DIGITAL MAPPING TECHNIQUES 2019

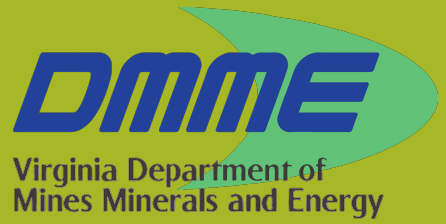
The following was presented at DMT'19
(May 19 – 22, 2019 - Montana Technological University)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2019)

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

MANAGING BEDROCK AND SURFICIAL GIS DATA – CURRENT APPROACH IN VIRGINIA



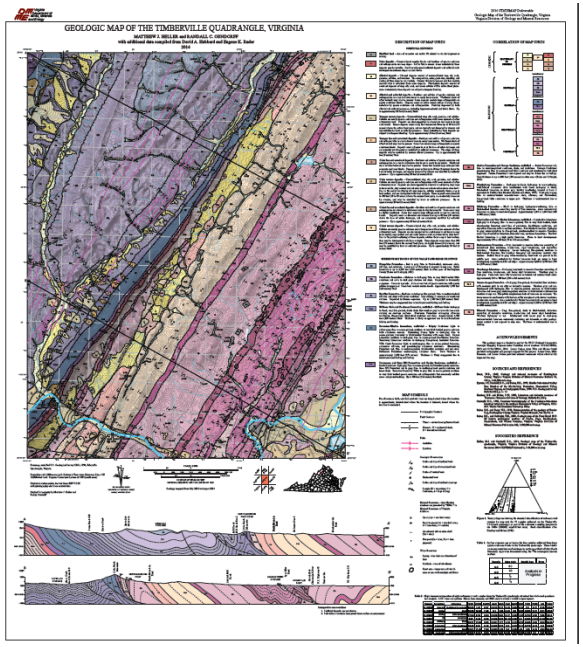
Division of Geology and Mineral Resources

