very important to conduct a thorough quality check of each PUMA justification prior to export.

These quality checks are especially important if a participant is providing their suggested delineations to the SDC for inclusion in the state’s PUMA project. The SDC may not be aware of coding and naming preferences of the participant that created the project. To review the codes, names, and justifications, follow the steps outlined in [Table 16](#).

Table 16: Steps to Perform Quality Checks of Names, Codes, and Justifications

Step	Action and Result(s)
Step 1	Select the Modify Area Feature tool from the PUMA toolbar . 
Step 2	From the Modify Area Feature window, confirm the Action field is set to Boundary Change . 

Step	Action and Result(s)												
Step 3	<p>Select a PUMA from the list of PUMAs or in the Map View.</p>  <table border="1" data-bbox="505 541 1248 800"> <thead> <tr> <th>State</th> <th>Info</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>01-00100-Lauderdale, Colbert, Franklin & Marion (North...</td> </tr> <tr> <td>01</td> <td>01-00200-Limestone & Madison (Outer) Counties--Hunt...</td> </tr> <tr> <td>01</td> <td>01-00600-Morgan & Lawrence Counties--Decatur City</td> </tr> <tr> <td>01</td> <td>01-00700-Cullman & Winston Counties</td> </tr> <tr> <td>01</td> <td>01-01400-Walker, Marion (South & West), Fayette & Lam...</td> </tr> </tbody> </table>	State	Info	01	01-00100-Lauderdale, Colbert, Franklin & Marion (North...	01	01-00200-Limestone & Madison (Outer) Counties--Hunt...	01	01-00600-Morgan & Lawrence Counties--Decatur City	01	01-00700-Cullman & Winston Counties	01	01-01400-Walker, Marion (South & West), Fayette & Lam...
State	Info												
01	01-00100-Lauderdale, Colbert, Franklin & Marion (North...												
01	01-00200-Limestone & Madison (Outer) Counties--Hunt...												
01	01-00600-Morgan & Lawrence Counties--Decatur City												
01	01-00700-Cullman & Winston Counties												
01	01-01400-Walker, Marion (South & West), Fayette & Lam...												
Step 4	<p>Select the Change Attribute button.</p> 												
Step 5	<p>A secondary <i>Modify Area Feature</i> window appears.</p>  <p>Review content that appears in the PUMACE, NAME and JUSTIFY fields. Select OK to dismiss the window. The justification shown above is a participant entry, not a pre-selected option.</p>												
Step 6	<p>Repeat steps 3-5 to review each PUMA in the Modify Area Feature window.</p>												

With the quality checks complete, review sub-chapter [5.1](#) for details on the PUMA Criteria Review tool. For interested data users that completed delineation for only part of a state, skip to sub-section [5.1.1](#) for instructions on using the tool on a partially completed state project.

5.1 PUMA Criteria Review Tool


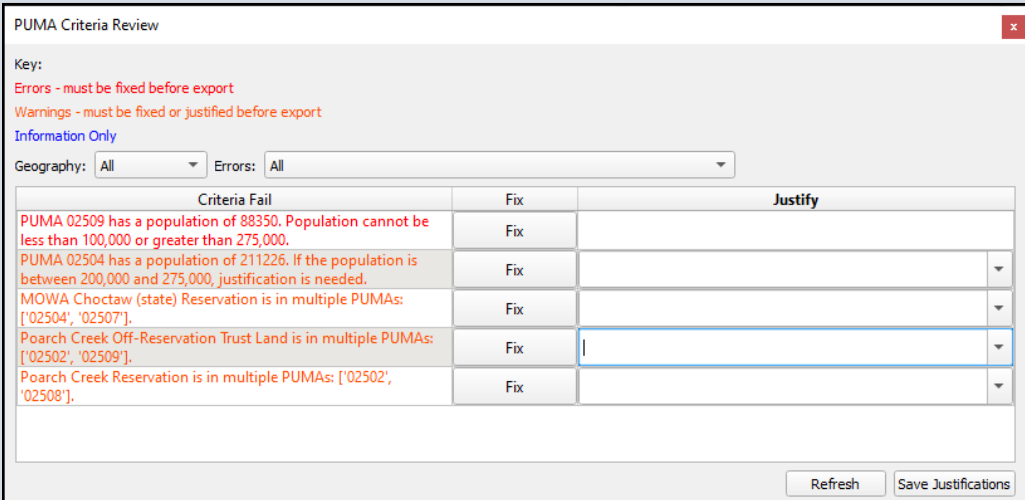
The PUMA Criteria Review tool reviews the PUMA project to confirm the finalized criteria are not violated. This tool will generate a list of failures for review. SDCs must execute the PUMA Criteria Review tool on their state’s PUMA project prior to exporting for submission to the Census Bureau. Follow the steps in [Table 17](#) for details on executing the tool and the options for resolving the failures that appear for a completed PUMA project.


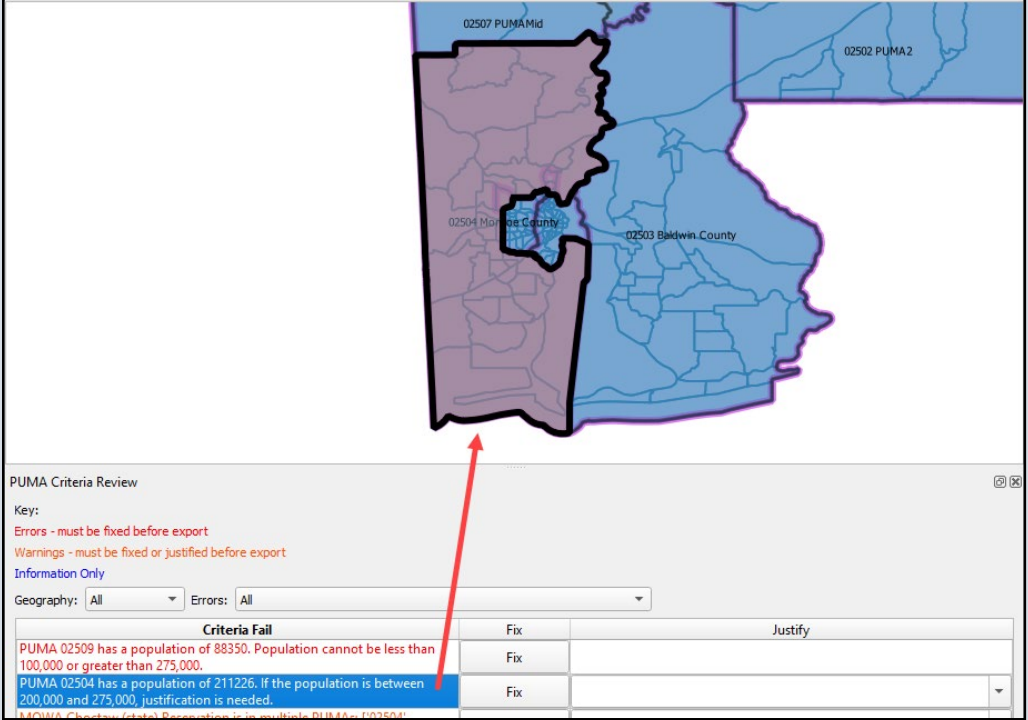
Criteria failures include, but are not limited to, the following:

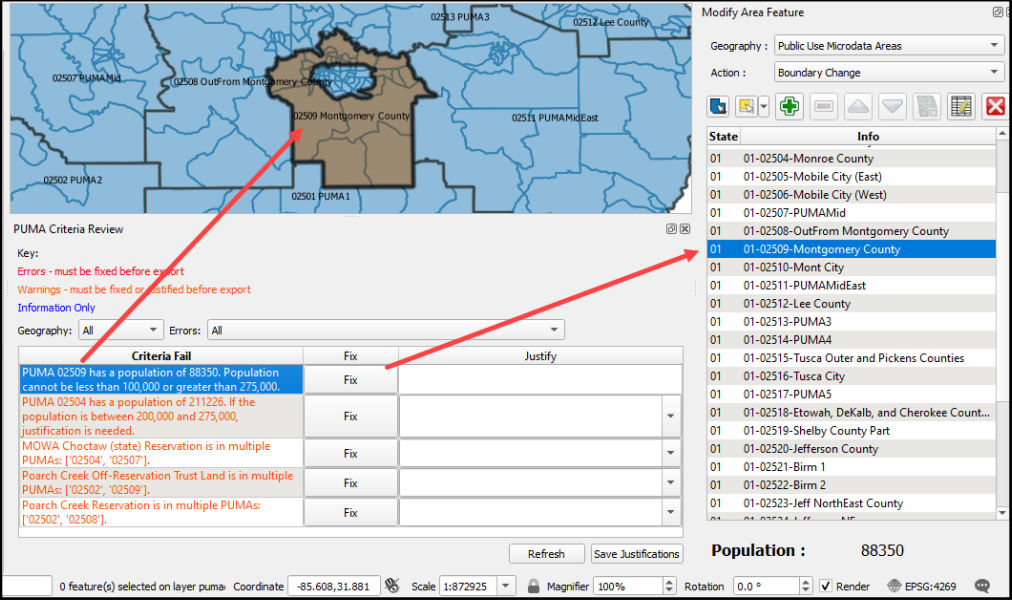

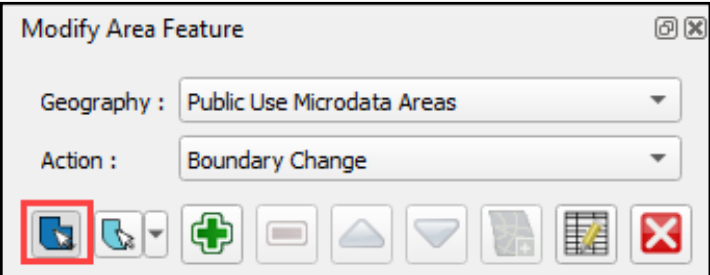
- Unassigned geographies (i.e., no PUMA assigned). These are labeled as “faces” in the review tool.
- PUMAs that fall above/below population threshold requirement.
- PUMAs with overlapping geographies (most common when importing files, not possible with interactive delineation).
- PUMAs with noncontiguous boundaries.
- PUMAs that cross county boundaries with the census tracts having population of less than 10,000.

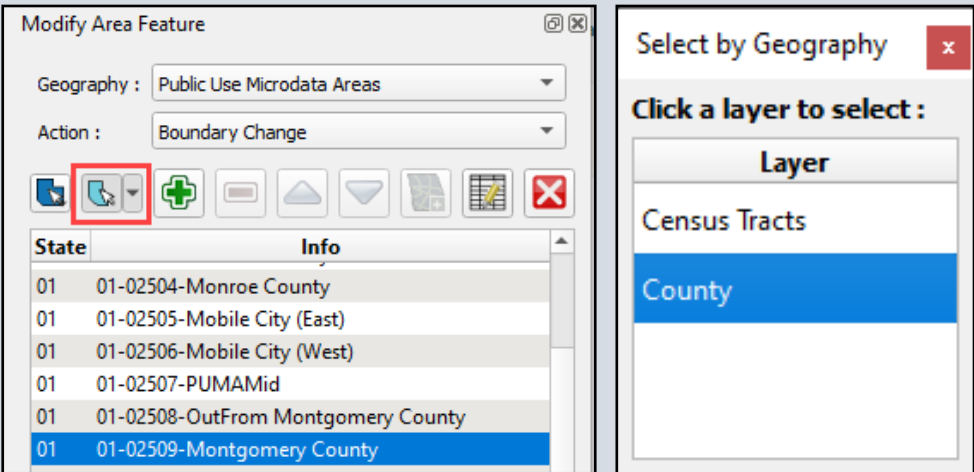
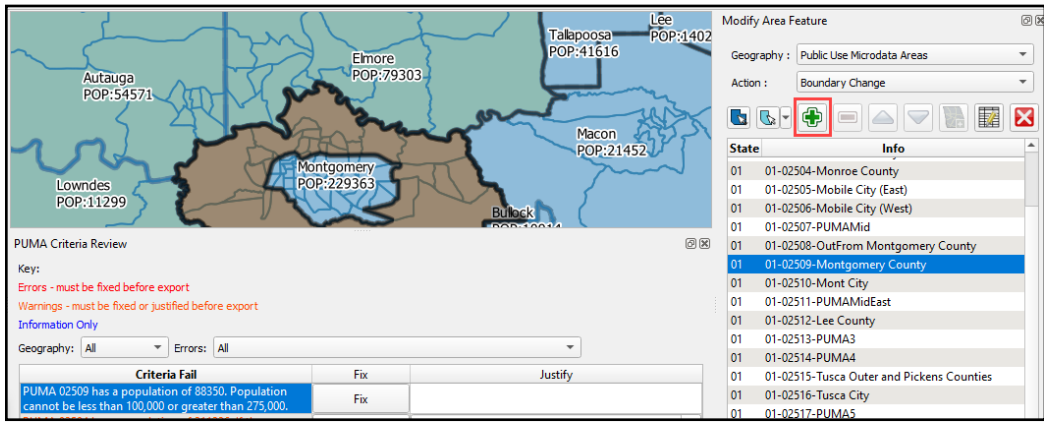

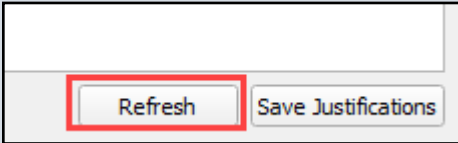
Note: Running the tool on a project that is incomplete will introduce criterial failures for each geography without an assigned PUMA; therefore, the steps in the table are written for a SDC with a completed PUMA project. Skip to sub-section [5.1.1](#) for instructions on using the tool on a partial state project.

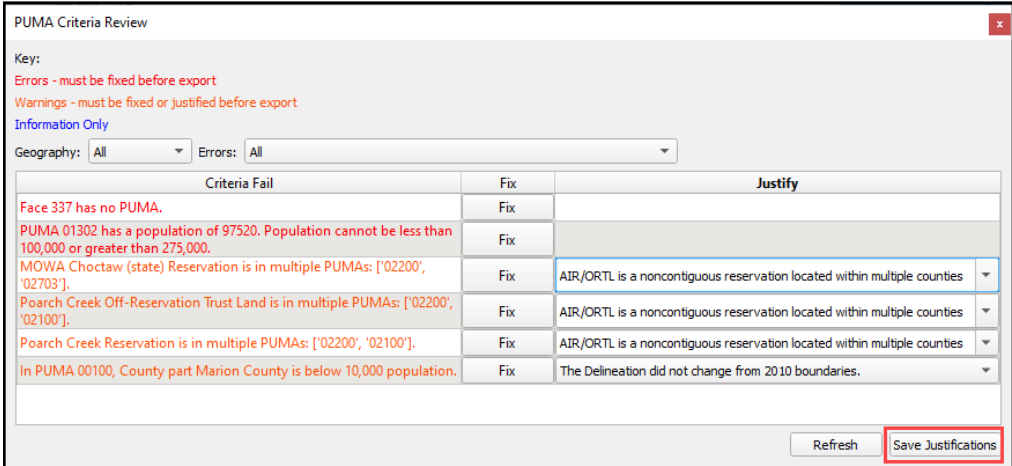
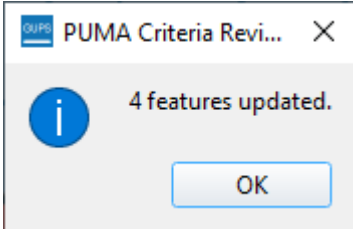

Table 17: Steps to Use the PUMA Criteria Review Tool and to Fix or Justify Failures

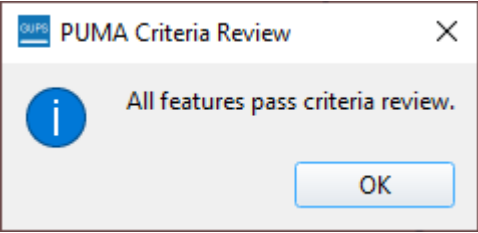
Step	Action and Result(s)																		
Step 1	<p>With the state’s PUMA project open in GUPS, select the PUMA Criteria Review button from the PUMA toolbar.</p> 																		
Step 2	<p><i>The PUMA Criteria Review window appears with the criteria failures listed.</i></p>  <table border="1" data-bbox="365 1570 1377 1791"> <thead> <tr> <th>Criteria Fail</th> <th>Fix</th> <th>Justify</th> </tr> </thead> <tbody> <tr> <td>PUMA 02509 has a population of 88350. Population cannot be less than 100,000 or greater than 275,000.</td> <td>Fix</td> <td></td> </tr> <tr> <td>PUMA 02504 has a population of 211226. If the population is between 200,000 and 275,000, justification is needed.</td> <td>Fix</td> <td></td> </tr> <tr> <td>MOWA Choctaw (state) Reservation is in multiple PUMAs: ['02504', '02507'].</td> <td>Fix</td> <td></td> </tr> <tr> <td>Poarch Creek Off-Reservation Trust Land is in multiple PUMAs: ['02502', '02509'].</td> <td>Fix</td> <td></td> </tr> <tr> <td>Poarch Creek Reservation is in multiple PUMAs: ['02502', '02508'].</td> <td>Fix</td> <td></td> </tr> </tbody> </table> <p>Buttons: Refresh, Save Justifications</p>	Criteria Fail	Fix	Justify	PUMA 02509 has a population of 88350. Population cannot be less than 100,000 or greater than 275,000.	Fix		PUMA 02504 has a population of 211226. If the population is between 200,000 and 275,000, justification is needed.	Fix		MOWA Choctaw (state) Reservation is in multiple PUMAs: ['02504', '02507'].	Fix		Poarch Creek Off-Reservation Trust Land is in multiple PUMAs: ['02502', '02509'].	Fix		Poarch Creek Reservation is in multiple PUMAs: ['02502', '02508'].	Fix	
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Poarch Creek Reservation is in multiple PUMAs: ['02502', '02508'].	Fix																		

Step	Action and Result(s)
	<p>The PUMA Criteria Review tool identifies three categories of criteria failures. Errors appear in red font in the PUMA Criteria Review window and must be fixed prior to exporting the project for submission. Participants cannot provide a justification for an error. Warnings appear in orange font and must be fixed or justified before exporting the project. Information only items appear in blue font and should be reviewed to confirm they are as expected.</p> <p>Please note that the colors in the Criteria Fail column do not correspond to the colors used for the “pumacurrent” layer in the Map View.</p>
Step 3	<p>To locate a PUMA with a criteria failure, select the PUMA in the PUMA Criteria Review window. <i>The Map View zooms to the selected PUMA.</i> Conduct a review of the delineation to determine whether to fix or justify the PUMA.</p>  <p>The Census Bureau recommends reviewing the Errors first, prior to tackling the Warnings and Information Only failures.</p>

Step	Action and Result(s)																		
<p>Step 4</p>	<p>To modify the delineation to resolve the Error or Warning, select the Fix button. <i>The Modify Area Feature window opens with the PUMA selected and the Map View zoomed to the PUMA.</i></p>  <p>PUMA Criteria Review</p> <p>Key: Errors - must be fixed before export Warnings - must be fixed or justified before export Information Only</p> <p>Geography: All Errors: All</p> <table border="1"> <thead> <tr> <th>Criteria Fail</th> <th>Fix</th> <th>Justify</th> </tr> </thead> <tbody> <tr> <td>PUMA 02509 has a population of 88350. Population cannot be less than 100,000 or greater than 275,000.</td> <td>Fix</td> <td></td> </tr> <tr> <td>PUMA 02504 has a population of 211226. If the population is between 200,000 and 275,000, justification is needed.</td> <td>Fix</td> <td></td> </tr> <tr> <td>MOWA Choctaw (state) Reservation is in multiple PUMAs: ['02504', '02507'].</td> <td>Fix</td> <td></td> </tr> <tr> <td>Poarch Creek Off-Reservation Trust Land is in multiple PUMAs: ['02502', '02509'].</td> <td>Fix</td> <td></td> </tr> <tr> <td>Poarch Creek Reservation is in multiple PUMAs: ['02502', '02508'].</td> <td>Fix</td> <td></td> </tr> </tbody> </table> <p>Refresh Save Justifications</p> <p>Population: 88350</p> <p>0 feature(s) selected on layer puma Coordinate: -85.608,31.881 Scale: 1:872925 Magnifier: 100% Rotation: 0.0° Render EPSG:4269</p>	Criteria Fail	Fix	Justify	PUMA 02509 has a population of 88350. Population cannot be less than 100,000 or greater than 275,000.	Fix		PUMA 02504 has a population of 211226. If the population is between 200,000 and 275,000, justification is needed.	Fix		MOWA Choctaw (state) Reservation is in multiple PUMAs: ['02504', '02507'].	Fix		Poarch Creek Off-Reservation Trust Land is in multiple PUMAs: ['02502', '02509'].	Fix		Poarch Creek Reservation is in multiple PUMAs: ['02502', '02508'].	Fix	
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Poarch Creek Reservation is in multiple PUMAs: ['02502', '02508'].	Fix																		
	<p>Though the problematic PUMA is selected, it may be necessary to select and modify a different PUMA to resolve the failure. For instance, if the problematic PUMA is too large, the participant needs to reassign county(s) or census tract(s) to a different PUMA. They would select an adjacent PUMA to modify, rather than the problematic PUMA and add counties or census tracts to the newly selected PUMA. Areas can only be added to PUMAs, not removed from PUMAs.</p>																		
<p>Step 5</p>	<p>As explained in sub-section 4.2.1, use the Select Target Area button and choose the PUMA to modify in the Map View or from the list in the Modify Area Feature tool. This ensures the correct PUMA to modify is selected.</p>  <p>Modify Area Feature</p> <p>Geography: Public Use Microdata Areas</p> <p>Action: Boundary Change</p> <p>Select Target Area (highlighted)</p>																		

Step	Action and Result(s)
Step 6	<p>Activate the Select Features by Geography window to open the Select by Geography window and select either Census Tracts or County.</p> 
Step 7	<p>Use the mouse to select geography (census tract or county) assigned to another adjacent PUMA and then choose the Add Area button from the toolbar in the Modify Area Feature window to add the selected geography to the selected PUMA.</p> 
	<p>The PUMA will not disappear from the list of failures once it is corrected. Participants must save the project and choose the Refresh button at the bottom right of the PUMA Criteria Review window or re-run the PUMA Criteria Review tool.</p> 

Step	Action and Result(s)																					
<p>Step 8</p>	<p>To retain the delineation to resolve a Warning failure instead of fixing the PUMA, provide a justification in the PUMA Criteria Review window. First, review the delineation to determine if the PUMA is delineated as expected and confirm the warning is valid before keying or selecting a prefilled option from the Justify section of the PUMA Criteria Review window. The Justify field has a 150-character limit, so the field contains suitable space to provide a thorough justification.</p> <p>The Criteria Fail column provides the issue as well as the PUMAs involved. This information is helpful for researching a solution to the failures.</p>  <p>The screenshot shows the 'PUMA Criteria Review' window with a table of failures. The table has three columns: 'Criteria Fail', 'Fix', and 'Justify'. The 'Justify' column contains dropdown menus with pre-filled text.</p> <table border="1" data-bbox="381 653 1365 863"> <thead> <tr> <th>Criteria Fail</th> <th>Fix</th> <th>Justify</th> </tr> </thead> <tbody> <tr> <td>Face 337 has no PUMA.</td> <td>Fix</td> <td></td> </tr> <tr> <td>PUMA 01302 has a population of 97520. Population cannot be less than 100,000 or greater than 275,000.</td> <td>Fix</td> <td></td> </tr> <tr> <td>MOWA Choctaw (state) Reservation is in multiple PUMAs: ['02200', '02703'].</td> <td>Fix</td> <td>AIR/ORTL is a noncontiguous reservation located within multiple counties</td> </tr> <tr> <td>Poarch Creek Off-Reservation Trust Land is in multiple PUMAs: ['02200', '02100'].</td> <td>Fix</td> <td>AIR/ORTL is a noncontiguous reservation located within multiple counties</td> </tr> <tr> <td>Poarch Creek Reservation is in multiple PUMAs: ['02200', '02100'].</td> <td>Fix</td> <td>AIR/ORTL is a noncontiguous reservation located within multiple counties</td> </tr> <tr> <td>In PUMA 00100, County part Marion County is below 10,000 population.</td> <td>Fix</td> <td>The Delineation did not change from 2010 boundaries.</td> </tr> </tbody> </table> <p>Buttons for 'Refresh' and 'Save Justifications' are visible at the bottom right of the window.</p> <p>Select the Save Justifications button to save the work. <i>After the save completes, the PUMA Criteria Review window closes, and a confirmation window appears with the information about the records saved.</i></p>  <p>The confirmation dialog box shows a blue information icon, the text '4 features updated.', and an 'OK' button.</p>	Criteria Fail	Fix	Justify	Face 337 has no PUMA.	Fix		PUMA 01302 has a population of 97520. Population cannot be less than 100,000 or greater than 275,000.	Fix		MOWA Choctaw (state) Reservation is in multiple PUMAs: ['02200', '02703'].	Fix	AIR/ORTL is a noncontiguous reservation located within multiple counties	Poarch Creek Off-Reservation Trust Land is in multiple PUMAs: ['02200', '02100'].	Fix	AIR/ORTL is a noncontiguous reservation located within multiple counties	Poarch Creek Reservation is in multiple PUMAs: ['02200', '02100'].	Fix	AIR/ORTL is a noncontiguous reservation located within multiple counties	In PUMA 00100, County part Marion County is below 10,000 population.	Fix	The Delineation did not change from 2010 boundaries.
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	<p>In this example, the state includes an American Indian reservation. Participants must confirm that the counties and census tracts containing the reservation is assigned properly, taking into consideration noncontiguous pieces of reservation and/or off-reservation trust land that may prevent the AIR from being included in one PUMA. PUMAs that split reservations appear as Warnings for review in the PUMA Criteria Review tool.</p>																					

Step	Action and <i>Result(s)</i>
Step 9	<p>Save the project and re-run the PUMA Criteria Review tool to confirm all failures are resolved. <i>If the project is free from failures, a confirmation window appears.</i></p>  <p>Dismiss the window by choosing OK.</p>

For SDCs with a complete state project, proceed to [Part 3](#) for instructions to export and submit the state’s PUMA project

5.1.1 Partial State Project and the PUMA Criteria Review Tool

Participants are not required to run the Criteria Review tool to export a PUMA project to share with another participant or to export a shapefile or a TEF of a partial state project. If executed prior to assigning PUMAs to the entire state, every unassigned census tract will be listed as a criteria failure. The tool sees each unassigned census tract (i.e., “face”) as an error. For a partial delineation of PUMAs in the state, ignore these “Face x has no PUMA” failures. Participants may proceed with reviewing failures that appear for the delineated PUMAs to confirm their work is valid before providing the files to the SDC or another participant. See [Figure 9](#) for an example of how these errors appear in the PUMA Criteria Review window.

