DIGITAL MAPPING TECHNIQUES 2021

The following was presented at DMT'21
(June 7 - 10, 2021 - A Virtual Event)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2021)

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

GeMS-in-Excel

as Editing Mechanism

Jordan T. Hastings

UC Santa Barbara

Undoubtedly, Excel is everyone's go-to software for tabular data entry, manipulation, analysis and visualization. Excel is also a developer's dream: it is fast, portable, stable, and extensible, with APIs attuned to the user interface that the world already knows.

For over a decade, I have been programming scientific data management in Excel. Through the NCGMP-funded coop at UC Santa Barbara, I am now exploring how to leverage Excel for geologic maps, GeMS specifically. In my DMT21 talks, I show how Excel can be utilized to:
1) deliver our geologic maps to end-users, many of whom lack or eschew GIS software; and
2) facilitate end-users' own work with our geologic maps, in field engineering, resource studies, survey, etc.

BACKGROUND

Currently

GISc Researcher, UCSB

Formerly

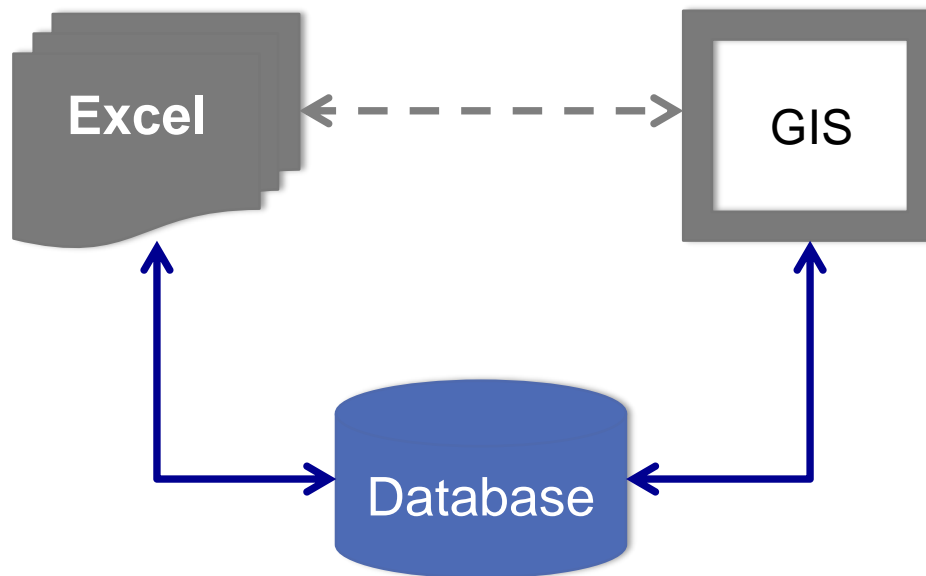**Chief Cartographer, NBMG**

Long ago / first training

Database Professor, UNR

→ *Advanced love / hate relationship*
with geologic maps in GIS databases
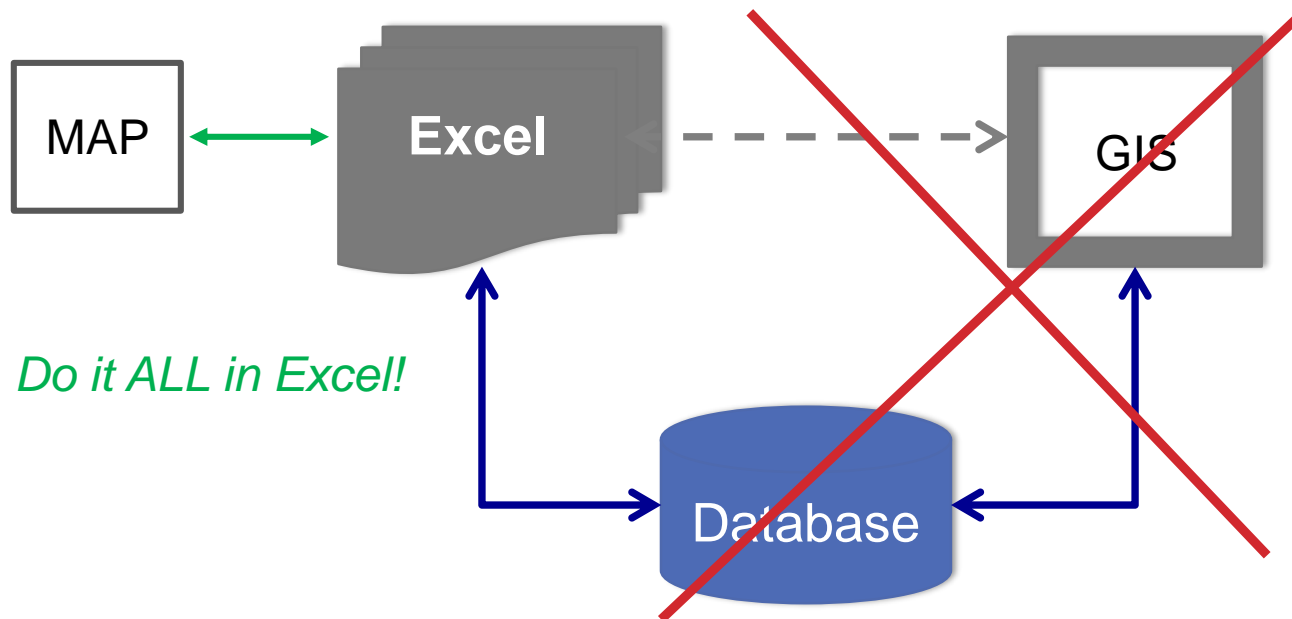
FOREGROUND

