

# DIGITAL MAPPING TECHNIQUES 2013

The following was presented at DMT'13  
(June 2-5, 2013 - Colorado Geological Survey and Colorado School of Mines  
Golden, CO)

The contents of this document are provisional

See Presentations and Proceedings  
from the DMT Meetings (1997-2013)

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



# Working with Compiled Map Databases

Digital Mapping Techniques - 2013

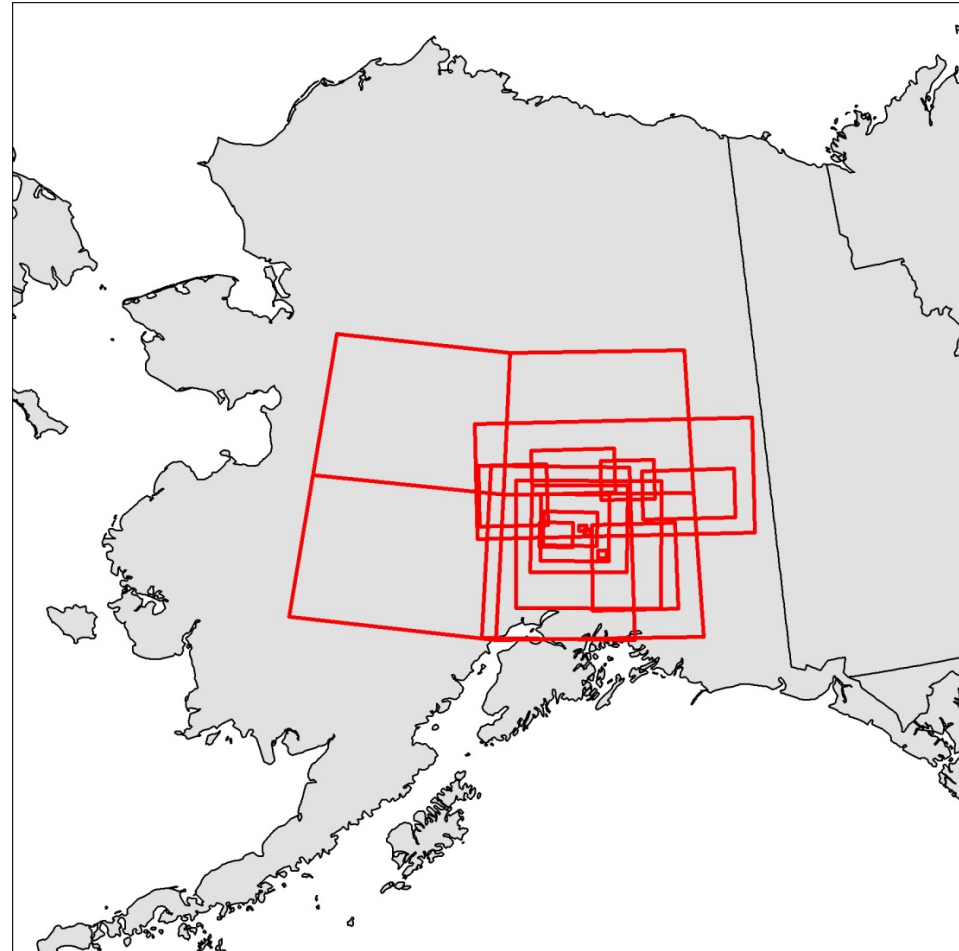
Golden, Colorado

Mark Zellman



# COMPILED MAP DATABASES

- A collection of maps used to build the geologic model for a given project.
  - An effort to collect the best available data for the site.
  - Often overlapping datasets
  - Consists of various scales, map vintages, authorship, subjects, extents, etc...



