

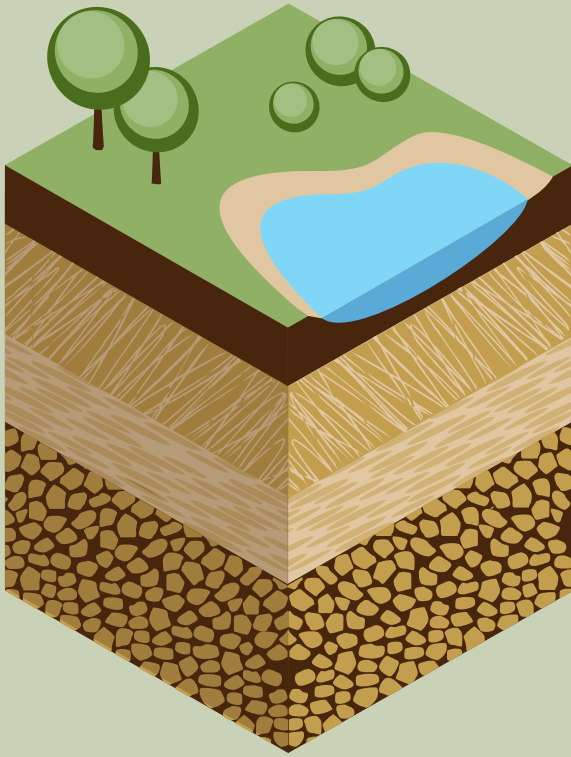
DIGITAL MAPPING TECHNIQUES 2022

The following was presented at DMT'22
May 22 - 25, 2022

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2022)

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




ESRI Stylx Implementation of FGDC Standard



South Carolina Department of Natural Resources
Geological Survey

Megan James

<https://ngmdb.usgs.gov/Info/standards/GeMS/>



“Generally speaking (and to the extent that it is possible), line and point symbolization should follow the FGDC Digital Cartographic Standard for Geologic Map Symbolization (FGDC, 2006).”

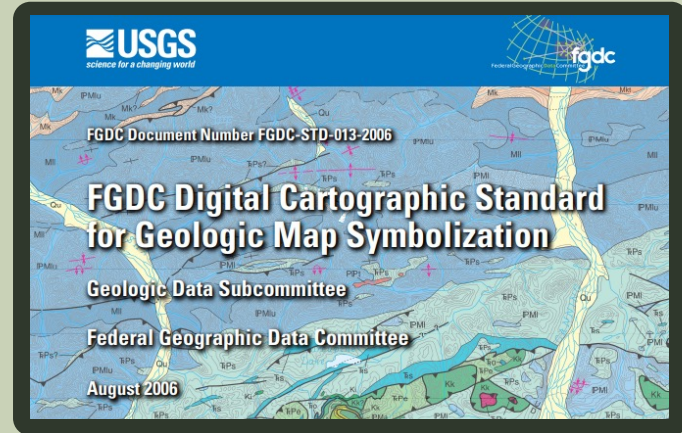
—U.S. Geological Survey National Cooperative Geologic Mapping Program, 2020

