

DIGITAL MAPPING TECHNIQUES 2018

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Lexington, KY)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2018)

<http://ngmdb.usgs.gov/info/dmt/>

Scripted Conversion of Legacy GIS Data to USGS Formats

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Abstract

The Arizona Geological Survey (AZGS) has converted over one hundred geologic map products from a variety of legacy formats into National Cooperative Geologic Mapping Program standard schema for geologic map publications (NCGMP09) compliant geodatabases. A mixture of manual editing and python scripts were used to convert the data. Once in NCGMP09 format, the AZGS is able to batch convert all of its geodatabases into new formats like GeMs with a single python script and ArcGIS toolbox. The latest AZGS conversion tools are available on the open-source code-sharing repository GitHub. The python conversion to NCGMP09 scripts are located here: <https://github.com/ncgmp09/transfer-data-to-ncgmp09>. The NCGMP09 to GeMS tool is located here: [https://github.com/ncgmp09/Ncgmp09 to GeMS](https://github.com/ncgmp09/Ncgmp09_to_GeMS). The AZGS toolbar is located here: <https://github.com/ncgmp09/azgs-toolbar>. These tools will continue to be supported by the AZGS as new standards and technologies in geologic mapping arise. Support from NCGDPP has been acquired to upgrade the toolbar to improve checks for geometry, symbology, and topology errors in converted maps and to validate GeMs geodatabases.

Reference

Clark, R.C., Day, J. and Richard, S.M., 2014, The AZGS geologic map toolbar for creating geologic map data using the NCGMP09 database and ESRI ArcMap. Arizona Geological Survey Open File Report, OFR-13-13, 18 p. http://repository.azgs.gov/uri_gin/azgs/dlio/1564

SCRIPTED CONVERSION OF LEGACY GIS DATA TO USGS FORMATS

ARIZONA GEOLOGICAL SURVEY,
TUCSON, ARIZONA



TRANSFORMATION

- Python script - Transforms old AZGS databases into NCGMP09
- Python script / Arc toolbox - NCGMP09 into GeMS
- AZGS Toolbar/ Map production

PYTHON SCRIPTS

- <https://github.com/ncgmp09/transfer-data-to-ncgmp09>

ABRANDNEWDATABASE.py	set the workspace environment
AppendCartographicLinesWithFieldMappings.py	set the workspace environment
AppendContactsWithFieldMappings.py	set the workspace environment
AppendDMUWithFieldMappings.py	update to out FC path
AppendDataSourcePolysWithFieldMappings.py	set the workspace environment
AppendDataSourcesWithFieldMappings.py	set the workspace environment
AppendExtendedAttributesWithFieldMappings.py	set the workspace environment
AppendGeologicEventsWithFieldMappings.py	set the workspace environment
AppendGeologicLinesWithFieldMappings.py	set the workspace environment
AppendGlossaryWithFieldMappings.py	set the workspace environment
AppendMapUnitPolysWithFieldMappings.py	set the workspace environment
AppendNotesWithFieldMappings.py	set the workspace environment
AppendOrientationPointsWithFieldMappings.py	set the workspace environment
AppendOverlayPolysWithFieldMappings.py	set the workspace environment
AppendSamplePointsWithFieldMappings.py	set the workspace environment
AppendStandardLithologyWithFieldMappings.py	set the workspace environment
AppendStationPointsWithFieldMappings.py	set the workspace environment
AppendSysInfoWithFieldMappings.py	set the workspace environment
ConfidenceUpdate.py	set the workspace environment
DataSourcesDomainUpdate.py	set the workspace environment
FeatureCopyFromOldDatabase.py	set the workspace environment
README.md	more updates on read me
execute-mixed.py	set the workspace environment

```
1 import arcpy, shutil
2 from arcpy import env
3
4
5 # List all file geodatabases in the current workspace
6 #
7 workspaces = arcpy.ListWorkspaces("*", "")
8 for workspace in workspaces:
9     name = arcpy.Describe(workspace).name
10    namepart = name.split(".")
11    newname = namepart[0]
12    # Set local variables
13    #
14    featureclassin = "MapUnitPolys"
15    featureclassout = "MapUnitPolys"
16    inFC = "C:\\Documents\\azgs\\mixed\\" + name + "\\GeologicMap\\" + featureclassin
17    outFC = "C:\\Documents\\ncgmp\\mixed\\" + newname + ".gdb\\GeologicMap\\" + featureclassout
18    schemaType = "NO_TEST"
19    subtype = ""
20
21    # Set input field variables
22    #
23    infield1 = "MapUnitPolys_ID"
24    infield2 = "MapUnit"
25    infield3 = "Label"
26    infield4 = "DataSourceID"
27    infield5 = "Symbol"
28
29    # Set output field variables
30    #
31    outfield1 = "MapUnitPolys_ID"
32    outfield2 = "MapUnit"
33    outfield3 = "Label"
34    outfield4 = "DataSourceID"
35    outfield5 = "Symbol"
```

```
14     featureclassin = "MapUnitPolys"
15     featureclassout = "MapUnitPolys"
16     inFC = "C:\\Documents\\azgs\\mixed\\" + name + "\\GeologicMap\\" + featureclassin
17     outFC = "C:\\Documents\\ncgmp\\mixed\\"+newname+".gdb\\GeologicMap\\" + featureclassout
18     schemaType = "NO_TEST"
19     subtype = ""
```



```
1 import arcpy, os
2 from arcpy import env
3
4 env.workspace = "C:\\Documents\\azgs\\mixed"
5 executefile = ["execute-mixed.py"]
6 scripts = os.listdir("C:\\Documents\\transfer-data-to-ncgmp09-master")
7 for script in scripts:
8     if script.endswith(".py"):
9         if script not in executefile:
10             print script
11             execfile(script, {"env.workspace": env.workspace})
```

```
# Set input field variables
#
infield1 = "ContactsAndFaults_ID"
infield2 = "Type"
infield3 = "LTYPE"
infield4 = "Label"
infield5 = "DataSourceID"
infield6 = "Notes"
infield7 = "RuleID"
infield8 = "Symbol"
infield9 = "IsConcealed"
infield10 = "ExistenceConfidence"
infield11 = "IdentityConfidence"
infield12 = "LocationConfidenceMeters"
```

```
# Set output field variables
#
outfield1 = "ContactsAndFaults_ID"
outfield2 = "Type"
outfield3 = "LTYPE"
outfield4 = "Label"
outfield5 = "DataSourceID"
outfield6 = "Notes"
outfield7 = "RuleID"
outfield8 = "Symbol"
outfield9 = "IsConcealed"
outfield10 = "ExistenceConfidence"
outfield11 = "IdentityConfidence"
outfield12 = "LocationConfidenceMeters"
```

