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. 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 NGGDPP 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.az.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

```
import arcpy, shutil
from arcpy import env


# List all file geodatabases in the current workspace
#
workspaces = arcpy.ListWorkspaces("*", "")
for workspace in workspaces:
    name = arcpy.Describe(workspace).name
    namepart = name.split(".")
    newname = namepart[0]
    # Set local variables
    #
    featureclassin = "MapUnitPolys"
    featureclassout = "MapUnitPolys"
    inFC = "C:\\Documents\\azgs\\mixed\\" + name + "\\GeologicMap\\" + featureclassin
    outFC = "C:\\Documents\\ncgmp\\mixed\\"+newname+".gdb\\GeologicMap\\" + featureclassout
    schemaType = "NO_TEST"
    subtype = ""

    # Set input field variables
    #
    infield1 = "MapUnitPolys_ID"
    infield2 = "MapUnit"
    infield3 = "Label"
    infield4 = "DataSourceID"
    infield5 = "Symbol"

    # Set output field variables
    #
    outfield1 = "MapUnitPolys_ID"
    outfield2 = "MapUnit"
    outfield3 = "Label"
    outfield4 = "DataSourceID"
    outfield5 = "Symbol"
```

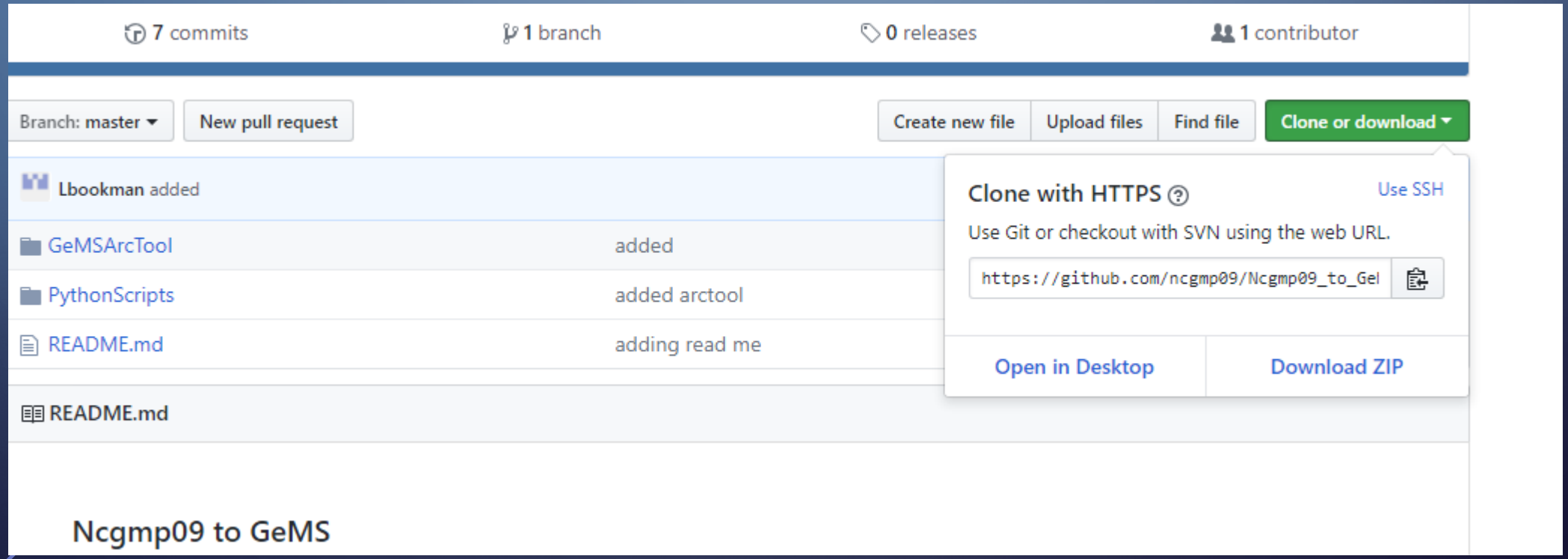
```
14      featureclassin = "MapUnitPolys"
15      featureclassout = "MapUnitPolys"
16      inFC = "C:\\Documents\\azgs\\mixed\\" + name + "\\GeologicMap\\" + featureclassin
17      outFC = "C:\\Documents\\ncgmp\\mixed\\"+newname+".gdb\\GeologicMap\\" + featureclassout
18      schemaType = "NO_TEST"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

```
import arcpy, os
from arcpy import env

env.workspace = "C:\\Documents\\azgs\\mixed"
executefile = ["execute-mixed.py"]
scripts = os.listdir("C:\\Documents\\transfer-data-to-ncgmp09-master")
for script in scripts:
    if script.endswith(".py"):
        if script not in executefile:
            print script
            execfile(script, {"env.workspace": env.workspace})
```

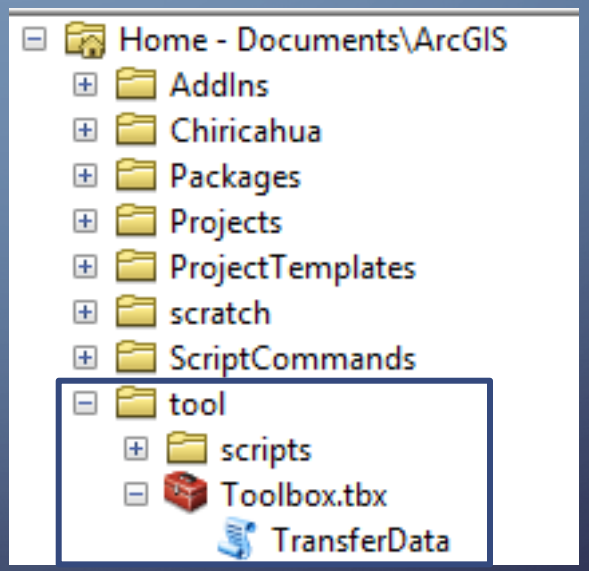
```
# Set input field variables
#
infield1 = "ContactsAndFaults_ID"
infield2 = "Type"
infield3 = "LTYPE"
infield4 = "Label"
infield5 = "DataSourceID"
infield6 = "Notes"
infield7 = "RuleID"
infield8 = "Symbol"
infield9 = "IsConcealed"
infield10 = "ExistenceConfidence"
infield11 = "IdentityConfidence"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