Try something new   **Same old**

Excel ← - - - - - - - - → GIS

Database

FOREGROUND

Try something *really* new   **Same old**

Do it ALL in Excel!

FOREGROUND

really new workflow
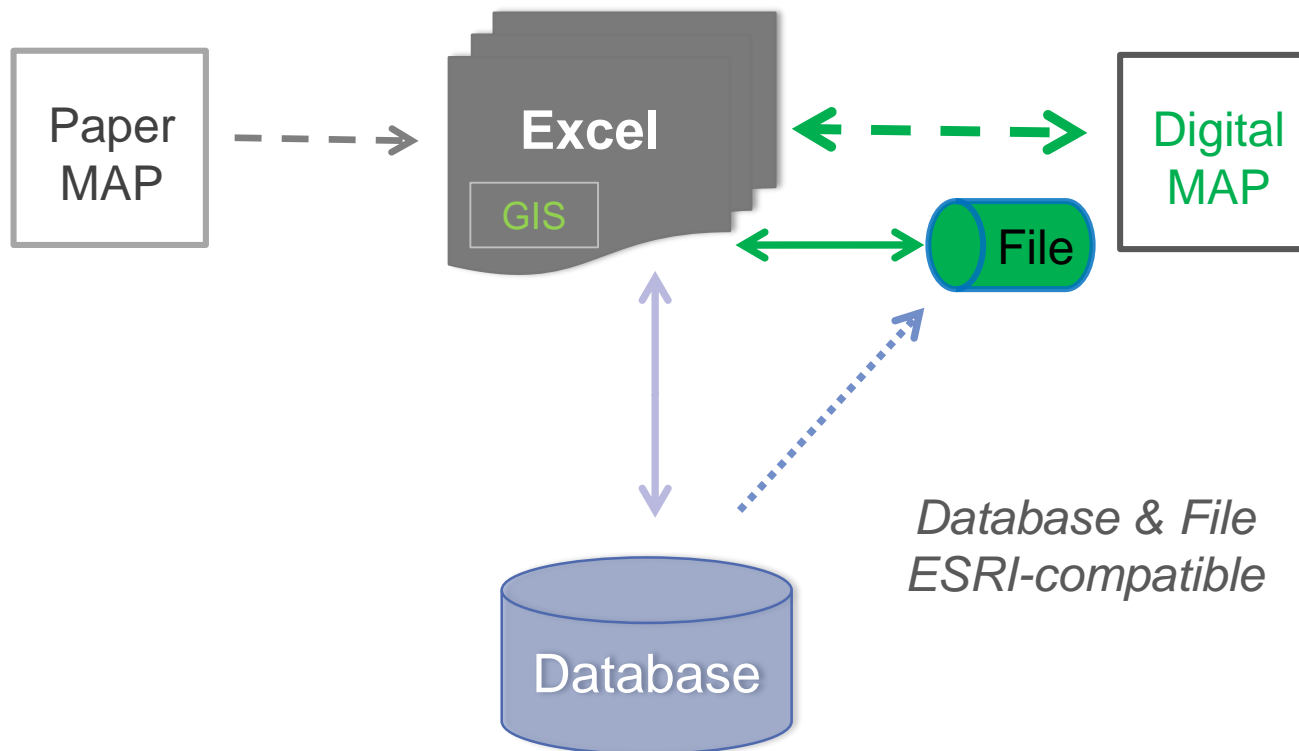
FOREGROUND

Different focus – the <u>map-user</u>

Simplify, simplify

Google MAP

KML

Excel

GIS
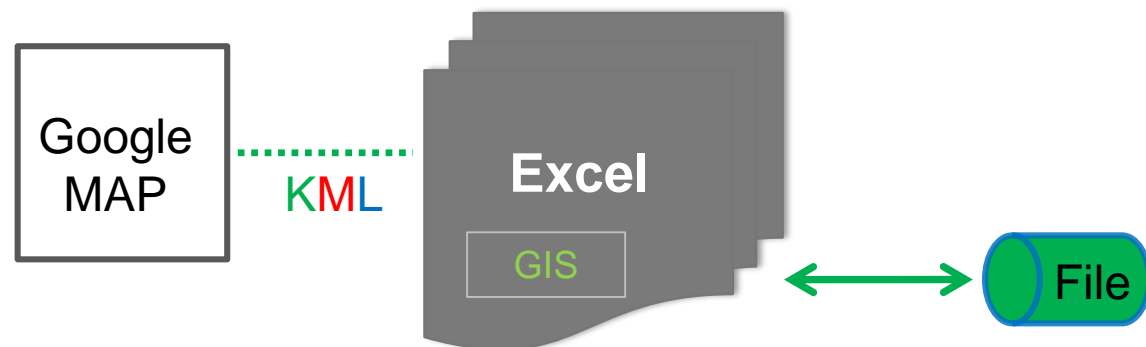
File

OUTLINE

GIS-in-Excel Processing