GEMS SCRIPT AND ARC TOOLBOX

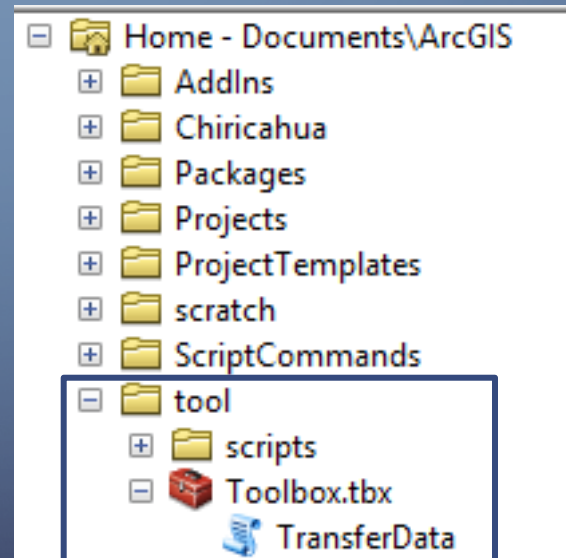
- https://github.com/ncgmp09/Ncgmp09_to_GeMS

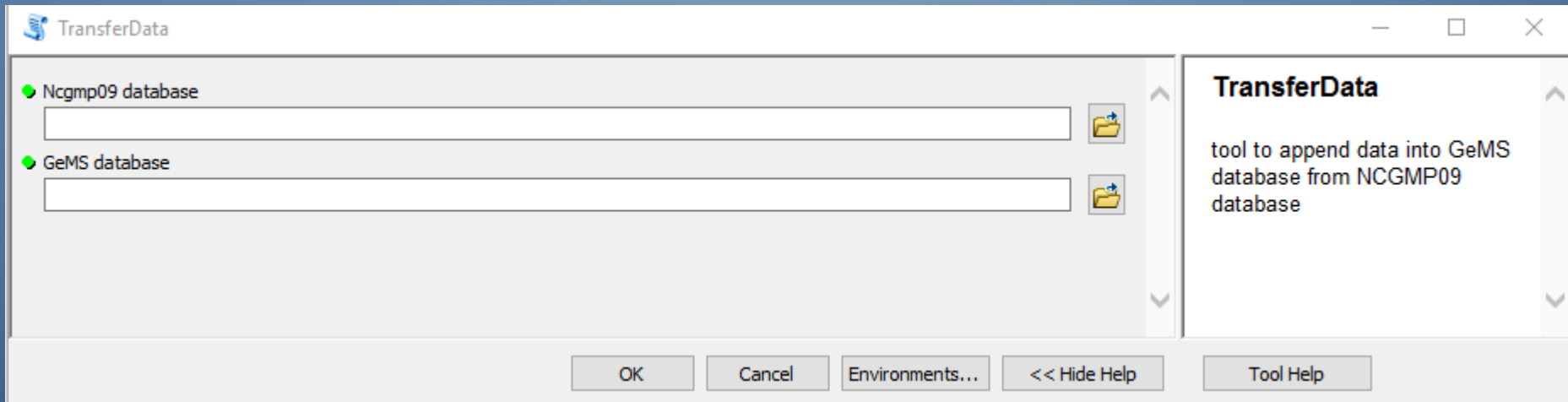
The screenshot shows the GitHub interface for the repository 'Ncgmp09 to GeMS'. At the top, it displays '7 commits', '1 branch', '0 releases', and '1 contributor'. Below this, there are navigation buttons: 'Branch: master', 'New pull request', 'Create new file', 'Upload files', 'Find file', and a green 'Clone or download' button. A dropdown menu is open from the 'Clone or download' button, showing 'Clone with HTTPS' (selected) and 'Use SSH'. The HTTPS URL is 'https://github.com/ncgmp09/Ncgmp09_to_GeMS'. Below the URL are buttons for 'Open in Desktop' and 'Download ZIP'. The main content area shows a file tree with the following items:

File/Folder	Status
Lbookman	added
GeMSArcTool	added
PythonScripts	added arctool
README.md	adding read me
README.md	

At the bottom of the repository view, the name 'Ncgmp09 to GeMS' is displayed.