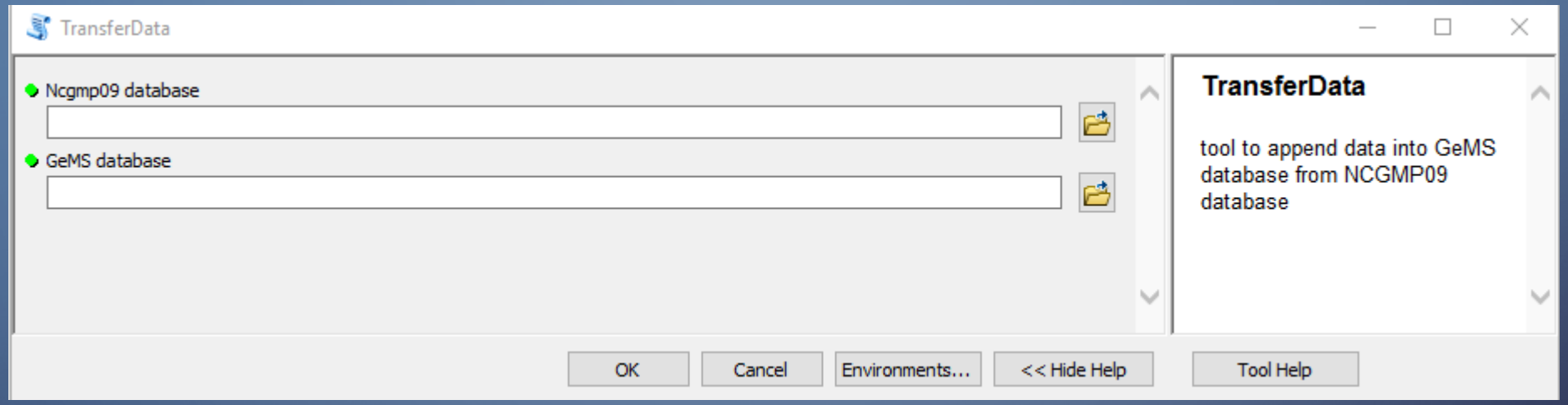
GEMS SCRIPT AND ARC TOOLBOX

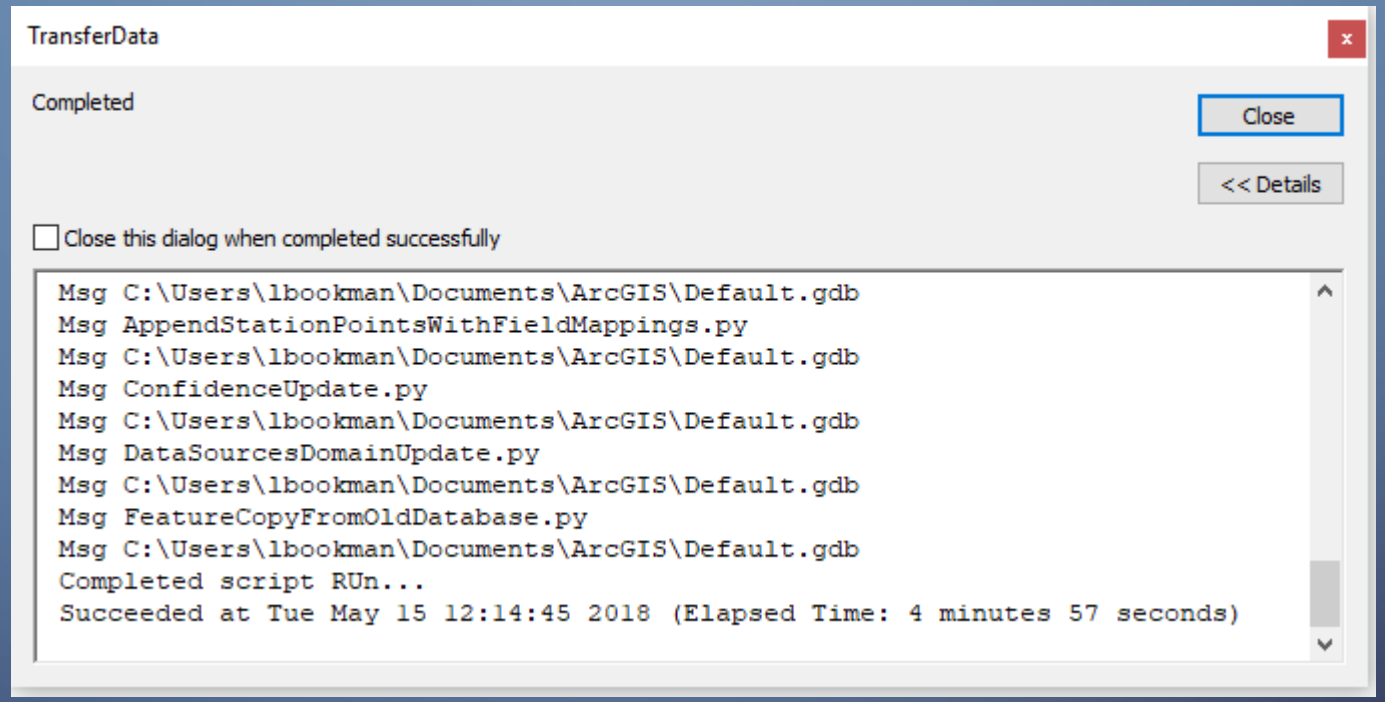
- https://github.com/ncgmp09/Ncgmp09_to_GeMS