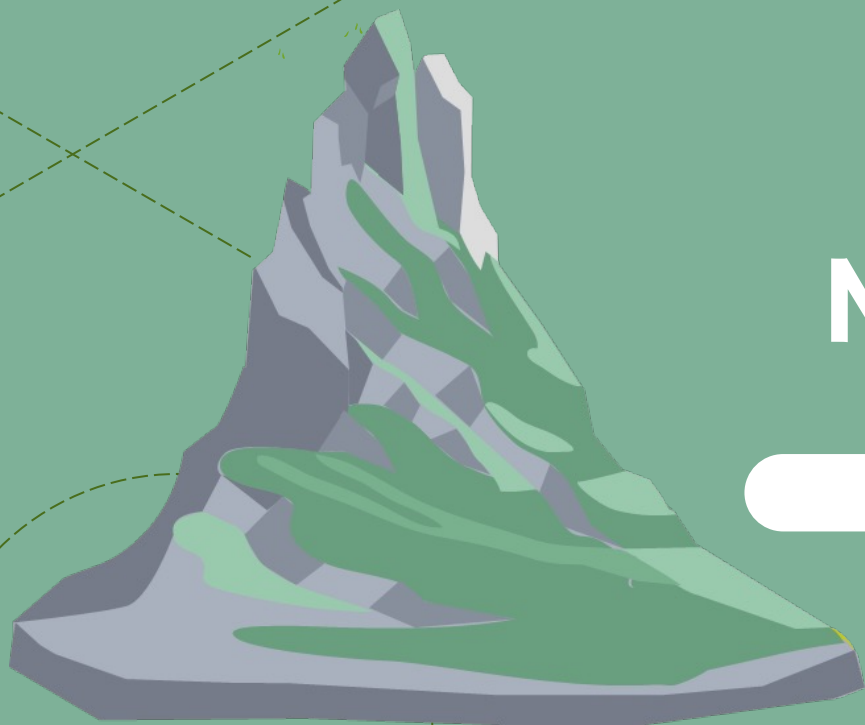
TABLE OF CONTENTS

01 Methodology

02 How To Use

03 Questions





01 METHODOLOGY

How was the .stylx file created?



Symbolization Resources



GSC_FGDC_
GeologicMapSymbols

Point

Line

Polygon

Text



DGGS_Map_
Symbolization

Point

Line

Polygon

Text

Color

Color Scheme

Scale Bar



esriNcgm Online Geologic
Mapping Template

Point

Line

Polygon

Text

Color

Color Scheme

Maplex Label
Placement

Symbolization Resources



GSC_FGDC_
GeologicMapSymbols

Colors → CMYK

Line Dashes/Marker
Spacing

Rotation of Some
Markers

672 Missing



DGGS_Map_
Symbolization

Fonts →
FGDCGeoSym#

Colors → CMYK

Line Dashes/Marker
Spacing

Rotation of Some
Markers

672 Missing



esriNcgmp Online Geologic
Mapping Template

Line Dashes/Marker
Spacing

~1080 Missing

My Work

Began with **DGGS_Map_Symbolization**:

- ❖ Edited Alaska's implementation to match FGDC's lengths/placements/etc. and to position more exactly
- ❖ Created missing symbols

Notes

- ❖ Used Arial instead of Helvetica

6pt font → 2.117mm; 8pt font → 2.822mm

- ❖ Made polygon borders a line symbol (contacts and faults), and polygon fills a polygon without a border

- ❖ Some symbols have white fills versus transparent to 'hide' other lines



- ❖ Will have to use a label with a white background to break lines

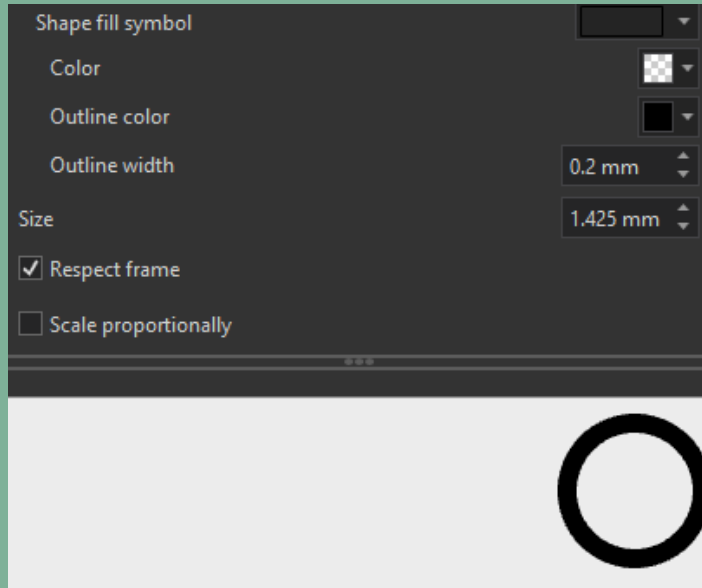


- ❖ Some sizes of markers will not match exactly for one of two reasons:

1) outlines add width/height that need to be removed to keep the correct size

2) the shape used is sized abnormally and needs to be adjusted

24.4	Secondary terrestrial impact crater (too small to draw to scale) (2nd option)—Formed by debris thrown from primary crater		 <i>linewidth .2 mm</i> <i>circle diameter 1.625 mm</i>
------	---	---	--