- Place the GeMSArcTool in your documents under ArcGIS
- Click on TransferData





TransferData



Completed

Close

<< Details

Close this dialog when completed successfully

```
Msg C:\Users\lbookman\Documents\ArcGIS\Default.gdb
Msg AppendStationPointsWithFieldMappings.py
Msg C:\Users\lbookman\Documents\ArcGIS\Default.gdb
Msg ConfidenceUpdate.py
Msg C:\Users\lbookman\Documents\ArcGIS\Default.gdb
Msg DataSourcesDomainUpdate.py
Msg C:\Users\lbookman\Documents\ArcGIS\Default.gdb
Msg FeatureCopyFromOldDatabase.py
Msg C:\Users\lbookman\Documents\ArcGIS\Default.gdb
Completed script RUn...
Succeeded at Tue May 15 12:14:45 2018 (Elapsed Time: 4 minutes 57 seconds)
```

AZGS NCGMP TOOLBAR

- **Only opens NCGMP09 database**
- **Creates and Manages Data Sources and Description Of Map Units**
- **Draws the map unit legend onto an ArcMap layout**
- **Provides symbols for common geologic features**
- **Updates feature identifiers and Data Source identifiers as edits are made**

DEVELOPMENT

- C#.NET and ArcObjects
- Created in 2009
- Undergone updates over the years
- <https://github.com/ncgmp09/azgs-toolbar>
- http://repository.azgs.az.gov/uri_gin/azgs/dlio/1564

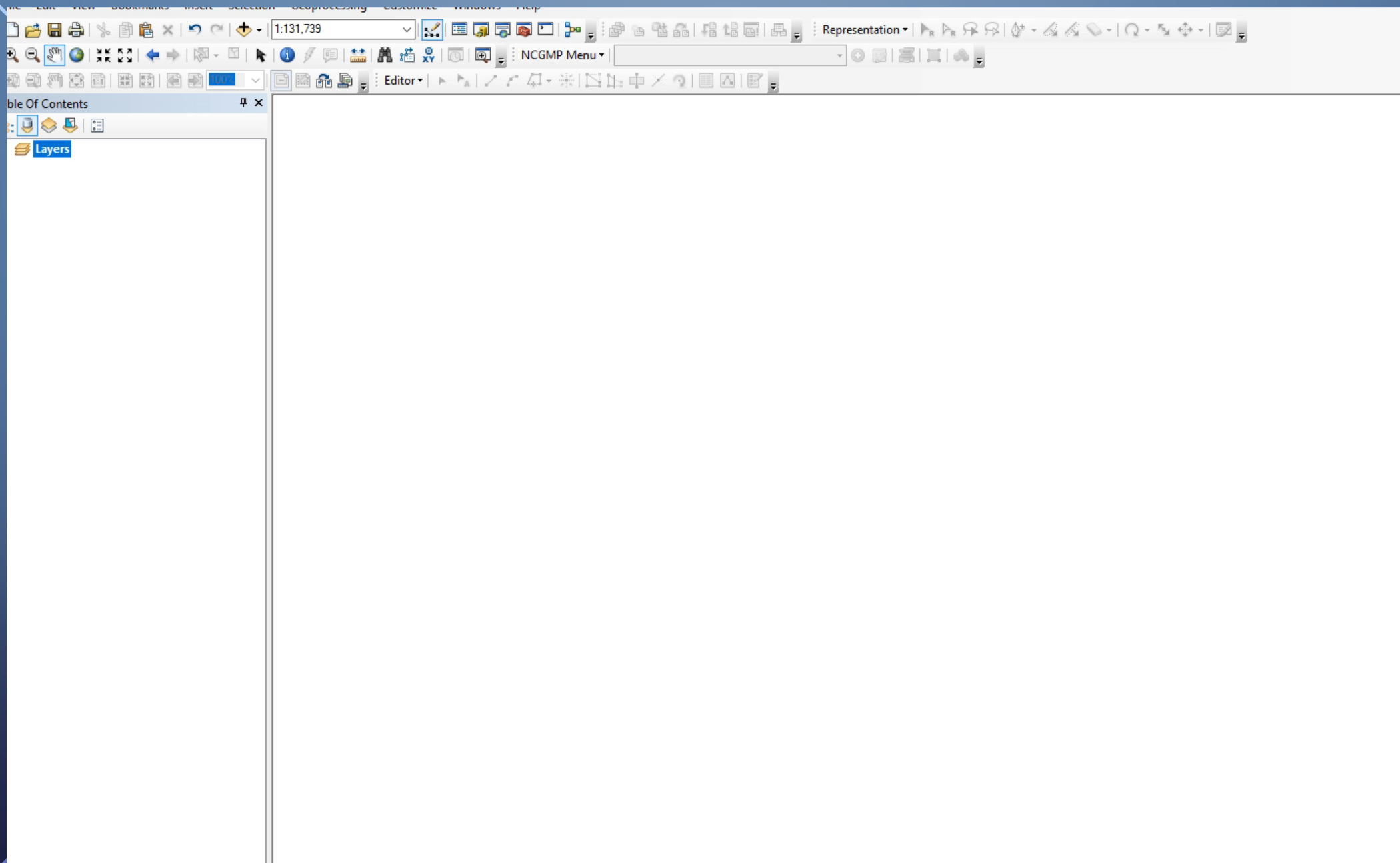
[HTTPS://GITHUB.COM/NCGMP09/AZGS-TOOLBAR](https://github.com/ncgmp09/azgs-toolbar)