• **Image Feature Extraction (raster-to-vector) - optional**

• **Feature Digitizing (points, lines, and polygons)**

• **Topology Construction (lines+points → polygons)**

Excel GIS Data File

• **Raster and Vector data types**

• **Editable (vector) data in-situ**

• **Esri compatible → fluidity**

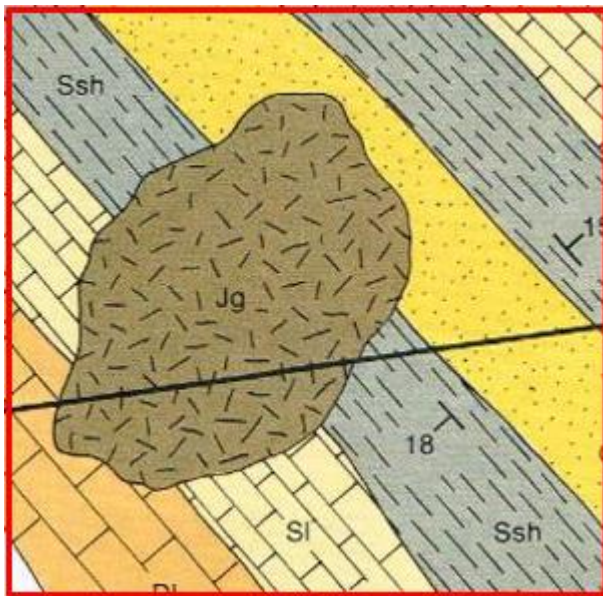• **Standards support → longevity**
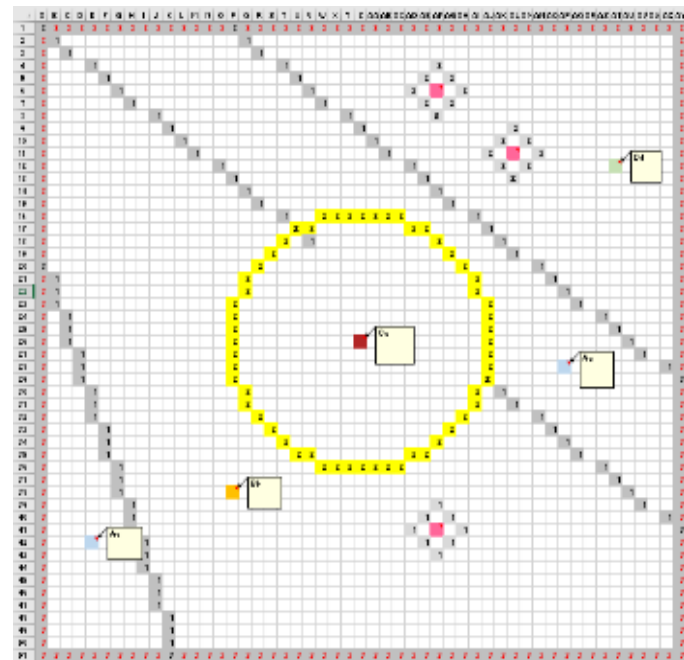
GEOLOGIC MAP