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




TransferData
Ncgmp09 database
GeMS database
TransferData
tool to append data into GeMS database from NCGMP09 database
OK
Cancel
Environments...
<< Hide Help
Tool Help


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

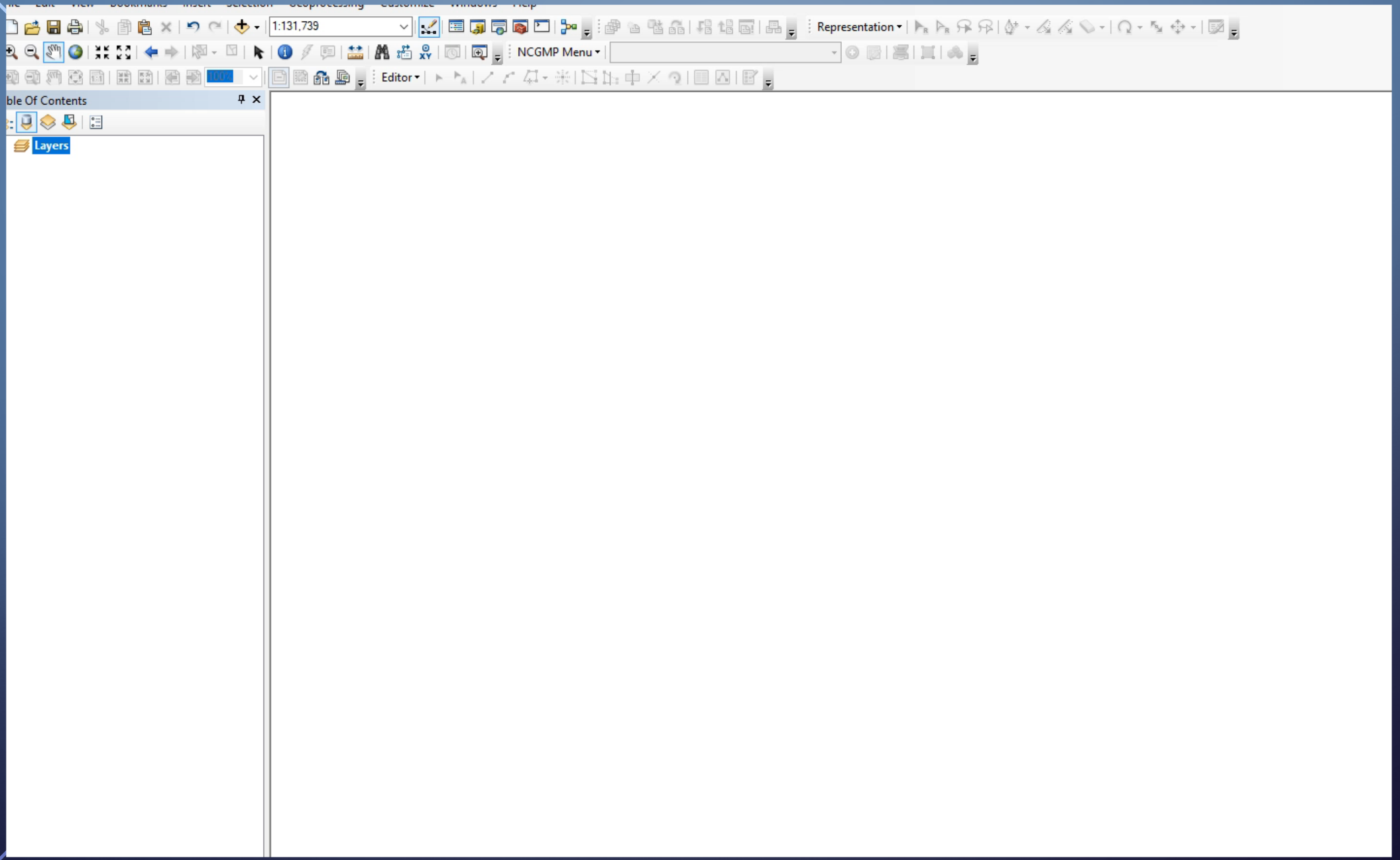
HTTPS://GITHUB.COM/NCGMP09/AZGS-TOOLBAR

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

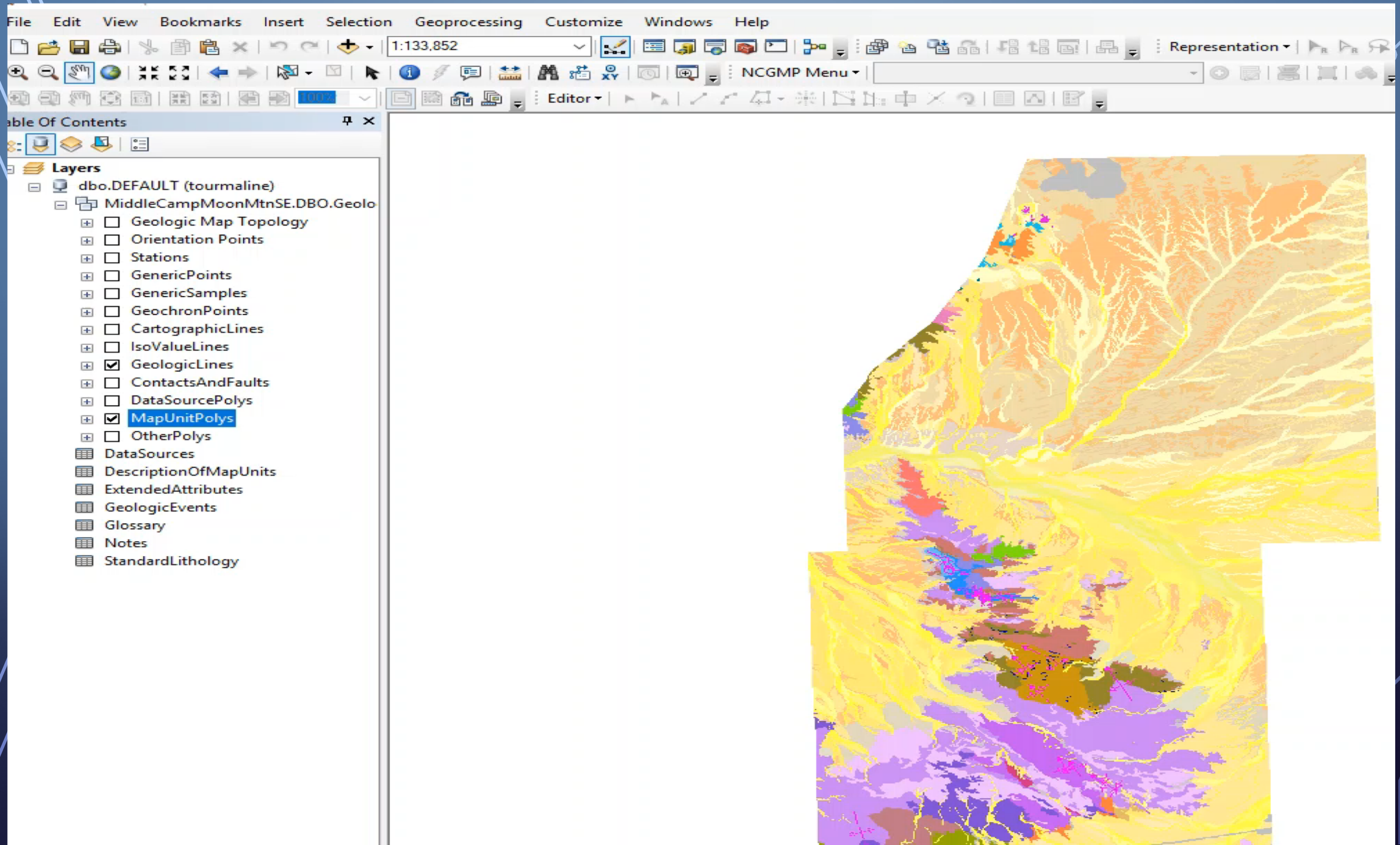
OPENING AN EXISTING NCGMP09 DATABASE

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


1:131,739
Representation
NCGMP Menu