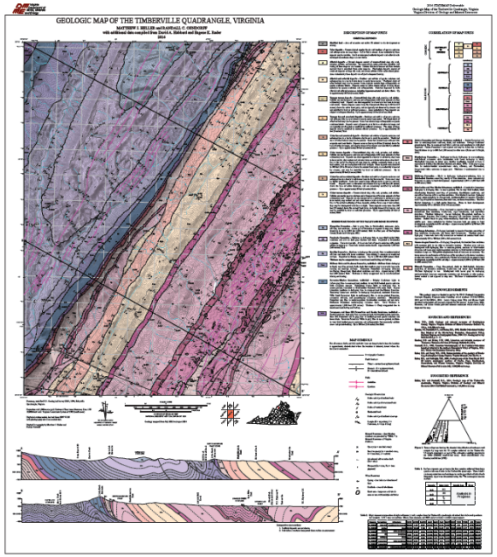
Matt Heller

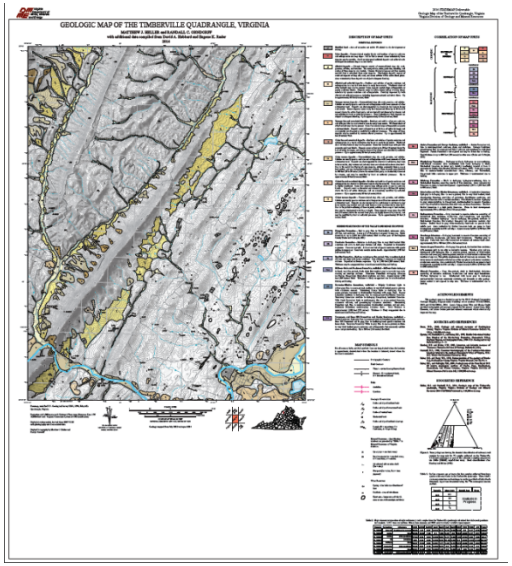
Our digital mapping program

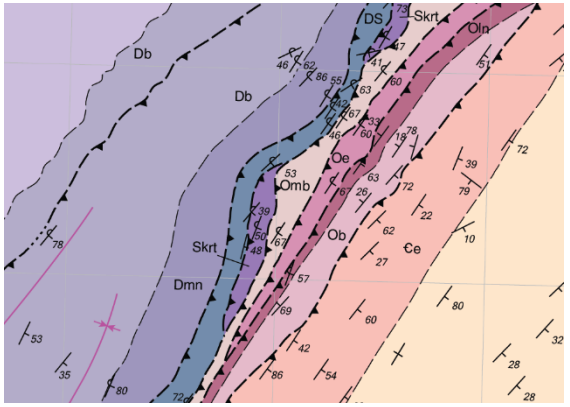
- Early adopter of NGCMP09.
- No dedicated GIS staff.
- Geologists and technicians compile each map in GIS.
- Provide 1:24,000-scale maps to public primarily as PDF documents.
- An ongoing update of our state geologic map uses GeMS.
- We would like to be fully compliant with GeMS for our 1:24,000 mapping projects in the future.