# OBTAINING MAP DATA



The screenshot shows the USGS AASG website. At the top, there are logos for USGS and AASG, along with navigation links: Home, Catalog, Lexicon, New Mapping, Standards, and Comments. The main heading is 'The National Geologic Map Database' with a sub-heading 'Developing a distributed archive of standardized geoscience information for the nation.' Below this are five service tiles: 'Map Catalog' (Find over 90,000 products from over 600 publishers), 'Stratigraphy' (Find geologic names, charts, and guidelines), 'MapView' (Discover geologic maps through our map interface), 'TopoView' (Access the Historical Topographic Map Collection), and 'Mapping in Progress' (Find out where geologic mapping is happening now). At the bottom, there are links for 'Find Us' (Twitter) and 'ACCESSIBILITY', 'FOIA', 'PRIVACY', and 'POLICIES AND NOTICES'.

GeoRef  
Google  
State Geological Surveys  
Previous Reports

Much more labor intensive process

- Shapefiles
- Raster maps
- Hard copy maps
- Report figures
- Thesis docs
- Other...



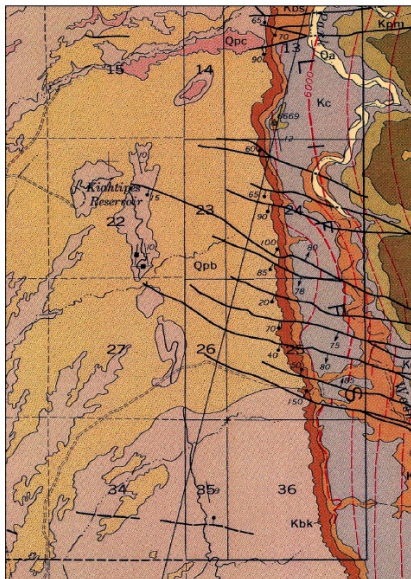
# WHY NOT STREAMING MAP SERVICES?

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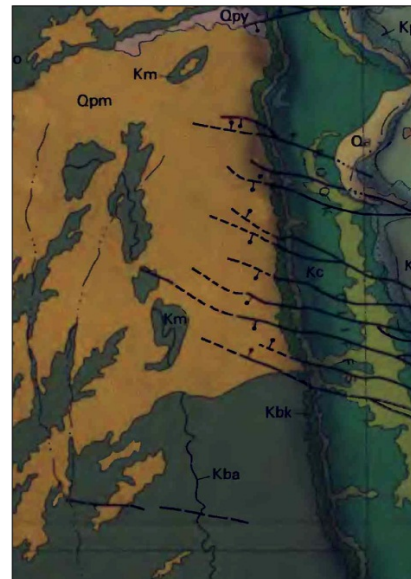
- We need the original / full datasets because...
  - QA/QC policies require archived hard / electronic copies
  - We add attributes and make other modifications
  - We view the data in 3D and with custom overlays
  - We often re-symbolization to standardize with other compiled maps
  - We often have to deliver data to the client

# WHY USE MORE THAN ONE MAP?

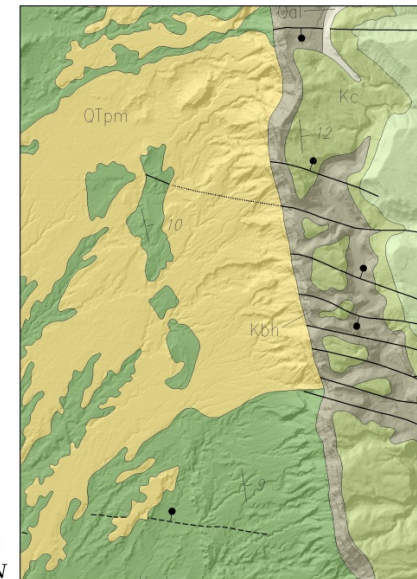
- The site location or region extends beyond the boundary of a single map.
- The need to present the geology at more than one scale.
- To provide insight for how the mapping has changed over time.
- To show multiple or opposing viewpoints.
- Site area might have many specialized maps available
  - Geology, faults, structure, groundwater, etc...



