Geographic Update Partnership Software (GUPS)

United States Census Bureau

Geography Division

Spatial Data Collection and Products Branch

September 15, 2022

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What Is Open Source?

- Software that is publicly accessible for modification, collaboration, and community-oriented development.
- Open source starts off with a license that provides royalty free (re)use of software.
- Open source guarantees access to the source code for audit and modification and the ability to redistribute the software with no additional costs.
- Open Source Geospatial Foundation (OSGeo).
  - https://www.osgeo.org

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Quantum Geographic Information System (QGIS)

- QGIS is a user-friendly, open source Geographic Information System (GIS) licensed under the GNU General Public License.
- QGIS is an official project of OSGeo.
- It runs on Linux, Unix, Mac OSX, Windows and Android and supports numerous vector, raster, and database formats and functionalities.
- www.qgis.org

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GUPS

- A stand-alone and web application that provides participants with the ability to update geospatial data and attributes for Census Bureau geographic partnership programs.
- Python script-based core functionality built on QGIS.
- GUPS consists of a core system with 12 individual program interfaces.
- GUPS loads, edits, and displays geospatial data, as well as generates output files that the Geography Division will use to update their databases.

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GUPS Standalone

- An Internet connection is *not* required for the GUPS standalone version.
- Allows user to:
  - Update addresses, address lists, feature, and feature attributes.
  - Update legal, statistical, and administrative boundaries.
  - Share files or projects with internal/external participants.
- GUPS Download

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GUPS Web

- The GUPS Web application is a new system designed to support the geographic update needs of geographic participant programs.
- The GUPS Web application makes use of open source software.
- Python, Django, and JavaScript are the primary programming languages used for developing all functionalities.

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GUPS Participant Programs

- Redistricting Block Boundary Suggestion Project (BBSP)
- Redistricting Voting District Project (VTD) and Voting District Project Verification (VTDV)
- Boundary and Annexation Survey (BAS)
- Local Update of Census Addresses (LUCA) Program and LUCA Feedback and Appeals (LUCA FB) Program
- School District Review Program (SDRP) and SDRP Verification (SDRPV) Program
- Participant Statistical Areas Program (PSAP) including Tribal Statistical Review (TSR)
- Boundary Validation Program (BVP)
- New Construction Project (NC)
- Count Review Operation (CRO)
- Geographic Areas Reconciliation Program (GARP)
- Public Use Microdata Areas (PUMA)
- Count Question Resolution (CQR)

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Boundary and Annexation Survey (BAS)

- Annual opportunity for tribal, state, and local governments to submit name changes, legal status updates, and boundary changes.
- The Census Bureau uses the boundary information collected in the BAS to tabulate data for the decennial and economic censuses, and annual estimates and surveys such as the Population Estimates Program and the American Community Survey.

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QGIS 3.4.4-Madeira - 10800003620 - BAS

Project Edit View Layer Settings Vector Raster Web Processing Help GUPS

- About GUPS
- Map Management
- Geographic Review
  - Add Linear Feature
  - Delete/Restore Linear Feature
  - Split Linear Feature
  - Display All Names
  - User Address List
  - Modify Linear Feature Attributes
  - Modify Area Feature
  - Show/Hide Legend
  - Scale Bar Tool
- Point Landmark
- QC
- Import / Export
- Imagery