Installation

1. Find the file `ncgmpToolbar.esriAddIn` in the `/bin/Debug` folder. (If using GitHub open the file and click the **Raw** button to download only this file.)
2. Save `ncgmpToolbar.esriAddIn` to your computer in a location of your choosing.
3. Double-click `NCGMPToolbar.esriAddIn`
4. Click **Install Add-In**
5. In ArcMap, click **Customize**
6. Select **Customize Mode...**
7. Click **Add from file...**
8. Navigate to and select `NcgmpToolbar.esriAddIn`
9. Click **Open**
10. On Toolbars tab, check the box next to NCGMP Toolbar then close Customize window

OPENING AN EXISTING NCGMP09 DATABASE

- the AddIn will only open a geologic map database created with one of the create database tools in the Geologic Mapping Toolset ArcGIS Toolbox.



CREATING AND MANAGING DATA SOURCES

- The toolbar provides a simple window for creating, managing and selecting data sources for individual or groups of features.

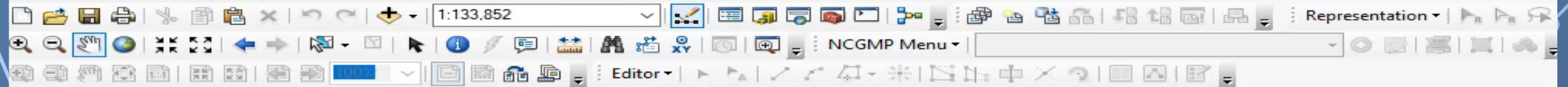
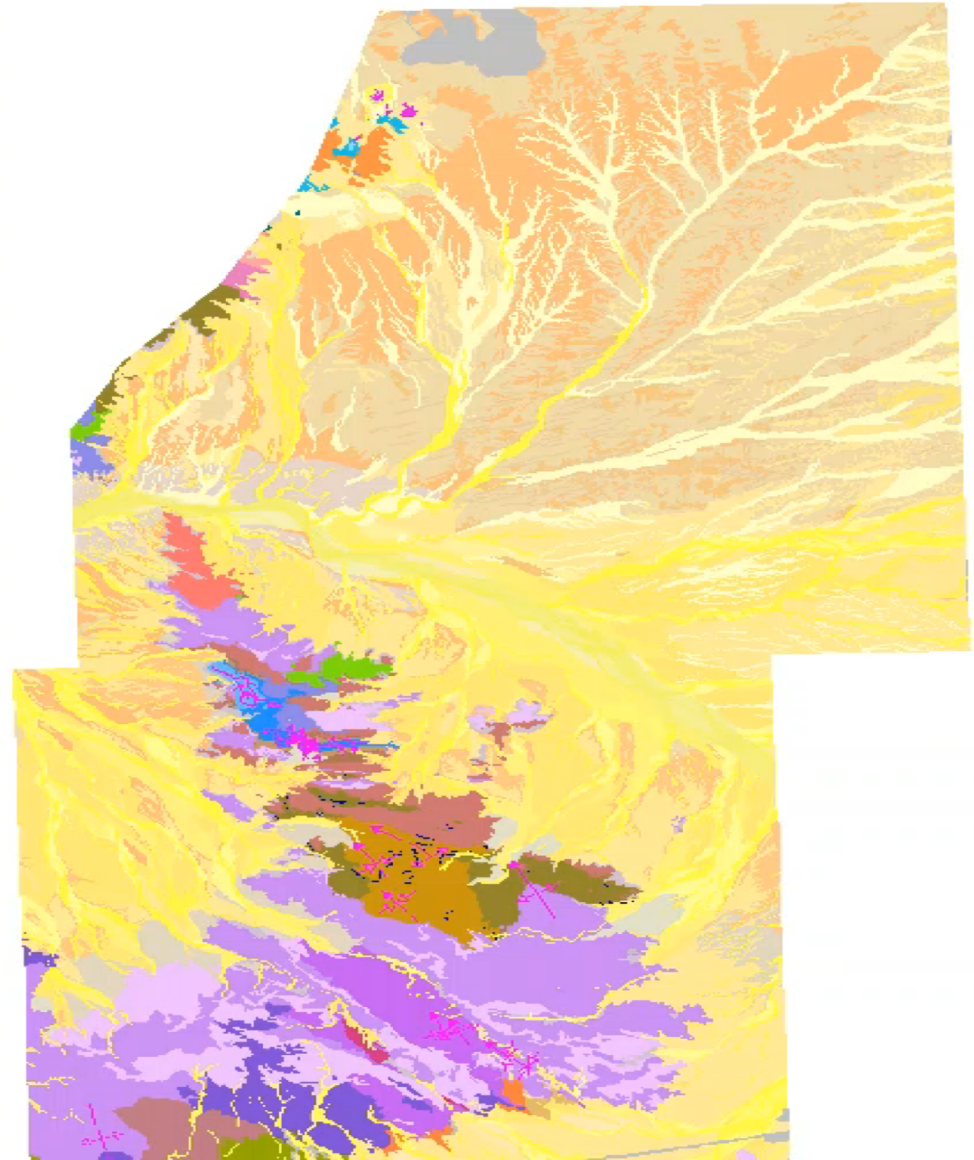