Osterwald and Maberry, 1974



Osterwald et al., 1981



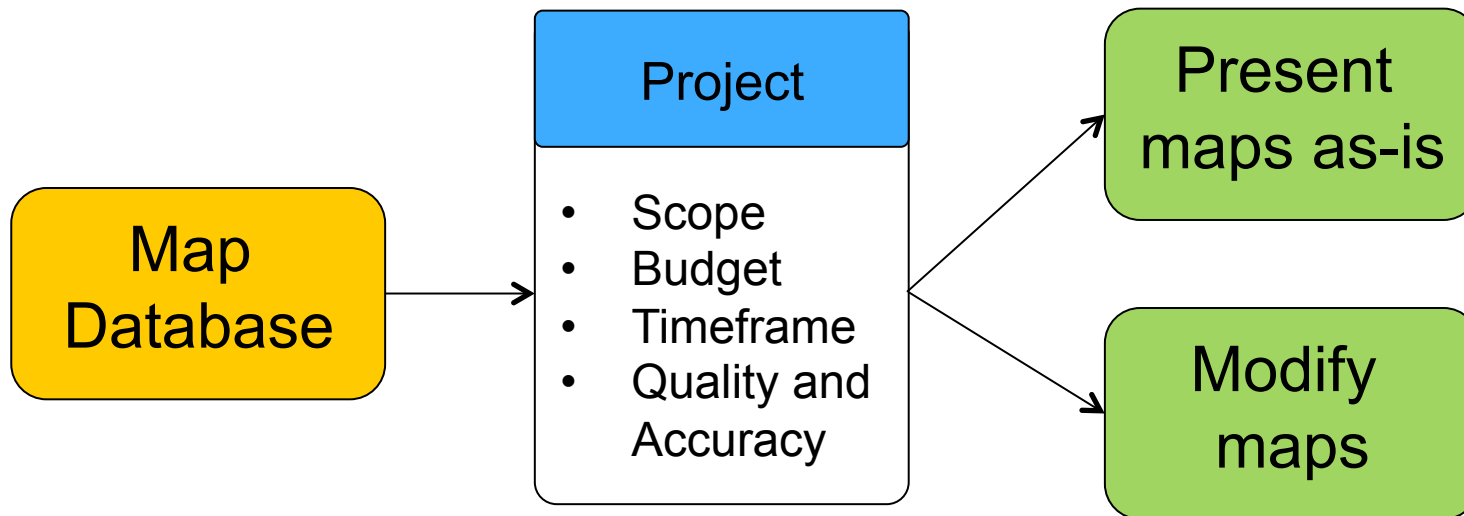
Witkind, 1988

## ISSUES MAY ARISE...

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- While working with more than one map, it is likely that you may encounter issues of two types:
  - **Ones you have to live with:**
    - Data gaps
    - Differing mapping styles
    - Scale differences
    - Warped / folded / damaged hard copy maps
    - “Cartoon” boundaries
  - **Ones you can modify:**
    - Unit name mis-match
    - Symbolization
    - Unit contact that do not match
    - Discontinued features
    - Projection issues
    - Mixture of data formats (shapefile / Raster / etc.)