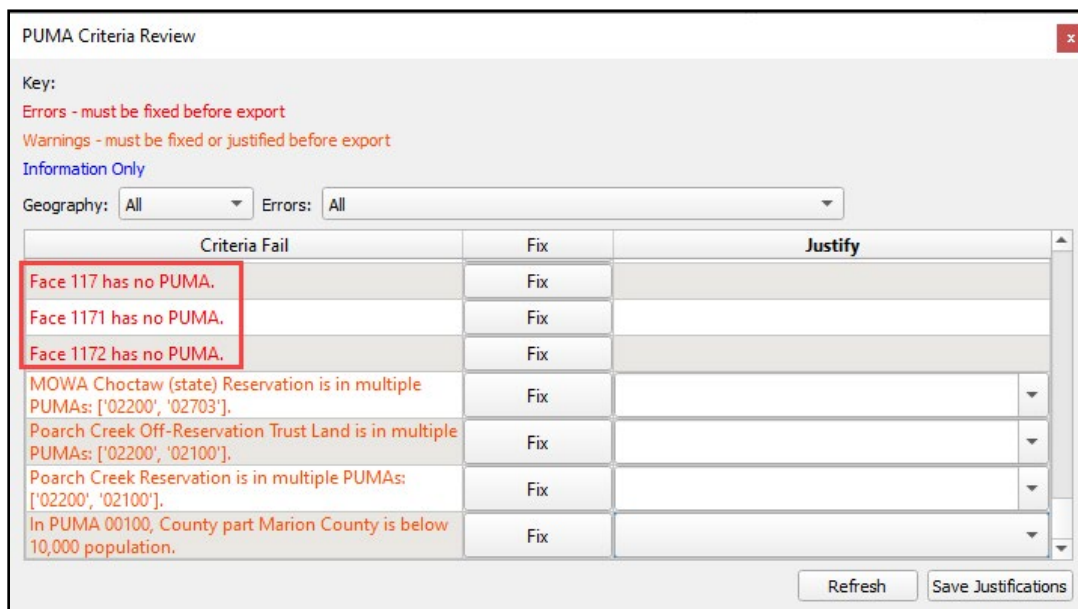


Figure 9: Example of the PUMA Criteria Review Tool with Errors for Unassigned Faces

PART 3 SUBMITTING A PUMA PROJECT

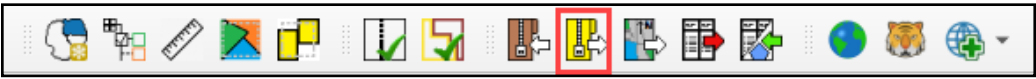
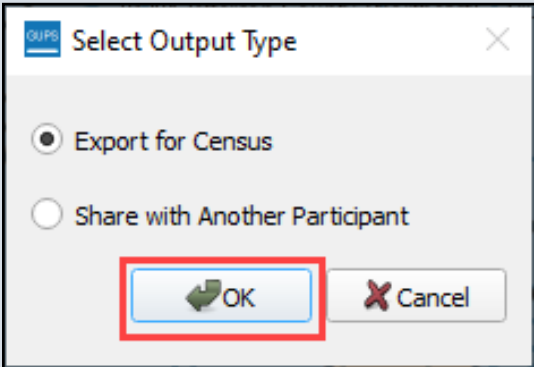
This part of the guide explains the steps to export a PUMA for submission to the Census Bureau as well as the steps for using the Secure Web Incoming Module (SWIM) to make the state's submission to the Census Bureau. The Census Bureau only accepts PUMA delineations from each state's respective SDC, so only SDCs need to review and apply the instructions within this part of the guide.


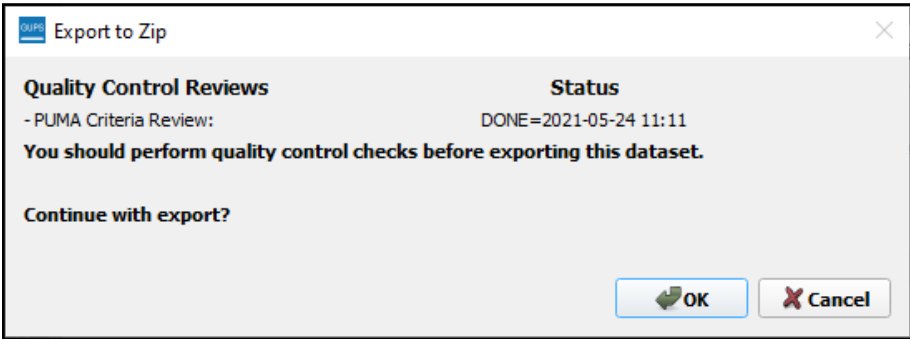
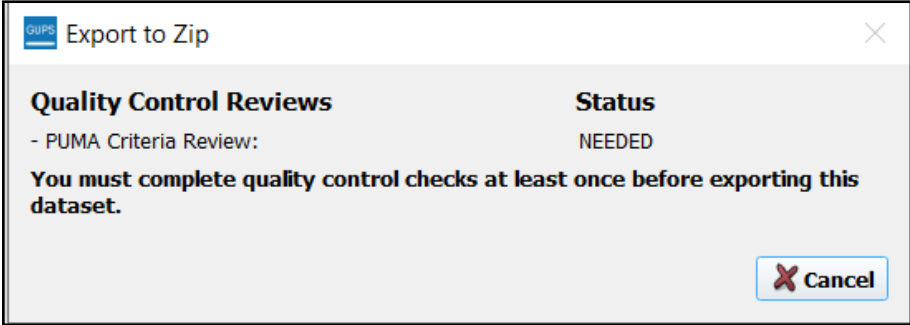
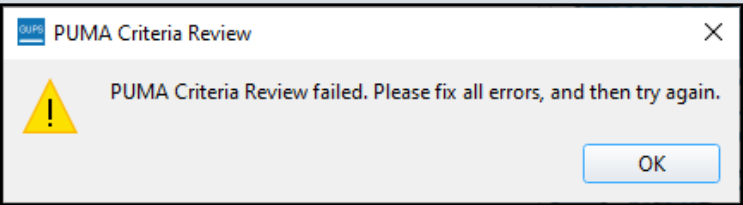
CHAPTER 6 EXPORT A PUMA PROJECT

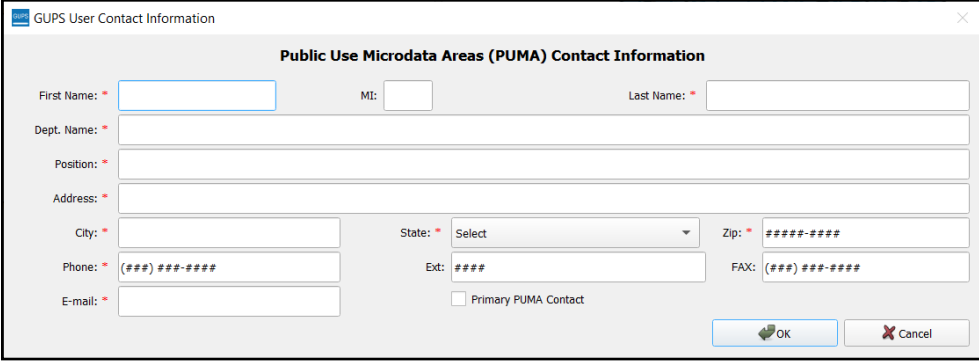
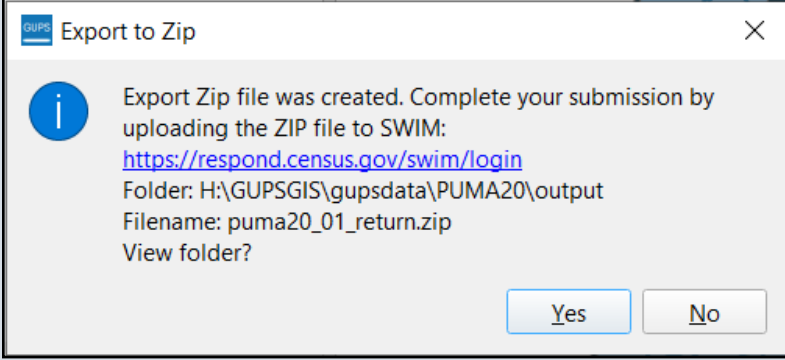
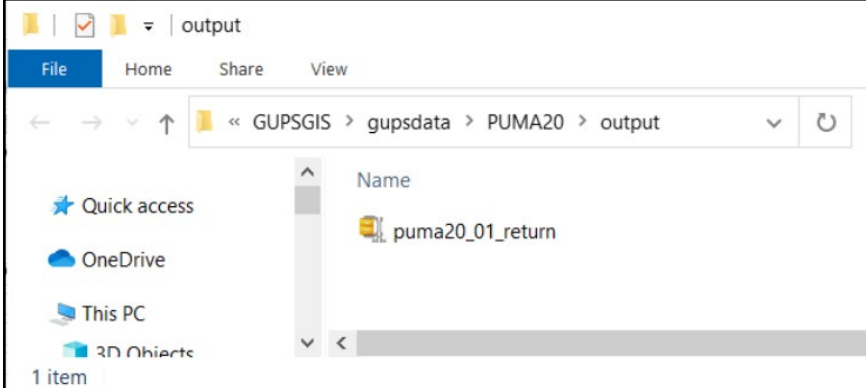
Once PUMA delineation and criteria review conclude, SDCs use the Export to Zip button from the PUMA toolbar to export their PUMA .zip file for submission to the Census Bureau. This chapter lists the steps to export the project.

The Export to Zip button on the PUMA toolbar reruns the PUMA Criteria Review tool quality checks prior to exporting the delineation work. To export the PUMAs, follow the steps in **Table 18**. GUPS packages all the files required by the Census Bureau into the zip file and saves it in the location created on the participant’s computer during the GUPS installation process.

Table 18: Steps to Export the PUMAs for Submission

Step	Action and Result(s)
Step 1	<p>Select the Export to Zip button from the PUMA toolbar.</p> 
Step 2	<p>The Select Output Type window opens with two options for export: Export for Census and Share with Another Participant.</p>  <p>Select Export for Census and OK to proceed with export or Cancel to return to the Map View.</p>

Step	Action and <i>Result(s)</i>
	<p>Before the tool proceeds, it reminds the participant to perform quality checks. If the PUMA Criteria Review has run, it provides the date and reminds that quality control checks should be performed prior to export.</p> <div data-bbox="423 338 1328 674">  </div> <p>If the PUMA Criteria Review has not run, it provides instruction to do so before exporting. The participant must cancel from this window and refer to sub-chapter 5.1 for instructions on executing the tool and fixing the errors.</p> <div data-bbox="423 814 1328 1136">  </div>
Step 3	<p>The export process checks the validity of the PUMAs as it prepares the .zip file. If the project contains criteria failures, a warning message appears with instructions to fix all errors and try the export process again.</p> <div data-bbox="508 1283 1247 1486">  </div> <p>Return to sub-chapter 5.1 for instructions on executing the tool and fixing the errors.</p>

Step	Action and Result(s)
Step 4	<p>If the export was successful, the PUMA Contact Information window appears for the participant to complete. Complete the form and select OK.</p> 
Step 5	<p>Once the export completes, the Export to Zip window appears confirming a successful export and providing the location of the exported .zip file.</p> 
Step 6	<p>Selecting Yes, opens a window that shows the location (path) of the exported file.</p> 

With the export process complete, proceed to the next chapter for instructions on submitting the file using the Secure Web Incoming Module (SWIM).

CHAPTER 7 SECURE WEB INCOMING MODULE (SWIM)

All submissions for the 2020 PUMA must be sent to the Census Bureau using the SWIM. SDCs use the instructions in this chapter to establish or access a SWIM account and submit their state's PUMA project.

Some SDCs may have staff with established SWIM accounts from other Census geography programs. If so, that person may submit the state's PUMA submission using their existing account. For SDCs without staff with an established account, contact the Census Bureau by email at <geo.puma@census.gov> to request a registration token.

To check for the existence of a SWIM account or to reset a password on an established account, choose "[Forgot your password?](#)" on the main SWIM page and enter the email address in question to check for the existence of an account. If SWIM locates an account, it asks the established security question for the account, for which the answer is not case-sensitive, and sends an email to reset the forgotten password. If SWIM does not locate an account associated with the email address, it returns the following message, *"No account registered for this email address. The email address associated with the account is case sensitive. Try again with the proper case or go to [Account Registration](#) to register for a SWIM account."* Choosing the Account Registration link opens another window to establish a SWIM account; however, the SDC staff person must have a registration token to proceed.

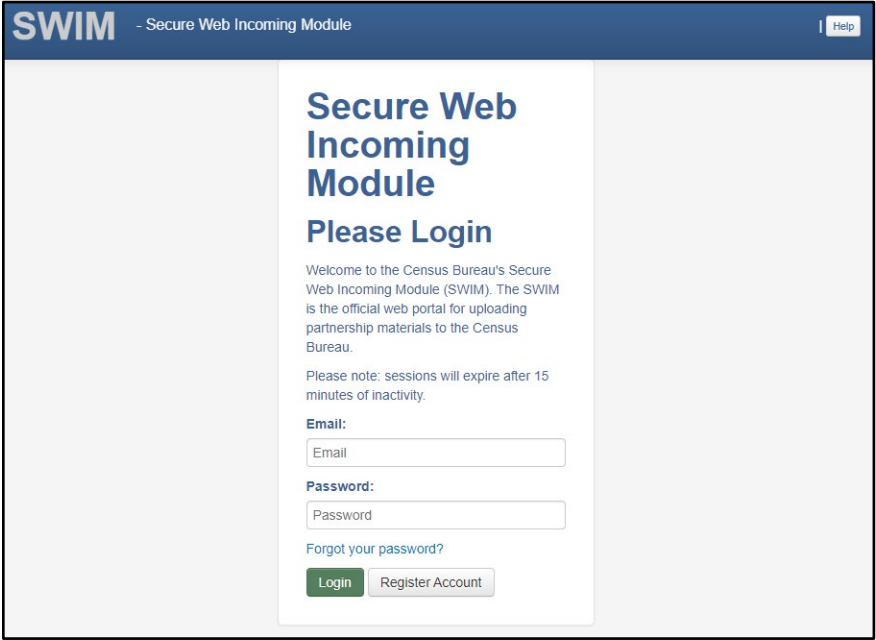
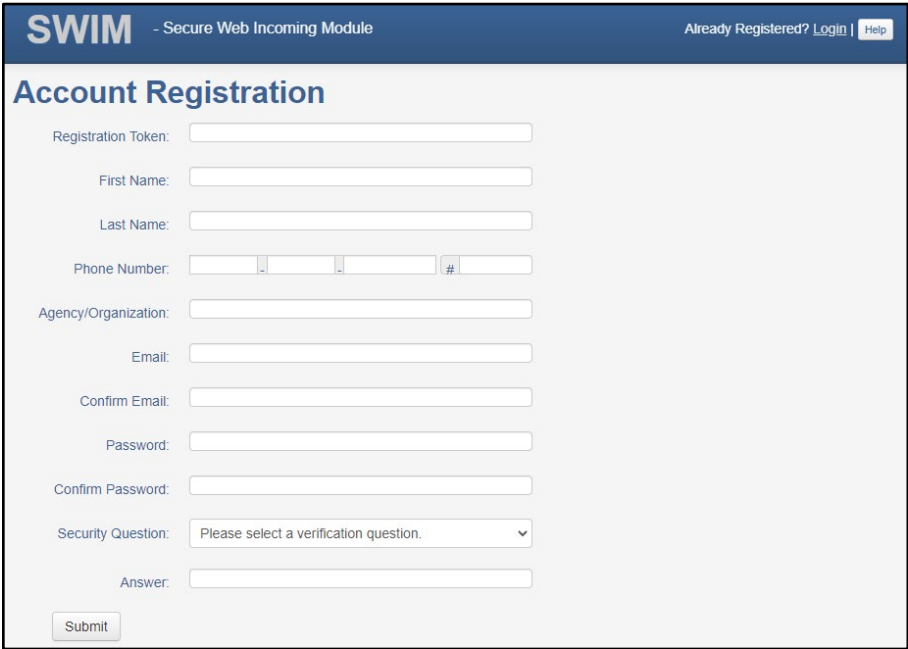
Note: The components of both the email address and the password of SWIM accounts are case-sensitive. Make note of the format used when establishing the SWIM account (e.g., [jane@anytown.org](#) or [Jane@anytown.org](#) or [JANE@ANYTOWN.ORG](#)). The Census Bureau recommends use of lowercase letters and safe retention of this information for future reference.


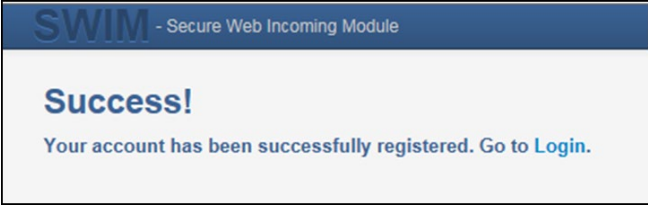
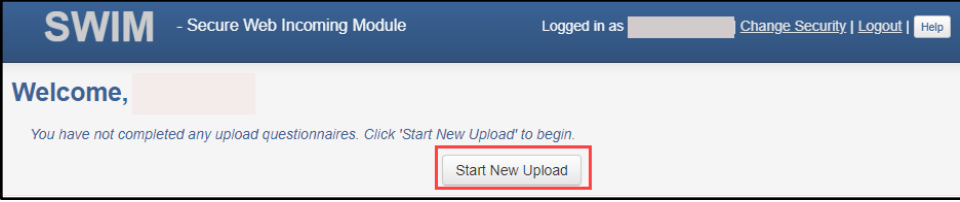

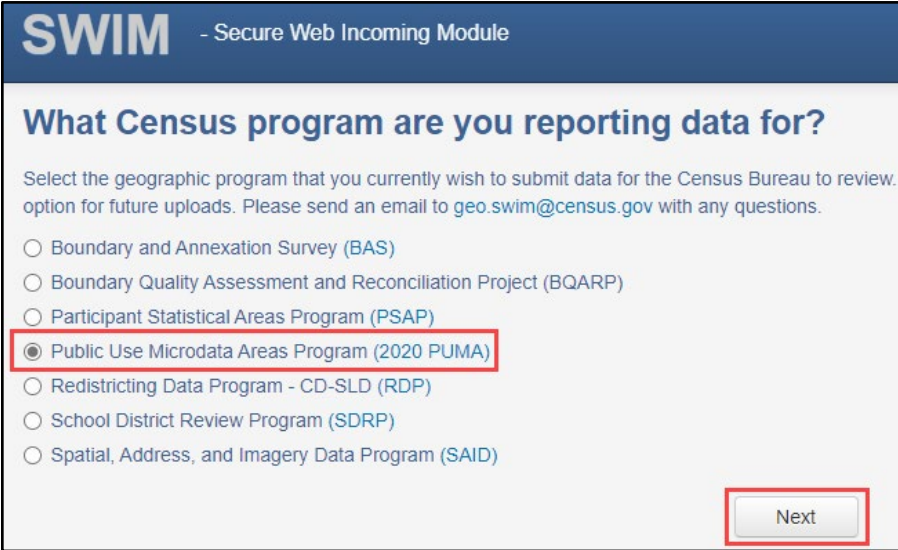
SWIM allows four attempts to login before it temporarily locks the account for 15 minutes. After the lock expires, try to login again or reset the password using the aforementioned "Forgot your password?" link on the login page. Once reset and logged into SWIM, account holders may modify their password and security answer by selecting "Change Security" link along the top, right side of the window.

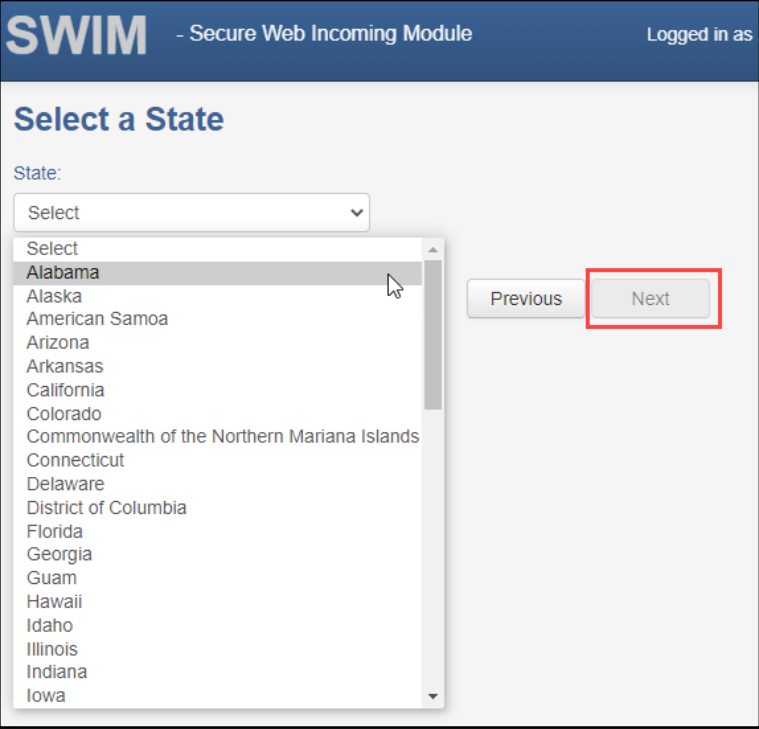
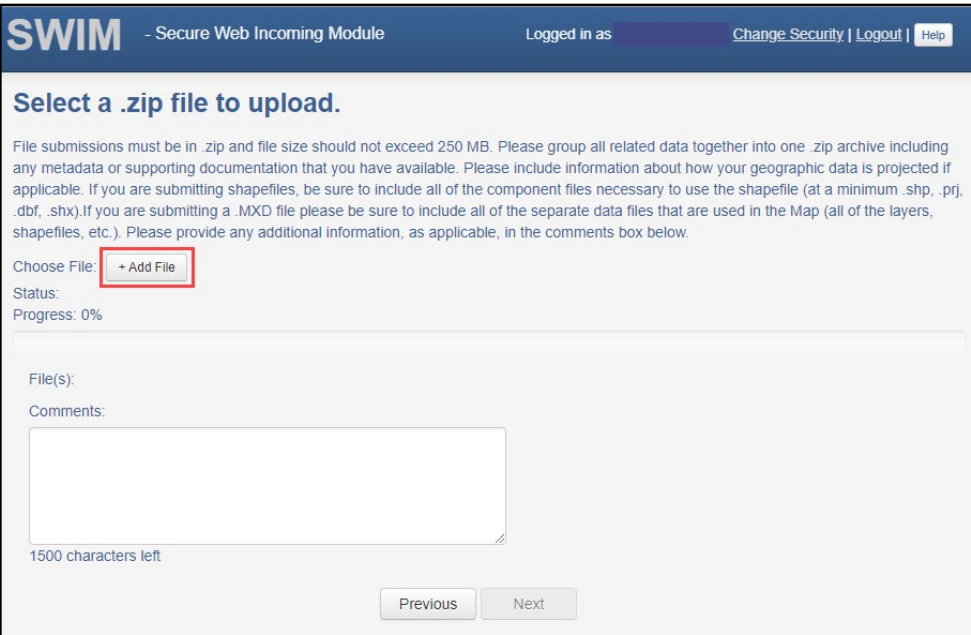
If login issues persist, confirm the vintage of internet browser version. SWIM runs on the two most recent versions of each of the major internet browsers, Microsoft Internet Explorer®, Microsoft Edge®, Google Chrome®, Mozilla Firefox®, and Apple Safari®. If the browser version is older, upgrade the version. If problems still occur with SWIM, contact the Census Bureau because it may be necessary to create a new SWIM account.

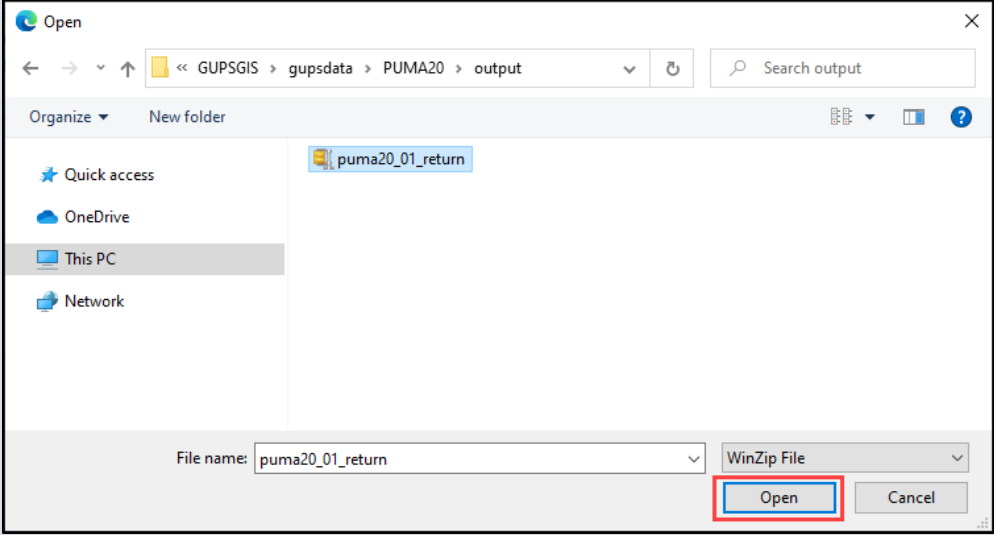
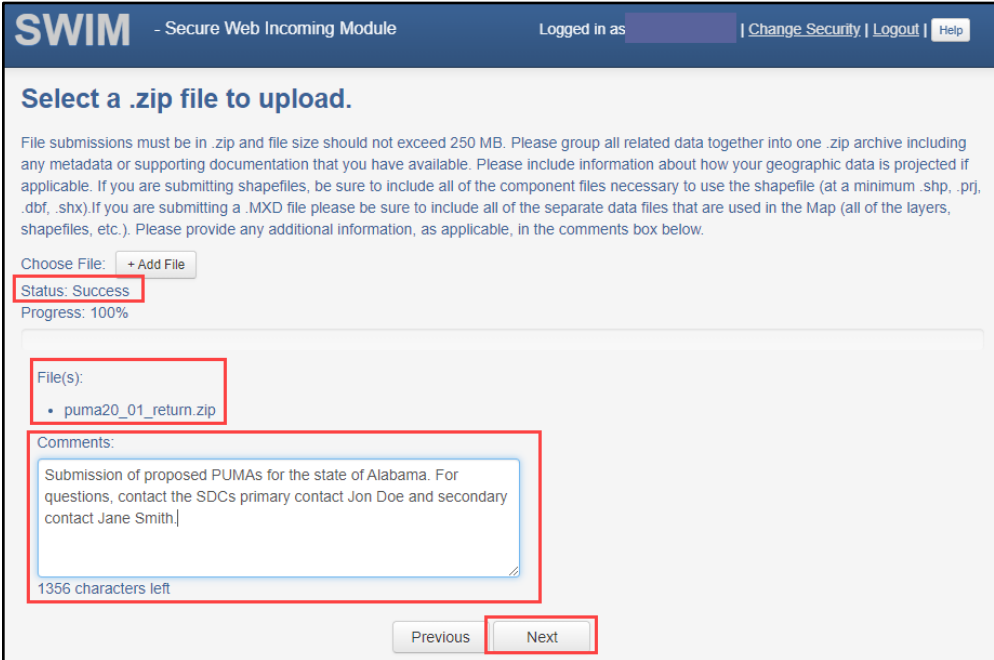
SWIM file requirements include submission of .zip file format. The .zip file may not include another .zip file as a component and it must not be larger than 250 megabytes. Do not create separate zip files for supporting documentation, the shapefile suite of files, or any other relevant case information. Include all those materials in one .zip file. Follow the steps below for instructions on using SWIM to submit the PUMA .zip file.