Editor
ble Of Contents
Layers

CREATING AND MANAGING DATA SOURCES

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


File
Edit
View
Bookmarks
Insert
Selection
Geoprocessing
Customize
Windows
Help
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Layers
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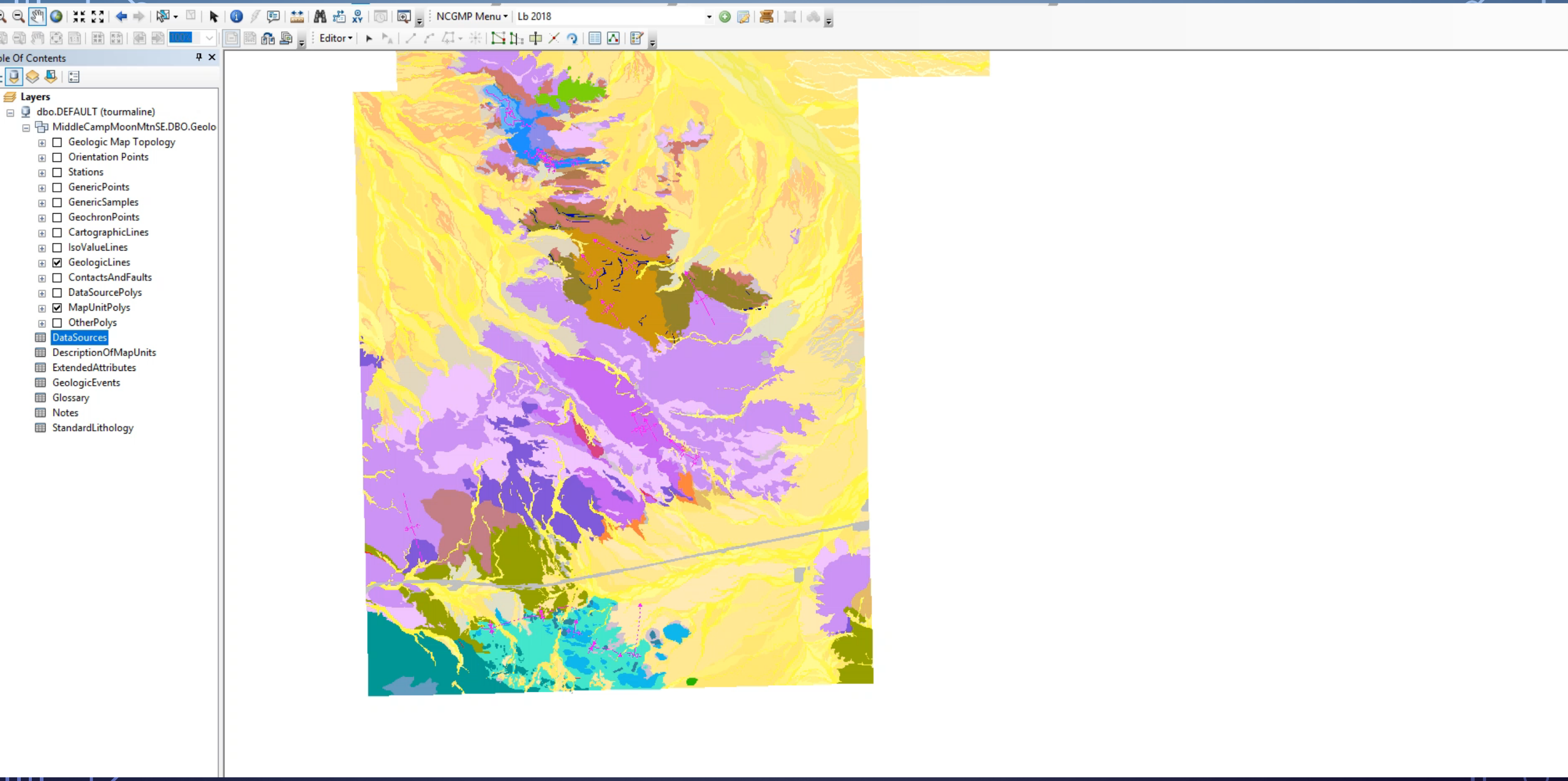
Geologic Map Topology
Orientation Points
Stations
GenericPoints
GenericSamples
GeochronPoints
CartographicLines
IsoValueLines
GeologicLines
ContactsAndFaults
DataSourcePolys
MapUnitPolys
OtherPolys
DataSources
DescriptionOfMapUnits