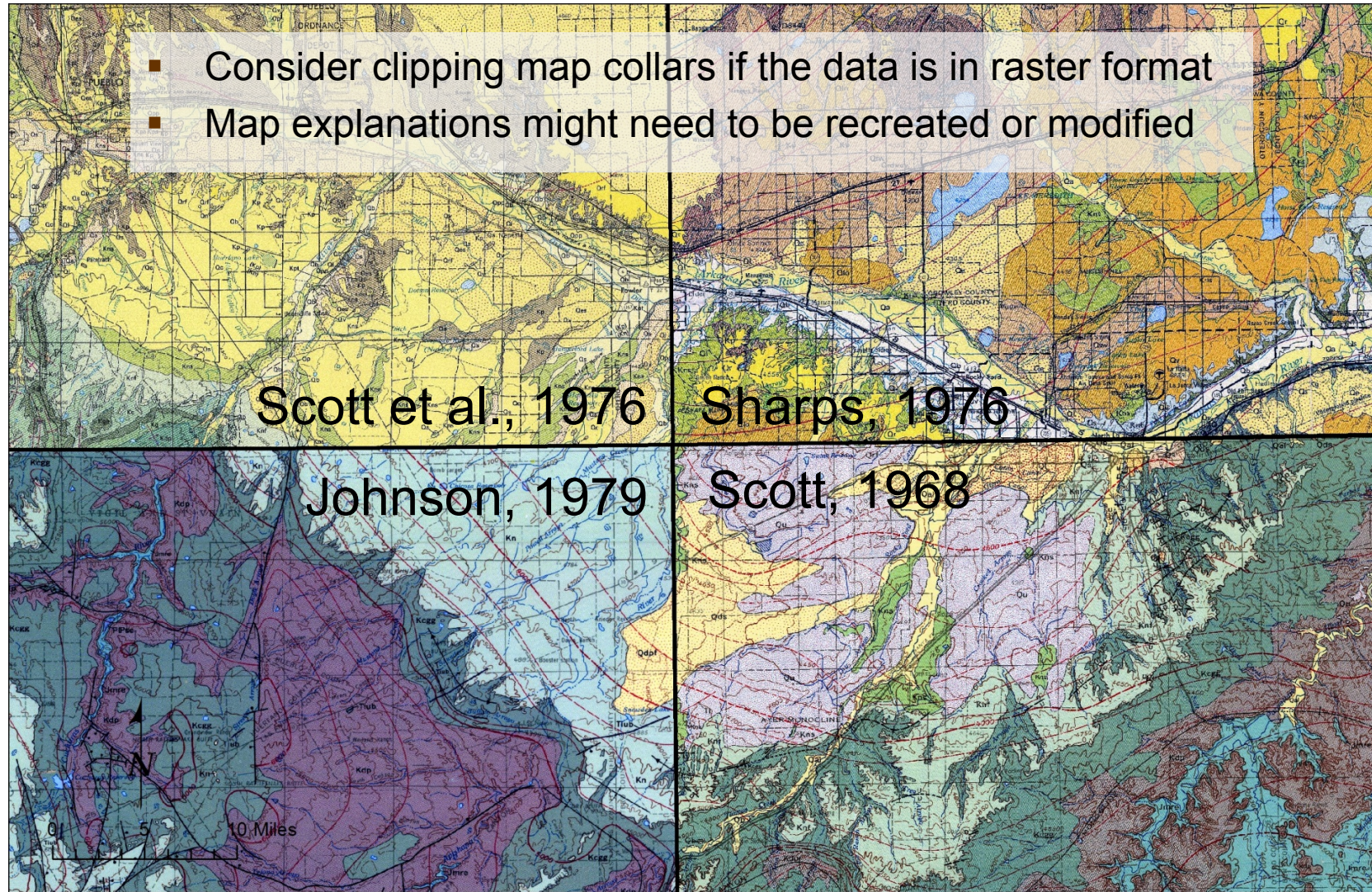
# DECISIONS...





