Yellowstone National Park

Geologic Resources Inventory

GIS Data Explanation, June 10, 2025

Geologic-Geographic Information Systems (GIS) data related to Yellowstone National Park is delivered in data package Zip (.zip) files. These data are a product of the NPS Geologic Resources Inventory (GRI) program, which is funded by the Inventory and Monitoring (I&M) Division and administered by the NPS Geologic Resources Division (GRD).

Geologic-GIS data for Yellowstone National Park consist of a dedicated park map providing complete coverage of the park and surrounding area, as well as individual component maps. Data files for the dedicated park map are named using the park four-letter code (YELL) as a prefix.

Geologic-GIS data are provided in the following GRI-supported GIS data formats 1.) ESRI file geodatabase format, 2.) 2.2 KML/KMZ format for use with Google Earth software, 3.) Open Geospatial Consortium (OGC) geopackage format for use in QGIS (or other OGC software), and upon request in 4.) ESRI shapefile format (contact Stephanie O'Meara, see contact information below, to acquire shapefile format data).

Data package Zip files containing the different GRI-supported GIS data formats are identified with following file suffixes: 1.) ESRI file geodatabase for use in ArcGIS Pro have a file suffix of "gdb_pro.zip", 2.) KML data have a file suffix of "kml.zip", 3.) OGC geopackage data have a file suffix of "gpkg.zip", and if requested 4.) shapefile data have a file suffix of "shp.zip".

The ArcGIS Pro data package ZIP file has an ESRI file geodatabase and a Pro 3.X map (.mapx) file, as well as Pro layer (.lyrx) files. Pro 3.X map (.mapx) files and QGIS project (.qgz) files present GRI geologic data layers and GIS tables complete with data layer and table naming, symbology and feature labeling for viewing and data analysis. The Pro 3.X layer (.lyrx) files are provided so data layers can be added to a new or existing Pro 3.X map (.mapx) file with their associated layer naming, symbology and labeling. All data package ZIP files also contain a FGDC-compliant metadata file (in .txt format).

In addition to the data package ZIP files, three additional files comprise a GRI digital geologic-GIS map: 1.) this file (yell_geology_gis_readme.pdf), 2.) the map's GRI ancillary map information document (.pdf) file (yell_geology.pdf), which contains geologic unit descriptions, as well as other ancillary map information and graphics from the source maps used by the GRI in the production of this park's GRI digital geologic-GIS data, and 3.) a user-friendly FAQ PDF version of the metadata (e.g., yell_geology_metadata_faq.pdf).

For a GIS dataset, the GRI recommends extracting all map files from a data package to its own folder. This is particularly of importance for file geodatabase data packages as an associated Pro 3.X map file (.mapx) and related layer (.lyrx) files have relative file paths set to their file geodatabase.

Detailed information concerning the source data used by the GRI is listed in the Source Citation sections(s) of the included map metadata record (e.g., yell_geology_metadata.txt). This information is also available in the FAQ version of the metadata (e.g., yell_geology_metadata_faq.pdf). Information concerning source data is also in the Source Map Information GIS table (yellmap) and repeated in the GRI ancillary map information document (.pdf) file.

The Google Earth KMZ files, divided into four quadrants (NW, NE, SW, SE) due to file size constraints, yell_geology_nw.kmz, yell_geology_ne.kmz, yell_geology_sw.kmz, yell_geology_se.kmz, contain a limited version of the full compiled spatial dataset (limited features and symbology). Google Earth software is available for free at: https://www.google.com/earth/versions/. The KMZ files possess on-line links to the GRI program and its products, as well as to this readme document (on-line version), the GRI ancillary map information (.pdf) and the FGDC-compliant FAQ metadata (in .pdf format) pertaining to this dataset. Users are encouraged to open the readme document, FAQ metadata and the ancillary map information document outside of Google Earth should accessing the on-line versions via Google Earth be an issue. Users can also download Google Chrome (free at: http://www.google.com/chrome/) to view these files should their default browser not open these files from Google Earth.