ExtendedAttributes
GeologicEvents
Glossary
Notes
StandardLithology

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.


NCGMP Menu
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Orientation Points
Stations
GenericPoints
GenericSamples
GeochronPoints
CartographicLines
IsoValueLines
GeologicLines
ContactsAndFaults
DataSourcePolys
MapUnitPolys
OtherPolys
DataSources
DescriptionOfMapUnits
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GeologicEvents
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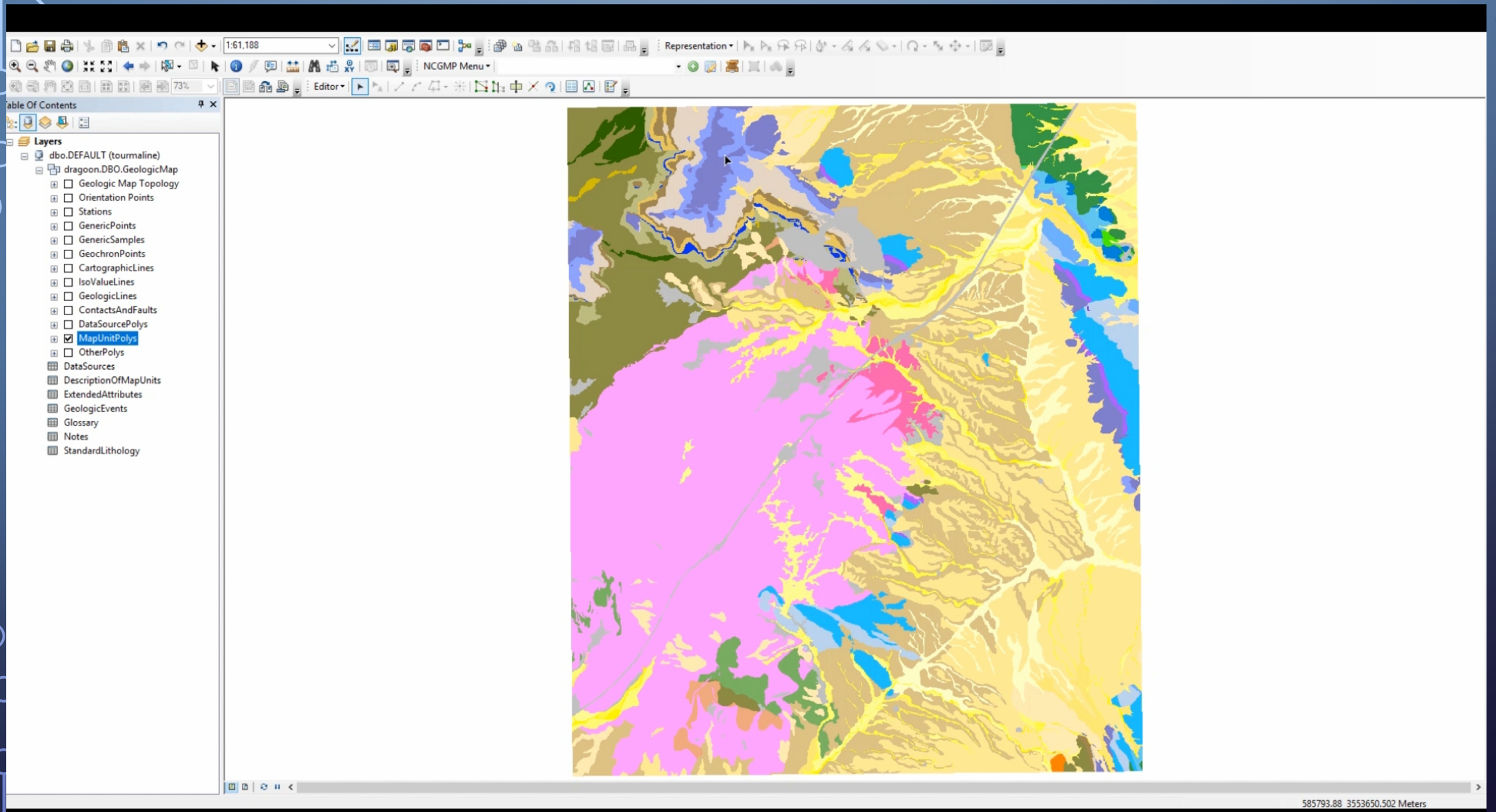
StandardLithology