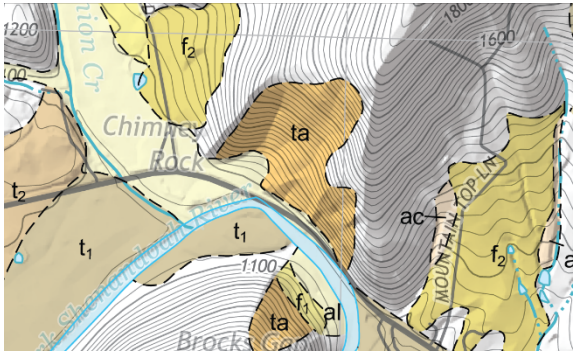
Example layered PDF product





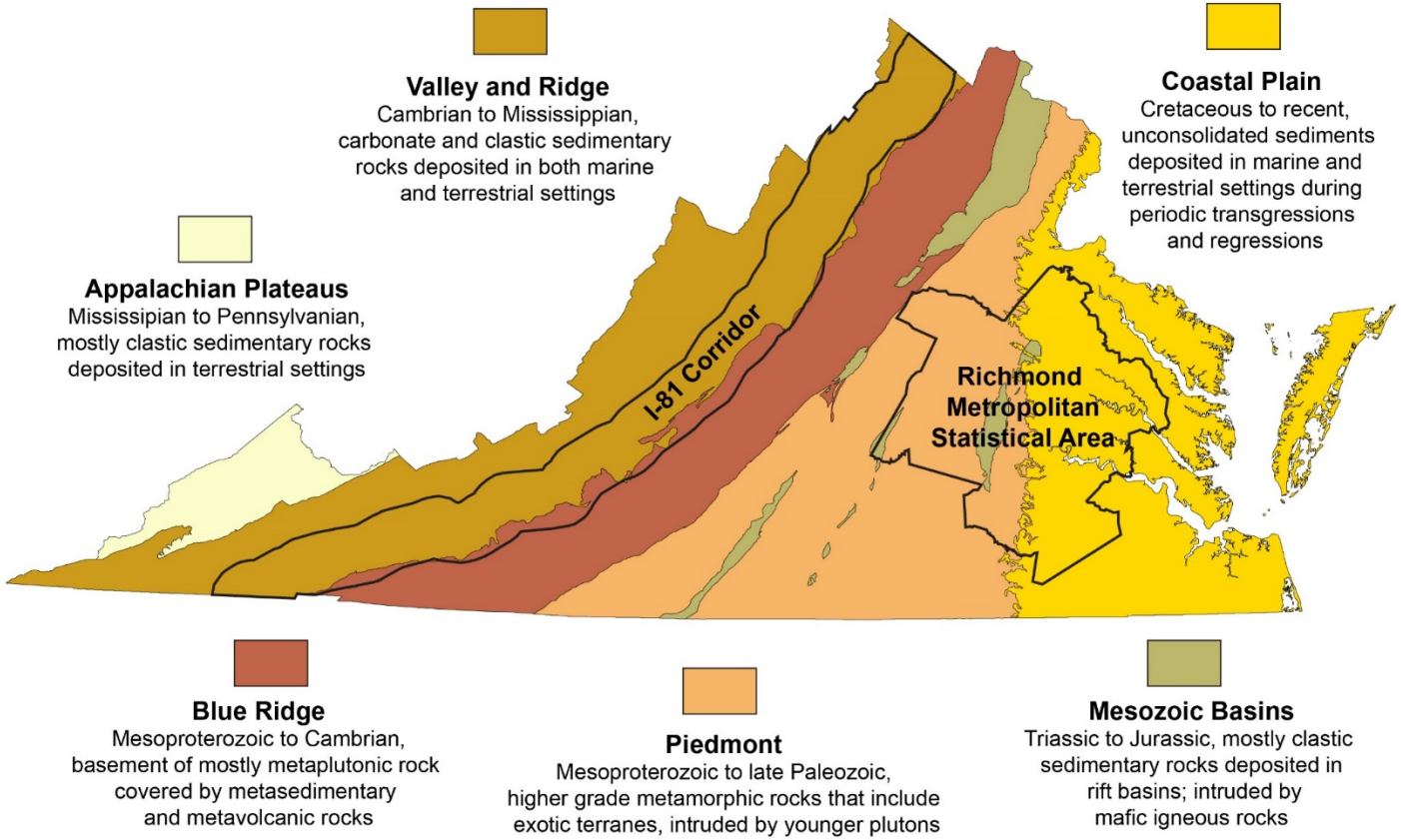






Timberville Quadrangle – Heller and Orndorff

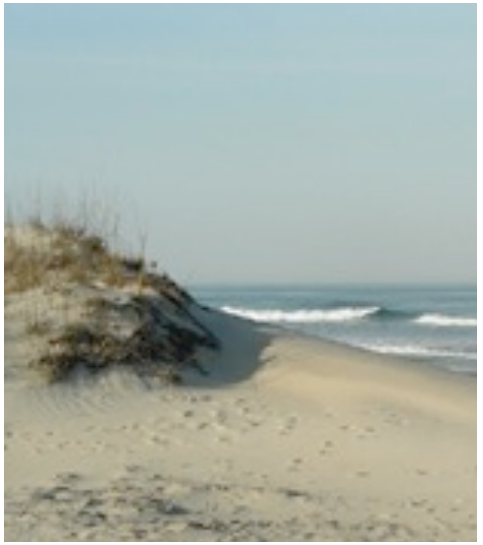
Our geologic setting



Well-developed residual soil; no glacial deposits; discontinuous alluvial and colluvial deposits; dense network of incised perennial streams

Types of surficial deposits we map:

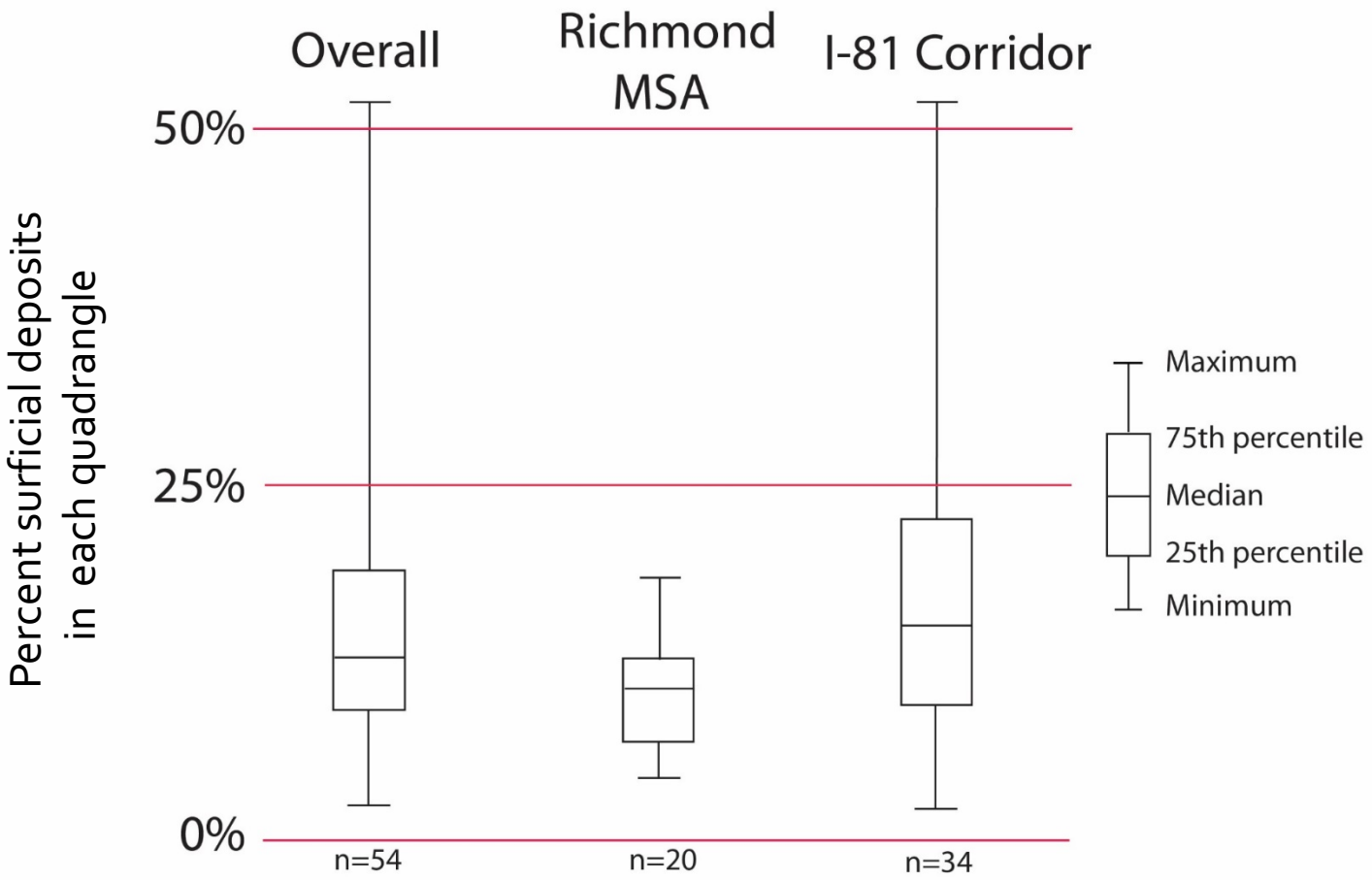
- Floodplain
- Terrace
- Colluvium
- Debris-flow
- Fan
- Swamp/Marsh
- Beach
- Artificial fill