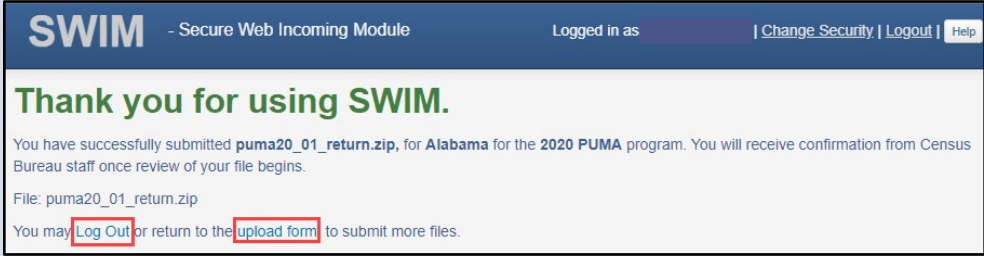
Table 19: Steps to Use SWIM

Step	Action and Result(s)
Step 1	<p>Open a new browser window and enter the SWIM URL <respond.census.gov/swim> to open the SWIM Login screen.</p> 
Step 2	<p>For persons with an existing SWIM account, enter the email address and password associated with the account and choose the Login button. Skip to Step 6.</p>
Step 3	<p>For persons without an existing SWIM account, have the 12-digit registration token provided by the Census Bureau ready for account registration. Select the Register Account button to open the “Account Registration” screen. All fields within this screen are required. Select the Submit button to continue.</p> 

Step	Action and <i>Result(s)</i>
	<p>The password must be at least 8-characters in length and have at least one uppercase character, one lowercase character, one number, and one special character. Valid special characters are limited to the #, !, \$, *, &, ?, and ~.</p> <p>The comma is not a valid special character for use in the password. The commas shown in the list of valid special characters are for spacing purposes only.</p>
Step 4	<p><i>A Success! pop-up window appears confirming successful account registration.</i></p>  <p>The screenshot shows a blue header with 'SWIM - Secure Web Incoming Module'. Below it, the text reads 'Success! Your account has been successfully registered. Go to Login.' with 'Go to Login' as a blue link.</p>
Step 5	<p>Choose Login to return to the SWIM Login screen to enter the newly established account login and password information.</p>
Step 6	<p>With a valid login and password, <i>the Welcome screen opens</i>. To submit the SDC's PUMA submission .zip file, choose the Start New Upload button.</p>  <p>The screenshot shows the 'Welcome' screen with a blue header 'SWIM - Secure Web Incoming Module'. It includes a 'Logged in as' field, 'Change Security Logout Help' links, and a 'Start New Upload' button highlighted with a red box.</p>
	<p>If the account has uploaded other files for different geography programs administered by the Census Bureau, a list of files previously uploaded by the SWIM user displays on the page.</p>
Step 7	<p><i>The What Census program are you reporting data for? screen opens</i>. Choose the Public Use Microdata Areas Program (2020 PUMA) radio button and then the Next button.</p>  <p>The screenshot shows a selection screen with a blue header 'SWIM - Secure Web Incoming Module'. The title is 'What Census program are you reporting data for?'. Below is a list of radio button options: <ul style="list-style-type: none"> Boundary and Annexation Survey (BAS) Boundary Quality Assessment and Reconciliation Project (BQARP) Participant Statistical Areas Program (PSAP) Public Use Microdata Areas Program (2020 PUMA) (highlighted with a red box) Redistricting Data Program - CD-SLD (RDP) School District Review Program (SDRP) Spatial, Address, and Imagery Data Program (SAID) A 'Next' button is highlighted with a red box at the bottom right.</p>

Step	Action and <i>Result(s)</i>
Step 8	<p>The Select a State screen opens. Choose your state from the drop-down menu and then the Next button.</p> 
Step 9	<p>The Select a .zip file to upload screen opens. Disregard the language regarding grouping all related data into one .zip file. The PUMA GUPS handles this grouping of files/data. Choose the +Add File button.</p> 

Step	Action and Result(s)
Step 10	<p>The Open screen appears. Navigate to the directory location of the exported PUMA .zip file (e.g., /GUPSGIS/gupsdata/PUMA20/output) and select the file and then the Open button.</p> 
Step 11	<p>Upon completion, the Status field shows Success, and the name of the .zip file appears in the File(s) field. Add additional, pertinent information to the Comments section if applicable. Choose the Next button to proceed with the upload.</p> 

Step	Action and <i>Result(s)</i>
Step 12	<p>The Thank You screen appears and indicates a successful transfer of the file. GUs can expect to receive an email once processing of the file begins and throughout the process as questions arise. Choose either Upload Form or Log Out option from the Thank You screen message.</p> 

Congratulations on the completion of PUMA delineation using GUPS and the submission of those delineations using SWIM. The Census Bureau will review all submissions to ensure they meet the established criteria and will contact SDCs if there are questions. Other than this communication, there are no plans for formal feedback. Finalized PUMAs and their associated PUMS data will be available online for use beginning the summer of 2022.

APPENDICES

APPENDIX A SUMMARY OF ADDITIONAL PROGRAM DOCUMENTS

This appendix summarizes the final criteria, the naming guidelines, and coding guidelines.

Note: A summary guide and FAQs document are also available on the [2020 PUMA website](#). The Census Bureau encourages participants review those materials for high-level summarization of the program and specific answers to questions that may arise.

A1 Final Criteria

Below is a summarization of the final criteria and guidelines for 2020 PUMA. Refer to the *2020 PUMA Final Criteria* document on the [2020 PUMA website](#) for more details.

- Minimum Required Population and Maximum Suggested Population
 - Require minimum population threshold of 100,000 persons with the ability to maintain this population throughout the decade.
 - Should not contain more than 200,000 persons, unless defining the PUMA for an area where significant population decline is anticipated.
- Relationships with Other Geographic Areas
 - Must not cross state boundaries.
 - Should comprise an area that is either entirely inside or entirely outside a core based statistical area (CBSA) where possible.
 - Should use 2020 place definitions, 2010 urban/rural definitions, and local knowledge to inform 2020 PUMA delineations.
 - Should avoid splitting Census Bureau urban areas.
 - Should avoid splitting governmental minor civil divisions (MCDs).
 - Avoid splitting American Indian reservations and/or off-reservation trust lands (AIRs/ORTLs), particularly if the population is included within all parts of the split AIR/ORTL. Since AIRs/ORTLs may cross state boundaries, this guideline applies only to the portion of an AIR/ORTL within a state. In all such instances, consider the total population and makeup of the affected areas in any decisions regarding the adjustment of PUMAs for AIRs/ORTLs.
 - If the AIR/ORTL has a population of <100,000, it should be contained within one PUMA.
 - If the AIR/ORTL has a population of <200,000, it should be contained within no more than two PUMAs.
- Geographic Entities Used to Define
 - Must use counties (and equivalent entities), and/or census tracts to construct.
 - A single county may be a PUMA if it meets the 100,000 minimum population threshold.
 - Two or more contiguous counties may be combined to form a PUMA that meets the 100,000 minimum population threshold.
 - Divide counties with more than 200,000 population using census tracts. Consider aggregation of census tracts that approximate the extent of other geographic entities (e.g., MCDs, incorporated places, census designated places, and/or urban areas).

- Census tract-based PUMAs may cross county boundaries provided each PUMA-county part meets a minimum population threshold of 10,000. This is an increase from the 2,400-minimum requirement from 2010. This change is intended to further ensure the confidentiality of data in a PUMA-county part, align with the 2020 Census urban area plans, and eliminate unique geographic areas with low population.
- Contiguity and Noncontiguity Guidelines
 - To the greatest extent possible, each PUMA should encompass a single, geographically contiguous area.
 - May be noncontiguous if the county, counties, or census tracts used to form the PUMA are noncontiguous.
 - Use of noncontiguous building blocks is acceptable where it facilitates more demographically homogenous areas; however, this is not intended to create highly fragmented PUMAs.
 - All noncontiguous PUMAs are subject to Census Bureau final review and approval.
- Place of work (POW) and Migration (MIG) PUMAs
 - Delineated by statisticians, not as part of the 2020 PUMA, using Place of work data and in/out migration data after the 2020 PUMA concludes.
 - Standard PUMAs used to create POWPUMAs and MIGPUMAs; therefore, carefully consider standard PUMA relationships with other geographic areas when forming the standard PUMAs.
 - Can consist of a single PUMA or combination of PUMAs (county-based or census tract-based), but must aggregate to whole counties. Carefully consider how this will affect the eventual aggregation of PUMAs that are not delineated using whole counties.

A2 Coding Guidelines

Below is a summarization of the coding guidelines. Refer to the *2020 PUMA Coding Guidelines* document on the [2020 PUMA website](#) for more details.

- Must be a unique, five-digit numeric code that ranges from 00100 to 99995.
- Preserve the 2010 PUMA code for 2020 if the geographic extent of the proposed PUMA remains unchanged from 2010, except when it is necessary to establish an orderly, logical coding scheme within the state, as described in the next guideline.
- Should be assigned sequentially within a state, beginning with 00100, 00200, 00300, and so forth in an orderly, logical manner. They should not be randomly assigned.
 - To establish this orderly, logical manner, assign codes using a geographic sequence that begins in the northwest corner of the state. Proceed with coding from west to east, then east to west in a serpentine fashion until each PUMA is coded. This sequence of coding promotes easy identification by visual inspection and review since codes that are close in numeric sequence should be close geographically.
- Assign “00” as the fourth and fifth digits of the PUMA code for each PUMA that consists of either an entire county or group of whole counties.
- Assign the same first three digits of the PUMA code and increment up from “01” for the fourth and fifth digits, for each PUMA that splits a county or group of counties. PUMAs that are delineated using census tracts instead of whole counties, should be coded in this manner.

A3 Naming Guidelines

Below is a summarization of the naming convention rules and guidelines presented in the *2020 PUMA Naming Guidelines* located on the [2020 PUMA website](#). Refer to that document for additional information on the structural components of a PUMA name and for details on the toponymy of PUMA names and particular associations to the communities and feature that the name represents.

- Must not exceed 85 characters.
- Must be unique within the state.
- Must not include the state name or abbreviation, except where there is no clear cultural focus or topographic name that can be applied to the PUMA.
- May include hyphens to connect the names of multiple geographic areas.
- Must use the Roman alphabet as normally used for writing the English language.
- Use hyphens to join names for PUMAs with multiple geographies areas and list them in the order of population size or regional importance, listing the most populous or most important first.
- May use diacritical marks (i.e., accents, rings, tildes, and umlauts).
- May include a limited number of abbreviations. Use of all other abbreviations are discouraged and must be approved by the Census Bureau.
- Deference given to names submitted by SDCs; however, the Census Bureau may edit the proposed names to adhere to programmatic and technical needs.

APPENDIX B TROUBLESHOOTING GUPS INSTALLATION

If the default Map Management window, as shown in [Figure 10](#), does not display after opening QGIS ([Figure 11](#)), then this indicates a GUPS installation issue.

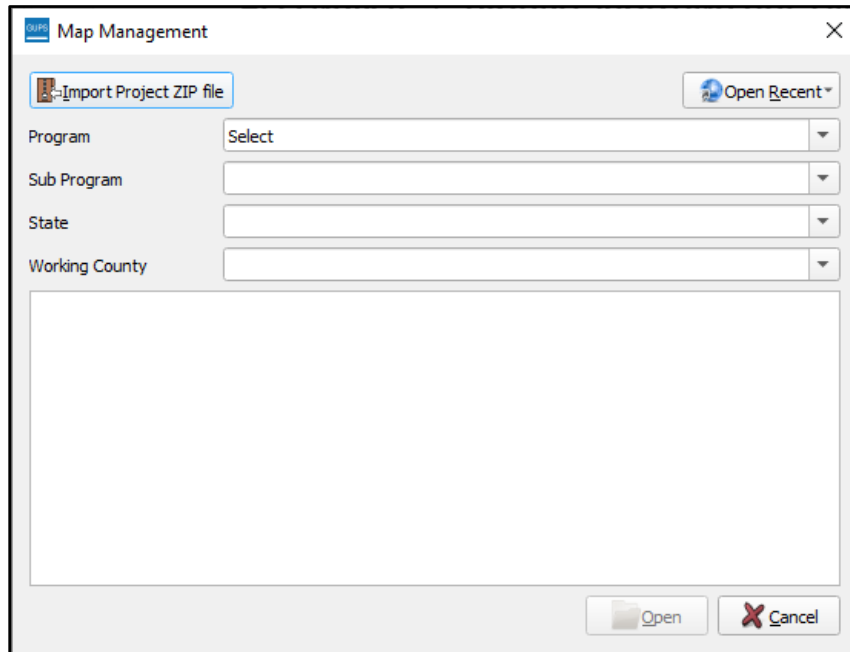


Figure 10: Default Map Management Window

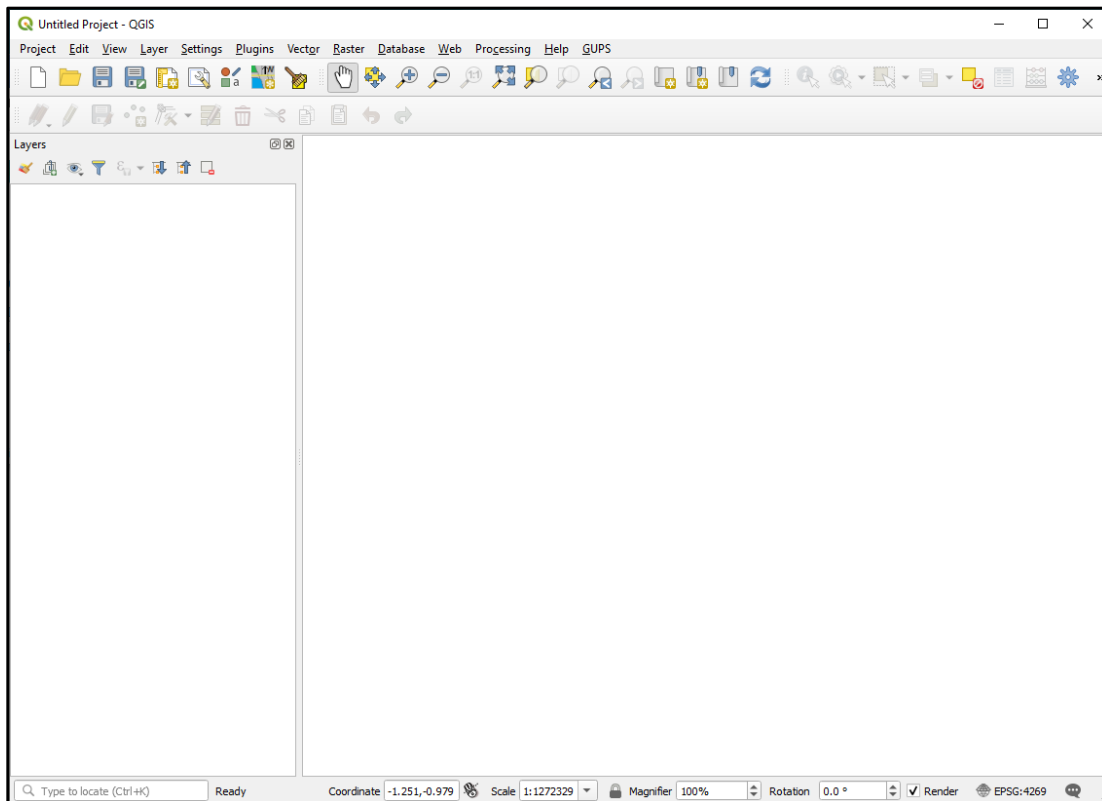

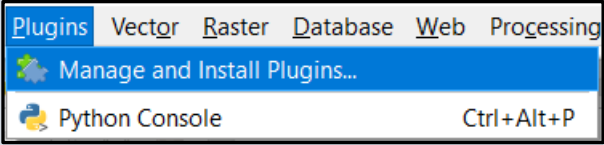
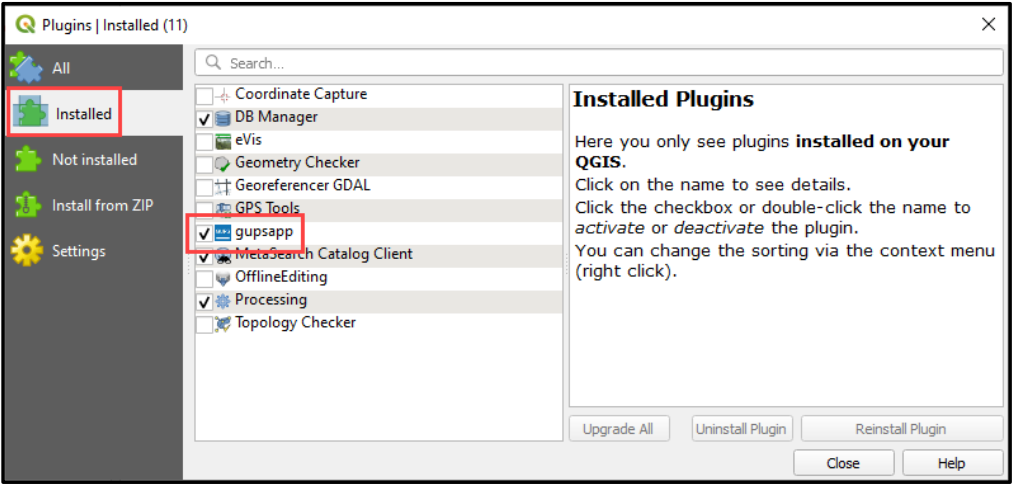
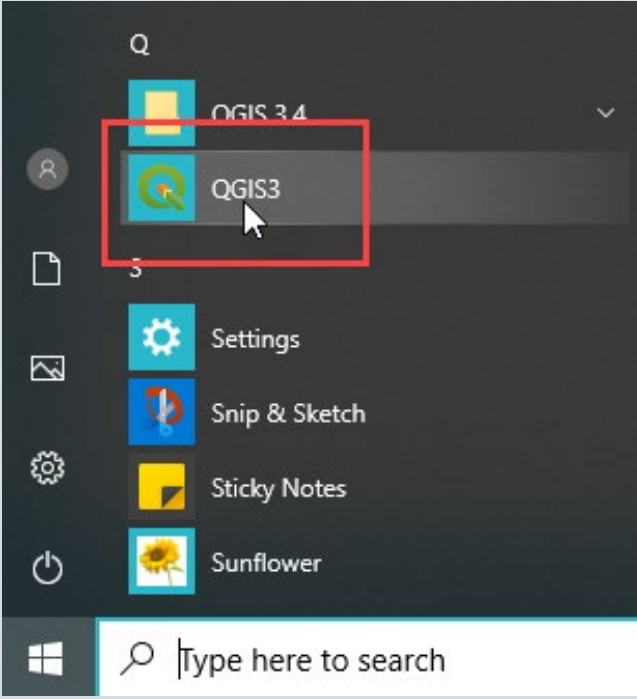


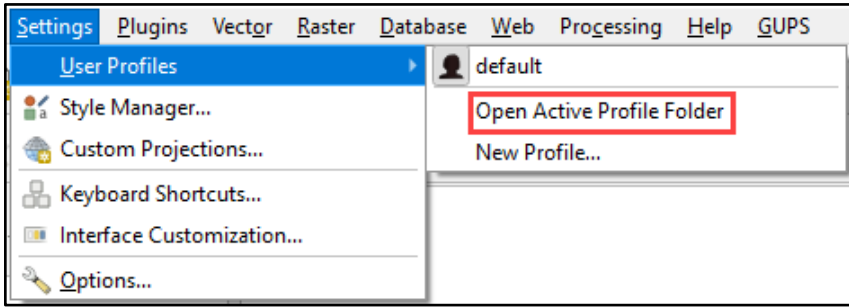
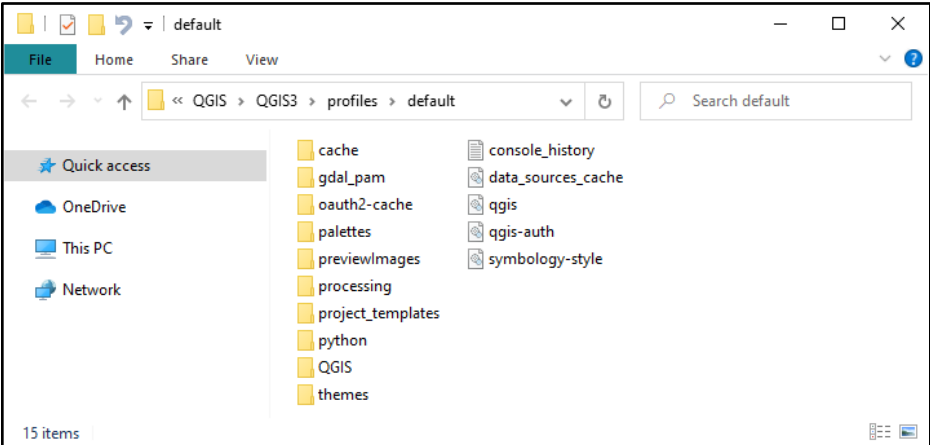
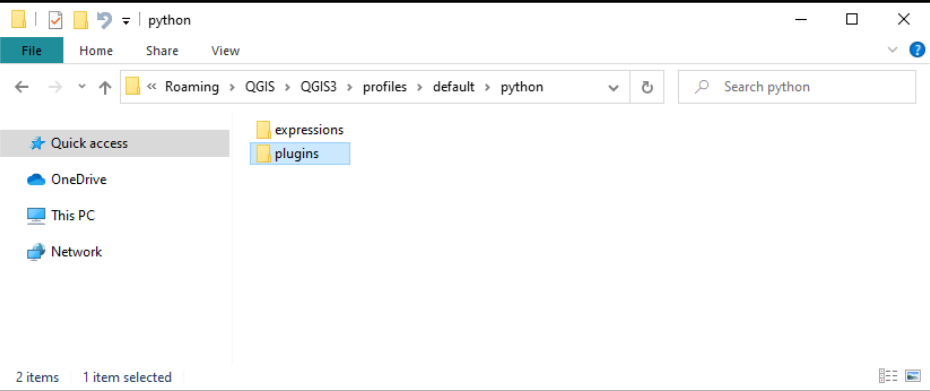
Figure 11: QGIS without a Map Management Window

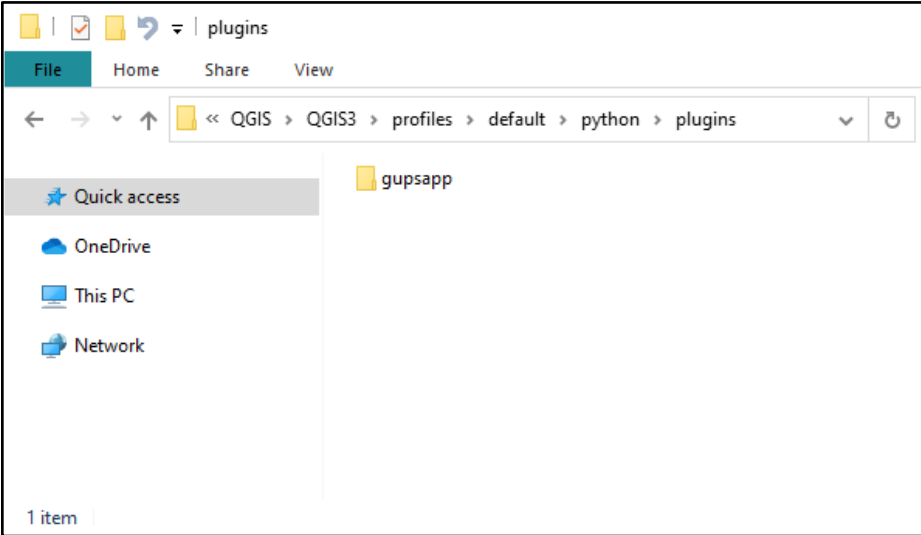

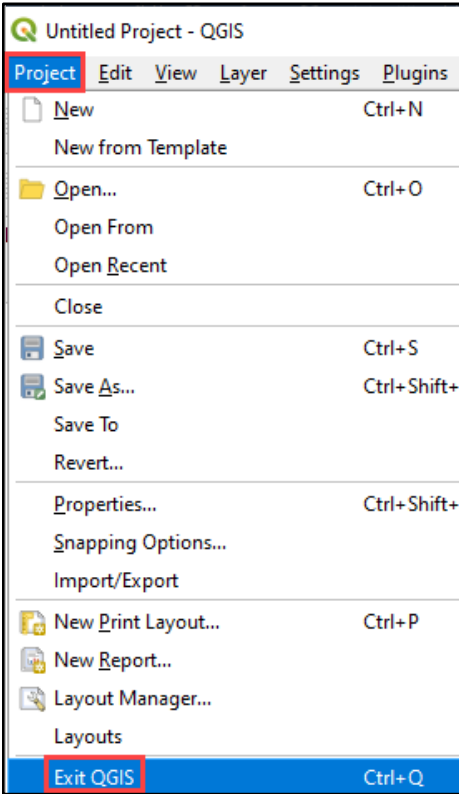
Follow the instructions below in [Table 20](#) to correct the installation issue(s). If problems persist after applying the instructions in the table below, contact the Census Bureau by email at [<geo.puma@census.gov>](mailto:geo.puma@census.gov) for assistance.