The OGC geopackage data can be accessed using QGIS software. The software is available for free at: https://www.qgis.org/en/site/. A QGIS Project (.qgz) file is included for compiled GRI Geologic-GIS data for Yellowstone National Park. For the OGC geopackage and its QGIS project (.qgz) file, these files should also be kept together in the same folder.

Users of this data are cautioned about the locational accuracy of features and should not assume that features are exactly where they portrayed in Google Earth, QGIS or other software used to display the data. Refer to the positional accuracy report and use constraints within a map metadata record for additional information concerning the positional accuracy of features in a GRI dataset. Users are also encouraged to only use the Google Earth data for basic visualization, and not to use the GIS data for any type of data analysis or investigation.

For detailed information regarding GIS parameters such as data attribute field definitions, attribute field codes, value definitions, and rules that govern relationships found in the data, refer to the NPS Geology-GIS Data Model document, gri_gdb_ggdm_v2dot3.pdf (available at: https://www.nps.gov/articles/gri-geodatabase-model.htm).

An additional data package ZIP file—**yell_geology_msu_thesis.zip**—is included with this release. It contains data and materials associated with a 2023 Montana State University Master's thesis by Natali Kragh, titled *Addressing the State of Yellowstone National Park's Geologic Maps Using Traditional and Novel Approaches*. This thesis examines map boundary issues within the GRI Geologic-GIS data for Yellowstone National Park.

The data package includes:

- Natali Kragh's Master's thesis.
- A PDF compilation of YELL one-sheet documents that describe field mapping sites and updates to existing geologic mapping.
- Supplementary spreadsheets containing appendix data referenced in the thesis:
    - **Appendix A**: Whole rock and trace element geochemical analyses.
    - **Appendix B**: A geochemical database of whole rock samples not collected as part of the thesis.
    - **Appendix C**: U-Pb zircon geochronology results.
    - **Appendix D**: Pb isotope ratios and trace element concentrations in plagioclase from the Absaroka Volcanic Supergroup.
- A file geodatabase containing point data for field sample sites from the 2020, 2021, and 2022 field seasons, referenced in both the thesis and one-sheet documents.
- Photographs from each field season, linked to the corresponding geodatabase points.

Note: Updates to geologic map data identified during the thesis research have been incorporated into the revised GRI digital geologic-GIS data for Yellowstone National Park.

GRI digital geologic-GIS data are available at the NPS Data Store Search Application: http://irma.nps.gov/App/Reference/Search. To find GRI data for a specific park or parks select the appropriate park(s), enter "GRI" as a Search Text term, and then select the Search Button.

For a complete listing of Geologic Resources Inventory products and direct links to the download site, visit the GRI products webpage: http://go.nps.gov/gri_products.

For more information about the Geologic Resources Inventory Program visit the GRI webpage: https://www.nps.gov/subjects/geology/gri.htm. At the bottom of that webpage is a "Contact Us" link if you need additional information. You may also directly contact the program coordinator:

Jason Kenworthy
Inventory Program Coordinator
National Park Service Geologic Resources Division
P.O. Box 25287
Denver, CO 80225-0287
phone: (303) 987-6923
fax: (303) 987-6792
email: Jason_Kenworthy@nps.gov

To provide feedback or to inquire about the use of GRI products, contact Jason Kenworthy (contact information listed above).

For information about using and/or obtaining GRI digital geologic-GIS data, contact:

Stephanie O'Meara
Geologist/GIS Specialist/Data Manager
Colorado State University
Cooperator to the National Park Service
Fort Collins, CO
e-mail: stephanie_o'meara@partner.nps.gov

James Winter
Geologist/GIS Specialist/Developer
Colorado State University
Cooperator to the National Park Service
e-mail: jamesrh.winter@rams.colostate.edu

Jim Chappell
Geologist/GIS Specialist/Developer
Colorado State University
Cooperator to the National Park Service
e-mail: james.chappell@colostate.edu