Evident in:
 24.2,
 24.4, &
 all of 26

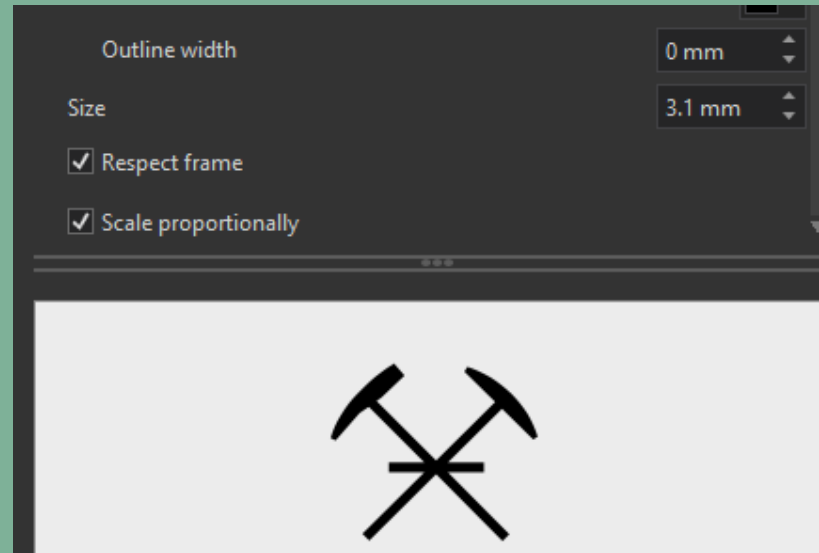
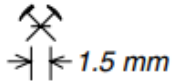
- ❖ Some sizes of markers will not match exactly for one of two reasons:
 - 1) outlines add width/height that need to be removed to keep the correct size
 - 2) the shape used is sized abnormally and needs to be adjusted

19.3.5

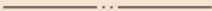
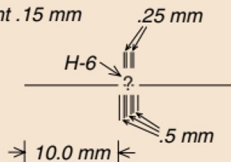

Abandoned open pit, quarry, or glory hole



all lineweights
.15 mm



- ❖ Some sizes of markers will not match exactly for one of two reasons:
 - 1) outlines add width/height that need to be removed to keep the correct size
 - 2) the shape used is sized abnormally and needs to be adjusted

1.1.9	Internal contact—Identity and existence certain, location accurate			Use to delineate individual debris flows, landslide blocks, alluvial fans, etc., within the same geologic map unit.
1.1.10	Internal contact—Identity or existence questionable, location accurate			


01.01.09 Original

Line symbol

Display in real-world units

Solid stroke


Appearance

Color: 

Width: 0.15 mm

Offset effect

Dash effect

Dash type: 

Dash template: 10.033 0.5574

At line ends: No constraint

Offset along line: 0 mm

Custom endings offset: 0 mm

244%

2D 3D

Apply Cancel

Description Properties Preview


01.01.09 South Carolina

Line symbol

Display in real-world units

Solid stroke


Appearance

Color: 

Width: 0.15 mm

Offset effect

Dash effect

Dash type: 

Dash template: 10 0.5 0.25 0.5

At line ends: No constraint

Offset along line: 0 mm

Custom endings offset: 0 mm

244%

2D 3D

Apply Cancel

Description Properties Preview

01.01.09

CMYK

0/0/0/100

Dash Template

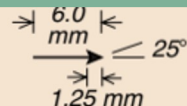
10 0.5 0.25 0.5
0.25 0.5

9.1

Approximate plunge direction of inclined generic (origin or type not known or not specified) lineation or linear structure (1st option)



lineweight
.2 mm



09.001 Original

Point symbol

Display in real-world units

Shape marker

insert snape from

Form

Style... Font... File...

Shape fill symbol

Color

Outline color

Outline width 0 mm

Size 6 mm

Respect frame

Scale proportionally

Position

Anchor point presets

Anchor point Absolute

X 1.25 mm

Y -3.05 mm

100%

2D 3D

Apply Cancel

09.001 South Carolina

Point symbol

Display in real-world units

Shape marker

insert snape from

Form

Style... Font... File...