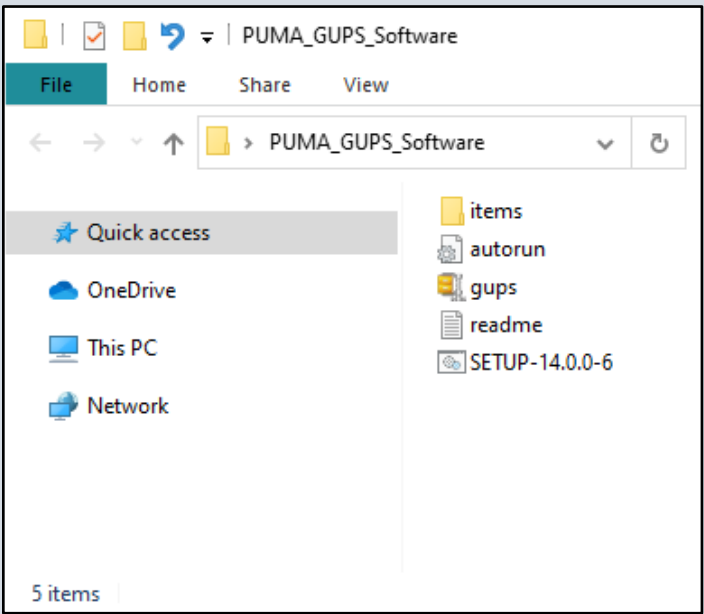
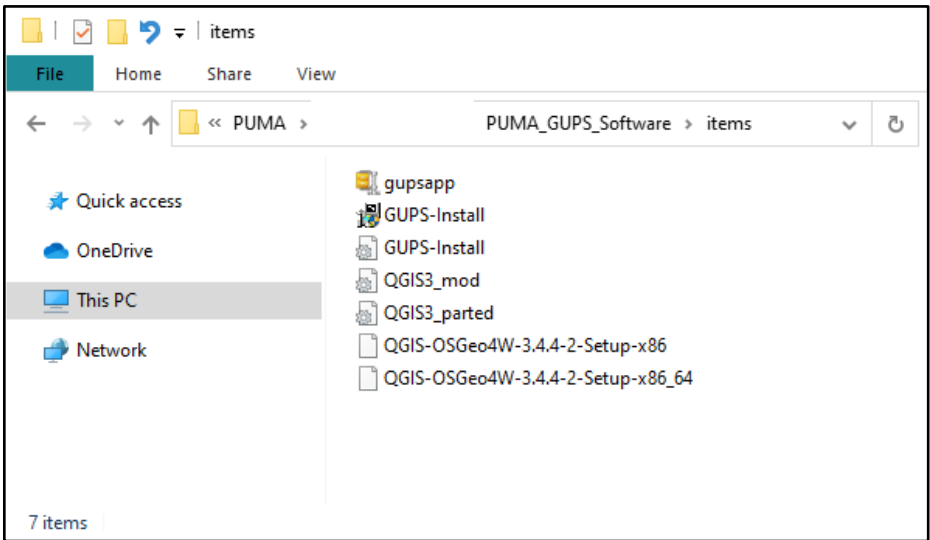
Table 20: Steps to Troubleshoot GUPS Installation

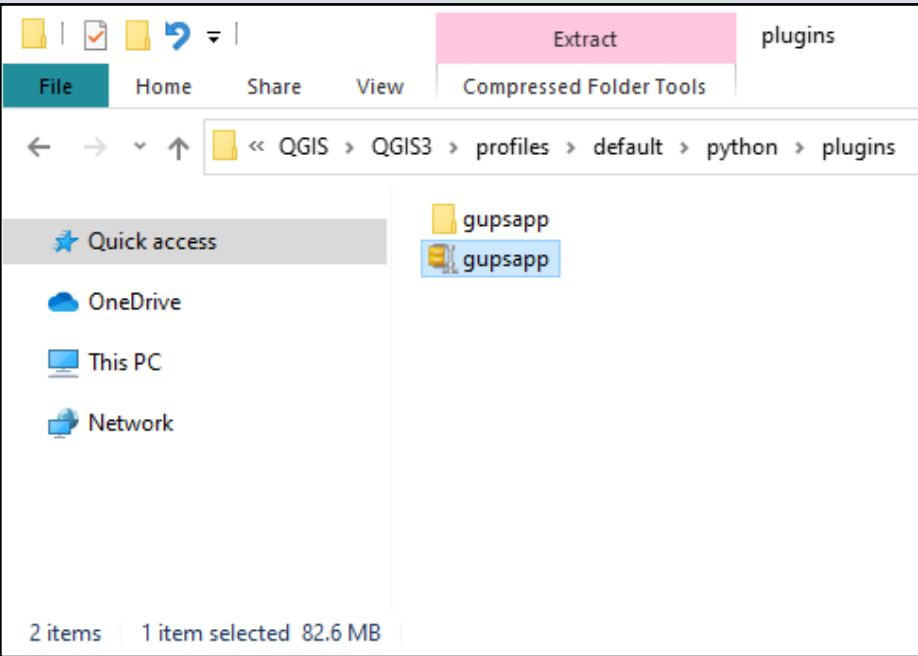
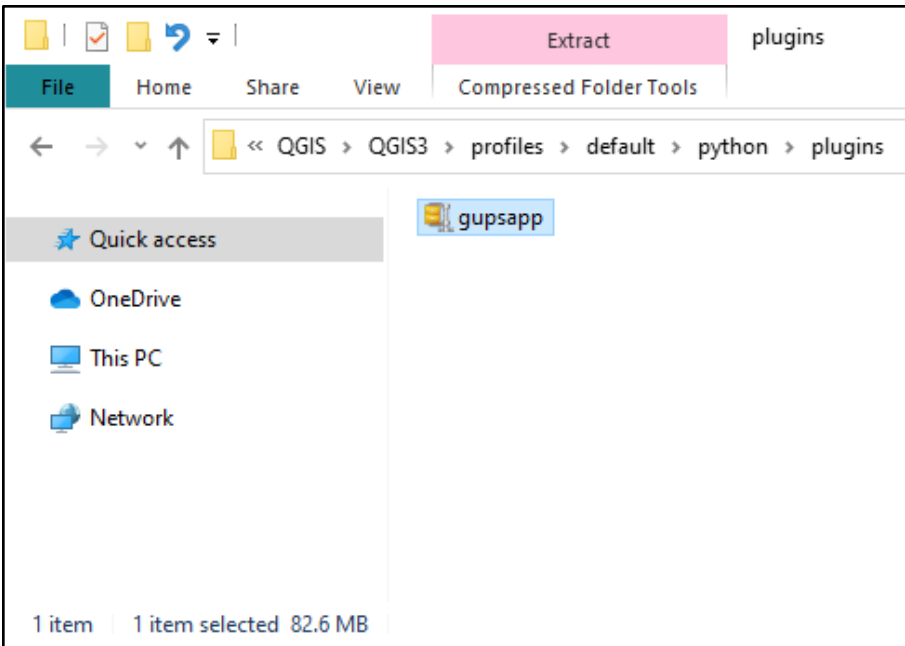
Step	Action and <i>Result(s)</i>
Step 1	<p>With QGIS open, identify the GUPS version by accessing the GUPS → About GUPS menu located on the Menu bar. The Menu bar buttons are described in sub-appendix C1.</p> <p>If the version is lower than version 14.0.0-6, navigate to the 2020 PUMA website and download the proper version. Those steps are discussed in Table 2 and should be applied before proceeding with the details in this table.</p> 
Step 2	<p>If no Map Management window is visible, from the Menu bar choose the Plugins menu and then Manage and Install Plugins.</p> 
Step 3	<p><i>The Plugins window opens.</i> Select the Installed option on the left side of the window. Confirm a checkmark exists next to the gupsapp item. If a checkmark is absent, use the mouse to select the box to the left of the gupsapp name. Choose the Close button to close the window.</p> 

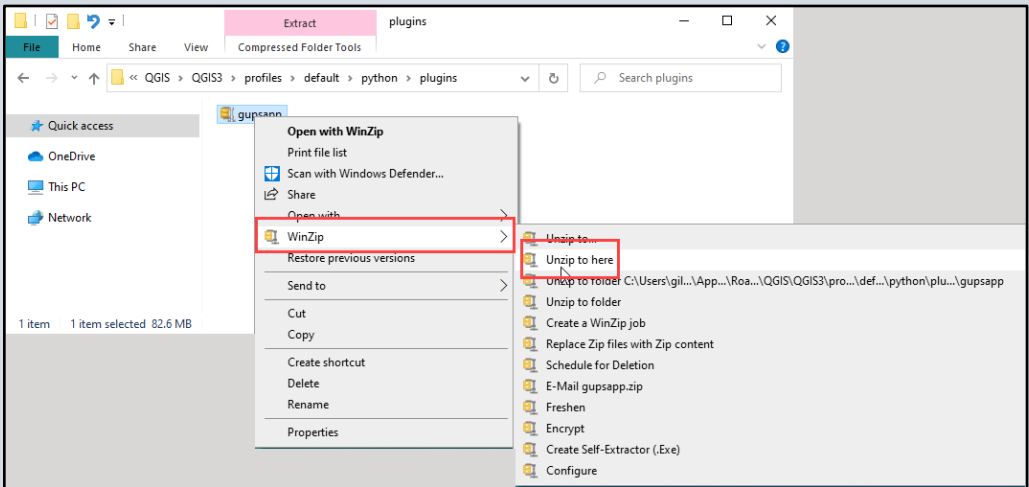

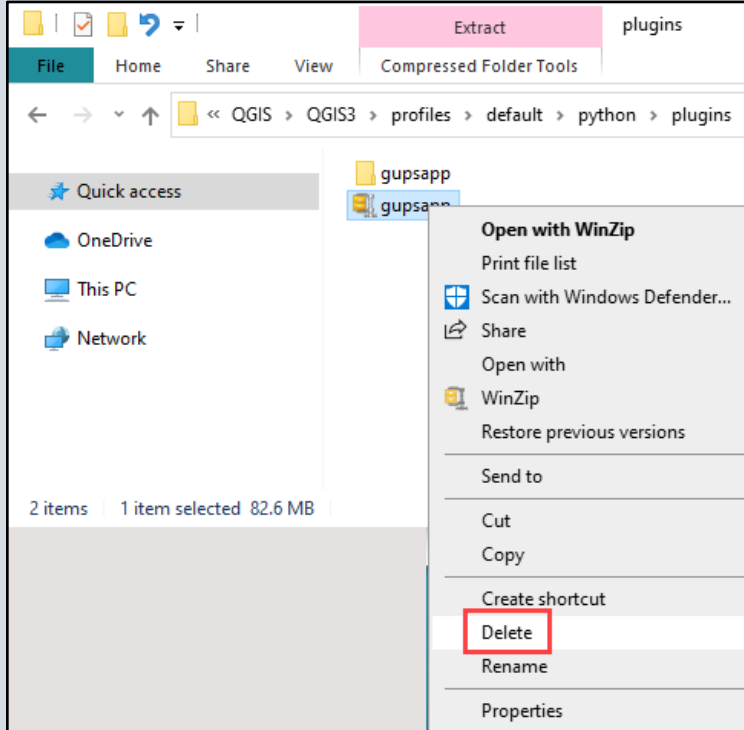
Step	Action and <i>Result(s)</i>
Step 4	<p data-bbox="349 220 1274 262">Close QGIS and restart the software by selecting the QGIS3 icon from the Start Menu.</p>  <p data-bbox="349 976 1356 1050">If the Map Management window still does not appear, add the plugin manually following the remaining steps in this table.</p>


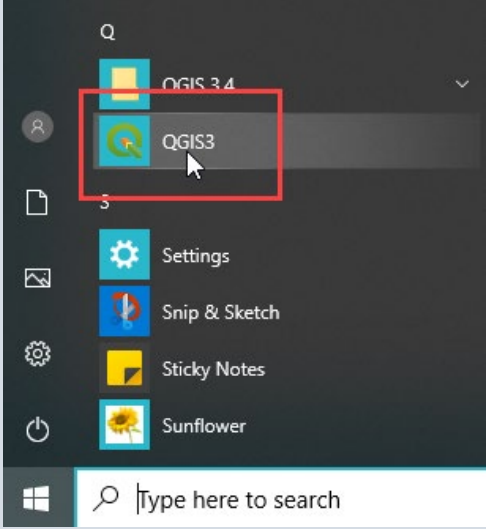
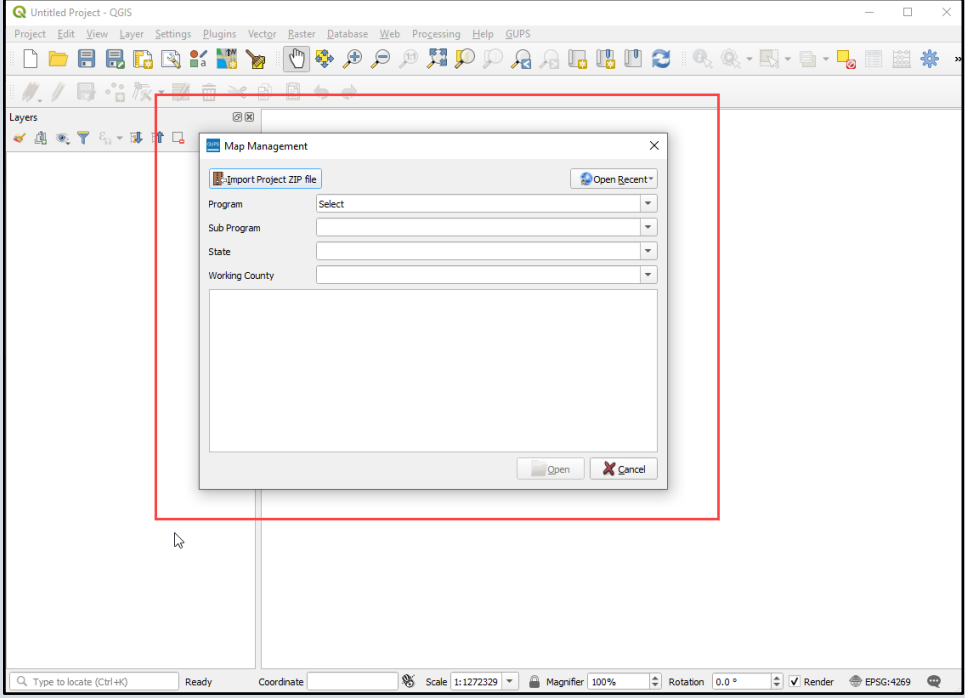
Step	Action and Result(s)
Step 5	<p>From the Menu bar, select the Settings→Select User Profiles→Open Active Profile Folder.</p>  <p>The default profile window opens.</p> 
Step 6	<p>Select and open the python folder. The window shows the contents of the python folder.</p> 

Step	Action and Result(s)
Step 7	<p>Select and open the plugins folder. <i>The window shows the contents of the plugins folder.</i></p> 
	<p>Keep this window open. Do not close this window. This window provides the location where upcoming changes are needed.</p>
Step 8	<p>Close QGIS by selecting Project → Exit QGIS or by selecting the “X” in the upper right corner.</p> 

Step	Action and <i>Result(s)</i>
Step 9	<p>With the plugins window still open, open another File Explorer window on the computer. Navigate to the location where the gups.zip file was saved and unzipped. Note, this occurred as part of action described in Table 2.</p> 
Step 10	<p>Select and open the items folder.</p> 

Step	Action and <i>Result(s)</i>
Step 11	<p>Copy the gupsapp.zip file from the items folder into the plugins folder in Step 7.</p>  <p>The screenshot shows a Windows File Explorer window with the address bar set to <math>\ll</math> QGIS > QGIS3 > profiles > default > python > plugins. The left sidebar shows 'Quick access' with links to OneDrive, This PC, and Network. The main pane displays two items: a folder named 'gupsapp' and a file named 'gupsapp.zip'. The file is selected, and the status bar at the bottom indicates '2 items 1 item selected 82.6 MB'.</p>
Step 12	<p>Delete the gupsapp folder so that only the gupsapp.zip file exists in the plugins folder.</p>  <p>The screenshot shows the same Windows File Explorer window as in Step 11. The folder 'gupsapp' has been removed, and only the file 'gupsapp.zip' remains in the main pane. The status bar at the bottom indicates '1 item 1 item selected 82.6 MB'.</p>

Step	Action and Result(s)
Step 13	<p>Unzip the gupsapp.zip file to the plugins folder. WinZip provides the Unzip to here option that handles the proper placement of unzipped file contents.</p>  <p>The screenshot shows a Windows File Explorer window titled 'Extract plugins' with the address bar set to 'C:\Users\gil...\AppData\Roaming\QGIS\QGIS3\profiles\default\python\plugins'. A context menu is open over a file named 'gupsapp...'. The 'WinZip' option is selected, and a sub-menu is displayed with 'Unzip to here' highlighted by a red box. Other options in the sub-menu include 'Unzip to folder C:\Users\gil...\AppData\Roaming\QGIS\QGIS3\profiles\default\python\plugins\gupsapp', 'Unzip to folder', 'Create a WinZip job', 'Replace Zip files with Zip content', 'Schedule for Deletion', 'E-Mail gupsapp.zip', 'Freshen', 'Encrypt', 'Create Self-Extractor (.Exe)', and 'Configure'.</p>
	<p>Unzipping the file elsewhere is incorrect and will cause problems with correcting the installation problem.</p>
Step 14	<p>Once the unzip action completes, confirm the new gupsapp folder was created and delete the gupsapp.zip file from the plugins folder.</p>  <p>The screenshot shows the same File Explorer window, but now a folder named 'gupsapp' has been created in the 'plugins' directory. A context menu is open over the 'gupsapp.zip' file. The 'Delete' option is highlighted by a red box. Other options in the menu include 'Open with WinZip', 'Print file list', 'Scan with Windows Defender...', 'Share', 'Open with', 'WinZip', 'Restore previous versions', 'Send to', 'Cut', 'Copy', 'Create shortcut', 'Rename', and 'Properties'.</p>

Step	Action and Result(s)
	<p>For GUPS to work, the plugins folder must contain only the gupsapp folder, as shown in Step 7.</p>
<p>Step 15</p>	<p>Open QGIS by selecting the QGIS3 icon from the Start Menu.</p>  <p>If the Map Management window appears, the installation issue is resolved. Begin delineating PUMAs for your state.</p> 
<p>Step 16</p>	<p>If the Map Management window does not appear, please contact the Census Bureau by email at geo.puma@census.gov for assistance.</p>

With the installation issue corrected, return to **Chapter 3** for instructions on opening GUPS and starting a PUMA project.

APPENDIX C ADDITIONAL GUPS FUNCTIONALITY

The Census Bureau strongly recommends the use of the QGIS documentation to supplement information provided within this appendix. Refer to the QGIS documentation guide on-screen or download an Adobe Acrobat PDF of the QGIS 3.4 documentation from the following link, <[Documentation \(qgis.org\)](http://Documentation.qgis.org)>.

Note: The QGIS 3.4 documentation is in the “Archived” section at the bottom of the previously listed link.

The content included in the subsequent appendices may vary from what appears with each QGIS/GUPS installation, but we anticipate most installations will include the menus and toolbar elements described within this appendix. If new/different menus, sub-menus, toolbar buttons, etc. appear that are not included in this appendix, check the QGIS documentation.

C1 Menu Bar

The Menu bar includes top-level, drop-down menus and allows navigation through GUPS using a standard hierarchical menu. Most relate to QGIS functionality and not GUPS functionality. The Menu bar, shown in [Figure 12](#), offers basic features to manage the Map View. Almost all the functions available from the Menu bar are also available in the various toolbars.

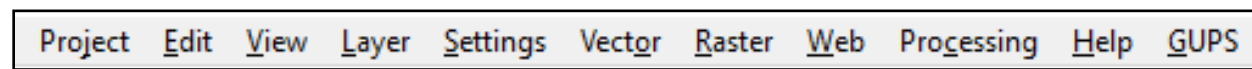
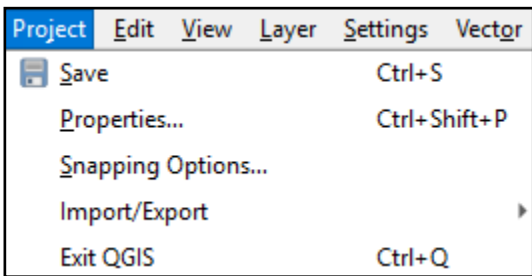
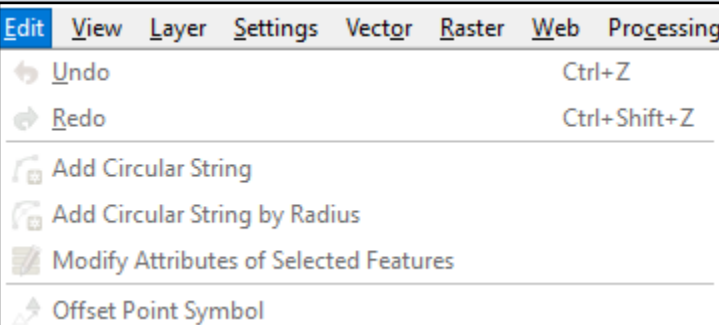
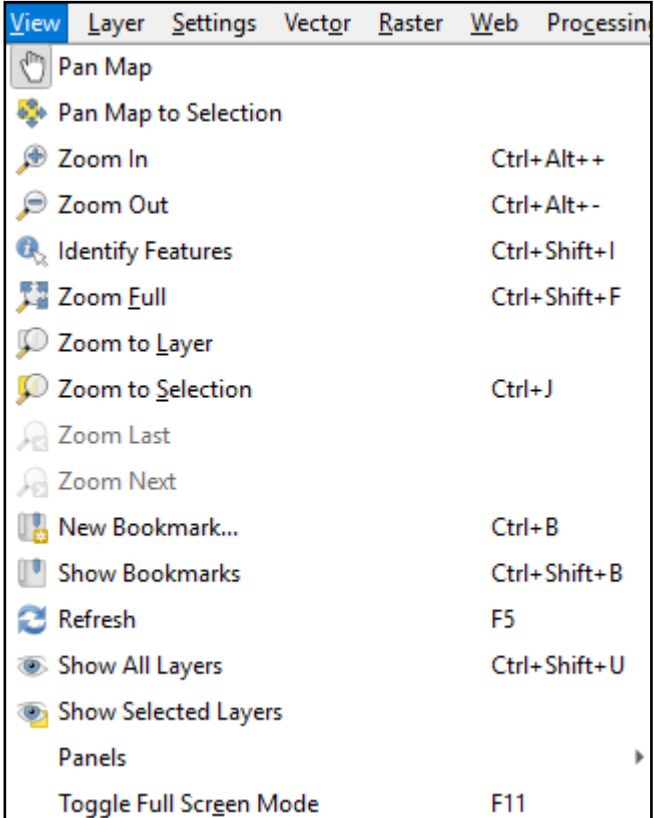
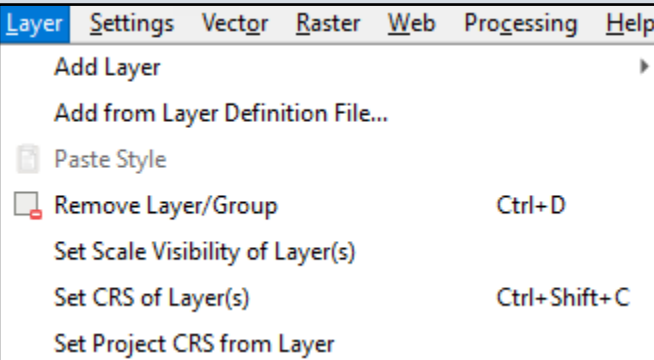


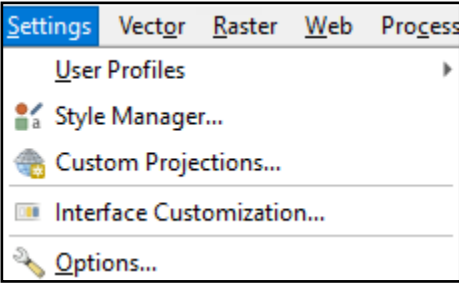
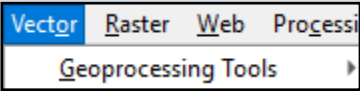
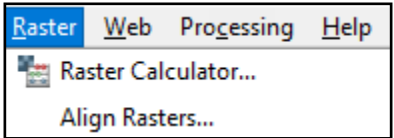
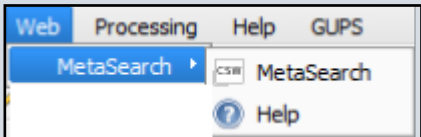
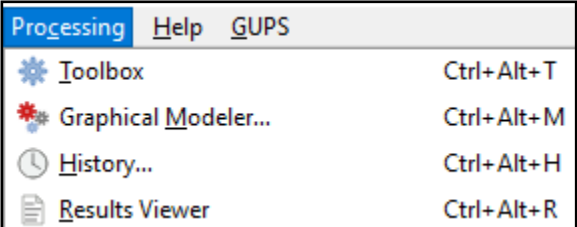
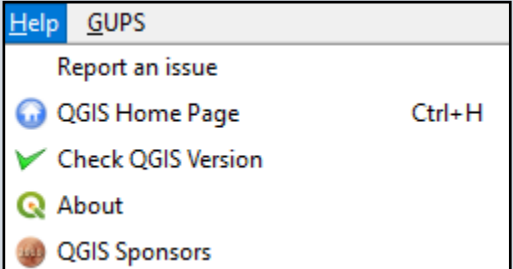
Figure 12: Menu Bar

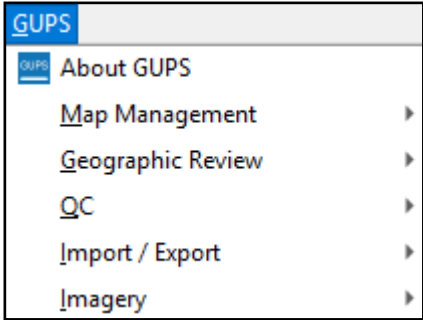
[Table 21](#) provides the function(s)/description(s) of the menus and sub-menus of the Menu bar.

Table 21: Menu Bar Tabs and Their Function/Description

Menu	Menu Option(s)	Function/Description
Project		Provides access and exit points of the project file.

Menu	Menu Option(s)	Function/Description
Edit		<p>Provides most of the native tools to edit layer attributes or geometry.</p> <p>For the Undo and Redo sub-menus to activate, the layer must be active/selected in the Table of Contents.</p>
View		<p>Provides tools to interact with Map View.</p>
Layer		<p>Provides large set of tools to create new data sources, add them to a project, or save modifications to them.</p> <p>The Add Layer sub-menu is useful to add PUMA delineations as reference layer prior to importing into a project.</p>

Menu	Menu Option(s)	Function/Description
Settings		Provides tools and options to manage profiles, styles, projections, and interfaces of the project. Because we ask for no changes to the Map content (so no changes to the projection), this menu is not needed for the 2020 PUMA.
Vector		Provides common vector-based GIS tasks from different providers. Core plugins affect subcomponent availability. Not needed for the 2020 PUMA.
Raster		Provides common raster-based GIS tasks from different providers. Core plugins affect subcomponent availability. Not needed for the 2020 PUMA.
Web		Provides access to tools that are QGIS based. Not needed for the 2020 PUMA.
Processing		Provides tools that pertain to algorithms, models, etc. Not needed for the 2020 PUMA.
Help		Provides common help functions for understanding QGIS.

Menu	Menu Option(s)	Function/Description
GUPS		<p>Provides information about GUPS version (About GUPS) and shortcuts to other common GUPS related toolbars.</p> <p>The About GUPS sub-menu provides the GUPS version number. Callers to technical support need to provide the version number with their question.</p>

Proceed to the next sub-appendix for details on the Standard toolbar.

C2 Standard Toolbar

The Standard toolbar, shown in [Figure 13](#), provides navigation tools and other tools needed to interact with the Map View and layers' attribute tables.



Figure 13: Standard Toolbar

The Standard toolbar includes three sub-toolbars, identified by the grouping bars or markers on the toolbar. See [Figure 14](#) for a visual of the markers.





















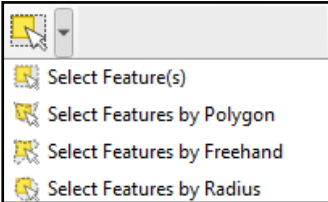
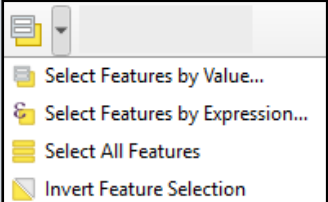


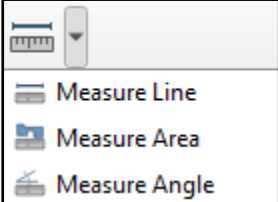
Figure 14: Sub-Toolbar Markers

The first sub-toolbar, the Project toolbar, contains buttons for saving projects, changing map projects, and managing map projects. The second sub-toolbar, the Map Navigation toolbar, contains buttons to navigate the Map View. The last sub-toolbar, the Attributes toolbar, contains buttons to identify, select, and measure elements within the map. To rearrange the toolbars, press the left mouse button and hold the sub-toolbar marker then drag it to the desired location within the project. Release the mouse button to set the toolbar in the new location.