cf. Montgomery, C.W. (1990) *Physical Geology*
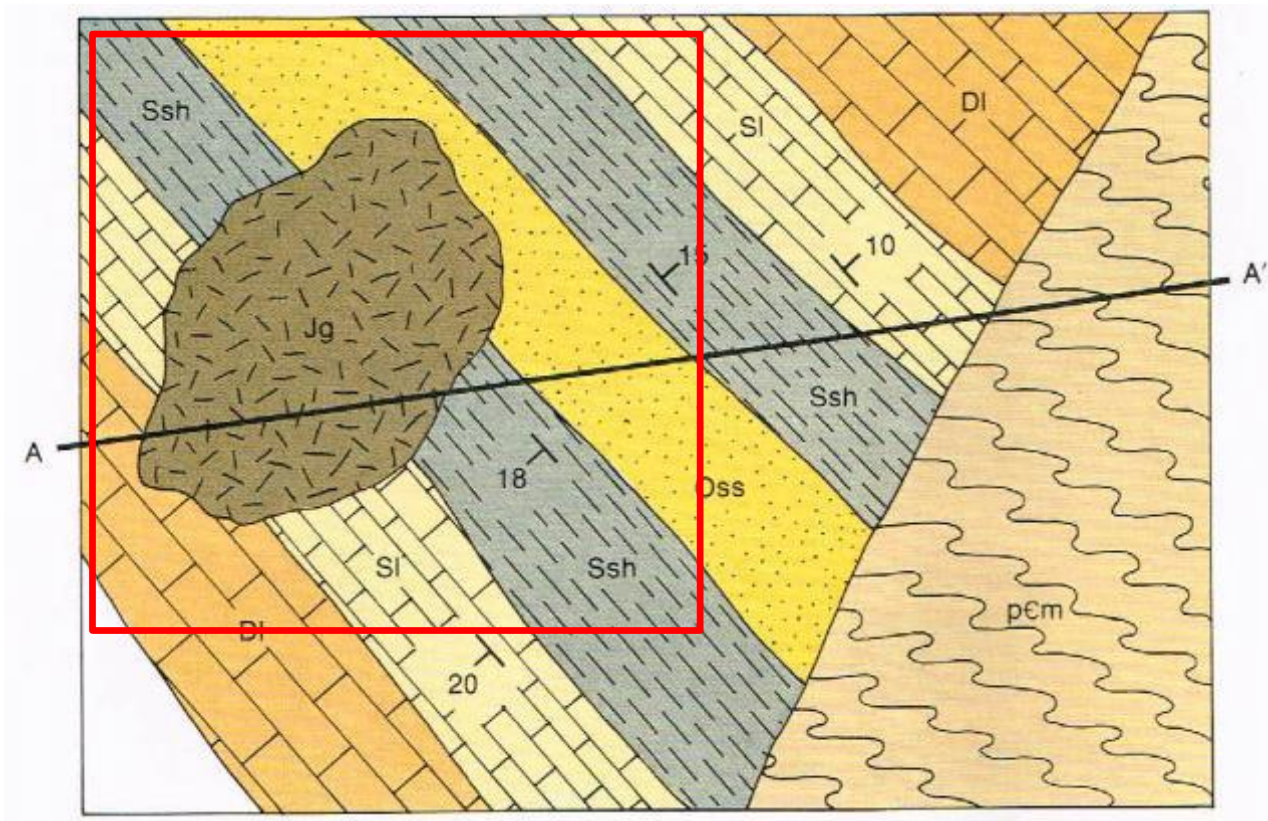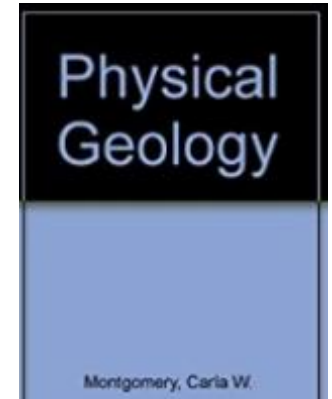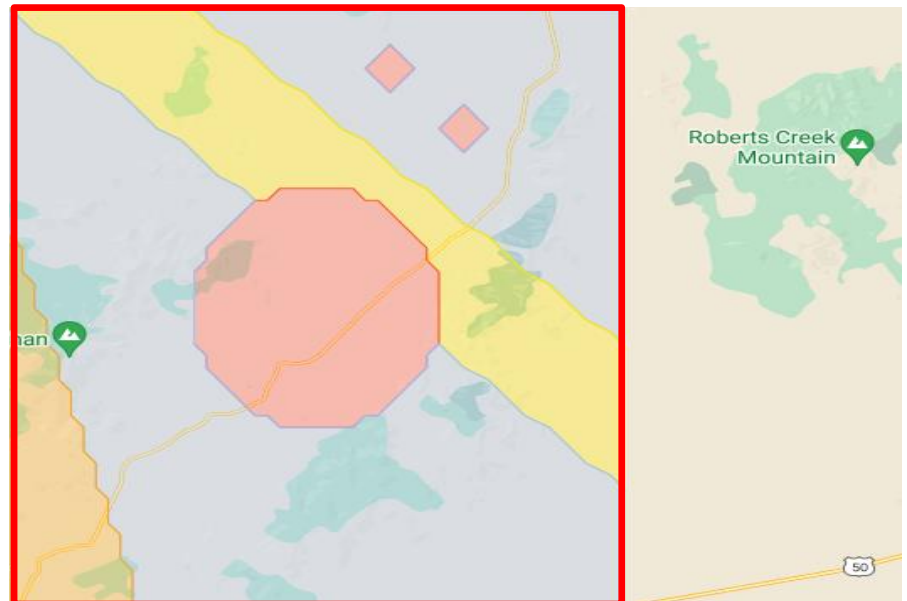
GIS IN EXCEL