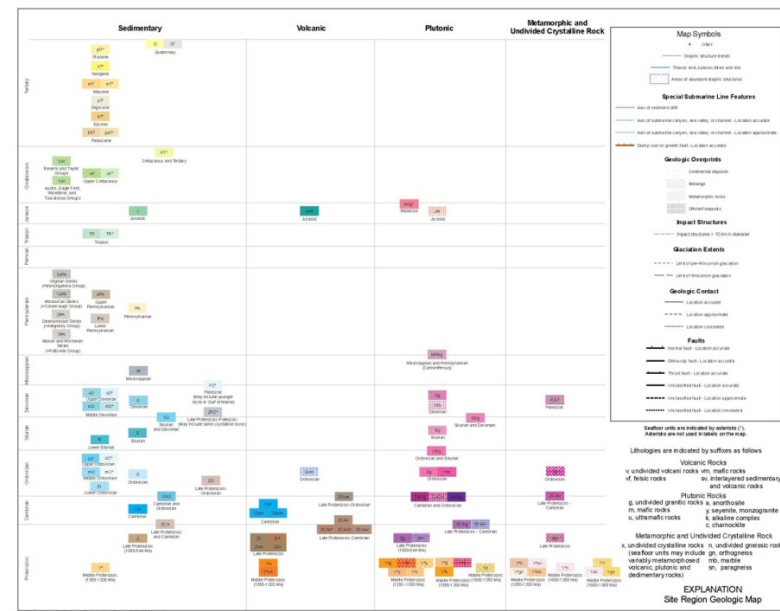
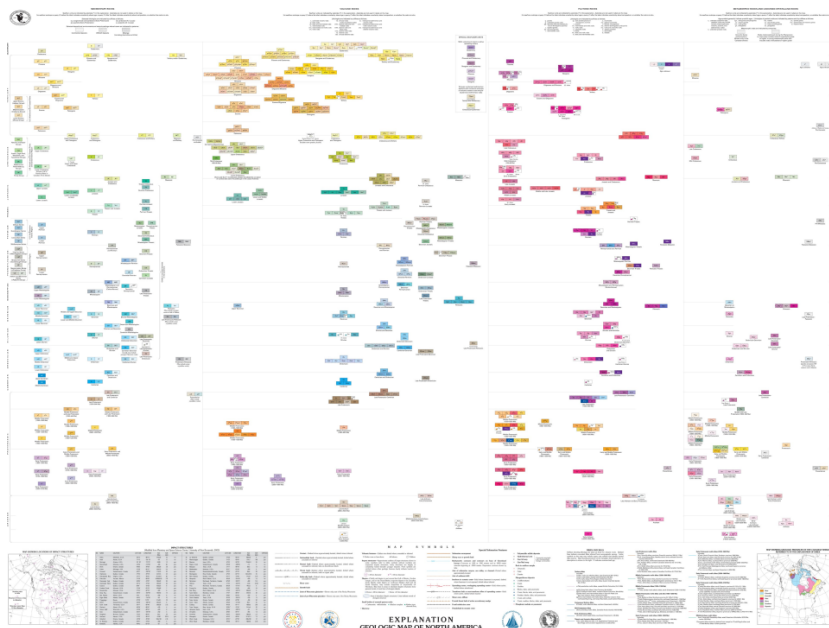
# PROVIDING DATA AS-IS

- Consider clipping map collars if the data is in raster format
- Map explanations might need to be recreated or modified