Table Of Contents

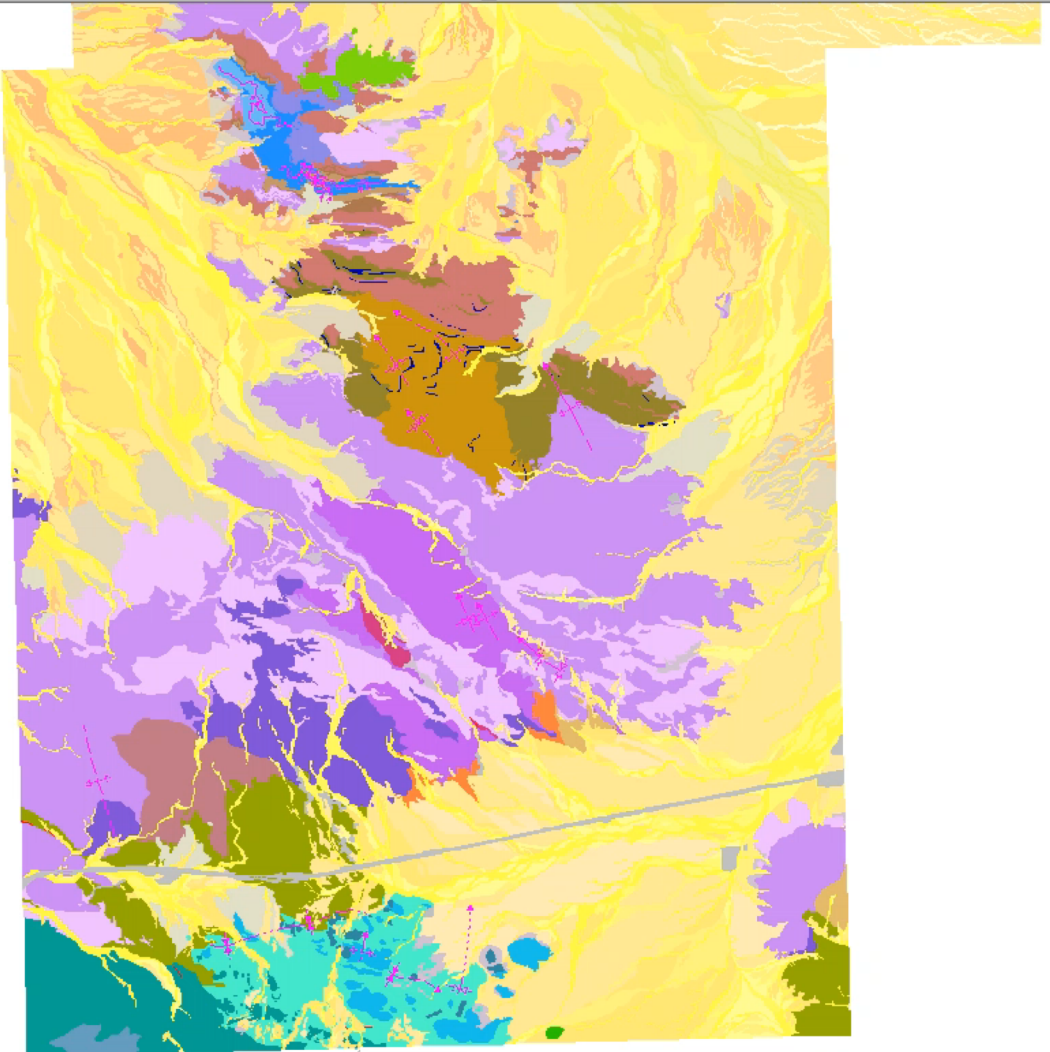
- Layers
 - dbo.DEFAULT (tourmaline)
 - MiddleCampMoonMtnSE.DBO.Geolo
 - Geologic Map Topology
 - Orientation Points
 - Stations
 - GenericPoints
 - GenericSamples
 - GeochronPoints
 - CartographicLines
 - IsoValueLines
 - GeologicLines
 - ContactsAndFaults
 - DataSourcePolys
 - MapUnitPolys
 - OtherPolys
 - DataSources
 - DescriptionOfMapUnits
 - ExtendedAttributes
 - GeologicEvents
 - Glossary
 - Notes
 - StandardLithology



CREATING AND MANAGING DESCRIPTION OF MAP UNITS

- The Map Unit Legend Editor, accessible from the NCGMP Menu dropdown, provides a window that allows users to define new units, edit existing ones, adjust the ordering and hierarchy of the legend, and to indicate which polygons on the map depict a particular unit. The information entered into this form is written to the NCGMP database's DescriptionOfMapUnits table.