Map Portion

Raster in Excel

GIS IN EXCEL

Generated KML

A
1	<?xml version="1.0" encoding="UTF-8"?>
2	<kml xmlns="http://www.opengis.net/kml/2.2">
3	<Document>
4	<Placemark>
5	<name>A1</name>
6	<Polygon>
7	<extrude>0</extrude>
8	<altitudeMode>clampToGround</altitudeMode>
9	<outerBoundaryIs>
10	<LinearRing>
11	<coordinates>
12	-117,39.81,1
13	-116.99,39.8,2
14	-116.99,39.79,3
15	-116.99,39.78,4

Image in Google Map

EXCEL GIS DATA FILE
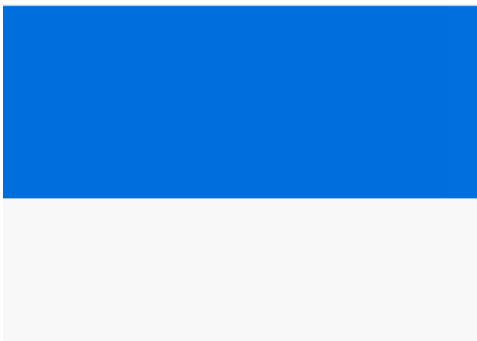
Develop an ODBC driver for the esri File Geodatabase

👁 301   💬 1   02-20-2021 02:18 AM

Status: Open

1 Comment

by JoshuaBixby MVP   02-20-2021 08:05 AM   Post Options ▾

I gave up on this hope/wish/dream many years ago. Fortunately with Esri's move to improve functionality and support for its mobile geodatabase format, which is based on SQLite, I am more interested in moving away from file geodatabases as much as possible.

GeoPackage = SQLite + Esri ST

EXCEL GIS DATA FILE

File

	Ent/File GDB	Personal GDB	Shapefile	GeoPackage	
Raster &Vector	√			√	
Editable in situ	√	√	✓	√	
ESRI Compatible	√√	✓	√√	√	
Standards Support	?		**de facto**	√	

KML is a (wonderful) transport format, but not a data storage format

EXCEL GIS DATA FILE

File

OGC
Making location count.