[Table 22](#) provides a visual of each button, the corresponding name, and each button's function/description.

Table 22: Standard Toolbar Buttons and Their Function/Description

Button	Name	Function/Description
	Save	Saves the current GUPS project including changes to the layer properties, last viewed map extent, and layers added.
	Style Manager	Opens window to edit the markers, lines, fills, colors, etc. within a project. Not recommended for use in the 2020 PUMA.
	Map Management	Opens window to choose GUPS program, import a zip file, or open a recent project. Likely will not use once the PUMA project is initially created.
	GUPS Data Settings	Opens window to change the GUPS working directory should problems occur when loading data. Also allows for deletion of a program or a project. Contact the Census Bureau prior to use of this button because deletion of program or project is permanent. For more instructions specific to cleaning a PUMA project refer to Appendix E .
	Import Custom Shapefile	Permits user to import their own shapefiles for reference into a project.
	Pan Map	Re-centers Map View based on location selected in the Map View without changing the scale.
	Pan Map to Selection	Re-centers Map View based on selected feature(s) without changing the scale.
	Zoom In	Increases the map scale after selecting the Map View and displays Map View at the larger scale.
	Zoom Out	Decreases the map scale after selecting the Map View and displays Map View at the smaller scale.
	Zoom Full	Displays Map View at the full extent of the project.
	Zoom to Selection	Zooms to the scale of the feature selected in the Map View or in the attribute table.
	Zoom to Layer	Zooms to the extent of layer selected in the Table of Contents.
	Zoom Last	Returns to the previous zoom extent.

Button	Name	Function/Description
	Zoom Next	Moves forward to the next zoom extent.
	New Bookmark	Creates a spatial bookmark for the given area to ease navigation. Allows for the naming and saving of the geographic location for future reference.
	Show Bookmarks	Views and manages spatial bookmarks. Use the mouse to double-click bookmark name in the Spatial Bookmark window to zoom to the bookmark.
	Refresh	Refreshes Map View at the current extent.
	Identify Features	Identifies features in the Map View.
	Select Features by area or single click	Reveals four selection methods: single click, polygon, freehand, and radius. PUMA participants' likely use tools within the PUMA toolbar to select features.
	Select Features by Value	Reveals four selection tactics: by value, by expression, all features, and invert selection. PUMA participants' likely use tools within the PUMA toolbar to select features.
	Deselect Features from All Layers	Deselects selected features from all layers in a single action. Useful to deselect census tracts or counties and begin again during delineation.
	Toolbox	Reveals a Processing Toolbox window with numerous QGIS processing tasks. Not used in the 2020 PUMA.
	Measure	Reveals three measure options to measure the distance along a line, for an area, or for an angle on the map.

Proceed to the next sub-appendix for details on the Table of Contents and its toolbar.

C3 Table of Contents and TOC Toolbar

Though the Census Bureau believes the default organization of layers and symbology serves PUMA participants in the most efficient manner, participants may use the Table of Contents and Table of Contents toolbar to manage the Map View. See [Figure 15](#) for a visual of the Table of Contents toolbar.

Using the Table of Contents toolbar, participants can add and remove layers or groups, manage map themes, filter the legend by map content or by expression, expand or collapse all sections of the Table of Contents list at once and may remove layers/groups. Participants may manipulate layers and symbology in GUPS using basic selection/deselection techniques in the Table of Contents, like with other GIS software. Manipulation of layers within the Table of Contents may assist with viewing information more appropriately in the Map View. Changes made in the Table of Contents reflect immediately in the Map View.

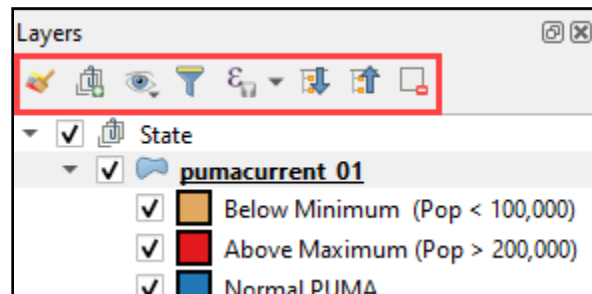










Figure 15: Table of Contents Toolbar

[Table 23](#) provides a visual of each button, the corresponding name, and each button's function/description.

Table 23: Table of Contents Toolbar Buttons and Their Function/Description

Button	Name	Function/Description
	Open Layer Styling Panel	Toggles layer styling panel on/off.
	Add Group	Organizes layers in the Table of Contents into groups.
	Manage Map Themes	Offers modification of views based on layers in the Table of Contents.
	Filter Legend by Map Content	Removes layers not currently in the Map View extent.
	Filter Legend by Expression	Removes features from the selected layer tree style that have no features satisfying a condition/expression.
	Expand All	Expands the Table of Contents menus to display all layers under each group's menu.
	Collapse All	Collapses the Table of Contents menus to only show groups (not the layers beneath).
	Remove Layer/Group	Removes a layer or group from the Table of Contents.

To manage visibility of individual groups or layers, check the checkbox next to a layer to make the layer visible (e.g., turn the layer on) in the Map View. Uncheck the checkbox (e.g., turn the layer off) next to a layer to make the layer invisible in the Map View. This may prove beneficial if the Map View is cluttered with too many data layers.

To expand the menu for a layer or grouped layer, select the ▶ symbol and the sub-menu opens. Select the ▼ symbol to collapse the sub-menu. See [Figure 16](#) for an example of the checkmark and arrow symbology.

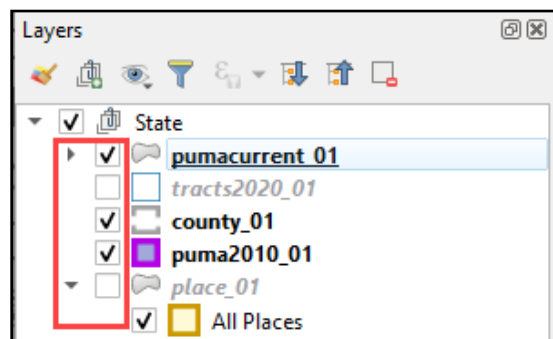


Figure 16: Table of Contents with Layer Checkmarks and Arrows

The order in which the layers appear in the Table of Contents determines the order that the layers display in the Map View. The layers at the top of the Table of Contents display on top of the layers that appear below them. While PUMA GUPS is programmed to display data layers in an order that works for most participants, adding imagery or other data layers may require a reordering of layers for the map elements to appear properly within GUPS. To manage the order of layers, use the mouse and follow these steps:

1. Select the layer name in the Table of Contents.
2. Hold down the mouse button and drag the layer to the desired position in the Table of Contents.
3. Release the mouse button to place the layer in its new position. The Map View will reflect the new layer order in the Table of Contents.

IMPORTANT: Map labels appear at varying scales dependent on the map layer. For instance, census tract labels appear at the 1:20,000 scale, while minor civil division and incorporated place labels appear at 1:250,000 scale.

Proceed to the next sub-appendix for details on the Status bar.

C4 Status Bar




The Status bar, shown in [Figure 17](#), provides details on the coordinates, scale, magnification, rotation, and projection. These tools allow users to adjust the display. Also included are an icon to review the software logs and a tool for rendering. Neither of which are used very often during delineation.

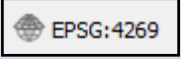



Figure 17: Status Bar

[Table 24](#) shows the elements within the Status bar and describes their function(s).

Table 24: Status Bar Elements and Their Function/Description

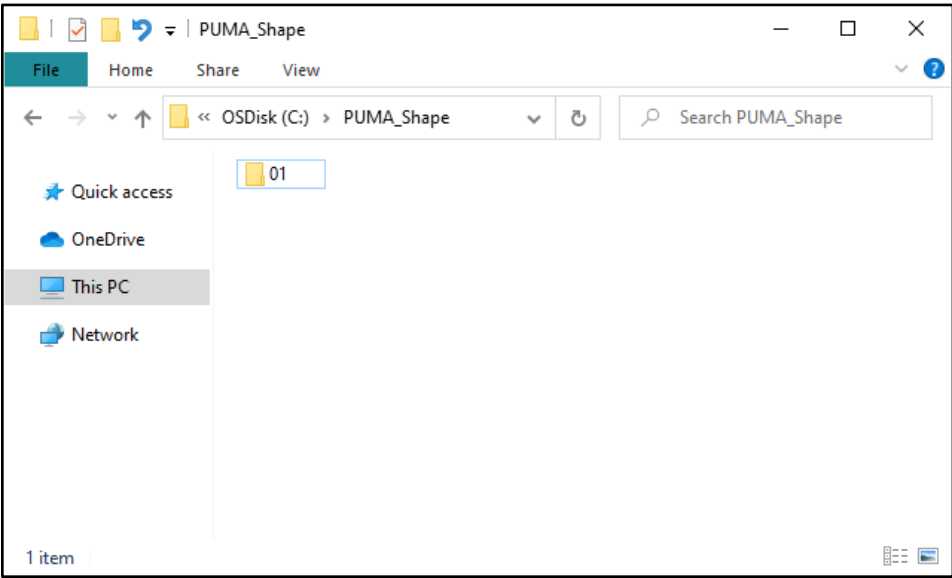

Element	Function/Description
	This locator bar, a quick search widget, helps find and run any feature or option in QGIS.
Coordinate	Shows the current position in map coordinates as the mouse moves across the Map View. The default unit shown is decimal degrees. As a reminder, do not change the projection of the project.
	Toggles between the coordinate position of the mouse cursor or the Map View extents as the map is panned and zoomed.
	Locks the scale to use the magnifier to zoom in and out at the locked scale.


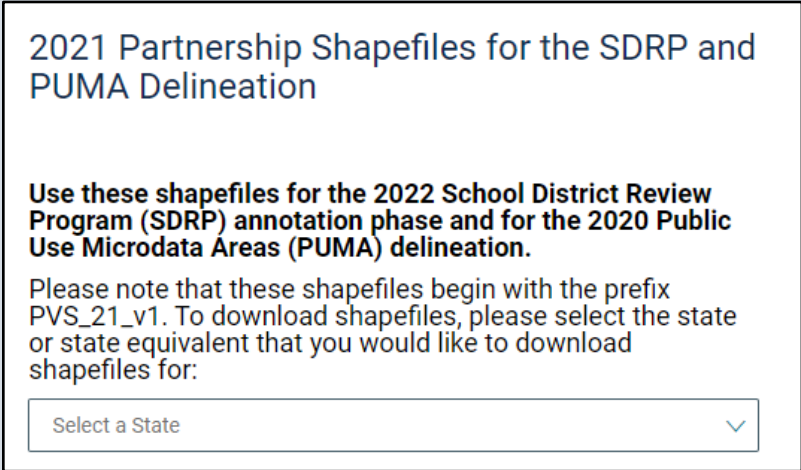
Element	Function/Description
Magnifier	Allows user to zoom without changing the scale in the Map View, making it easier to tweak label positions and symbols. Magnification is as percentage. If 100%, then magnification is not applied to the view.
Rotation	Defines the clockwise rotation for Map View in degrees.
Render	Checkbox to handle the rendering of layers to the Map View.
	Shows the current coordinate reference system used in the Map View.
	Shows the logs for the GUPS session.

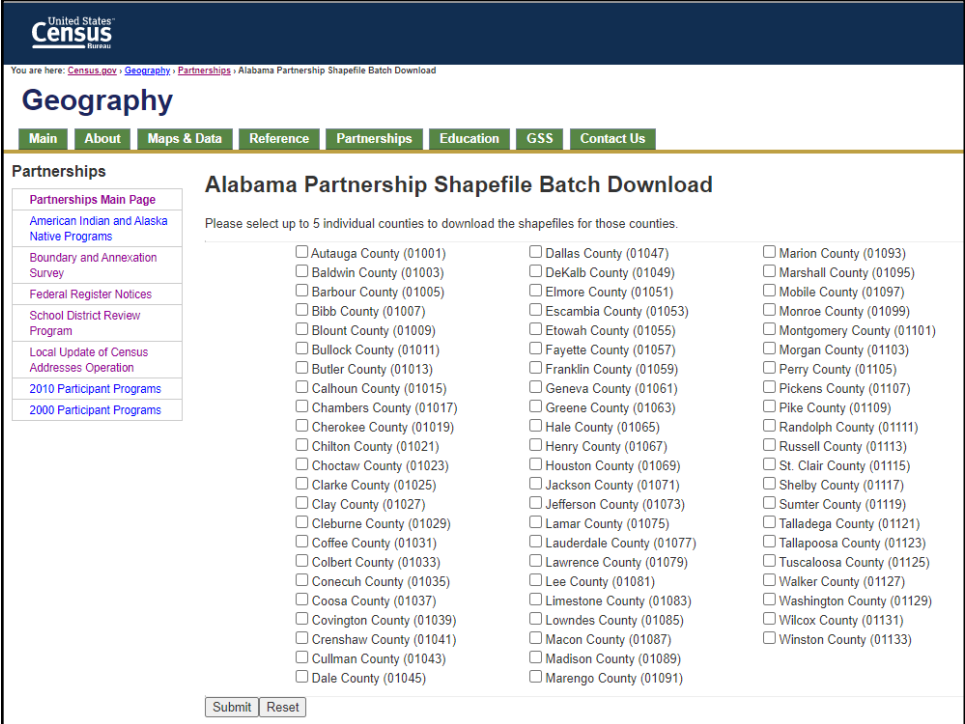
APPENDIX D START A PUMA PROJECT USING MY COMPUTER


While not the preferred option, participants with unstable internet connectivity or restrictions placed on their local network may download the shapefiles to their local machine/network rather than using the Census Web option. To use files from a local computer, the first steps involve downloading and unzipping the proper partnership shapefiles. Follow the steps outlined in [Table 25](#) for instructions on acquiring and staging the shapefiles needed for the 2020 PUMA.

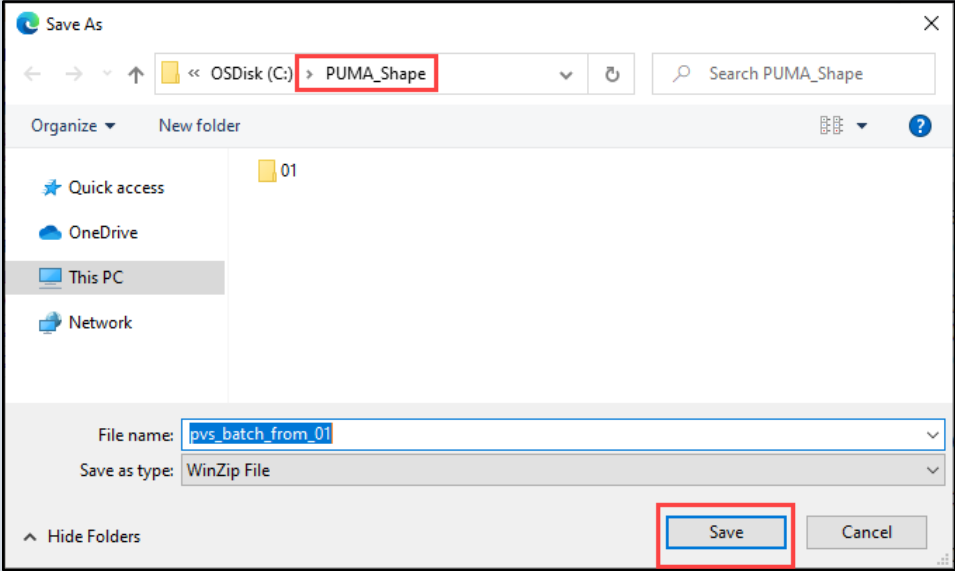
Table 25: Steps to Download and Unzip the 2021 Partnership Shapefiles

Step	Action and Result(s)
Step 1	<p>Create a directory on the local computer or network named PUMA_Shape or something similar. Within the PUMA_Shape directory, create a sub-directory for the state using its two-digit state FIPS code. This example uses 01 for the state of Alabama.</p> 
	<p>The Census Bureau does not recommend including “GUPS” in the folder’s name to clearly separate locally downloaded shapefiles from GUPS related information.</p>

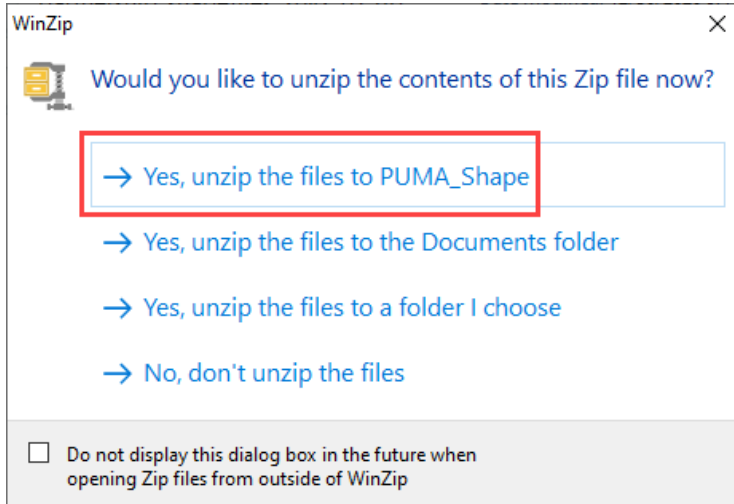
Step	Action and Result(s)
Step 2	<p>Navigate to the 2020 PUMA website, scroll down to select Download Partnership Shapefiles. <i>The main Partnership Shapefiles website opens in a separate window.</i></p> 
Step 3	<p>Ensure the use of the 2021 Partnership Shapefiles for the SDRP and PUMA Delineation vintage. Within this section of the page, use the Select a State drop-down menu to select the state to download.</p> 

Step	Action and Result(s)
Step 4	<p>The state's partnership shapefile batch download window appears with all the counties within the selected state shown.</p> 

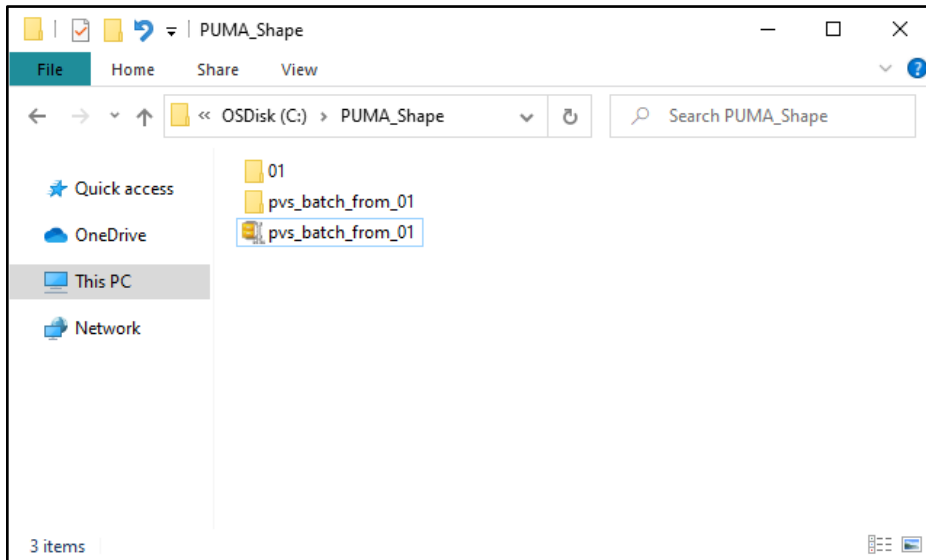
Step	Action and Result(s)																																														
Step 5	<p>Participants may choose a maximum of five counties from the list and select Submit. Select Reset to clear the selection and begin again.</p> <div data-bbox="495 310 1260 1134" style="border: 1px solid black; padding: 10px;"> <h3 style="text-align: center;">Alabama Partnership Shapefile Batch Download</h3> <p>Please select up to 5 individual counties to download the shapefiles for those counties.</p> <table border="0" style="width: 100%;"> <tr> <td><input checked="" type="checkbox"/> Autauga County (01001)</td> <td><input type="checkbox"/> Dallas County (01047)</td> </tr> <tr> <td><input type="checkbox"/> Baldwin County (01003)</td> <td><input type="checkbox"/> DeKalb County (01049)</td> </tr> <tr> <td><input type="checkbox"/> Barbour County (01005)</td> <td><input type="checkbox"/> Elmore County (01051)</td> </tr> <tr> <td><input type="checkbox"/> Bibb County (01007)</td> <td><input type="checkbox"/> Escambia County (01053)</td> </tr> <tr> <td><input type="checkbox"/> Blount County (01009)</td> <td><input type="checkbox"/> Etowah County (01055)</td> </tr> <tr> <td><input type="checkbox"/> Bullock County (01011)</td> <td><input type="checkbox"/> Fayette County (01057)</td> </tr> <tr> <td><input type="checkbox"/> Butler County (01013)</td> <td><input type="checkbox"/> Franklin County (01059)</td> </tr> <tr> <td><input type="checkbox"/> Calhoun County (01015)</td> <td><input type="checkbox"/> Geneva County (01061)</td> </tr> <tr> <td><input type="checkbox"/> Chambers County (01017)</td> <td><input type="checkbox"/> Greene County (01063)</td> </tr> <tr> <td><input type="checkbox"/> Cherokee County (01019)</td> <td><input type="checkbox"/> Hale County (01065)</td> </tr> <tr> <td><input type="checkbox"/> Chilton County (01021)</td> <td><input type="checkbox"/> Henry County (01067)</td> </tr> <tr> <td><input type="checkbox"/> Choctaw County (01023)</td> <td><input type="checkbox"/> Houston County (01069)</td> </tr> <tr> <td><input type="checkbox"/> Clarke County (01025)</td> <td><input type="checkbox"/> Jackson County (01071)</td> </tr> <tr> <td><input type="checkbox"/> Clay County (01027)</td> <td><input type="checkbox"/> Jefferson County (01073)</td> </tr> <tr> <td><input type="checkbox"/> Cleburne County (01029)</td> <td><input type="checkbox"/> Lamar County (01075)</td> </tr> <tr> <td><input type="checkbox"/> Coffee County (01031)</td> <td><input type="checkbox"/> Lauderdale County (01077)</td> </tr> <tr> <td><input type="checkbox"/> Colbert County (01033)</td> <td><input type="checkbox"/> Lawrence County (01079)</td> </tr> <tr> <td><input type="checkbox"/> Conecuh County (01035)</td> <td><input type="checkbox"/> Lee County (01081)</td> </tr> <tr> <td><input type="checkbox"/> Coosa County (01037)</td> <td><input type="checkbox"/> Limestone County (01083)</td> </tr> <tr> <td><input type="checkbox"/> Covington County (01039)</td> <td><input type="checkbox"/> Lowndes County (01085)</td> </tr> <tr> <td><input type="checkbox"/> Crenshaw County (01041)</td> <td><input type="checkbox"/> Macon County (01087)</td> </tr> <tr> <td><input type="checkbox"/> Cullman County (01043)</td> <td><input type="checkbox"/> Madison County (01089)</td> </tr> <tr> <td><input type="checkbox"/> Dale County (01045)</td> <td><input type="checkbox"/> Marengo County (01091)</td> </tr> </table> <p style="text-align: center;"><input type="button" value="Submit"/> <input type="button" value="Reset"/></p> </div> <p>If the participant intends to use reference layers to assist with delineation and is unable to use the Census Web option for loading reference layers, then this is the mechanism for downloading the individual county shapefiles used for that process. Create a sub-directory for the county in PUMA_Shape (e.g., 01001) before proceeding. This is not illustrated in this table/example.</p>	<input checked="" type="checkbox"/> Autauga County (01001)	<input type="checkbox"/> Dallas County (01047)	<input type="checkbox"/> Baldwin County (01003)	<input type="checkbox"/> DeKalb County (01049)	<input type="checkbox"/> Barbour County (01005)	<input type="checkbox"/> Elmore County (01051)	<input type="checkbox"/> Bibb County (01007)	<input type="checkbox"/> Escambia County (01053)	<input type="checkbox"/> Blount County (01009)	<input type="checkbox"/> Etowah County (01055)	<input type="checkbox"/> Bullock County (01011)	<input type="checkbox"/> Fayette County (01057)	<input type="checkbox"/> Butler County (01013)	<input type="checkbox"/> Franklin County (01059)	<input type="checkbox"/> Calhoun County (01015)	<input type="checkbox"/> Geneva County (01061)	<input type="checkbox"/> Chambers County (01017)	<input type="checkbox"/> Greene County (01063)	<input type="checkbox"/> Cherokee County (01019)	<input type="checkbox"/> Hale County (01065)	<input type="checkbox"/> Chilton County (01021)	<input type="checkbox"/> Henry County (01067)	<input type="checkbox"/> Choctaw County (01023)	<input type="checkbox"/> Houston County (01069)	<input type="checkbox"/> Clarke County (01025)	<input type="checkbox"/> Jackson County (01071)	<input type="checkbox"/> Clay County (01027)	<input type="checkbox"/> Jefferson County (01073)	<input type="checkbox"/> Cleburne County (01029)	<input type="checkbox"/> Lamar County (01075)	<input type="checkbox"/> Coffee County (01031)	<input type="checkbox"/> Lauderdale County (01077)	<input type="checkbox"/> Colbert County (01033)	<input type="checkbox"/> Lawrence County (01079)	<input type="checkbox"/> Conecuh County (01035)	<input type="checkbox"/> Lee County (01081)	<input type="checkbox"/> Coosa County (01037)	<input type="checkbox"/> Limestone County (01083)	<input type="checkbox"/> Covington County (01039)	<input type="checkbox"/> Lowndes County (01085)	<input type="checkbox"/> Crenshaw County (01041)	<input type="checkbox"/> Macon County (01087)	<input type="checkbox"/> Cullman County (01043)	<input type="checkbox"/> Madison County (01089)	<input type="checkbox"/> Dale County (01045)	<input type="checkbox"/> Marengo County (01091)
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<input type="checkbox"/> Dale County (01045)	<input type="checkbox"/> Marengo County (01091)																																														
	<p>To download all the necessary state level files for the 2020 PUMA, a participant only needs to select one county from the list. This action downloads the data for that selected county as well as all the state level files. If the participant does not need the county level data, they can choose a single, small county to download to shorten the download time and reduce the .zip file size.</p>																																														

Step	Action and Result(s)
Step 6	<p>The selected county and state files are bundled into one .zip file for saving locally. The file is pvs_batch_from_xx.zip, where xx is the two-digit state FIPS code. Use the local system's process for saving the .zip file to the previously created PUMA_Shape directory.</p>  <p>The screenshot shows a 'Save As' dialog box with the following details:</p> <ul style="list-style-type: none"> Location: OSDisk (C:) > PUMA_Shape File name: pvs_batch_from_01 Save as type: WinZip File Buttons: Save (highlighted), Cancel

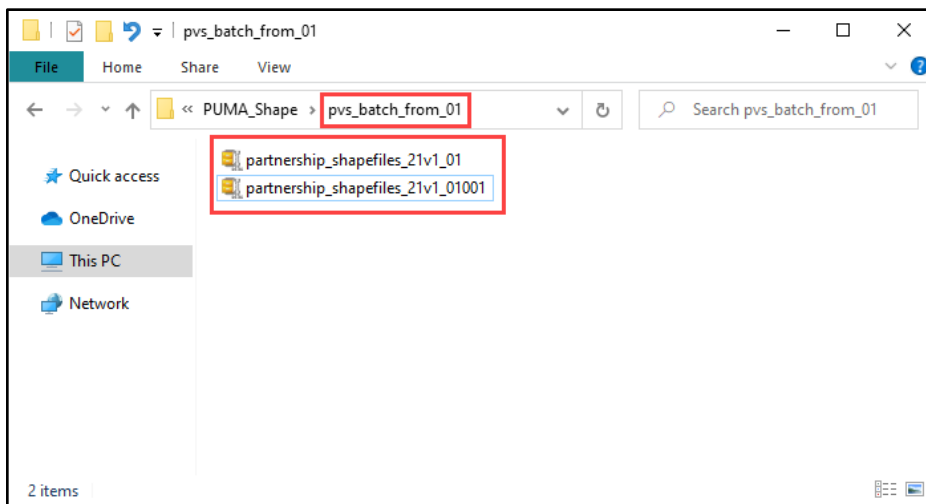
Unzip the **pvs_batch_from_xx.zip** file to the same **PUMA_Shape** directory.