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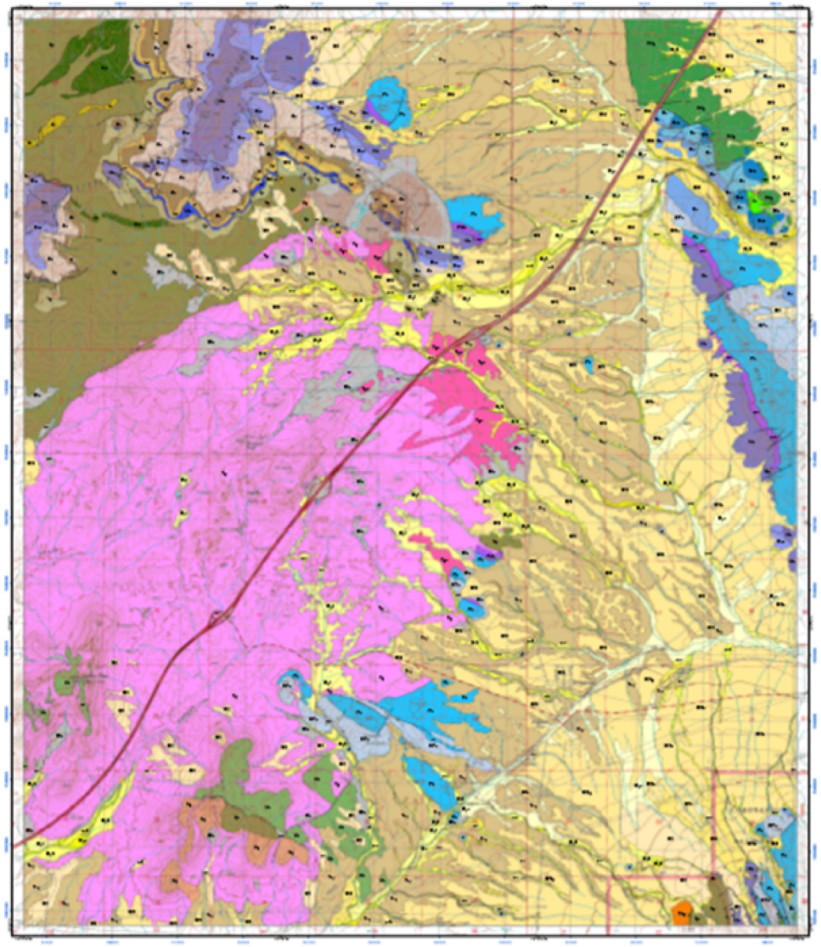
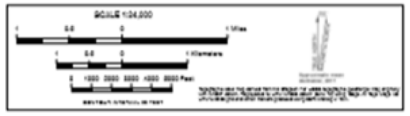