GeoPackage

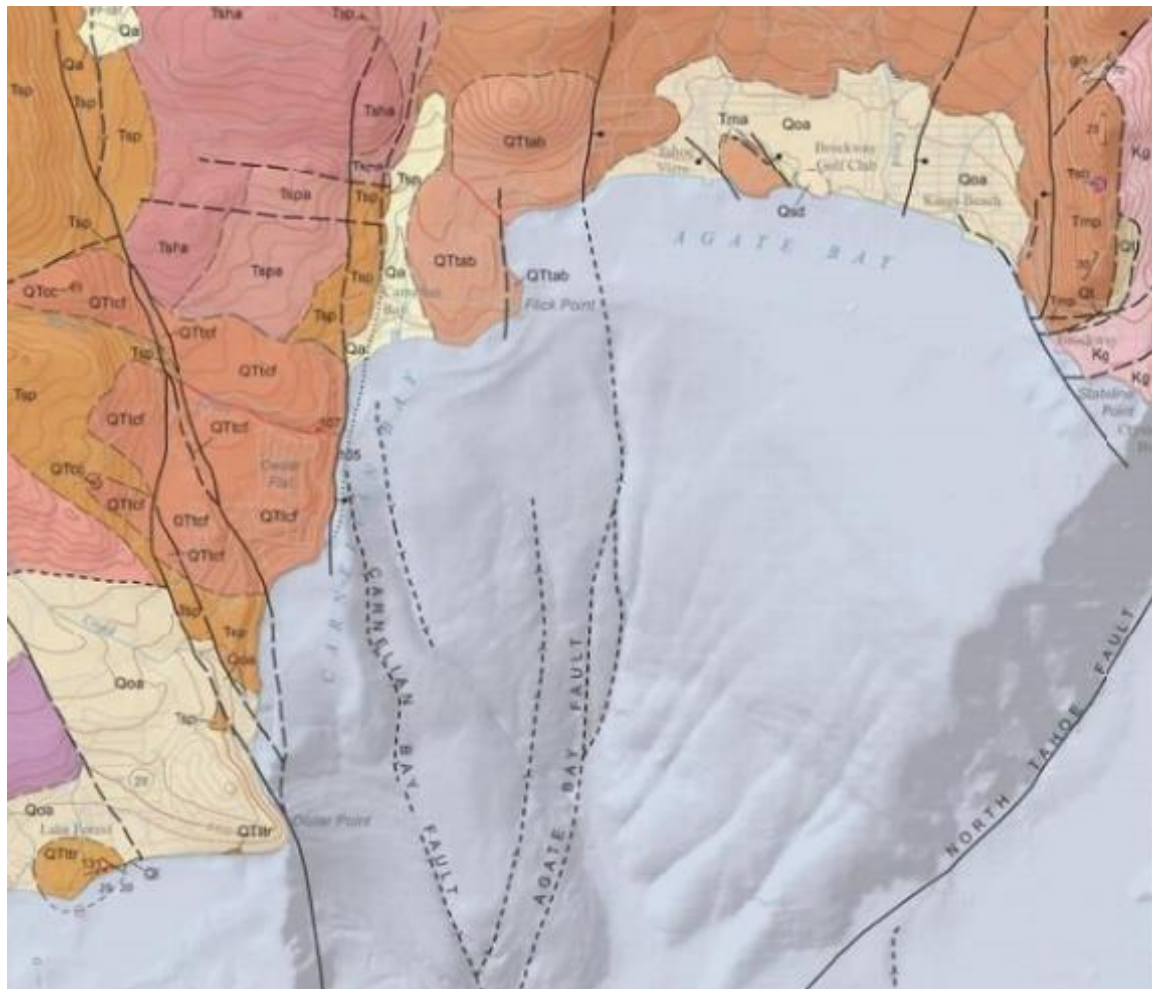*Non-Esri / Non-MS Personal Geodatabase*

An Open Format for Geospatial Data

GeoPackage is an open, standards-based, platform-independent, portable, self-describing, compact format for storing and transporting geospatial data.   https://www.geopackage.org/implementations.html