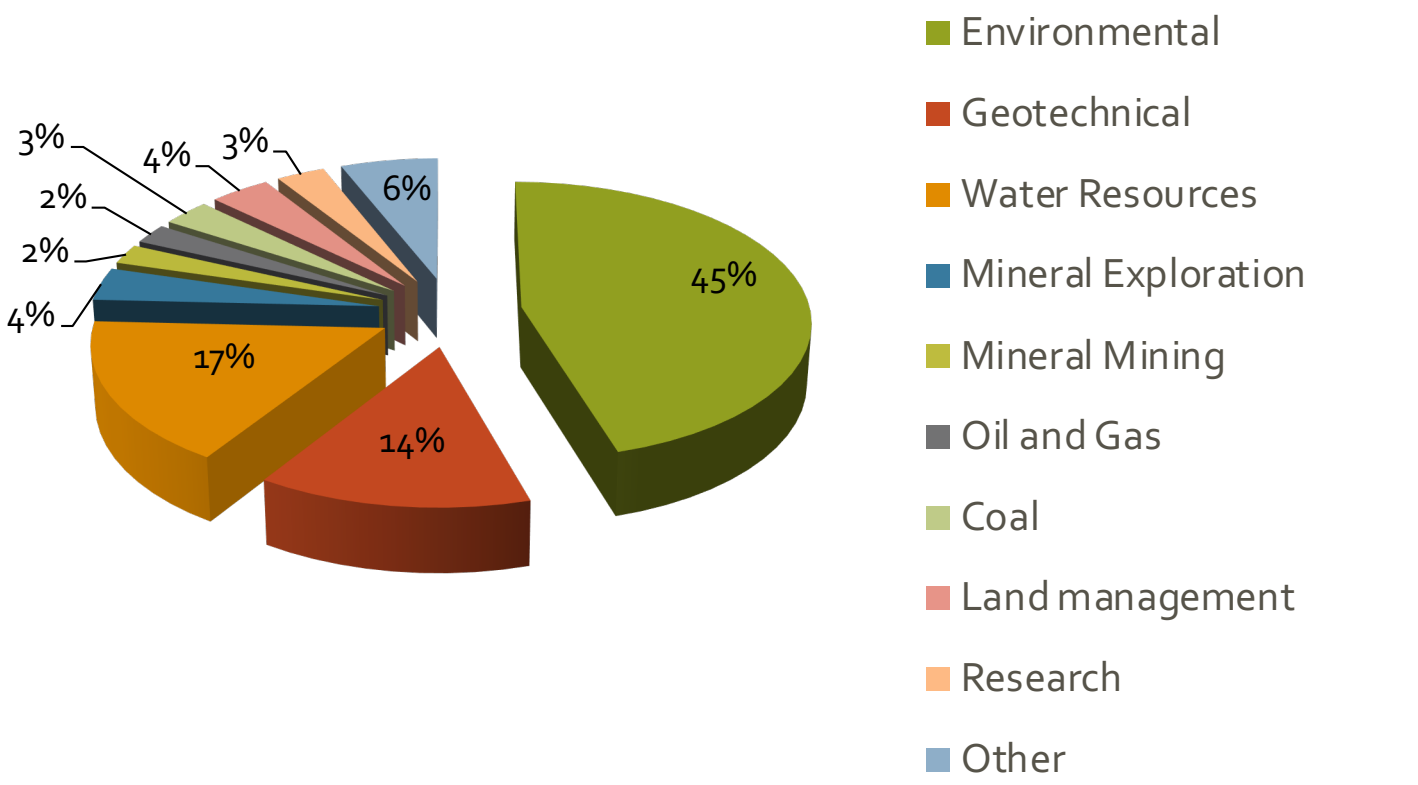
Characteristics of surficial deposits

- Most are thin, <10 meters
- Unconformably overlie bedrock, unconsolidated formations in the Coastal Plain Province, or residuum derived from these units.
- In most places, concealed contacts can be accurately drawn under surficial deposits.
- Not an important source of ground water

How extensive are these deposits?



How are our maps being used?



2015, n = 80

Many users require information about bedrock site conditions, even when thin surficial deposits are present.

How do we provide this bedrock data to our customers?