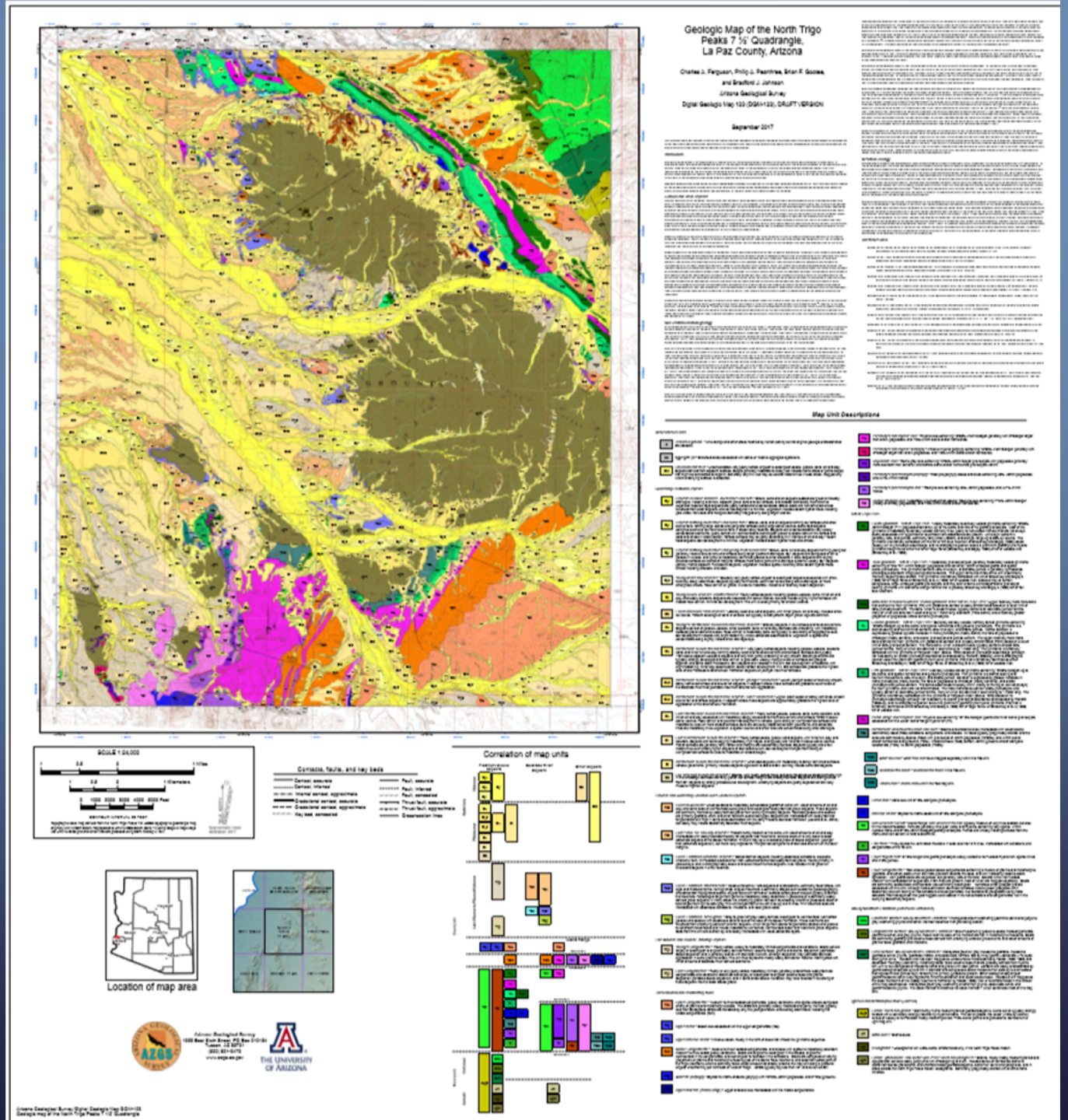
Geologic map of the Dragoon 7 ½' Quadrangle, Cochise County, Arizona

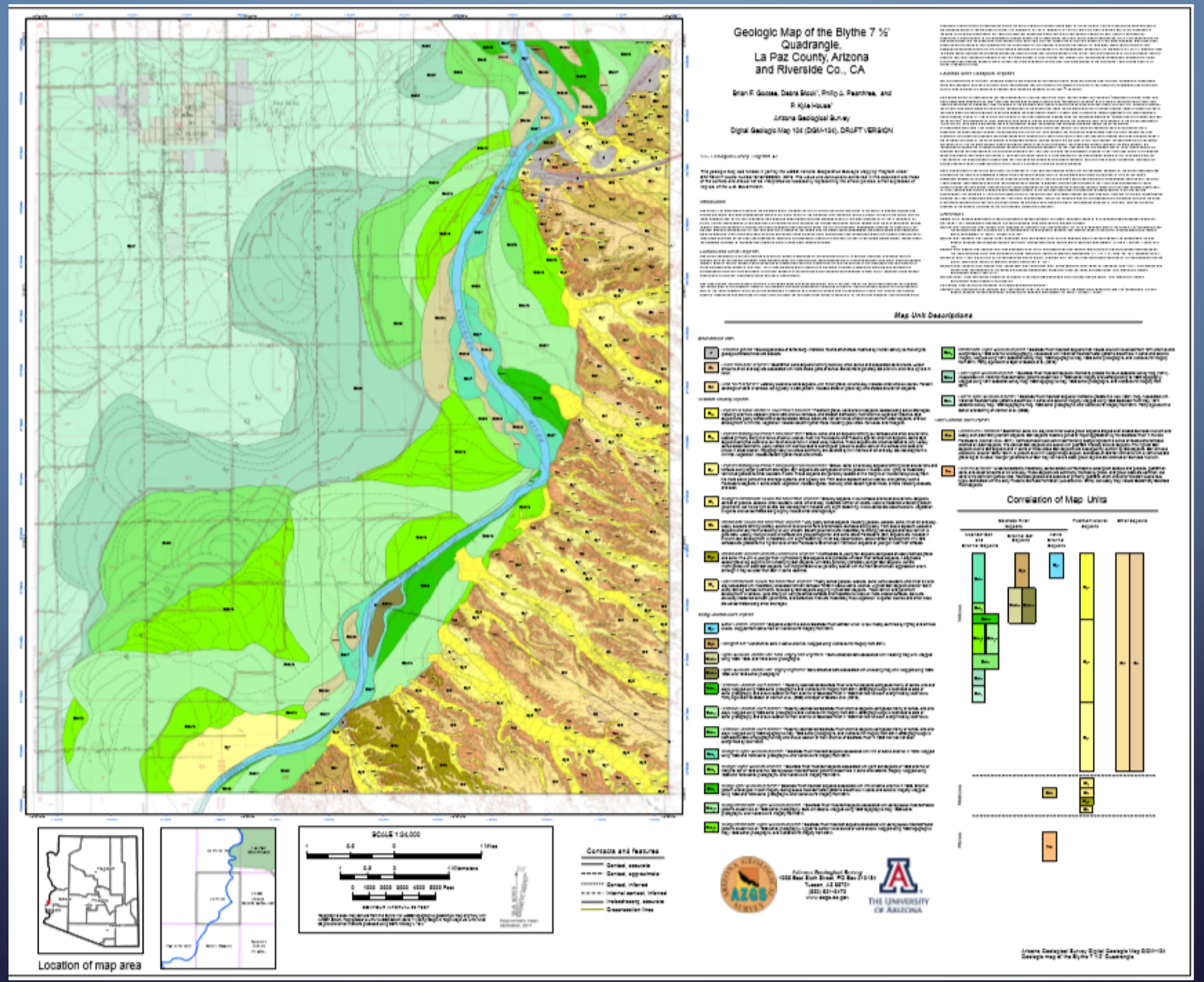
Bradford J. Johnson, Joseph P. Cook, and Charles J. Ferguson
Arizona Geological Survey