Shape fill symbol

Color

Outline color

Outline width 0 mm

Size 6 mm

Respect frame

Scale proportionally

Position

Anchor point presets

Anchor point Absolute

X 1.208 mm

Y -3.025 mm

100%

2D 3D

Apply Cancel

09.001

Font & CMYK

FGDCGeoSym02
0/0/0/100

Anchor Position

x: 1.208 mm
y: -3.025 mm

Original South Carolina



Names, tags, and keys

01.01.01

Line symbol

Name

p1.01.01

Category

1.1 - Contacts

Tags

contact; identity and existence certain, location accurate

Style


























\\scdnradmin\data\Geology\Geousr\Megan\GeMS_FGDC_Style
\DGGs_Map_Symbolization_ver3_ArcGISPro
\DGGs_Map_Symbolization_ver3.stylx

Key ⓘ

01.01.01

Other elements

1. Scale bars
2. Maplex label placements

 Contact, key bed, dike	 Elevation of glacial-lake spill...	 Fault - displacement	 Fault - name	 Fold	 Fold crest/trough line	 Former shoreline/ marine limit
 Geophysical boundary	 Geophysical contour - index	 Geophysical data collection locality	 Glacial boundary	 Landslide displacement	 Lineament	 Main landslide scarp
 Map unit	 Minor landslide scarp	 Orientation point - center	 Orientation point - tail	 Paleontological features	 Structural control point - 1st surface	 Structural control point - 2nd surface
 Structural control point - 3rd surface	 Structure contour - 1st surface	 Structure contour - 2nd surface	 Structure contour - 3rd surface			



02

How To Use

How do I implement this into my workflow?



DOWNLOAD FONTS AND ZIPPED FOLDER

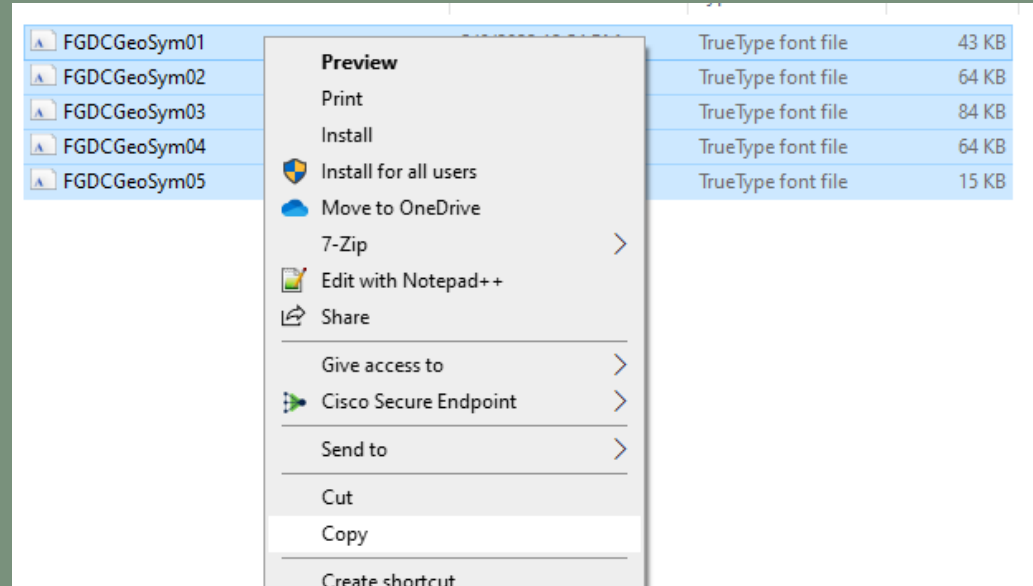
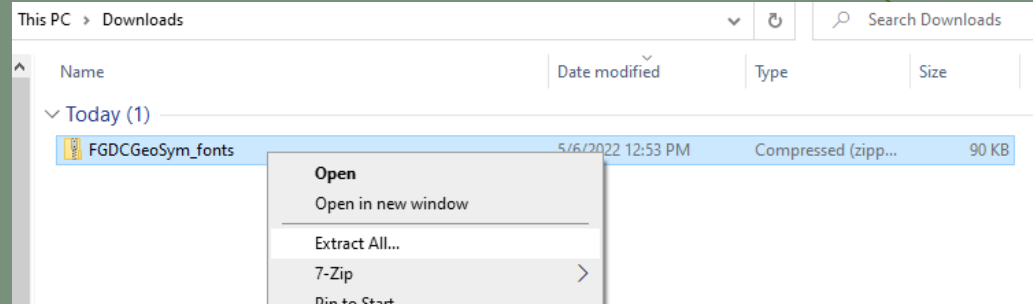
<https://ngmdb.usgs.gov/Info/standards/GeMS/>