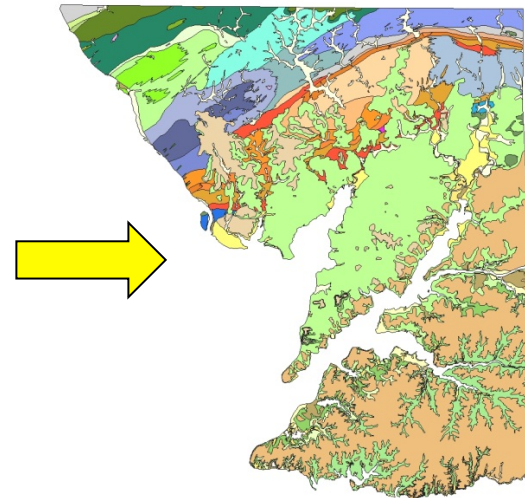
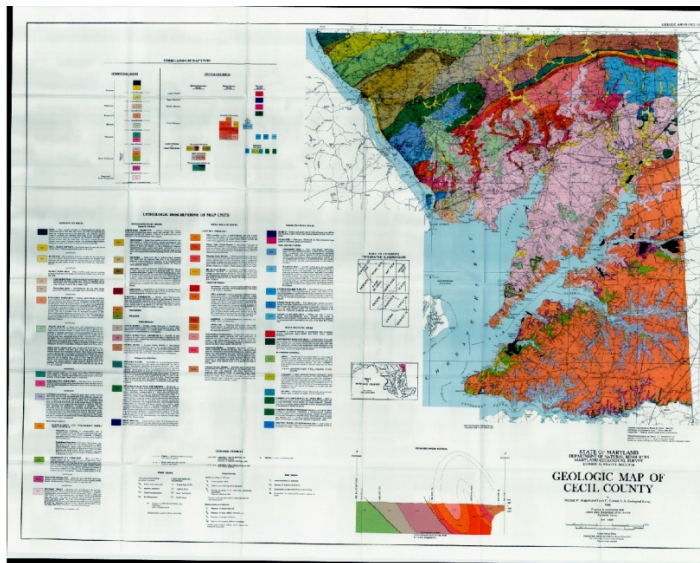
# CUSTOM MAP EXPLANATIONS

- I wish I had an APP for that!
- If only portions of a map are being used it may be necessary to modify the map explanation.
- Easier to modify an explanation if the data is in shapefile format.



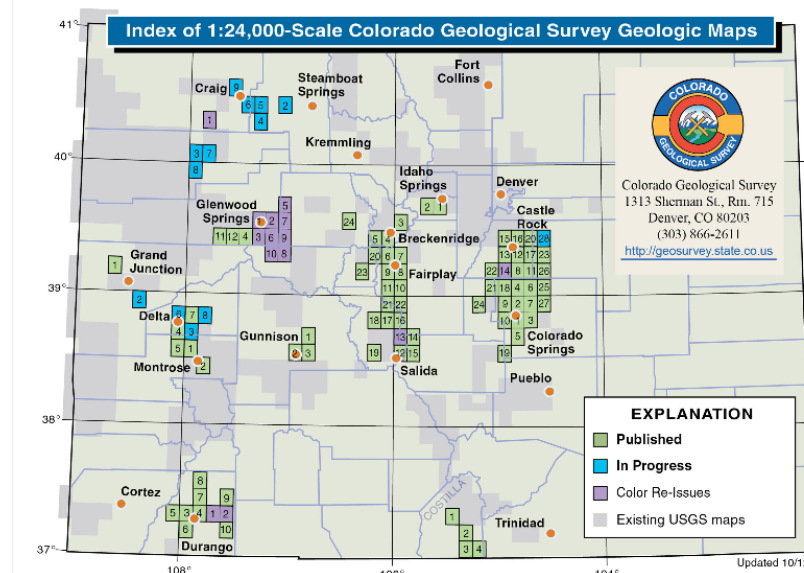
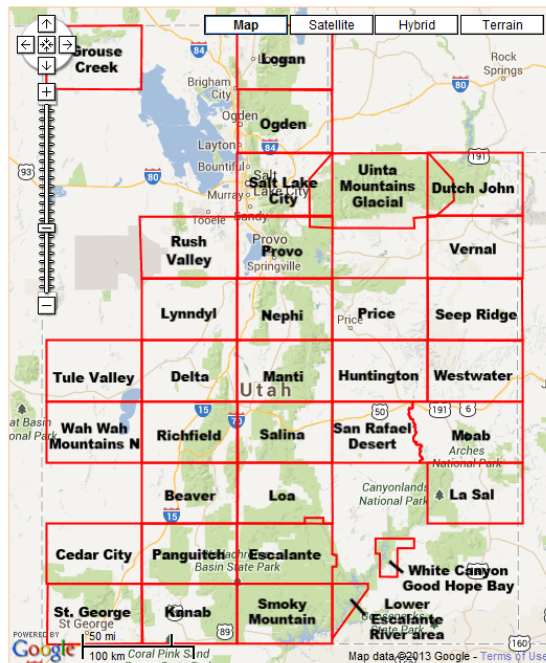
# MODIFICATIONS TO MAP DATA

- Addressing issues with multiple maps is most easily accomplished when all data is in shapefile format.
  - Unit name and Symbolization modifications
  - Contact adjustment\*
  - Feature delineation
- \*Modifications to contact and features should not be made unless they can be field checked or verified in another way.