- Layers
 - dbo.DEFAULT (tourmaline)
 - MiddleCampMoonMtnSE.DBO.Geolo
 - Geologic Map Topology
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DRAWING THE MAP UNIT LEGEND ONTO AN ARCMAP LAYOUT

- When ArcMap is in layout mode, the toolbar allows a user to draw the contents of the DescriptionOfMapUnits table as a set of graphical elements on the layout. These graphical elements include a color patch, map unit abbreviation, map unit name, display age and map unit description.

1:61,188

Representation

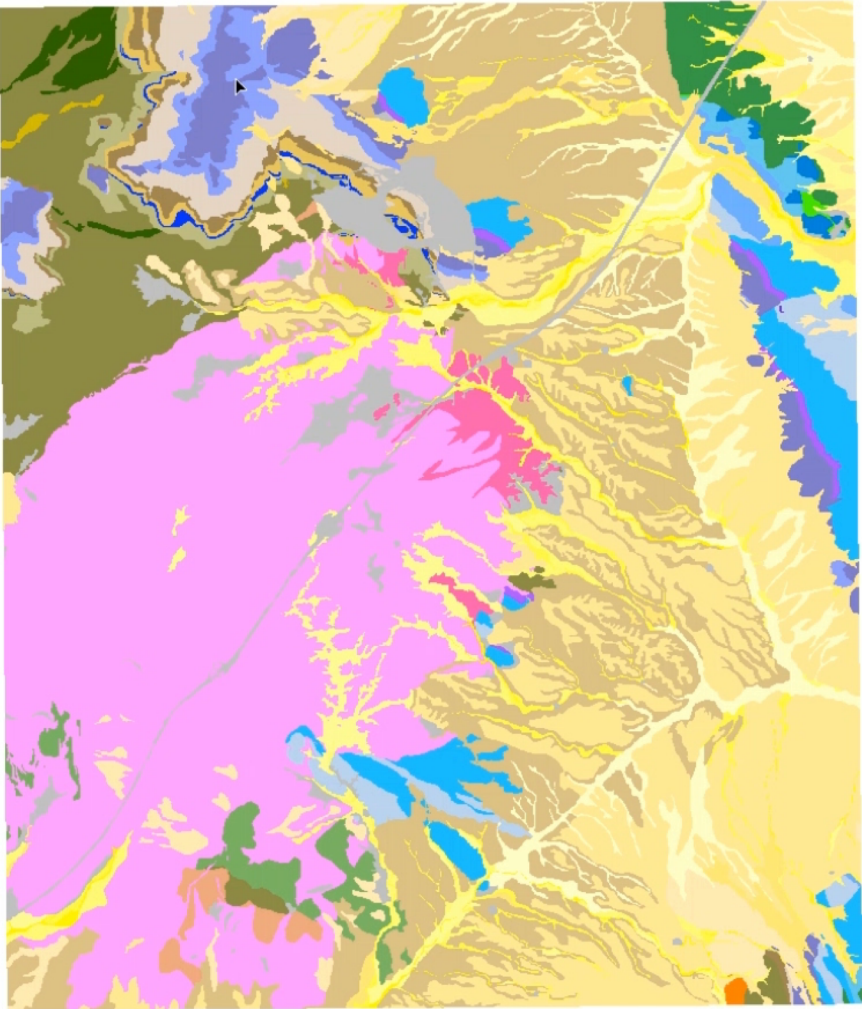
NCGMP Menu

Editor

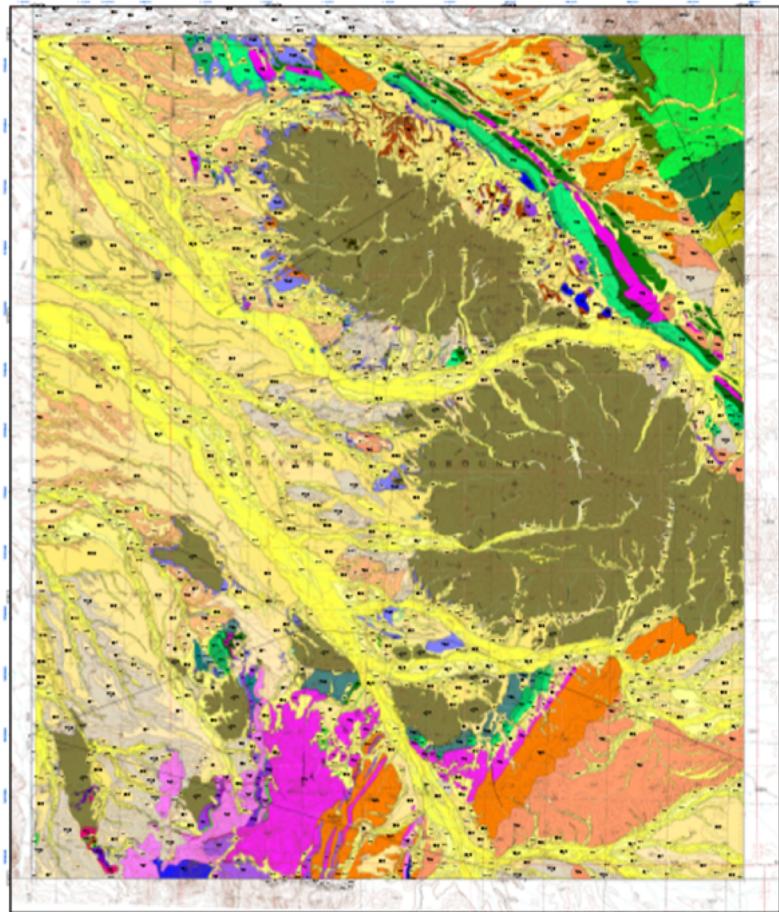
Table Of Contents

Layers

- dbo.DEFAULT (tourmaline)
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 - Geologic Map Topology
 - Orientation Points
 - Stations
 - GenericPoints
 - GenericSamples
 - GeochronPoints
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 - MapUnitPolys
 - OtherPolys
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 - ExtendedAttributes
 - GeologicEvents
 - Glossary
 - Notes
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585793.88 3553650.502 Meters