The screenshot shows a web browser window with the URL ngmdb.usgs.gov/Info/standards/GeMS/. The page content is as follows:

- Documentation and Tools**
- Resources**
- Get help**
- Collaborate**
- Background**
- Archive of previous versions and presentations**
- Resources**
 - Delivery**
 - [Guidance for submitting GeMS-compliant map databases](#)
 - [GeMS Checklist](#) — form to help with the collection of items before delivery of a GeMS database to, for example, the National Geologic Map Database (NGMDB) or STATEMAP
 - [GeMS Transmittal Letter](#) — suggestions for the content of a transmittal letter to accompany a GeMS deliverable package.
 - Symbology**
 - Standard**
 - [FGDC Digital Cartographic Standard for Geologic Map Symbolization](#) — Publication website (Federal Geographic Data Committee, 2006).
 - ArcGIS styles**
 - 2** [ArcGIS Pro style implementation of FGDC Standard](#) — Comprehensive and authoritative implementation of the standard created by the South Carolina Geological Survey for the NGMDB.
 - [AK GeMS symbology](#) — ArcMap style file and report from the Alaska Division of Geological & Geophysical Surveys. Contains the majority of symbols in the standard.
 - Fonts (required for style files)**
 - [FGDCGeoAge.otf](#) — OpenType version of special geologic age characters.
 - 1** [FGDCGeoSym](#) — five TrueType font files of geologic marker symbols used for decorating line symbols and symbolizing points. These are required for the style files below.