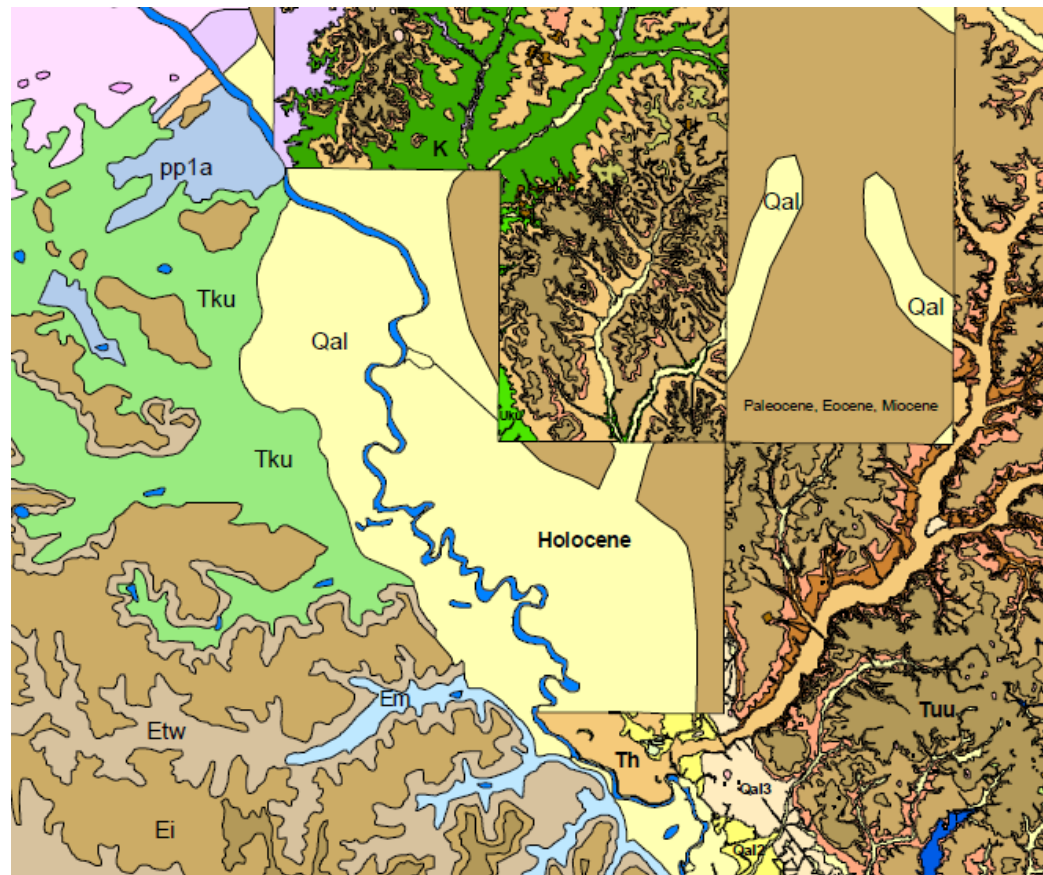
# DATA GAPS

- Gaps in large scale geologic map coverage can be a challenging issue
  - Fill voids with larger—scale data.
  - Utelize other data such as high resolution imagery, elevation data, and written reports to gain understanding for the area.