Geologic Map of the North Trigo Peaks 7 1/2 Quadrangle, La Paz County, Arizona

Charles J. Ferguson, Philip L. Ramirez, Brian F. Gomez, and Bradford J. Johnson
Arizona Geological Survey

Digital Geologic Map 133 (DGM-133), DRAFT VERSION

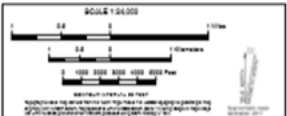
September 2017

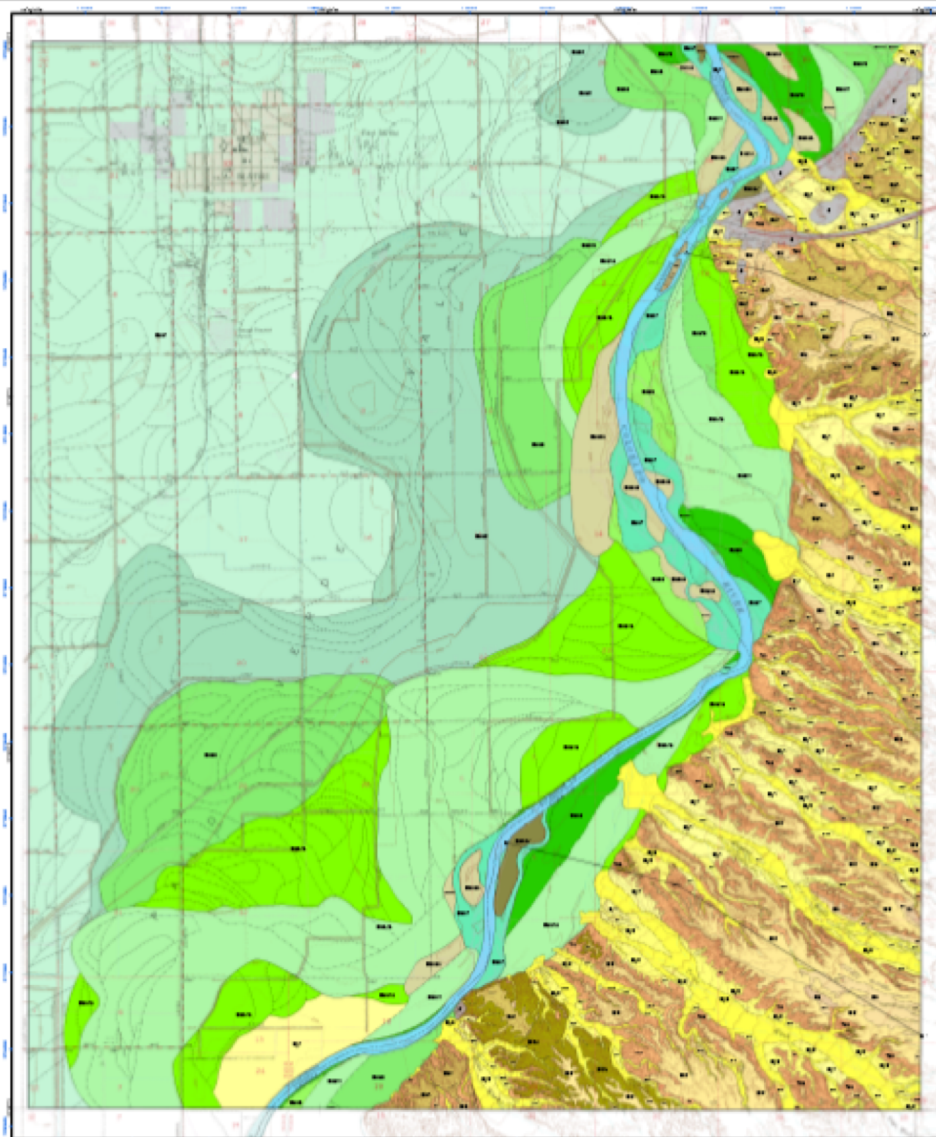
ABSTRACT
This geologic map of the North Trigo Peaks 7 1/2 Quadrangle, La Paz County, Arizona, shows the distribution of geological units and structural features. The map area is approximately 100 square miles and is bounded by the 113th and 115th meridians and the 33rd and 35th parallels. The map was compiled from various sources, including field observations, aerial photography, and existing geologic maps. The geological units are color-coded and described in the accompanying legend. Structural features, including faults and folds, are also shown and described. The map is intended for use by geologists, engineers, and other professionals involved in resource management and planning in the region.