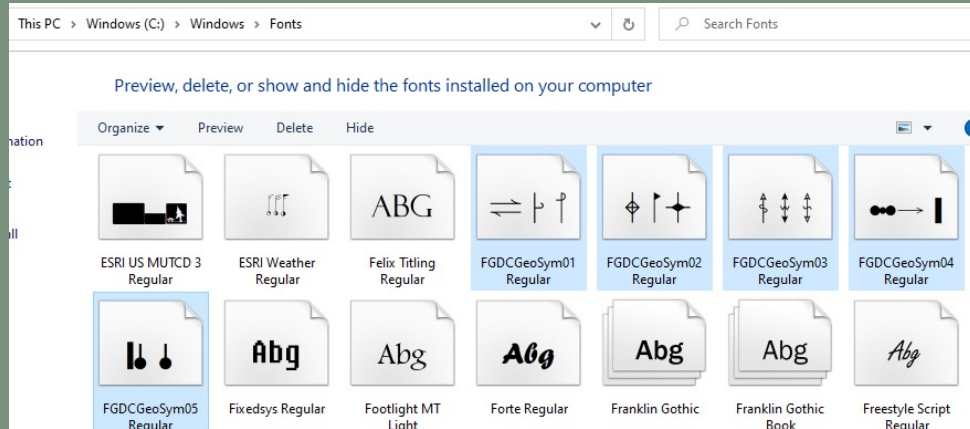
COPY FONTS

1. Unzip folder
2. Copy fonts



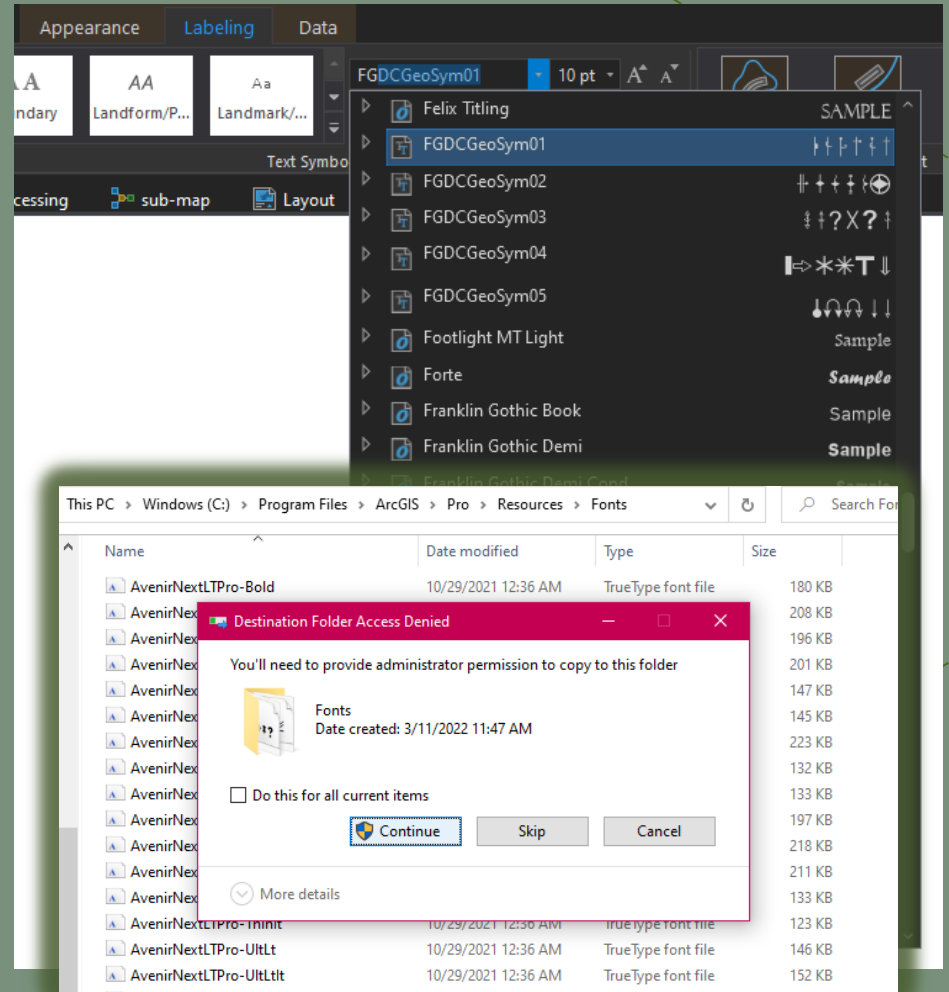
INSTALL FONTS

1. Paste in fonts folder
 - (Likely- C:\Windows\Fonts)












INSTALL FONTS

2. If font does not show up in ArcGIS Pro, paste in Pro's fonts folder
 - (Likely- C:\Program Files\ArcGIS\Pro\Resources\Fonts)



FAMILIARIZE YOURSELF WITH THE FGDC_STYLX FOLDER

1. Unzip folder

 .DS_Store	5/6/2022 1:28 PM	DS_STORE File	7 KB
 1-FGDC_Stylx_readme	5/6/2022 1:28 PM	Microsoft Edge P...	94 KB
 2-symbols_references	5/6/2022 1:28 PM	Microsoft Excel W...	64 KB
 3-Getting_Started	5/6/2022 1:28 PM	Microsoft Word D...	163 KB
 4-Fixing_Symbol_Fonts	5/6/2022 1:28 PM	Microsoft Word D...	86 KB
 5-Adding_and_Moving_Markers_Along_L...	5/6/2022 1:28 PM	Microsoft Word D...	82 KB
 6-colorChart	5/6/2022 1:28 PM	Microsoft Excel W...	43 KB
 7-Managing_the_Stylx_File	5/6/2022 1:28 PM	Microsoft Word D...	134 KB
 FGDC.stylx	5/6/2022 1:28 PM	STYLX File	52,216 KB