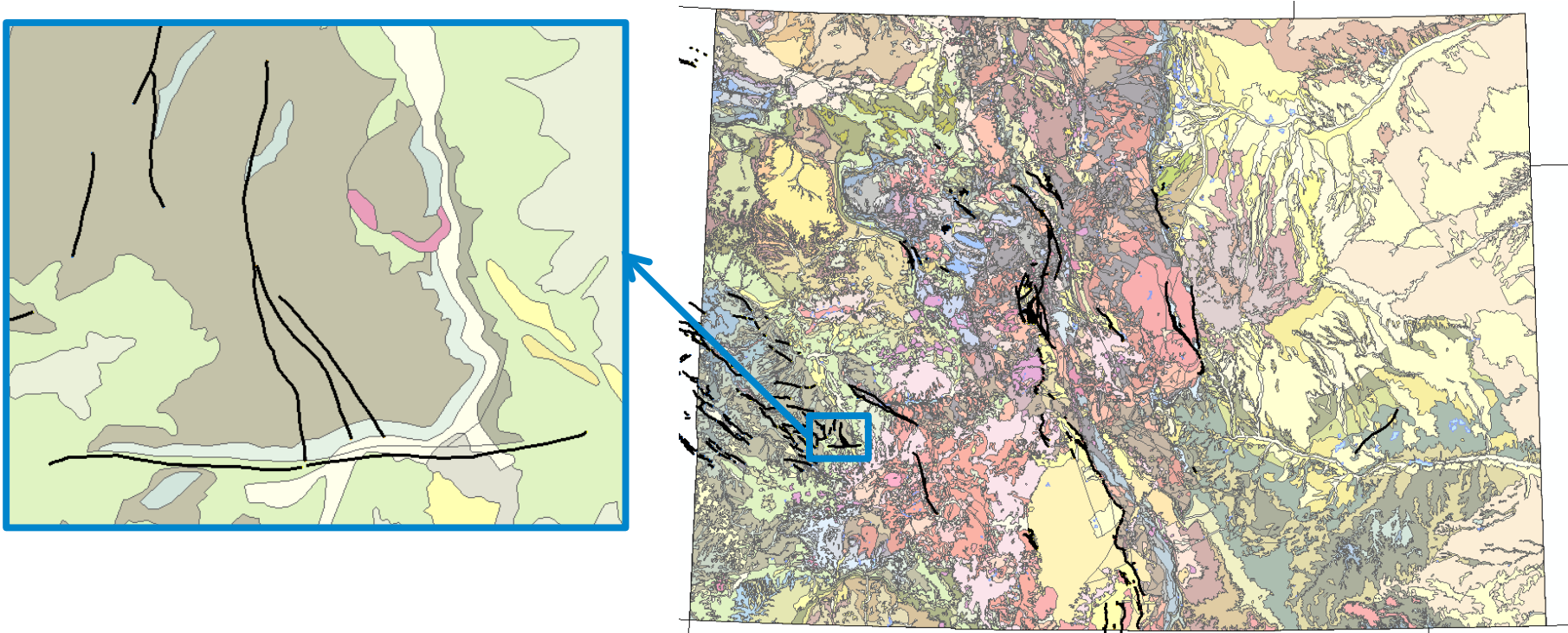
# FRANKEN-MAP

- Reflects the best available data for this area at the time of the project
- Combination of many maps of various scales
  - 9 merged 24k quads
  - SC – 1:1,000,000
  - GA – 1:500,000



## OTHER DATA

- Incorporation of higher-resolution data or other special data sets.
  - Example: USGS Quaternary Fault and Fold Database.
- Overlay of external datasets can lead to map conflicts.



# Conclusions

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- Multiple maps are often needed to depict the geologic setting for a project
- Using multiple maps for analysis and presentation can be complicated and require forethought.
- Issues we encounter with compiled datasets are probably similar to issues encountered by data producers.
- Providing accurate, reliable, and easy to digest information is the ultimate goal.

**Thank You**