TAHOE-DONNER MAP Kings Beach Quad
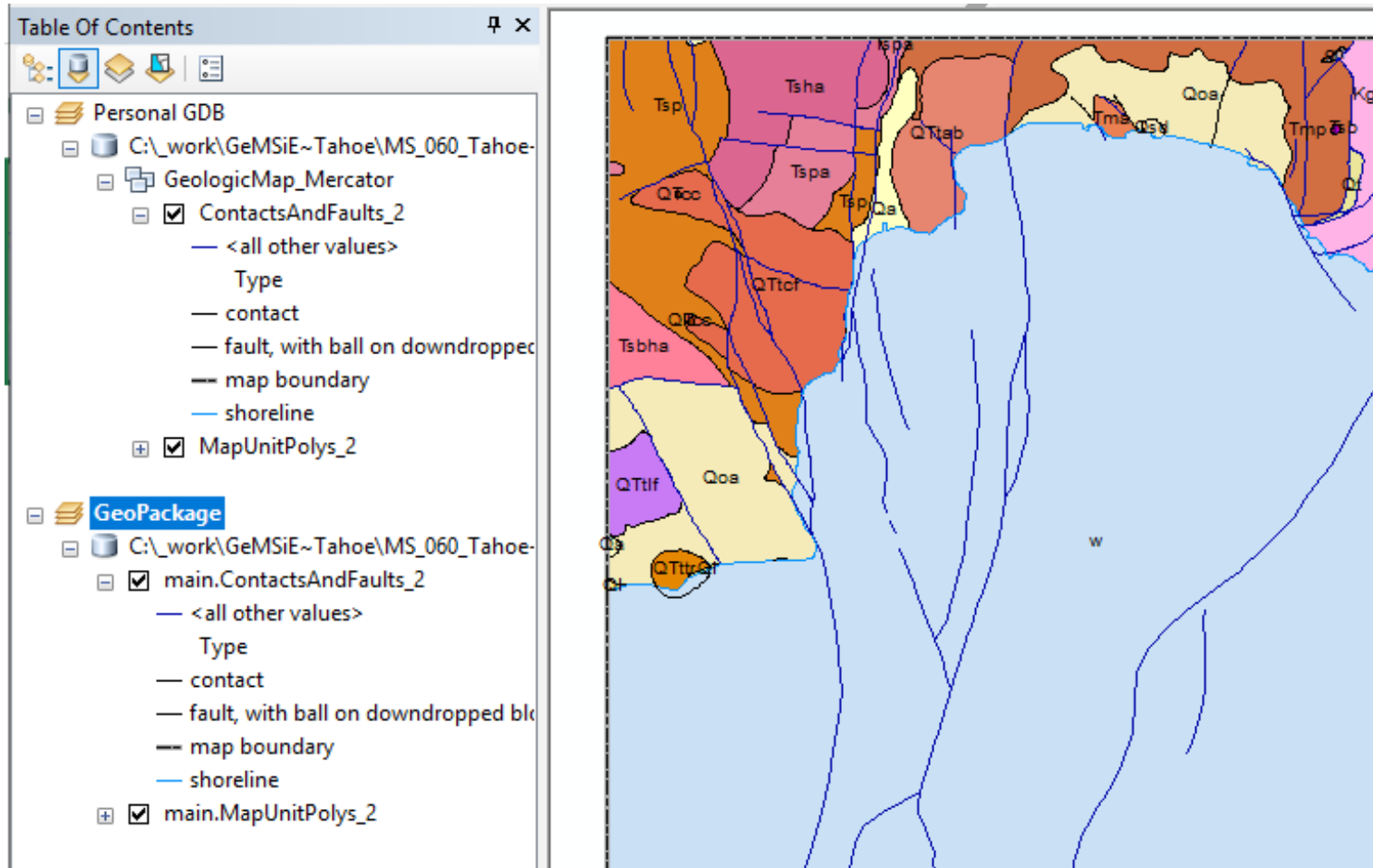

Relatively
simple geology

- Surficial and Igneous units

- Fault structure "in your face" still active and well studied -- even in the lake

- Intra-unit contacts (from lava flows)

- Fine cartography

TAHOE-DONNER MAP Kings Beach Quad

Simplify, simplify

GᴇMS EDITING

Immediate Next Steps (target Fall 2021)

1. Extend GeMSiE to support GeoPackage (ODBC)

2. Write GeoPackage conversion Script for ArcMap

3. Adapt simple feature sketch tool to GeMSiE/GeoPackage

4. Write Point+Line → Polygon processor in Excel

Future Ambitions

1. Integrate Image → Vector feature extraction in GeMSiE

2. Adapt Excel's 3D MapViewer to "see" GeoPackage

THANKS!

[end]