LOOK THROUGH THE CONTENTS

2. READ the readme & Managing_the_Stylx_File
3. Take a peek at the reference sheet

Credits

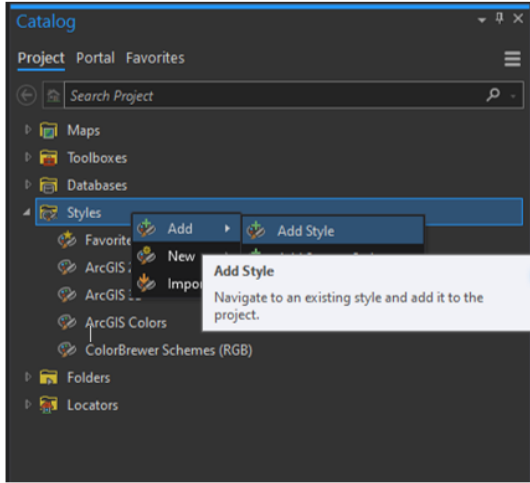
- Points, lines, polygons, or fonts with cells highlighted in **Orange, Accent 2, Darker 25%** in the symbols_references excel document were created by Megan James of the South Carolina Department of Natural Resources Geological Survey (JamesM@dnr.sc.gov).
- Points, lines, polygons, or fonts with cells highlighted in **Orange, Accent 2, Lighter 40%** in the symbols_references excel document were created by adjusting symbols from the AK GeMS symbology (Alaska Division of Geological & Geophysical Surveys, Miscellaneous Publication 169, <https://dggg.alaska.gov/pubs/id/30584>).
- 25.087 was copied from the planetary geology symbol library at the Github site (<https://github.com/afrigeri/geologic-symbols>) maintained by Andrea Nass (Institute of Planetary Research, Berlin) and Alessandro Frigeri (National Institute for Astrophysics, Rome).

	A	B	C	D	E
1	Ref No	Points	Lines	Polygons	Fonts
92	01.03.10				
93	01.03.11				
94	01.03.12				
95	01.03.13				
96	01.03.14				
97	01.03.15		use both 01.03.15a and 01.03.15c		
98	01.04.01				label
99	01.04.02				label
00	01.04.03				
01	01.04.04				label
02	01.04.05				label
03	01.04.06				label
04	01.04.07				label
05	01.04.08				label
06	01.04.09				
07	01.04.10				
08	01.04.11				label
09	01.04.12				label
10	01.04.13				label
11	01.04.14				label
12	01.04.15				label

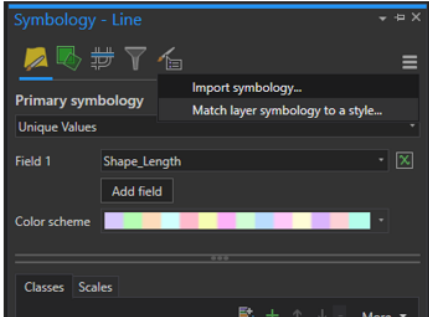
LOOK THROUGH THE CONTENTS

- 4. USE the Getting_Started guide
- 5. Ignore the Fixing_Symbol_Fonts and Adding_and_Moving_Markers_Along_Lines (unless you need them)

Getting Started



1 Add style "FGDC.stylx" to your ArcGIS Pro document (will not work in ArcMap).



2 The symbol field in the attribute table should be filled in using the FGDC reference number (including leading zeros), or a reference number from the CMYK chart.

Symbol
02.06.05
01.01.01
01.01.03
01.01.05
01.01.07
01.01.09
01.01.11
01.01.13

3 Choose "Match layer symbology to a style..."

GIVE IT A WHIRL

- [CorrelationOfMapUnits](#)
 - CMULines
 - CMUMapUnitPolys
 - CMUPoints
- [CrossSectionA](#)
 - CSAContactsAndFaults
 - CSAMapUnitPolys
 - CSAOrientationPoints
- [GeologicMap](#)
 - [CartographicLines](#)
 - [ContactsAndFaults](#)
 - [DataSourcePolys](#)
 - [FossilPoints](#)
 - [GenericPoints](#)
 - [GeochronPoints](#)
 - [GeologicLines](#)
 - [MapUnitLines](#)
 - [MapUnitOverlayPolys](#)
 - [MapUnitPoints](#)
 - [MapUnitPolys](#)
 - [OrientationPoints](#)
 - [OverlayPolys](#)
 - [Stations](#)
- [DescriptionOfMapUnits](#)
- [DataSources](#)
- [GeoMaterialDict](#)
- [Glossary](#)
- [MiscellaneousMapInformation](#)
- [RepurposedSymbols](#)
- [StandardLithology](#)