Digital Geologic Map 125 (DGM-125), DRAFT VERSION

September 2017




Geologic Map of the North Trigo Peaks 7 ½' Quadrangle, La Paz County, Arizona
Charles J. Ferguson, Philip A. Pearthree, Brian F. Gootee, and Bradford J. Johnson
Arizona Geological Survey
Digital Geologic Map 133 (DGM-133), DRAFT VERSION
September 2017
Map Unit Descriptions
Correlation of map units
Contacts, faults, and key beds
Location of map area
THE UNIVERSITY OF ARIZONA



Geologic Map of the Blythe 7 ½' Quadrangle, La Paz County, Arizona and Riverside Co., CA

Brian F. Gootee, Debra Block[1], Philip A. Pearthree, and P. Kyle House*

Arizona Geological Survey

Digital Geologic Map 134 (DGM-134), DRAFT VERSION

Map Unit Descriptions

Correlation of Map Units

Location of map area

SCALE 1:24,000

Contacts and features

Arizona Geological Survey
1520 West Sixth Street, PO Box 213161
Tucson, AZ 85721
(520) 621-2470
www.azgs.az.gov

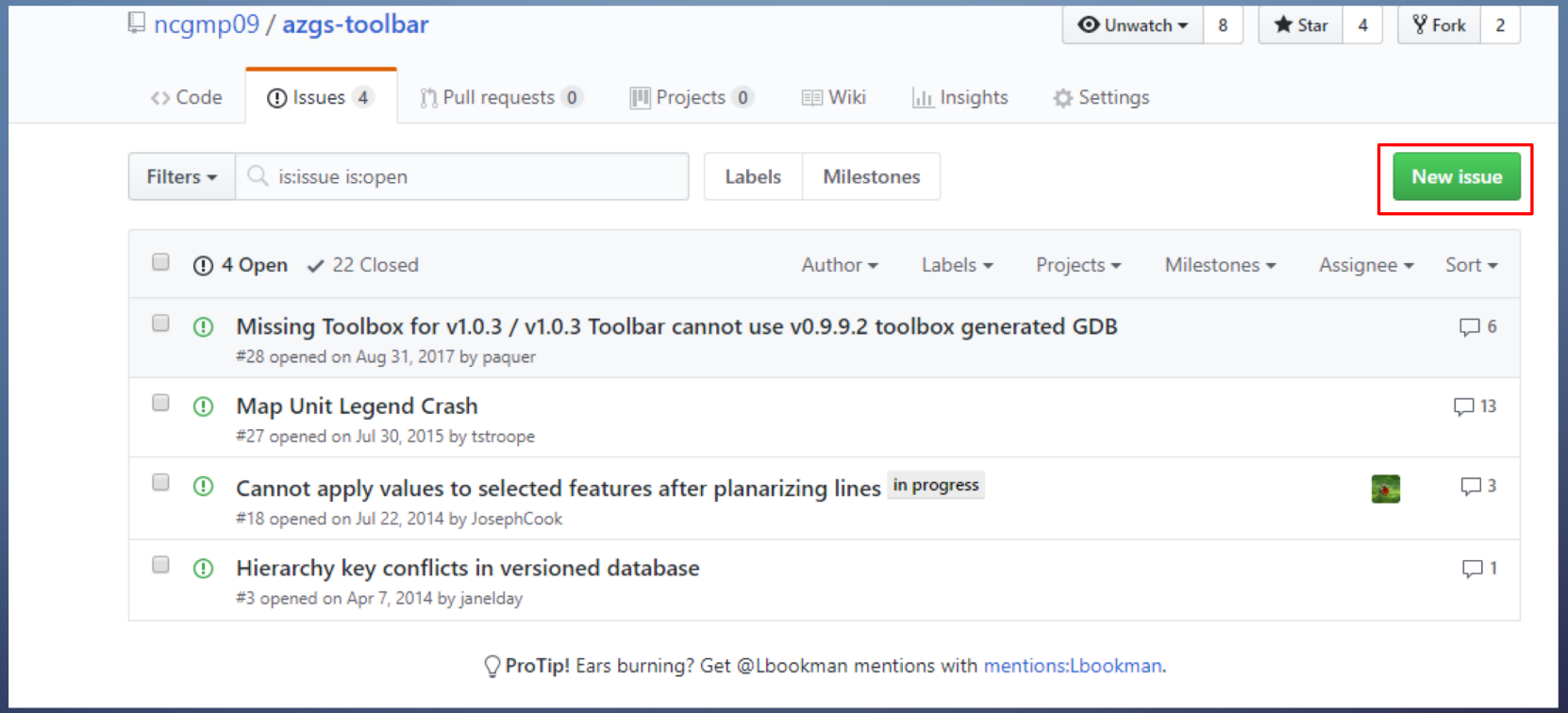
THE UNIVERSITY OF ARIZONA

Arizona Geological Survey Digital Geologic Map DGM-134
Geologic map of the Blythe 7 ½' Quadrangle

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
ProTip! Ears burning? Get @Lbookman mentions with mentions:Lbookman.

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http://azgs.arizona.edu/

https://github.com/lbookman