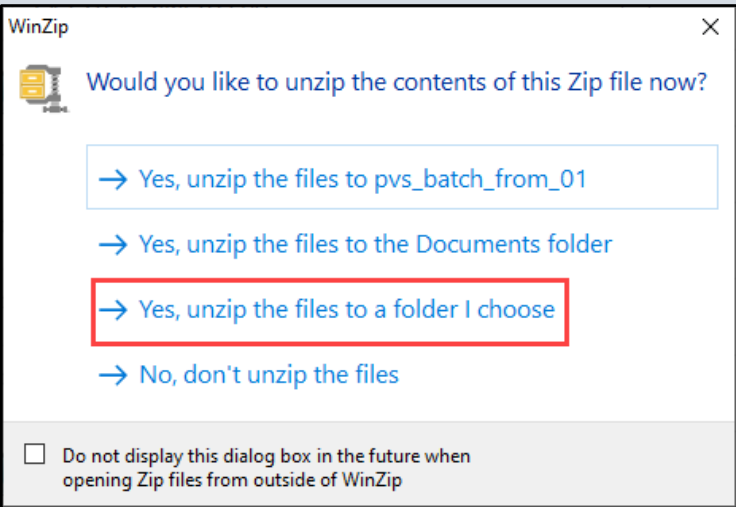
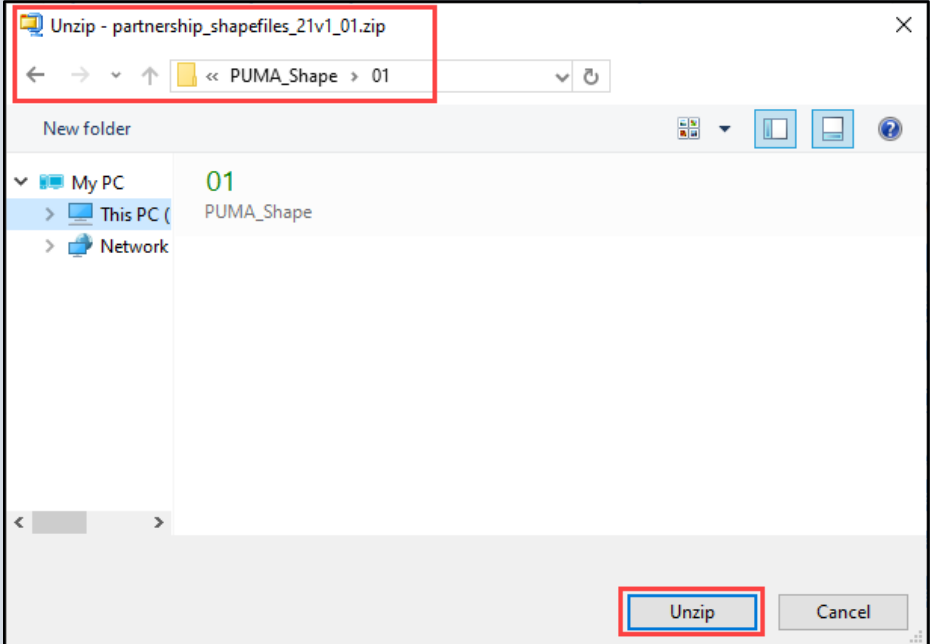



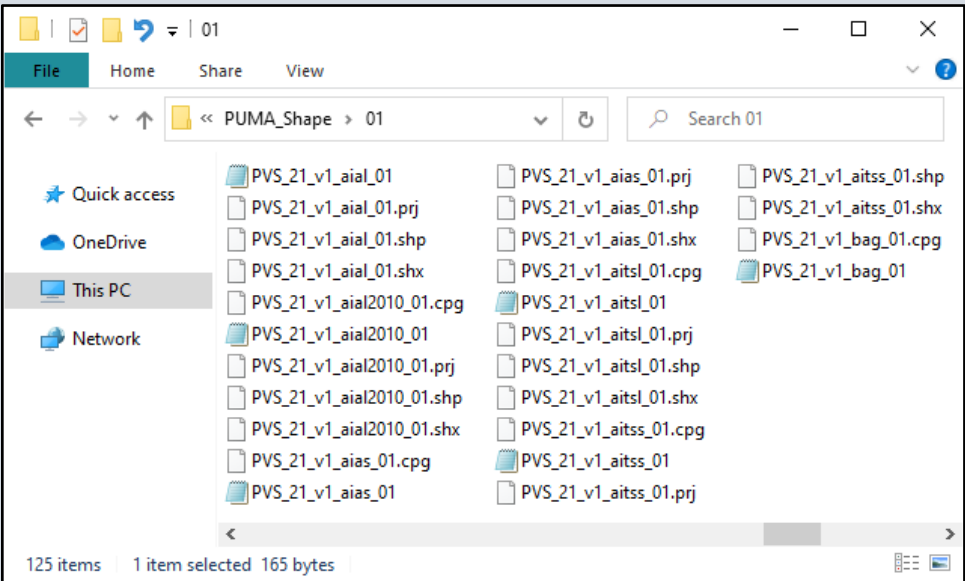

Step 7



The unzip process creates another sub-directory (*pvs_batch_from_01*) which contains the additional .zip files for the state and county(s) selected in Step 6.

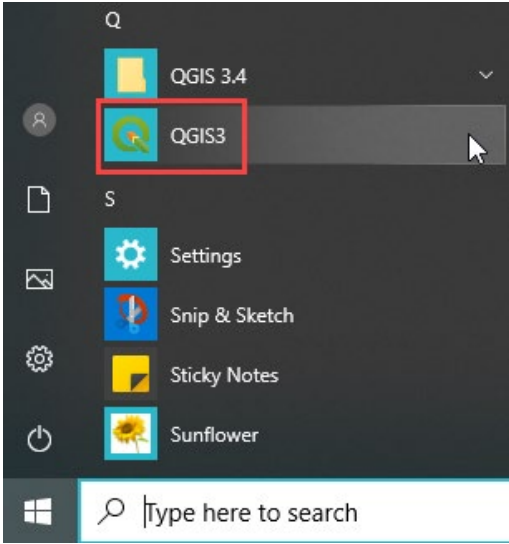



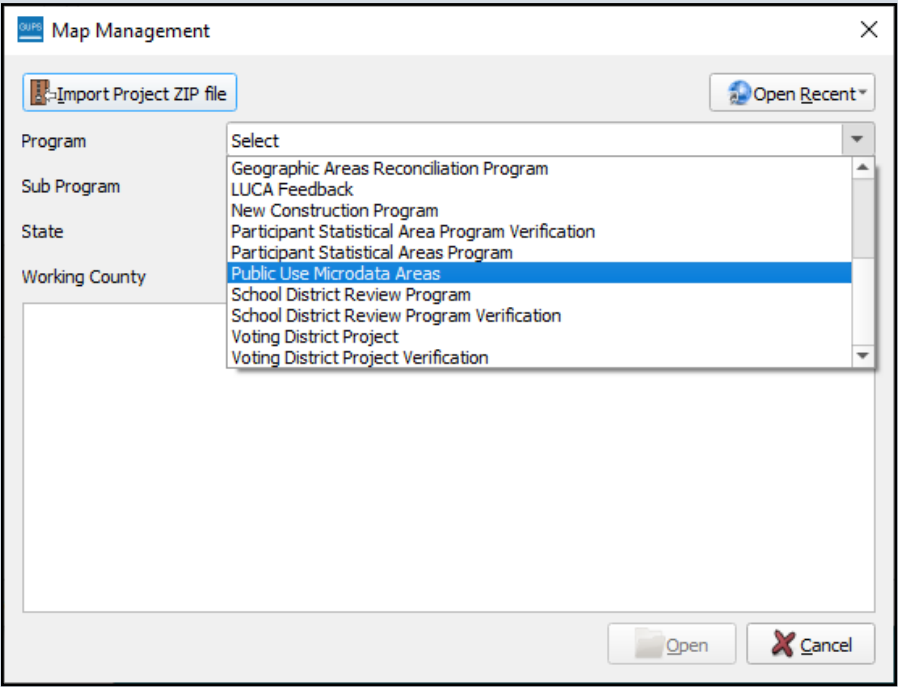

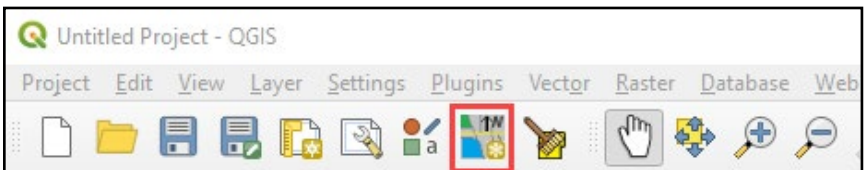
Step	Action and Result(s)
<p>Step 8</p>	<p>Unzip the state-level zip file (i.e., partnership_shapefiles_21v1_01.zip) to the state sub-directory (01) created in Step 1. For WinZip, choose the third option, “Yes, unzip the files to a folder I choose” to select this state sub-directory.</p>  
	<p>To unzip the county-level .zip file, create a county level sub-directory in Step 1 and follow the same process. If the county level shapefiles are not needed, unzip only the .zip file that ends with the state FIPS code.</p>

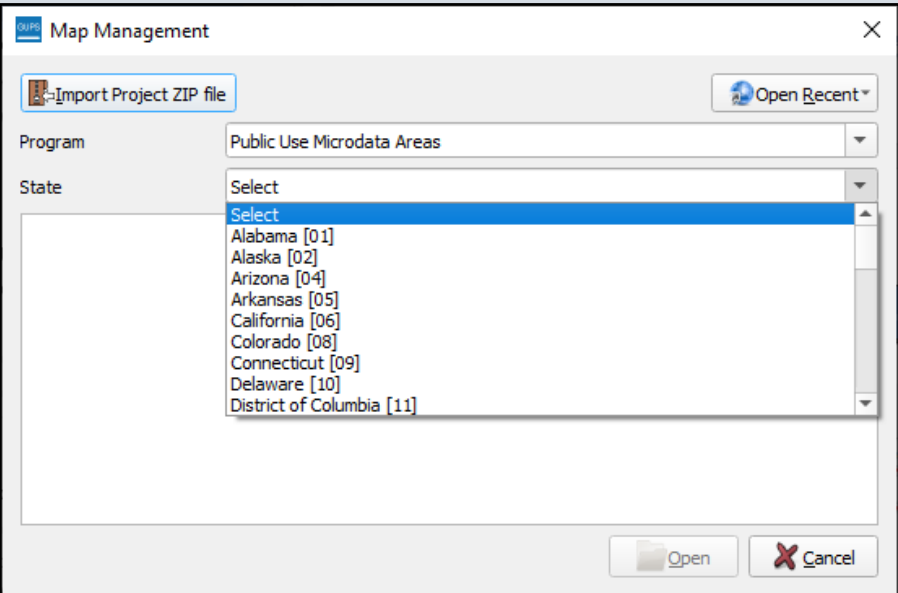
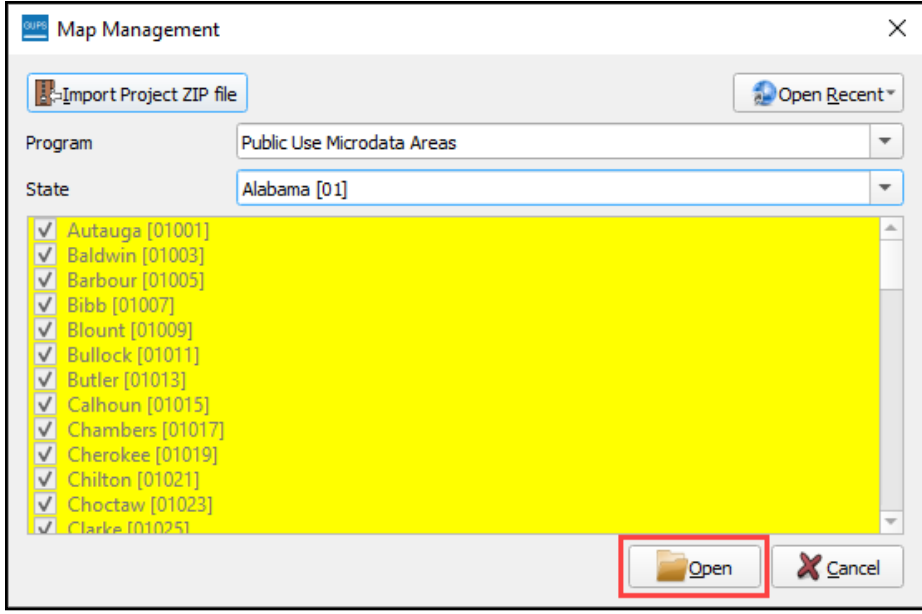
Step	Action and Result(s)
Step 9	<p>Once unzipped, the state sub-directory contains the shapefile components. Confirm the sub-directory contains shapefiles that begin with "PVS_21_v1". This is the version required by 2020 PUMA. This image does not depict all the shapefiles in the folder.</p>  <p>The screenshot shows a File Explorer window titled '01' with the address bar set to 'PUMA_Shape > 01'. The file list includes:</p> <ul style="list-style-type: none"> PVS_21_v1_aial_01 PVS_21_v1_aial_01.prj PVS_21_v1_aial_01.shp PVS_21_v1_aial_01.shx PVS_21_v1_aial2010_01.cpg PVS_21_v1_aial2010_01 PVS_21_v1_aial2010_01.prj PVS_21_v1_aial2010_01.shp PVS_21_v1_aial2010_01.shx PVS_21_v1_aias_01.cpg PVS_21_v1_aias_01 PVS_21_v1_aias_01.prj PVS_21_v1_aias_01.shp PVS_21_v1_aias_01.shx PVS_21_v1_aitss_01.cpg PVS_21_v1_aitss_01 PVS_21_v1_aitss_01.prj PVS_21_v1_aitss_01.shp PVS_21_v1_aitss_01.shx PVS_21_v1_bag_01.cpg PVS_21_v1_bag_01 <p>125 items 1 item selected 165 bytes</p>
	<p>Participants using the "My Computer" option rather than "Census Web" must save the 2021 Partnership shapefiles as described in this table. GUPS requires one sub-directory with the state shapefiles (named by the state FIPS code) to operate properly.</p>

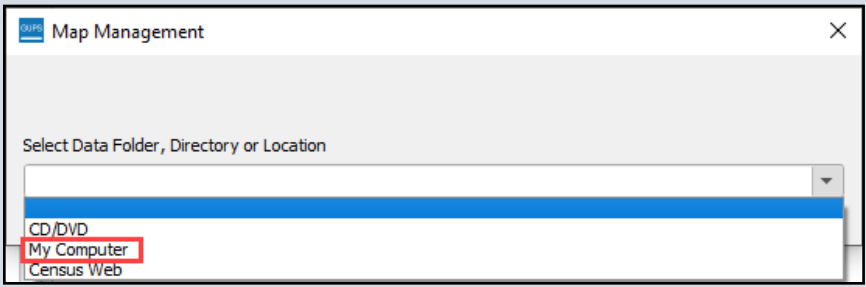
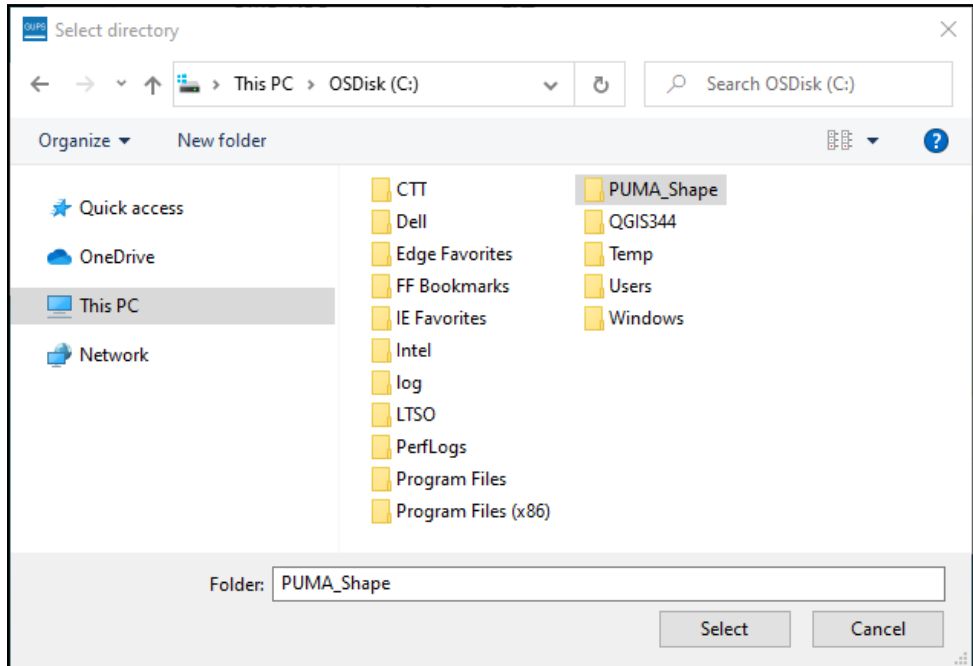
With the shapefiles downloaded and unzipped, proceed to [Table 26](#) for instructions to open GUPS and start a project using the My Computer option.

Table 26: Steps to Open GUPS and Start a PUMA Project Using My Computer

Step	Action and Result(s)
Step 1	<p>To open GUPS, select the QGIS3 icon from the Start Menu.</p>  <p>The <i>QGIS</i> splash screen appears. Depending on the age of the computer and amount of RAM, the application may require a few moments to load and open.</p> 

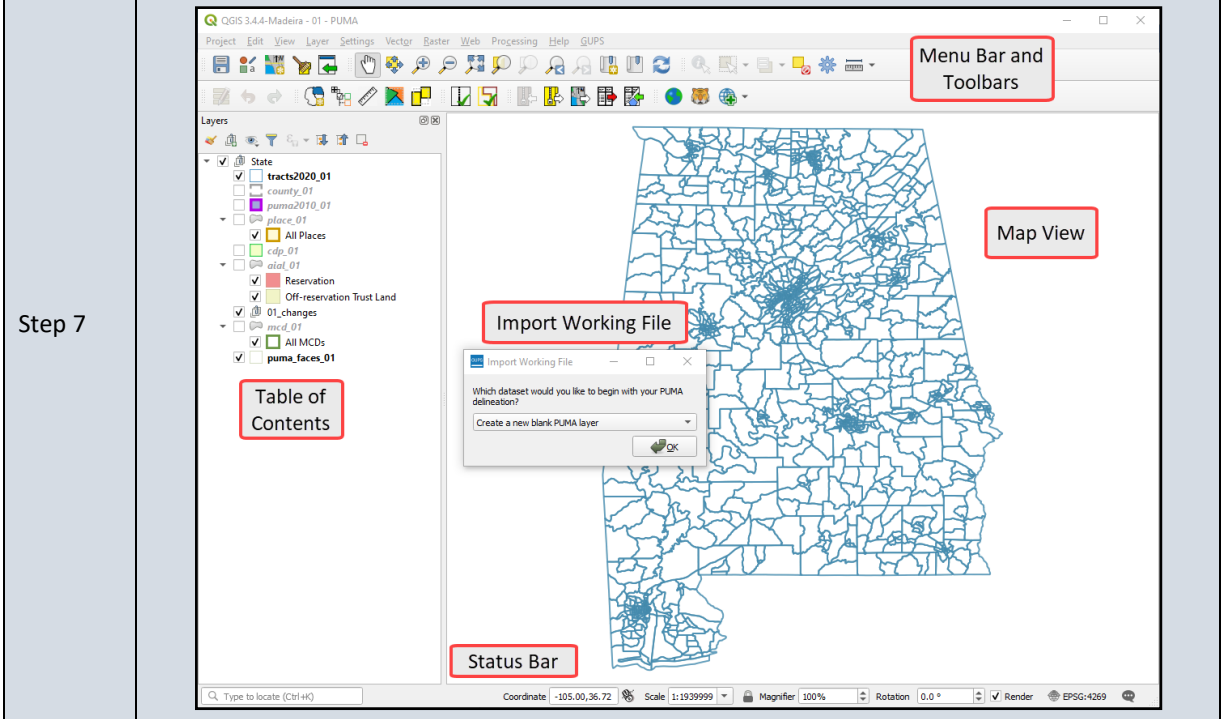
Step	Action and Result(s)
Step 2	<p>The Map Management window appears.</p>  <p>Use the drop-down menu next to the Program field to select Public Use Microdata Areas.</p>
	<p>If the Map Management window does not appear, choose the Map Management button from the Standard toolbar (shown below highlighted by a red rectangle). If it still does not appear, refer to Appendix B for troubleshooting tips.</p> 

Step	Action and Result(s)
Step 3	<p>Choose the state from the list beneath the State field.</p> 
Step 4	<p>With the state selected, choose the Open button.</p>  <p><i>All counties appear in the window below the state name and are selected for opening.</i></p>

Step	Action and Result(s)
Step 5	<p>From the Map Management window, choose My Computer from the Select Data Folder, Directory or Location menu.</p>  <p>The screenshot shows a window titled 'Map Management' with a dropdown menu open. The menu items are 'CD/DVD', 'My Computer', and 'Census Web'. 'My Computer' is highlighted with a blue bar and a red box around it.</p>
Step 6	<p>Navigate to the folder where the unzipped shapefiles are located as shown in Step 1 of Table 25 (e.g., PUMA_Shape) to select it. Choose Select.</p>  <p>The screenshot shows a Windows File Explorer window titled 'Select directory'. The address bar shows 'This PC > OSDisk (C:)'. The left sidebar shows 'This PC' selected. The main pane shows a list of folders including 'CTT', 'Dell', 'Edge Favorites', 'FF Bookmarks', 'IE Favorites', 'Intel', 'log', 'LTSO', 'PerfLogs', 'Program Files', 'Program Files (x86)', 'PUMA_Shape', 'QGIS344', 'Temp', 'Users', and 'Windows'. The 'PUMA_Shape' folder is selected and highlighted. The 'Folder:' field at the bottom contains 'PUMA_Shape'. There are 'Select' and 'Cancel' buttons at the bottom right.</p>

Step	Action and Result(s)
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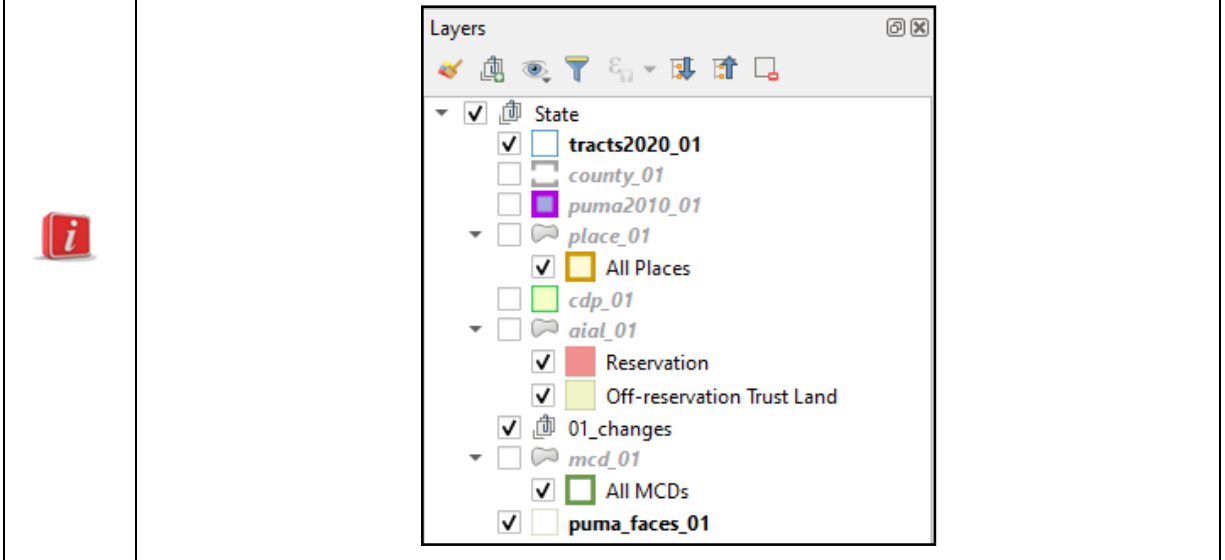
After the data loads into GUPS, the **Table of Contents** populates and symbolizes according to preset styles. The **Map View** displays the counties for the selected state. The **Menu Bar and Toolbars** appear along the top and the **Status Bar** appears at the bottom of the screen. The **Import Working File** window awaits selection for how to begin PUMA delineation. Refer to sub-chapter 3.1 for high-level information on the main page elements and the default layout.