MapUnitPolys X

Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

	OBJECTID *	Shape *	Shape_Length	Shape_Area	MapUnit	IdentityConfidence	Label	Symbol	DataSourceID	Notes	M
1	1	Polygon	75279.102703	281976449.221483	<Null>	<Null>	<Null>	602-K	<Null>	<Null>	<N
2	2	Polygon	131074.443311	654551810.235011	<Null>	<Null>	<Null>	602	<Null>	<Null>	<N
3	3	Polygon	32970.317307	81879120.324924	<Null>	<Null>	<Null>	313-M	<Null>	<Null>	<N
4	4	Polygon	83915.394114	206750588.784385	<Null>	<Null>	<Null>	02.14.03	<Null>	<Null>	<N
5	5	Polygon	37519.797355	56959550.060256	<Null>	<Null>	<Null>	13.28	<Null>	<Null>	<N
6	6	Polygon	94462.524539	440804142.657641	<Null>	<Null>	<Null>	339	<Null>	<Null>	<N

13.28

Polygon symbol

Name

13.28

Category

13.0 - Glacial and glaciofluvial features

Tags

Hummocky topography (3rd option)

Style

\\scdnradmin\data\Geology\Geousr\Megan
\\GeMS_FGDC_style\FGDC_STYLX\FGDC.stylx

Key

13.28

	A	B	C	D	E
1	Ref No	Points	Lines	Polys	Fonts
95	01.03.13				
96	01.03.14				
97	01.03.15		use both 01.03.15a and 01.03.15c		
98	01.04.01				label

Geoprocessing

Match Layer Symbology To A Style

Parameters Environments

Input Layer
MapUnitPolys

Match Values (Field or Expression)
Symbol

Style
FGDC

Symbol	Value
02.14.03	02.14.03
13.28	13.28
602-K	602-K
313-M	313-M
339	339
602	602

REVIEW AND LABEL

The image displays a GIS software interface with a map on the left and a side panel on the right. The map shows a complex shape with several distinct regions: a large blue area, a pink area, and several areas with different hatching patterns (dots, wavy lines, and small circles). The side panel is titled 'Labeling' and contains a list of labels with their corresponding symbols and dates. The labels are organized into sections: '2.11 - Line-symbol decorations and notations', '2.15 - Small, minor faults', '4.1 - Lineaments', and '4.2 - Joints'. The 'Labeling' tab is active, and the 'Data' tab is also visible. The side panel also shows a 'Zoom To' button and a 'Switch' button. The map is displayed on a monitor, and the background is a dark green color with a dashed green line.

Share Appearance Labeling Data

All ▾

Aa 01.04.15	Aa 01.04.16	Aa 01.04.17
Aa 01.04.18	Aa 01.04.19	Aa 01.04.20
Aa 01.04.21		

2.11 - Line-symbol decorations and notations 1

AA 02.11.02	Aa 02.11.03	Aa 02.11.08
Aa 02.11.09	Aa 02.11.11	Aa 02.11.12
Aa 02.11.14	AA 02.11.15	Aa 02.11.13

2.15 - Small, minor faults

Aa 02.15.01	Aa 02.15.03
----------------	----------------

4.1 - Lineaments

AA 04.01.02

4.2 - Joints

Aa 04.02.03	Aa 04.02.04	Aa 04.02.06
----------------	----------------	----------------

More ...

Tahoma 10 pt

Regular

573,718.28E 3,540,643.97N m

Zoom To Switch Clear

Annotation	Symbol
<Null>	02.15.01
<Null>	07.05
<Null>	08.02.01
<Null>	08.03.16
<Null>	09.031
<Null>	09.144



03

Questions

Do you have any questions for me?



THANKS!



-
-
-
-
-
-



Contact info

My Email	JamesM@dnr.sc.gov
Darby's Email	DeBruhID@dnr.sc.gov



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