ACKNOWLEDGMENTS
The authors wish to thank the following individuals and organizations for their assistance and support during the preparation of this map: [List of names and organizations]

Map Unit Descriptions

- U1** [Symbol] Unconsolidated Recent Deposits: Alluvium, colluvium, and other recent deposits.
- U2** [Symbol] Consolidated Recent Deposits: Sandstone, siltstone, and shale.
- U3** [Symbol] Consolidated Recent Deposits: Sandstone, siltstone, and shale.
- U4** [Symbol] Consolidated Recent Deposits: Sandstone, siltstone, and shale.
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- U98** [Symbol] Consolidated Recent Deposits: Sandstone, siltstone, and shale.
- U99** [Symbol] Consolidated Recent Deposits: Sandstone, siltstone, and shale.
- U100** [Symbol] Consolidated Recent Deposits: Sandstone, siltstone, and shale.





Geologic Map of the Blythe 7 1/2 Quadrangle, La Paz County, Arizona and Riverside Co., CA

Brian R. Goetz, Debra Block, Philo J. Paatmaa, and R. Kyle House
Arizona Geological Survey
Digital Geologic Map 134 (DGM-134), DRAFT VERSION

INTRODUCTION
This geologic map was prepared as a contribution to the geologic knowledge of the Blythe 7 1/2 Quadrangle, La Paz County, Arizona and Riverside County, California. The map is based on field observations, aerial photography, and geologic maps of adjacent areas.

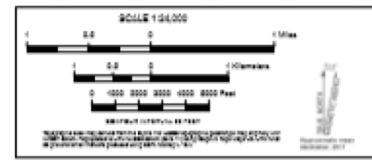
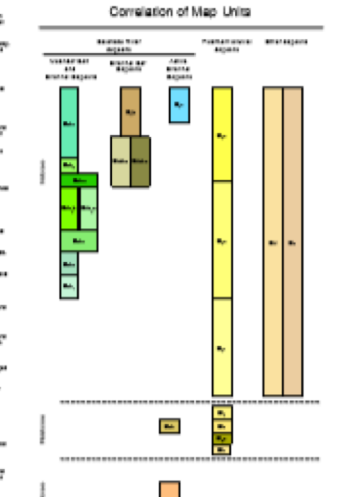
SYMBOLS
The symbols used on this map are based on the symbols used on the geologic maps of the Blythe 7 1/2 Quadrangle, La Paz County, Arizona and Riverside County, California. The symbols are defined in the legend on page 134.

Map Unit Descriptions

- U1** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U2** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U3** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U4** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U5** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U6** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U7** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U8** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U9** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U10** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.

- U11** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U12** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U13** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U14** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.
- U15** Unconsolidated recent deposits: This unit includes recent alluvium, colluvium, and other deposits that are less than 5000 years old. It is composed of sand, silt, and clay.

Correlation of Map Units
This diagram shows the correlation of map units between the Blythe 7 1/2 Quadrangle and adjacent areas. The units are color-coded to match the map.



- Contacts and Features**
- Contact, unconformable
 - Contact, approximate
 - Internal contact, inferred
 - Internal contact, assumed
 - Discontinuity line



UPDATING FEATURE IDENTIFIERS AND DATA SOURCE IDENTIFIERS AS EDITS ARE MADE

- An editor extension automatically manages various primary key fields defined in the NCGMP09 schema. As users create new features these fields are automatically populated. Similarly, users can select an "Active Data Source" record, and that Data Source will be automatically attached to each new feature.

ISSUES

ncgmp09 / azgs-toolbar

Unwatch 8 Star 4 Fork 2

Code Issues 4 Pull requests 0 Projects 0 Wiki Insights Settings

Filters is:issue is:open Labels Milestones **New issue**

4 Open 22 Closed Author Labels Projects Milestones Assignee Sort

- Missing Toolbox for v1.0.3 / v1.0.3 Toolbar cannot use v0.9.9.2 toolbox generated GDB #28 opened on Aug 31, 2017 by paquer 6
- Map Unit Legend Crash #27 opened on Jul 30, 2015 by tstroope 13
- Cannot apply values to selected features after planarizing lines in progress #18 opened on Jul 22, 2014 by JosephCook 3
- Hierarchy key conflicts in versioned database #3 opened on Apr 7, 2014 by janelday 1

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