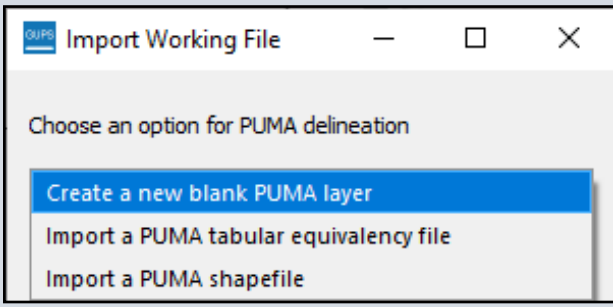
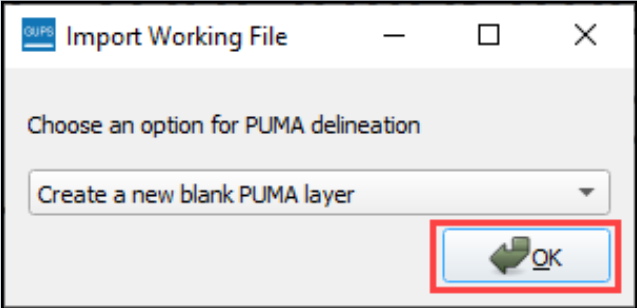



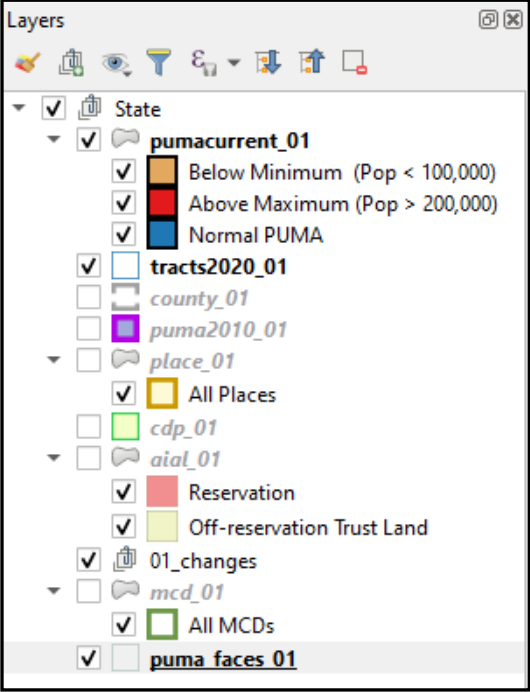

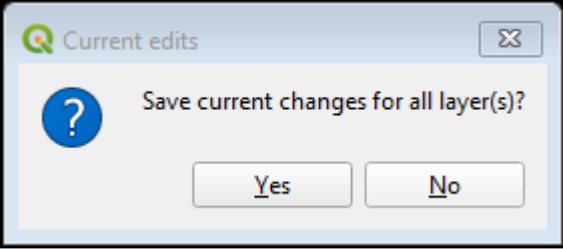
Step 7


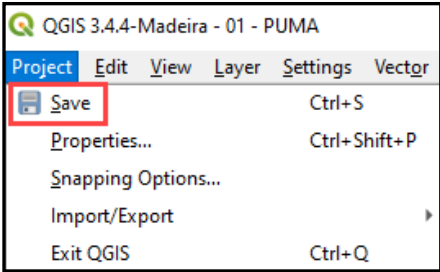
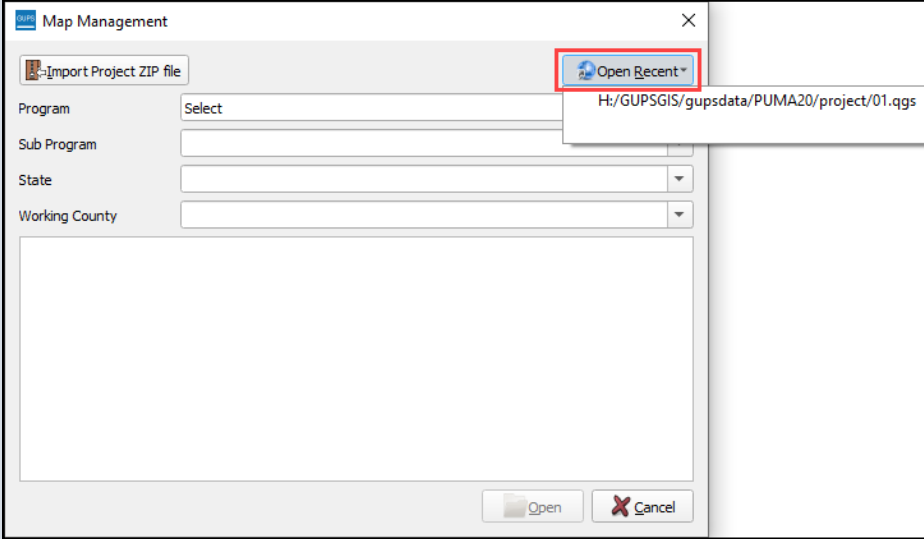
The **QGIS 3.4.4 Madeira** and **PUMA** display at the very top left of the application window, along with the two-digit FIPS code of the state. This information helps a participant confirm use of the newer QGIS version and selection of the correct state and program.

Basic data layers are loaded into the Table of Contents as shown below before choosing how to begin delineation. They are shown below.



Step	Action and <i>Result(s)</i>
Step 8	<p>Participants choose how to begin their delineation work from one of three options in the Import Working File window: Create a new blank PUMA layer, Import a PUMA tabular equivalency file, or Import a PUMA shapefile. Use of each option is detailed in Chapter 4.</p>  <p>Choose an option and the OK button to proceed.</p> 

Step	Action and <i>Result(s)</i>
	<p>After the delineation option is chosen, the Table of Contents updates to include additional data layers for delineation. In this case, the “pumacurrent_01” data layer is added since the Create a new blank PUMA layer option was selected.</p>  <p>The symbolization of the “pumacurrent” layer is vital to understanding the acceptable delineations in the Map View. PUMA delineations that fall below the minimum threshold appear in gold/tan while those that fall above the threshold are symbolized with red. Use of color brings a visual aid to the delineation process.</p>
Step 9	<p>To save a project, use the Save Project button on the Standard toolbar. Otherwise, delineation work will be lost.</p>  <p>The Current edits confirmation dialog box appears. Choose the Yes button to save or the No button to cancel without saving the project.</p> 

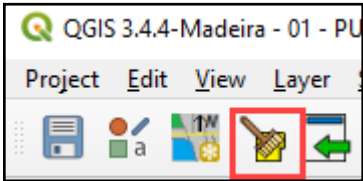
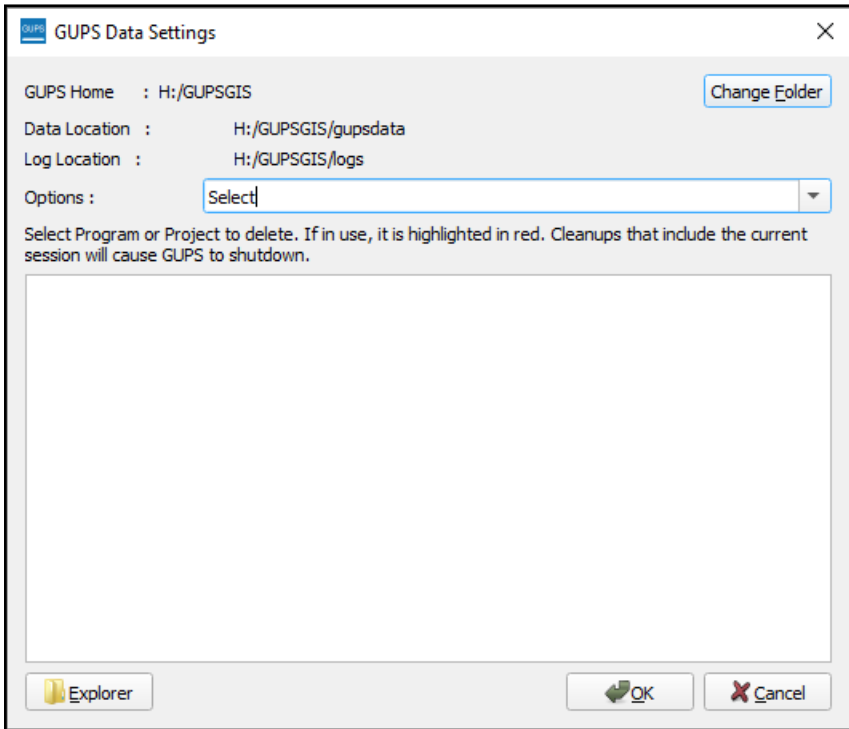

Step	Action and <i>Result(s)</i>
	<p>Participants may also use the Save option beneath the Project tab on the Menu bar to save the project.</p> 
<p>Step 10</p>	<p>To reopen a saved project, expand the menu beneath the Open Recent button in the Map Management window. <i>The drop-down list provides a list of current projects created using GUPS.</i></p> 

Return to sub-chapter [3.1](#) to complete the introduction of the GUPS menus and toolbars before proceeding with PUMA delineation as detailed in [Chapter 4](#).

APPENDIX E DELETE (CLEAN) A PUMA PROJECT

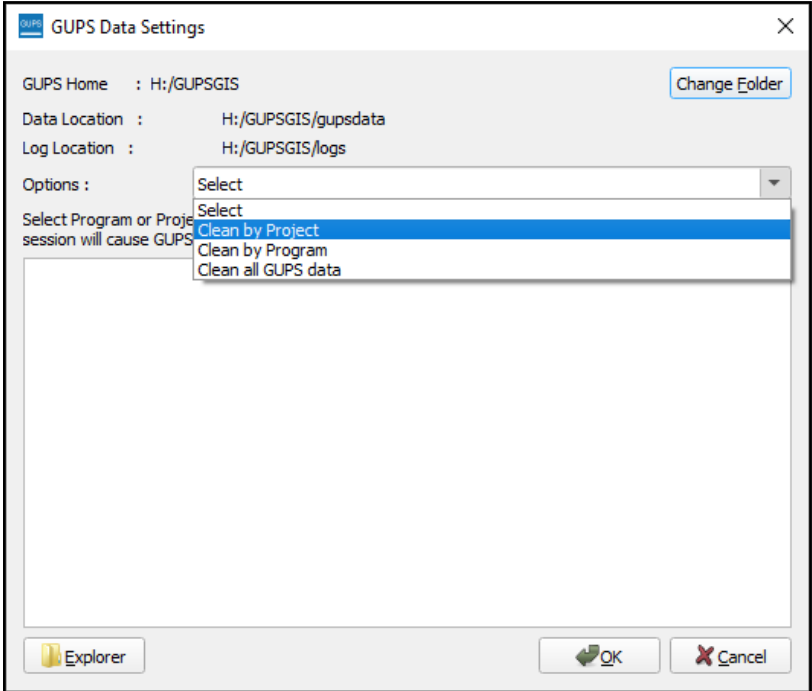
To ensure a successful import of a shared PUMA project or to completely delete a problematic project, participants use the Clean button from the Standard toolbar to erase an existing PUMA project and the sub-folders associated with the data in the project. Follow the steps in [Table 27](#) for instructions on this process.

Table 27: Steps to Delete (Clean) a PUMA Project

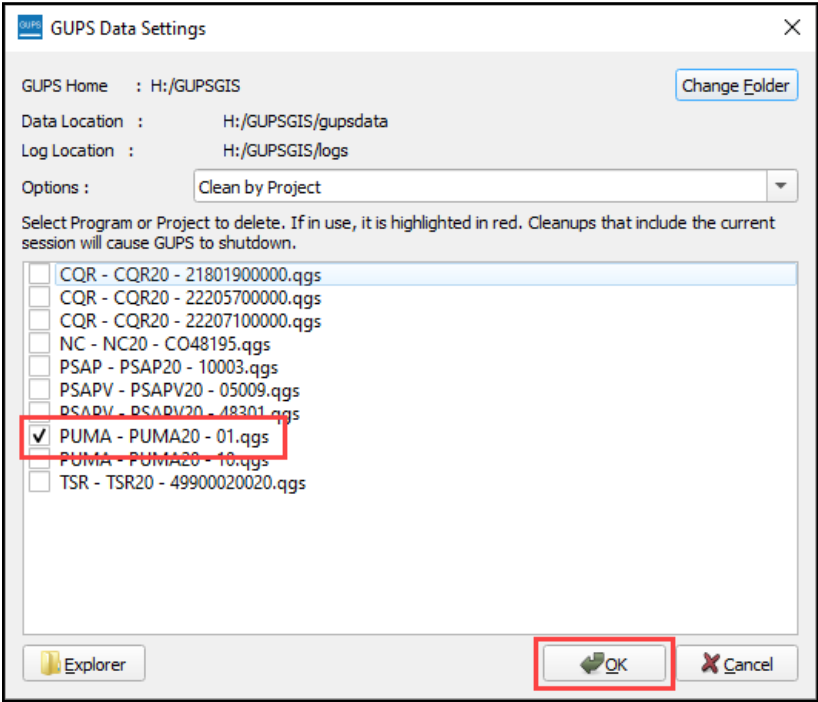
Step	Action and Result(s)
Step 1	<p>With GUPS launched, but no PUMA project open, select the Clean button from the Standard toolbar.</p>  <p>A GUPS Data Settings window appears.</p> 
	<p>A participant uses this same button/window to change the GUPS working directory (e.g., GUPS Home) location. This graphic uses the H:/GUPSGIS.</p>

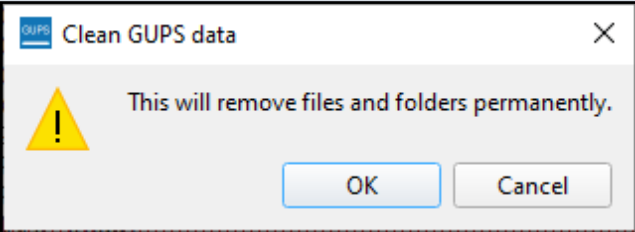

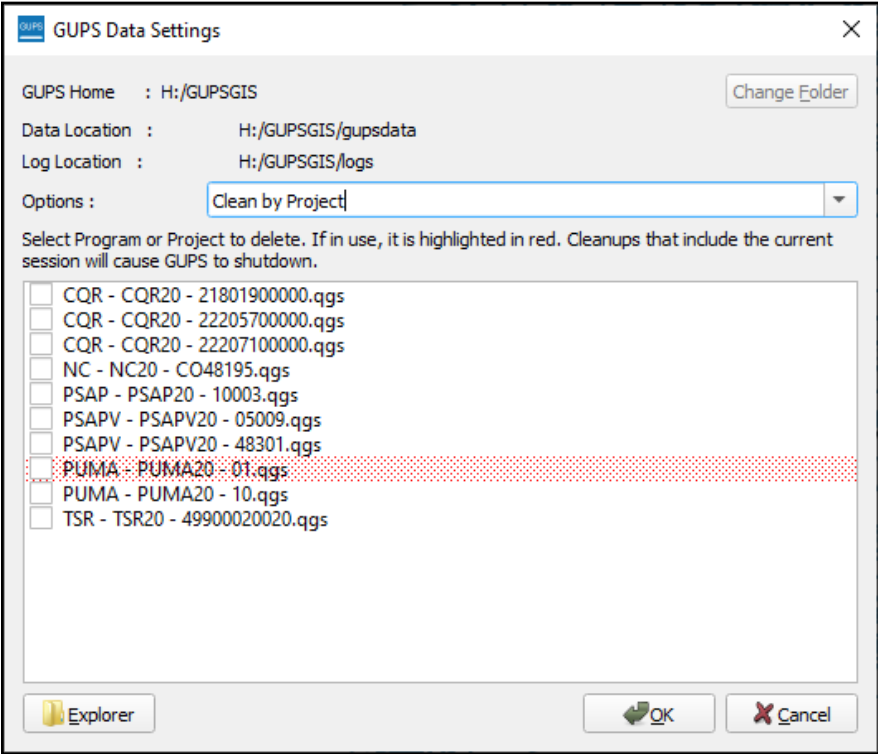
Step	Action and Result(s)
------	----------------------

Select **Clean by Project** from **Options** section of the **GUPS Data Settings** window.



Step 2 A list of projects saved on in the GUPS data directory appear. Select the project to delete from the list that appears and choose **OK** to proceed or **Cancel** to return to QGIS.



Step	Action and Result(s)
Step 3	<p>A Clean GUPS data warning window appears that informs the participant of the permanent nature of this action. Select OK to proceed with the deletion or Cancel to return to the GUPS Data Settings window.</p> 
	<p>An opened PUMA project will appear with a red shading from the list of program/project to delete.</p>  <p>If the opened project is selected for deletion, QGIS will offer the Clean GUPS data warning message and then close automatically and delete the project if OK is selected.</p>

Participants may now proceed with PUMA delineation, described in various options throughout [Chapter 4](#).

2020 Public Use Microdata Areas Program (PUMA) Coding Guidelines

September 2021

Background

State Data Centers (SDCs) provide PUMA names and codes with their 2020 PUMA submission. The Geographic Update Partnership Software (GUPS) stores this information and bundles these attributes during the export process. As the Census Bureau conducts their review of 2020 PUMA submissions, staff will work closely with SDCs to ensure the codes observe the guidelines in this material. Because these geographies and their attributes appear in public products (e.g., demographic, housing, and geographic products), the Census Bureau has final approval on all names and codes.

The *2010 PUMA Names File* that includes both the PUMA name and code for the nation is available on the [PUMA website](#). Participants in 2020 PUMA may find this reference file useful to copy/paste the names and codes into GUPS rather than re-typing the information.

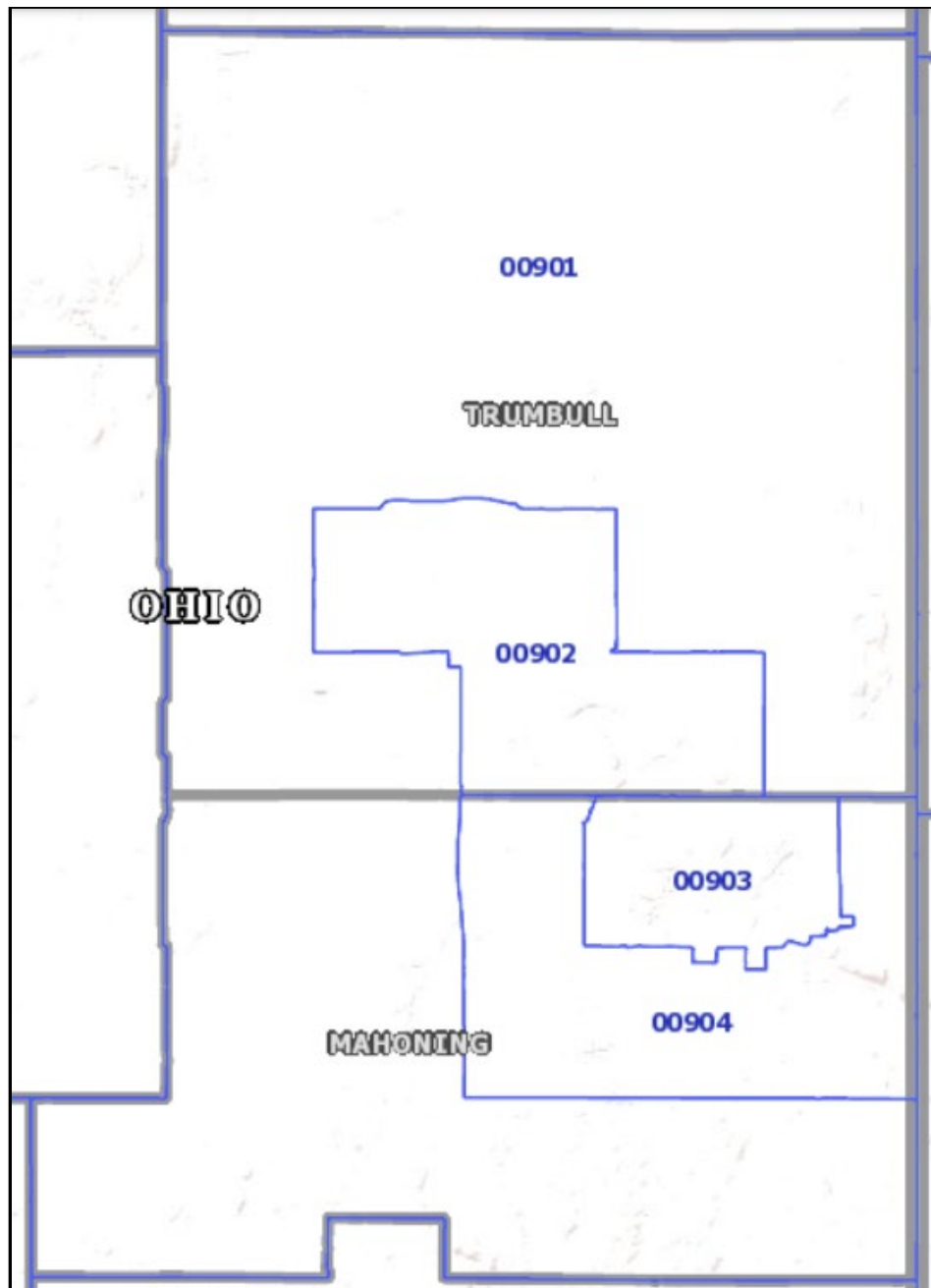
Guidelines

- 1) PUMA codes must be unique, five-digit numeric codes that range from 00100 – 99995.
- 2) Preserve the 2010 PUMA code for 2020 if the geographic extent of the proposed PUMA remains unchanged from 2010, except when it is necessary to establish an orderly, logical coding scheme within the state, as described in the next guideline.
- 3) PUMA codes should be assigned sequentially within a state, beginning with 00100, 00200, 00300, and so forth in an orderly, logical manner. They should not be randomly assigned.
 - To establish this orderly, logical manner, assign codes using a geographic sequence that begins in the northwest corner of the state. Proceed with coding from west to east, then east to west in a serpentine fashion until each PUMA is coded. This sequence of coding promotes easy identification by visual inspection and review since codes that are close in numeric sequence should be close geographically.

- 4) Assign “00” as the fourth and fifth digits of the PUMA code for each PUMA that consists of either an entire county or group of whole counties. This coding signifies the PUMA is comprised of one or more whole counties. It allows for easy identification of whole county PUMAs, whether they are in a single county or include a group of counties. See the image below for an example of a PUMA comprising two whole counties.



- 5) Assign the same first three digits of the PUMA code and increment up from “01” for the fourth and fifth digits, for each PUMA that splits a county or group of counties. PUMAs that are delineated using census tracts instead of whole counties, should be coded in this manner. This coding signifies the PUMA is comprised of one or more split counties. It allows for easy identification of county-part PUMAs, whether they are in a single county or span a group of counties. See the image below for an example of PUMAs comprising parts of two counties.



Contact Information

For questions or clarification about these guidelines, contact the Census Bureau staff involved with the 2020 PUMA at geo.puma@census.gov for assistance.

2020 Public Use Microdata Areas Program (PUMA) Naming Guidelines

September 2021

Background

State Data Centers (SDCs) provide PUMA names and codes with their 2020 PUMA submission. The Geographic Update Partnership Software (GUPS) stores this information and bundles these attributes during the export process. As the Census Bureau conducts their review of 2020 PUMA submissions, staff will work closely with SDCs to ensure the names observe the guidelines in this material. Because these geographies and their attributes appear in public products (e.g., demographic, housing, and geographic products), the Census Bureau has final approval on all names and codes.

The *2010 PUMA Names File* that includes both the PUMA name and code for the nation is available on the [PUMA website](#). Participants in 2020 PUMA may find this reference file useful to copy/paste the names and codes into GUPS rather than re-typing the information.

Basic Concepts and Nomenclature

PUMA names should clearly identify the geographic extent of the PUMA by identifying a concise area name that is also meaningful to data users. They should be as short and concise as possible while still being descriptive, clear, and unique within the state. Adequate PUMA names provide a means for easily understanding and identifying the geographic location of each PUMA. They should generally reference the geographic areas within the PUMA containing the most population, housing, and/or area. These could be the county, place (incorporated place and census designated place (CDP)), county subdivisions, American Indian reservation and/or off-reservation trust land, military installation, national park, and/or prominent physical feature. Another factor in naming could be the geographic relationship within or to another geographic area or well-known region (e.g., Northeast Utah, West Loudoun, Florida Panhandle).

The following guidelines refer to associations that the PUMA names have with the communities and features their name represents. The Census Bureau may edit submitted names as necessary for consistency and adherence to rules and guidelines described in this document.

- 1) PUMAs may be named after the largest population center, administrative division, or historically central place within its boundary. Names of incorporated places, CDPs, and county subdivisions are acceptable (e.g., Burbank in California and Taos in New Mexico).
- 2) PUMAs may be named after a populous American Indian reservation (AIR) within its boundary (e.g., Navajo Nation Reservation and Hopi Reservation in Arizona).
- 3) PUMAs may be named after a legal (e.g., county or incorporated place) or statistical geography (e.g., CDP).
 - The geographic type, area descriptor, and/or compass direction may be appended to the name to identify the geographic entity being described. This is especially important where a name alone may cause confusion for data users. Examples of this style include South San Bernardino County, San Bernardino City South, and Irvine South in California and Huntsville City (Central & South) in Alabama.
- 4) PUMAs may be named after a prominent physical feature (e.g., Denali or Cook Inlet in Alaska), a prominent land area in which it is partially or wholly located (e.g., Yellowstone National Park in Wyoming), or a distinctive region within the county or state (e.g., Everglades or Lower Keys in Florida).
- 5) Where a PUMA contains multiple centers or counties with relatively equal importance, the PUMA name should represent no more than three of the centers or counties. If unclear which to include in the name, use another guideline to name the PUMA.

- 6) Where there is no clear cultural focus or topographic name that can be applied to a PUMA, PUMA names can consist of the state or county name and a compass direction to indicate the portion of the state or county in the PUMA. The directional indicator should precede the state and county name (e.g., Northeast Colorado or Southwest Alabama). *Note. In all other instances, the state name or abbreviation should not be appended to the name.*

Naming Convention Rules and Guidelines

The information in this section pertains to the structural components of the PUMA name apart from its origin or association to the communities or features it represents.

- 1) PUMA names must not exceed 85 characters.
- 2) PUMA names must be unique within the state.
- 3) PUMA names must not include the state name or abbreviation, except where there is no clear cultural focus or topographic name that can be applied to the PUMA, as described above in #7.
- 4) PUMA names may include hyphens to connect the names of multiple geographic areas.
- 5) PUMA names representing multiple geographic areas joined by hyphens should be presented in the order of population size or regional importance, listing the most populous or most important first.
- 6) PUMA names must use the Roman alphabet as normally used for writing the English language. See [Table 1](#) for a list of valid characters for use in PUMA names.

Table 1: Valid Standard Characters for PUMA Names

Character(s)	Description
A-Z	Uppercase letters
a-z	Lowercase letters
0-9	Numbers
blank	Single blanks, not two or more consecutive blanks.
'	Apostrophe
(Open parenthesis
)	Close parenthesis
/	Forward slash
,	Comma
&	Ampersand
.	Period
-	Hyphen

- 7) PUMA names may use diacritical marks (i.e., accents, rings, tildes, and umlauts). See [Table 2](#) for a list of acceptable diacritical marks taken from the Latin character set (ISO-8859-1).

Table 2: Acceptable ISO-8859-1 (Latin Character Set) Characters for PUMA Names

Character	Code	Description
Á	193	A acute
Å	197	A ring
É	201	E acute
Í	205	I acute
Ñ	209	N tilde
Ó	211	O acute
Ú	218	U acute
Ü	220	U umlaut
á	225	a acute
å	229	a ring
é	233	e acute
í	237	i acute
ñ	241	n tilde
ó	243	o acute
ú	250	u acute
ü	252	u umlaut

- 8) PUMA names may include a limited number of abbreviations. PUMA names that use the words Saint or Sainte, Air Force Base, and Air Reserve Base must be abbreviated as follows: St., Ste., AFB, and ARB, respectively per Census Bureau naming rules. Except as described above in #3, use of state abbreviations is discouraged. Use of all other abbreviations are discouraged and must be approved by the Census Bureau.

Contact Information

For questions or clarification about these guidelines, contact the Census Bureau staff involved with the 2020 PUMA at geo.puma@census.gov for assistance.

2020 Public Use Microdata Areas Program Frequently Asked Questions (FAQs)

September 2021



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

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SECTION 1 2020 PUMA BASICS

1.1 **What are Public Use Microdata Areas (PUMAs)?**

Public Use Microdata Areas (PUMAs) are non-overlapping, statistical geographic areas that partition each state or equivalent entity into contiguous geographic areas of at least 100,000 people. They cover the entirety of the United States, the Commonwealth of Puerto Rico, Guam, and the U.S. Virgin Islands. American Samoa and the Commonwealth of the Northern Mariana Islands do not have PUMAs because their population is less than 100,000. Census tracts and/or whole counties serve as the geographic foundation for PUMAs.