Layers

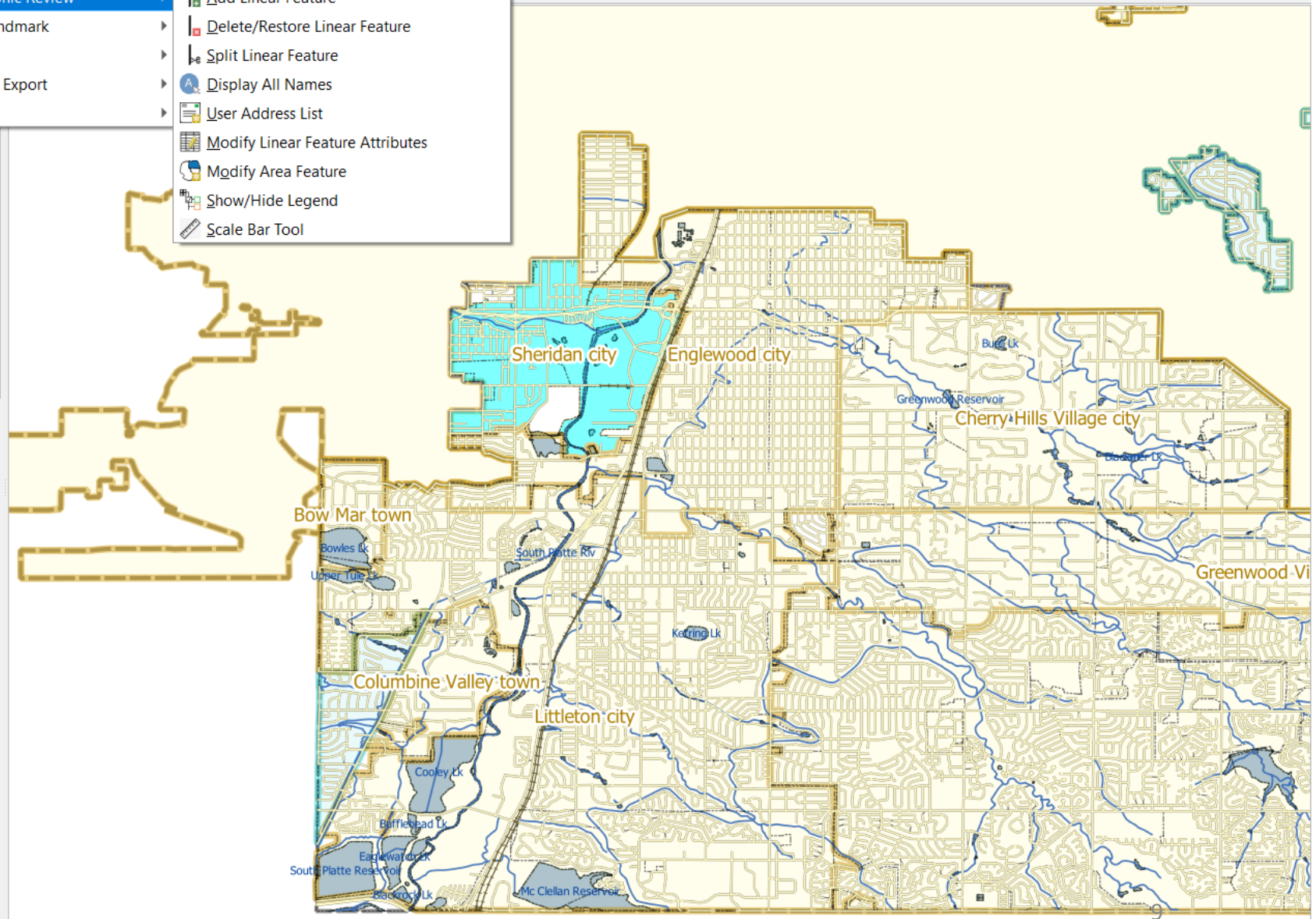
- working_county
  - edges_08005
    - Railroads (scale < 21,000)
    - Railroads (scale > 21,000)
    - Roads (scale < 21,000)
    - Roads (scale > 21,000)
    - Linear Water
    - Non-visible boundaries
    - Deleted Edge
    - Direction
  - 2020_tract_08005
  - 2020_block_08005
  - pointlm_08005
    - Un-edited Original Point Landmark
    - Point Landmark Flagged for Deletion

Geography Review Tool

Layer Name : place_08005 Refresh

Previous Zoom | Zoom | Next Zoom | Show All Edges

	FEATURE_ID	STATEFP	COUNTYFP	PLACEFP	NAMELSAD
0	0	08	005	12815	Centennial city
1	1	08	005	30340	Glendale city
2	2	08	005	28105	Foxfield town
3	3	08	005	13845	Cherry Hills Village
4	4	08	005	16385	Columbine Valley t
5	5	08	005	19630	Deer Trail town
6	6	08	005	69645	Sheridan city
7	7	08	005	24785	Englewood city
8	8	08	005	33035	Greenwood Villag
9	9	08	005	45255	Littleton city
10	10	08	005	06090	Bennett town
11	11	08	005	04000	Aurora city
12	12	08	005	08070	Bow Mar town



GUPS Algorithms & QGIS Plugins

- Topology Algorithms
- GUPS Management
- Add Linear Feature
- Modify Area Feature
- Address Update
- Criteria Review
- Import/Export Zip

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GUPS Standalone & Open Source Tools

- QGIS
  - GIS base functionality of the GUPS.
- OSGEO4W Shell
  - OSGeo4W is a binary distribution of a broad set of open source geospatial software for Windows environments.
- Geographic Resources Analysis Support System (GRASS) GIS
  - GRASS GIS offers powerful raster, vector, and geospatial processing engines in a single integrated software suite.
- System for Automated Geoscientific Analyses (SAGA GIS)
  - SAGA GIS is a GIS computer program, used to edit spatial data.

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GUPS Web & Open Source Tools

- QGIS
  - GIS base functionality of the GUPS Web.
- OpenLayers
  - An open source JavaScript library for generating interactive maps and performing geospatial analysis in a browser.
- GeoServer
  - An open source web mapping server for publishing and editing geospatial data.
- Django
  - Python-based web framework in conjunction with Python libraries provided by QGIS.

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GUPS Web & Open Source Tools

- PostgreSQL 
  - A database management system as the spatial database extension for geographic objects.
- Apache Tomcat 
  - An open source implementation of the Java Servlet, Java Server Pages, Java Expression Language and Java WebSocket technologies.
- Ubuntu 
  - A modern, open source operating system on Linux for the enterprise server, desktop, cloud, and Internet of Things (IoT).

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Questions?

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Reference Websites

- https://www.osgeo.org
- www.qgis.org
- https://www.osgeo.org/projects/osgeo4w/
- https://grass.osgeo.org/
- https://saga-gis.sourceforge.io/
- https://openlayers.org/
- https://geoserver.org/
- https://www.djangoproject.com/
- https://www.postgresql.org/
- https://tomcat.apache.org/
- https://ubuntu.com/

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