The Census Bureau creates PUMAs for the tabulation and dissemination of Public Use Microdata Sample (PUMS) data. Additionally, the American Community Survey and Puerto Rico Community Survey use PUMAs to disseminate their respective period estimates.

1.2 **What are Public Use Microdata Sample (PUMS) data?**

PUMS data are a subsample of the full ACS records. The data files show a full range of population and housing unit responses collected on individual ACS questionnaires for a subsample of ACS housing units and group quarters persons. They enable data users to create custom estimates and tables that are not available through ACS pre-tabulated data products.

Refer to [Microdata \(census.gov\)](https://www.census.gov/microdata) and [Geography & ACS \(census.gov\)](https://www.census.gov/geography) for more details.

1.3 **What is the 2020 Public Use Microdata Areas Program (2020 PUMA)?**

The 2020 PUMA is a Census Bureau program that invites the State Data Centers (SDCs) in each state, the District of Columbia, and the Commonwealth of Puerto Rico to delineate Public Use Microdata Areas (PUMAs) within their state or equivalent entity using specific criteria and guidelines.

1.4 **When does the 2020 PUMA occur?**

The 2020 PUMA occurs between September 2021 and January 2022.

1.5 **What is the deadline for making a submission for the 2020 PUMA?**

The deadline for submissions is January 31, 2022.

1.6 What has changed for the 2020 PUMA from the program in 2010?

For the 2020 PUMA, the Census Bureau requires the use of the Geographic Update Partnership Software (GUPS) to prepare the submission and the use of the Secure Web Incoming Module (SWIM) to send the submission to the Census Bureau.

The Census Bureau will implement two substantive changes to the PUMA criteria for 2020. First, for PUMAs comprised of census tracts and covering less than entire counties, each unique PUMA-county part must have a population of at least 10,000. Second, a PUMA may consist of noncontiguous territory to encompass populations and communities that are more homogenous; however, the noncontiguous areas must contain a population of at least 10,000. The Census Bureau will review and provide final approval for all noncontiguous PUMAs.

SECTION 2 CRITERIA AND GUIDELINES

2.1 What are the 2020 PUMA criteria and guidelines?

Refer to the *2020 PUMA Final Criteria* document on the [2020 PUMA website](#) for more specific details and examples, but at a summary level:

- Minimum Required Population and Maximum Suggested Population.
 - Require minimum population threshold of 100,000 persons with the ability to maintain this population throughout the decade.
 - Should not contain more than 200,000 persons wherever possible, unless defining the PUMA for an area where significant population decline is anticipated.
- Relationships Between PUMAs and Other Geographic Areas.
 - Must not cross state boundaries.
 - Should comprise an area that is either entirely inside or entirely outside a core based statistical area (CBSA) where possible¹.
 - Should use 2020 place definitions, 2010 urban/rural definitions, and local knowledge to inform PUMA delineations.
 - Should avoid splitting Census Bureau urban areas.
 - Should avoid splitting governmental minor civil divisions (MCDs).
 - Avoid splitting American Indian reservations and/or off-reservation trust lands (AIRs/ORTLs), particularly if the population is included within all parts of the split AIR/ORTL. Since AIRs/ORTLs may cross state boundaries, this guideline applies only to the portion of an AIR/ORTL within a state. In all such instances, consider the total population and makeup of the affected areas in any decisions regarding the adjustment of PUMAs for AIRs/ORTLs.
 - If the AIR/ORTL has a population of <100,000, it should be contained within one PUMA.
 - If the AIR/ORTL has a population of <200,000, it should be contained within no more than two PUMAs.
- Geographic Entities Used to Define PUMAs.
 - Must use counties (or equivalent entities²) and/or census tracts to construct.
 - A single county may be a PUMA if it meets the 100,000 minimum population threshold.
 - Two or more contiguous counties may be combined to form a PUMA that meets the 100,000 minimum population threshold.
 - Divide counties with more than 200,000 population using census tracts. Consider aggregation of census tracts that approximate the extent of other geographic entities (i.e., MCDs, incorporated places, census designated places, and/or urban areas).

¹ The term, core based statistical areas became effective in 2000 and refers collectively to metropolitan and micropolitan statistical areas. Refer to [Metropolitan and Micropolitan \(census.gov\)](#) for more information.

² Includes parishes in Louisiana; boroughs and census areas in Alaska; municipios in Puerto Rico; independent cities in Maryland, Missouri, Nevada, and Virginia; that portion of Yellowstone National Park in Montana; districts in American Samoa; three main islands of the U.S. Virgin Islands; municipalities in the Northern Mariana Islands; and the entire areas constituting the District of Columbia and Guam.

- Census tract-based PUMAs may cross county boundaries provided each PUMA-county part meets a minimum population threshold of 10,000. This is an increase from the 2,400-minimum requirement from 2010. This change is intended to further ensure the confidentiality of data in a PUMA-county part, align with the 2020 Census urban area plans, and eliminate unique geographic areas with low population.
- Contiguity and Noncontiguity Guidelines for Delineation of PUMAs.
 - To the greatest extent possible, each PUMA should encompass a single, geographically contiguous area.
 - May be noncontiguous if the county, counties, or census tracts used to form the PUMA are noncontiguous.
 - Use of noncontiguous building blocks is acceptable where it facilitates more demographically homogenous areas; however, this is not intended to create highly fragmented PUMAs.
 - All noncontiguous PUMAs are subject to Census Bureau final review and approval.
- Place of work (POW) and Migration (MIG) PUMAs.
 - Delineated by statisticians, not as part of the 2020 PUMA, using Place of work data and in/out migration data after the 2020 PUMA concludes.
 - Standard PUMAs used to create POWPUMAs and MIGPUMAs; therefore, carefully consider standard PUMA relationships with other geographic areas when forming the standard PUMAs.
 - Can consist of single PUMA or combination of PUMAs (county-based or census tract-based), but must aggregate to whole counties. Carefully consider how this will affect the eventual aggregation of PUMAs that are not delineated using whole counties.
 - Refer to [Understanding and Using the American Community Survey Public Use Microdata Sample Files \(census.gov\)](#) for more information. This document is located on the [Microdata \(census.gov\)](#) page.

2.2 What are the 2020 PUMA coding guidelines?

Refer to the *2020 PUMA Coding Guidelines* document on the [2020 PUMA website](#) for specifics on the coding for PUMAs, but at a summary level:

- PUMA codes must be a five-digit, numeric code, ranging from 00100 – 99995.
- PUMA codes must be unique within the state.
- Preserve the 2010 PUMA codes for 2020 if the geographic extent of the proposed PUMAs remain unchanged from 2010, except when it is necessary to establish an orderly, logical coding scheme within the state, as described in the next guideline.
- PUMA codes should be assigned sequentially within a state, beginning with 00100, 00200, 00300, and so forth in an orderly, logical manner. They should not be randomly assigned.
 - To establish this orderly, logical manner, assign codes using a geographic sequence that begins in the northwest corner of the state. Proceed with coding from west to east, then east to west in a serpentine fashion until each PUMA is coded. This sequence of coding promotes easy identification by visual inspection and review since codes that are close in numeric sequence should be close geographically
- Assign “00” as the fourth and fifth digits of the PUMA code for each PUMA that consists of either an entire county or group of whole counties. This coding signifies the PUMA is comprised of one or more whole counties.

- Assign the same first three digits of the PUMA code and increment up from “01” for the fourth and fifth digits, for each PUMA that splits a county or group of counties. This coding signifies the PUMA is comprised of one or more split counties.

2.3 What are the 2020 PUMA naming guidelines?

Refer to the *2020 PUMA Naming Guidelines* document on the [2020 PUMA website](#) for basic concepts and nomenclature details, but at a summary level the naming convention rules and guidelines include the following:

- PUMA names must not exceed 85 characters.
- PUMA names must be unique within the state.
- PUMA names must not include the state name or abbreviation, except where there is no clear cultural focus or topographic name that can be applied to the PUMA, as described above in #7.
- PUMA names may include hyphens to connect the names of multiple geographic areas.
- PUMA names representing multiple geographic areas joined by hyphens should be presented in the order of population size or regional importance, listing the most populous or most important first.
- PUMA names must use the Roman alphabet as normally used for writing the English language.
- PUMA names may use diacritical marks (i.e., accents, rings, tildes, and umlauts).
- PUMA names may include a limited number of abbreviations, though use of abbreviations is discouraged.

2.4 What are the minimum and maximum population thresholds for PUMAs?

The minimum population threshold is 100,000 and the maximum suggested population threshold is 200,000, with a few exceptions. A single PUMA should not contain more than 200,000 persons unless it is defined for an area in which significant population decline is anticipated. There are some unique situations where PUMAs may contain more than 200,000 in population due to geographic constraints, but it should be avoided whenever possible. Any county with a population substantially more than 200,000 should be subdivided into multiple PUMAs because PUMAs with a population between 100,000 to 200,000 are more suitable for detailed, meaningful analysis of data from the American Community Survey.

2.5 Why are core based statistical areas (CBSAs) important when delineating PUMAs?

Although not a criteria for PUMA delineation, for PUMS data to be meaningful, PUMA boundaries should be entirely within or entirely outside CBSA boundaries. The Census Bureau does not recommend splitting a PUMA among CBSAs. For more information about CBSAs refer to [Metropolitan and Micropolitan \(census.gov\)](#).

SECTION 3 REGISTRATION, PARTICIPATION, AND RESULTS

3.1 Who is eligible to participate in the 2020 PUMA?

The Census Bureau invites all State Data Centers (SDCs) that represent states or equivalent entities of more than 200,000 persons to participate in the 2020 PUMA. For states or equivalent entities with a population of more than 100,000, but less than 200,000 (i.e., Guam and the U.S. Virgin Islands), the Census Bureau defines the single PUMA without the need for participant input or official program participation.

The Census Bureau encourages eligible SDCs to involve other interested individuals from tribal, state, and local governments as well as regional organizations and agencies, especially those that represent counties and cities over 100,000 people to ensure that PUMAs meet the needs of a variety of data users.

3.2 Who designates the 2020 PUMA primary and secondary contacts?

The State Data Center (SDC) leads received an email in early November 2020 that requested the designation of a primary and secondary contact for their respective SDC. As the program start date of September 2021 draws closer, SDCs may alter their contacts for the 2020 PUMA by sending an email to <geo.puma@census.gov>.

3.3 What is the registration process for the 2020 PUMA?

There is no formal registration process. The Census Bureau established a primary and secondary contact from State Data Centers in November 2020 and will announce the beginning of the 2020 PUMA in an email to those primary and secondary contacts in September 2021.

3.4 What are the options to participate in the 2020 PUMA?

There is only one option to participate in the 2020 PUMA – Geographic Update Partnership Software (GUPS). While participants may use their own geographic information system (GIS) to research, analyze, and prepare information, the GUPS must be used to create the PUMA project that includes the proposed PUMAs for submission to the Census Bureau.

3.5 Is training available for the 2020 PUMA?

The Census Bureau plans to conduct two trainings in October 2021 and one in December 2021. Information about these trainings is located on the [2020 PUMA website](#). Census Bureau staff will be available throughout the program to answer questions that may arise. Send an email to <geo.puma@census.gov> for training or support outside of these three training opportunities.

3.6 Does the Census Bureau have a recommendation for developing a plan for participating in the 2020 PUMA?

Each State Data Center (SDC) should consider how they will conduct the PUMA work in their state, including work performed by others outside of the SDC (i.e., tribal, state, local governments and local or regional organizations), to determine the best delineation method(s) for their state or specific situation. If others are delineating PUMAs for their specific section of the state, the SDC must be prepared to import the work received into the state's PUMA project or load it into their project for reference and review. It is the responsibility of the SDC to determine what delineation manner works best for their state/situation and to communicate how they want the work completed and received. Instructions for loading/adding/importing data received from others is described in chapter 4 of the participant guide.

For SDCs that are the sole participant for their state, use GUPS and the recommendations described in the participant guide to complete the proposed delineations. For SDCs that plan to have others assist, the Census Bureau recommends SDCs create a folder on their computer or network, separate from the directory created by GUPS, to store the incoming proposed PUMAs (e.g., shapefiles, tabular equivalency files, text files, maps, etc.). Doing so protects information received should GUPS malfunction.

The Census Bureau recommends a thorough review of the PUMA documentation and establishing/maintaining communication with all interested data users and the Census Bureau throughout the timeframe of the program. Attending a PUMA training in the fall of 2021 is also highly recommended.

3.7 Will we receive confirmation that the Census Bureau received and accepts our proposed PUMAs?

The Secure Web Incoming Module (SWIM) generates a message on-screen indicating a successful transmission of the PUMA .zip file. The Census Bureau will send a separate email confirming receipt of the submission. As the Census Bureau reviews the submission, they will contact State Data Centers to discuss any questions or concerns they encounter with the proposed PUMAs.

3.8 Is feedback issued after submissions are processed?

There is no formal feedback issued based on the Census Bureau's content review of the State Data Center's submission. If there are issues discovered with the proposed PUMAs (e.g., naming, coding, boundaries) during processing, the Census Bureau may seek clarification or confirmation through email or a phone call to the primary and/or secondary contact(s).

3.9 When and where will the Census Bureau release the finalized PUMAs and associated data?

Finalized PUMAs from the 2020 PUMA and their associated PUMS data will be available online for use by the public beginning in summer of 2022 on data.census.gov.

SECTION 4 MATERIALS

4.1 What program materials are needed to participate in the 2020 PUMA?

Participants use the following program materials to create PUMAs:

- 2020 PUMA Final Criteria.
- 2020 PUMA Summary Guide.
- 2020 PUMA Participant Guide.
- 2020 PUMA Coding Guidelines.
- 2020 PUMA Naming Guidelines.
- Geographic Update Partnership Software (GUPS).
 - Required to delineate PUMAs and prepare a standardized output .zip file for submission.
- 2010 PUMA shapefile layer
 - Automatically loads in GUPS for use as visual reference.
- 2010 PUMA Names File.
 - Use as a reference and, if reusing a 2010 name and/or code for a 2020 PUMA, use to copy/paste the 2010 name and/or code into GUPS.
- Local data and materials for reference.

Note: Participants use the Secure Web Incoming Module (SWIM) to submit the proposed PUMAs to the Census Bureau for the 2020 PUMA. Learn more about SWIM in section 6 of this material. Detailed instructions on SWIM are in chapter 7 of the participant guide.

4.2 How are the program materials distributed?

The program materials are available online from the [2020 PUMA website](#) which is hosted on the main [PUMA website](#). State Data Centers (SDCs) must download the materials (e.g., instructions, software, etc.) from the respective websites. With SDCs serving as the primary participant, they must work to coordinate with individual and regional agency contributors. See the GUPS section of this FAQ document for questions related to multiple PUMA contributors.

4.3 How are the 2010 PUMA equivalency files used in the 2020 PUMA?

The 2010 PUMA equivalency files are state-based, tab-delimited text files that show the geographic correlations between the 2010 PUMAs and some standard 2010 Census geographic entities (e.g., counties, functioning minor civil divisions, places, and census tracts). These files, also known as PUMS Equivalency Files, delineate the summary level codes specific to the PUMA. It has its own set of summary level code and hierarchical sequencing. Refer to the “Reference Information” section on the [PUMA website](#) for these files and more information.

State Data Centers (SDCs) may wish to use the equivalency file for their state (or the 2010 Census Tract to 2010 PUMA relationship file) within a geographic information system (GIS) software to perform comparisons and analysis with other locally sourced data in preparation for creating 2020 PUMAs.

4.4 How is the 2010 Census Tract to 2010 PUMA Relationship File used in the 2020 PUMA?

The 2010 Census Tract to 2010 PUMA Relationship File is a nation-based, comma-delimited text file that identifies the state, county, and census tract(s) contained within a PUMA for all 50 states, the District of Columbia, the Commonwealth of Puerto Rico, Guam, and the U.S. Virgin Islands. The file has four fields: two-digit state Federal Information Processing Series (FIPS) code, three-digit county FIPS code, six-digit census tract code, and five-digit 2010 PUMA code. The file does not include geographic names referenced by the FIPS codes. Locate this file in the “Reference Information” section of the [PUMA website](#).

State Data Centers (SDCs) may wish to use the relationship file (or the 2010 PUMA equivalency file for their state) within a geographic information system (GIS) software to perform comparisons and analysis with other locally sourced data in preparation for creating 2020 PUMAs.

4.5 How is the 2010 PUMA shapefile used in the 2020 PUMA?

The 2010 PUMA shapefile is a reference layer for use in creating 2020 PUMAs. The 2010 PUMA shapefile automatically loads into GUPS upon creation of the state’s PUMA project. Since the shapefile is based off 2010 geography, the 2010 PUMAs may not align exactly with the 2020 geographies that are used during the 2020 PUMA. Use the 2010 PUMA shapefiles as a visual reference during delineation.

SECTION 5 GEOGRAPHIC UPDATE PARTNERSHIP SOFTWARE (GUPS)

5.1 What is GUPS?

The Geographic Update Partnership Software, or GUPS, is a self-contained, customized geographic information system (GIS) software application provided to participants by the Census Bureau for use in completing many of their geographic programs and operations. Each geographic program supported by GUPS includes a unique set of tools built to run within the QGIS environment. For the 2020 PUMA, GUPS is programmed to allow for the sharing of work performed by multiple participants to facilitate a collaborative delineation effort and to prepare standardized output files of the delineated PUMAs for submission to the Census Bureau.

Note: State Data Centers use the Secure Web Incoming Module (SWIM), detailed in section 6 of these FAQs, to submit their proposed PUMAs to the Census Bureau.

Designed with the participant in mind, GUPS is user-friendly. It includes a review tool requiring the validation of the data to the program criteria and thresholds before creating a submission .zip file. GUPS ensures the submission is valid and allows for easier processing once received by the Census Bureau. GUPS does not require an internet connection to function, but one is necessary to use the “Census Web” option and the built-in imagery server.

GUPS allows participants to add external geospatial data (shapefiles, geodatabases, and imagery) and tabular data (e.g., text files in the .txt or .csv format) for comparison and update purposes.

5.2 Are there specific hardware/system requirements to install and use GUPS?

GUPS can be installed on both Windows® and Apple® operating systems. GUPS requires a minimum of 4 gigabytes (GB) of disk space and a minimum of 4 GB of RAM (8 GB preferred for optimal performance) to run. Disk space to store shapefiles varies by size of the shapefiles. Refer to the participant guide for specific instructions on downloading and installing GUPS.

5.3 Can I use a previously installed version of GUPS for the 2020 PUMA?

No, all participants must install an updated version of GUPS to participate in the 2020 PUMA. The updated version is available for download from the [2020 PUMA website](#). Confirm the version installed (i.e., version 14.0.0-6) prior to proceeding by using the GUPS→About GUPS menu.

5.4 We have downloaded GUPS from the PUMA website, but cannot install it. What should we do?

Many agencies/organizations require certain security privileges to download and install external software. Work with your local Information Technology (IT) staff person to gain those rights or ask they assist with installation. If you still have problems, please contact the Census Bureau by email at geo.puma@census.gov for assistance.

5.5 We do not allow for the download and extraction of .zip files onto our network. How can we get the new GUPS version?

Contact the Census Bureau by email at geo.puma@census.gov to request a secure email delivery of the software during your communication. Please note the software is in the form of a .zip file to extract and install locally. Work with your local Information Technology (IT) staff person to assist with installation.

5.6 Our IT staff installed the new GUPS version, but GUPS will not work for me. What should we do?

GUPS users with different security privileges other than IT staff that installed the software may encounter problems accessing the directories and plugins needed to operate GUPS. This usually occurs when the software is not installed under the user's profile. To correct this, have the IT staff person reinstall GUPS under the user's profile using the user's credentials.

5.7 Does GUPS execute checks or verify the data it imports into a PUMA project?

No, GUPS does not verify the data it imports. GUPS is programmed to check for basic field requirements (e.g., correct number of characters in code and name, no overlaps, etc.) during the import process, but it has no way of knowing whether what its importing is valid. Participants should conduct their own quality checks of the files they have prior to importing them. For details on quality checks performed outside of GUPS, refer to chapter 5 of the participant guide.

As part of the export process, the project undergoes final quality checks and verification to confirm proper format and adherence to the criteria and guidelines for the 2020 PUMA.

5.8 Does GUPS include pre-2020 population data?

No, the state-based county and state-based census tract shapefile layers used by GUPS includes the population counts from the 2020 Census. GUPS permits participants to load/add other files (e.g., pre 2020 figures or post-2020 local estimates) for reference purposes.

5.9 What is the best way to share proposed PUMA work with a State Data Center (SDC)?

All participants (e.g., SDCs, tribal, state, local governments, and regional planning agencies/organizations) must use GUPS to create proposed PUMAs for their area of interest. Once the proposed PUMAs are complete, the participant would use GUPS to export a shapefile or a tabular equivalency file (TEF) of their proposed PUMAs. They would share their exported file following the guidance they received from their SDC.

The Census Bureau recommends SDCs add/load the files into the state's PUMA project for review PRIOR to importing the work into the project. Once the SDC agrees with the work, they can use the added file as a reference to perform their own interactive delineation of the PUMAs or they can import and append the file (or files) into the state's PUMA project. The specifics of these tasks are included in chapter 4 of the participant guide.

5.10 How does a State Data Center (SDC) combine the proposed PUMA work received from others with the work they completed?

GUPS allows SDCs to import and append multiple files into the state's PUMA project; however, the Census Bureau strongly recommends reviewing all proposed PUMAs prior to importing the files into the project. Refer to chapter 4 in the participant guide for detailed instruction on adding a PUMA shapefile as a layer for reference and for importing a PUMA shapefile and/or PUMA tabular equivalency file (TEF) into a state's PUMA project.

5.11 Where does GUPS save the exported PUMA .zip file?

GUPS saves the exported PUMA .zip file to C:\GUPSGIS\gupsdata\PUMA20\output. Please note the drive label (e.g., C:\) may differ on your machine if the default installation directory changed during the installation process.

The file naming convention for the exported puma .zip file is "puma20_XX_return.zip", where XX is the two-digit FIPS code for the state. If you cannot locate the file, perform a file search for "puma20_*.zip".

SECTION 6 SECURE WEB INCOMING MODULE (SWIM)

6.1 What is SWIM?

The Secure Web Incoming Module, also known as SWIM, is the official web portal for secure upload of partnership materials to the Census Bureau. Due to Census Bureau IT Security policies, participants use SWIM to provide their 2020 PUMA submission .zip file to the Census Bureau.

Access SWIM from the following URL: <respond.census.gov/swim>.

6.2 Are there specific hardware/system requirements to use SWIM?

SWIM runs on the two most recent versions of each of the four major internet browsers (i.e., Internet Explorer®, Google Chrome®, Mozilla Firefox®, and Apple Safari®). If you encounter issues with using SWIM, confirm the browser version and update it if it is not one of the latest two versions. If you are still having issues, contact the Census Bureau at <geo.puma@census.gov> for assistance.

6.3 Can I use an existing SWIM account for the 2020 PUMA?

Yes, individuals can use existing SWIM accounts for the 2020 PUMA.

6.4 How do I determine if I have an existing SWIM account?

To determine whether a SWIM account exists, click the “Forgot your password” link on the main SWIM page and enter the email address to check for account existence. If SWIM does not locate an account associated with the email address, it will return the following message, “*No account registered for this email. Go to Account Registration.*” Choosing the ‘Account Registration’ link opens a window to establish a new SWIM account.

For those without an account, the PUMA Team will provide a SWIM token during their follow-up after receipt of the announcement email or email <geo.puma@census.gov> to request a new SWIM token to proceed with establishing a new account.

6.5 How do I resolve problems logging into SWIM?

First, the email and password components of the SWIM system accounts are case-sensitive. If you have forgotten the case-sensitive format used when establishing the SWIM account, this may be the source of your login problems.

SWIM allows four attempts to login before it temporarily locks your account for 15 minutes. If you have attempted to login four times, wait 15 minutes and try to login again using different case sensitive combinations for your email address. If you have simply forgotten your password, you may reset your password using the ‘Forgot your password’ link on the login page. This functionality works in the same manner as other online websites; however, if you cannot remember the case-sensitive format used for the email address, this password reset functionality will not work. To attempt to reset your password, follow the prompts for entering

your case-sensitive email address and providing your security answer. If the security answer is correct, the SWIM system will send a password reset link to the email account for use in resetting the password. The security answer is not case-sensitive.

As a last resort, the Census Bureau can issue another SWIM token to establish another SWIM account for your use. Please contact the Census Bureau by email at <geo.puma@census.gov> for another token.

6.6 How do I reset my SWIM password?

If you have forgotten your SWIM password, you can reset your password by going to the SWIM website and selecting “Forgot your password?” on the login page. SWIM allows you to reset your password information and security questions.

Once selected, follow the prompts to enter your email address and provide your 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.

6.7 How do I submit my state’s proposed PUMAs?

Access SWIM from the following URL: <respond.census.gov/swim> and follow the instructions in chapter 7 of the participant guide. Note that FAQ 5.11 gives information regarding the file’s location.

6.8 How do I resolve SWIM issues encountered when submitting my state’s proposed PUMAs?

Three of the most common issues with SWIM involve the web browser, the file extension, and the file size.

SWIM supports the two most recent versions of Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari. If your version is older, upgrade to a newer browser version and try uploading again.

SWIM only recognizes “.zip” file extensions, so ensure the file you are attempting to submit is in the .zip file format. This should not be an issue for PUMA participants since GUPS creates a .zip file during the Export for Census process.

Lastly, SWIM currently has a size limitation of 250 megabytes for .zip files. Most submissions will easily fall beneath the 250 megabytes size limitation. If your file is larger than 250 megabytes, please contact the Census Bureau by email at <geo.puma@census.gov> to discuss options for making your state’s submission.

Subject: 2020 PUMA official launch announcement and instruction to download materials

OMB Control No. 0607-1017

Expiration Date 07/31/2024

Dear 2020 PUMA Contact:

You are receiving this email because you are a point of contact for the 2020 Public Use Microdata Areas Program, also known as the 2020 PUMA. With receipt of this email, please take the following actions to begin your work.

All materials created in support of the 2020 PUMA are digital and are available online at www.census.gov/programs-surveys/geography/guidance/geo-areas/pumas/2020pumas.html.

- Download and review the following documents:
 - 2020 PUMA Final Criteria.
 - 2020 PUMA Summary Guide.
 - 2020 PUMA Participant Guide.
 - 2020 PUMA Coding Guidelines.
 - 2020 PUMA Naming Guidelines.
- Download and install the Geographic Update Partnership Software (GUPS).
 - IMPORTANT: You must download and install the version of GUPS from the website listed above to participate in the 2020 PUMA. Previously installed GUPS versions are not valid for use in delineation of PUMAs.

For additional information and guidance, refer to the main PUMA website at www.census.gov/programs-surveys/geography/guidance/geo-areas/pumas.html.

The Census Bureau will contact you to confirm receipt of this correspondence. Please contact the Census Bureau PUMA team by email at geo.puma@census.gov if you have any questions regarding the 2020 PUMA.

We estimate that completing this program will take 40 hours on average. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to geo.puma@census.gov. This collection has been approved by the Office of Management and Budget (OMB). The eight-digit OMB approval number that appears at the upper left of the email confirms this approval. If this number were not displayed, we could not conduct this survey. The Census Bureau conducts this program under the legal authority of the Title 13 U.S. Code, Section 6.