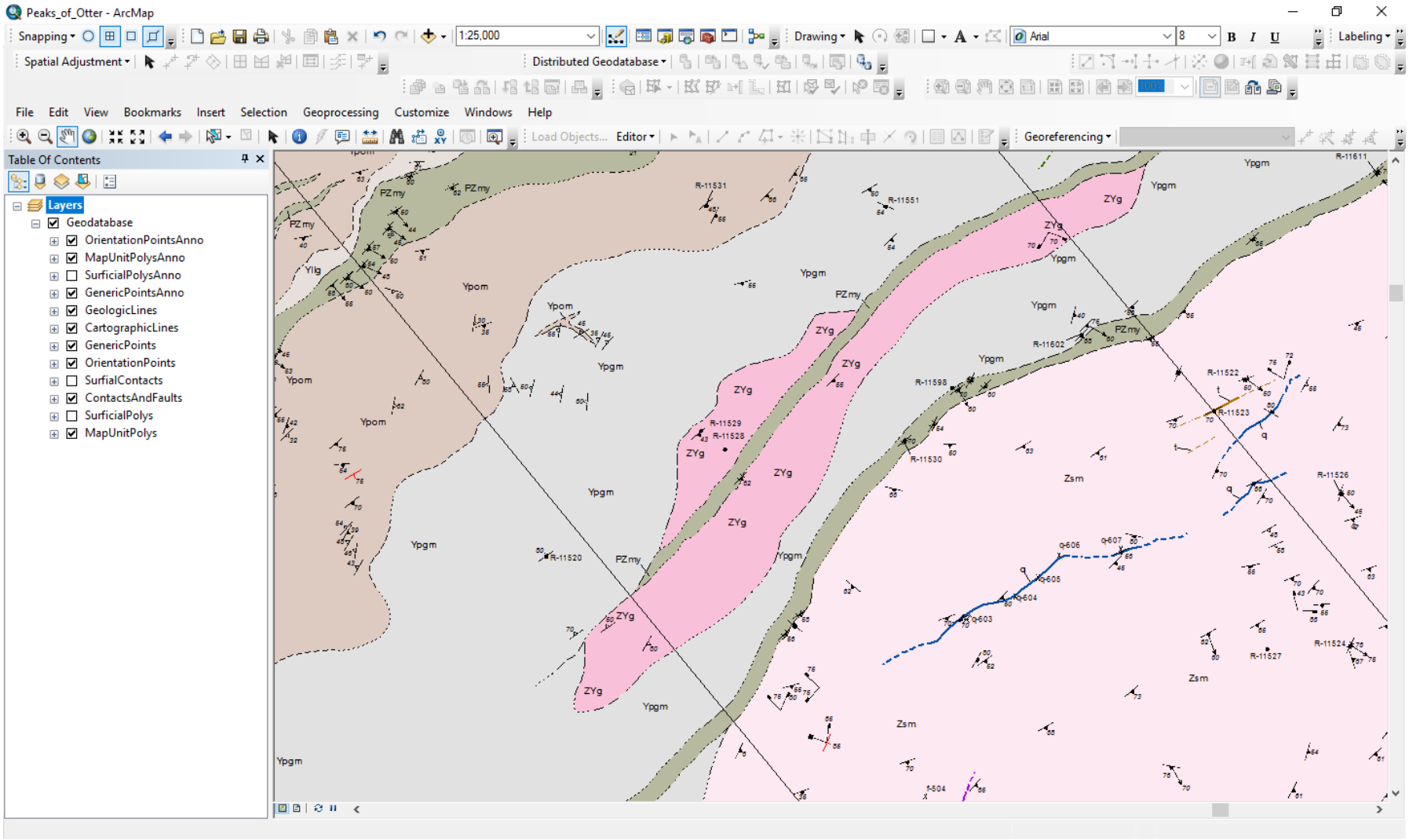
- Create bedrock polygons that cover 100% of each map area.
- Store surficial deposit polygons and surficial contacts in separate feature classes so that bedrock (or surficial) geology can be viewed independently.
- Provide geologic maps as layered PDFs that can be customized to meet individual user needs.

We aren't able to store surficial and bedrock information separately in GIS and be compliant with NCGMP09

A comparison of our current approach to NCGMP09 and GeMS

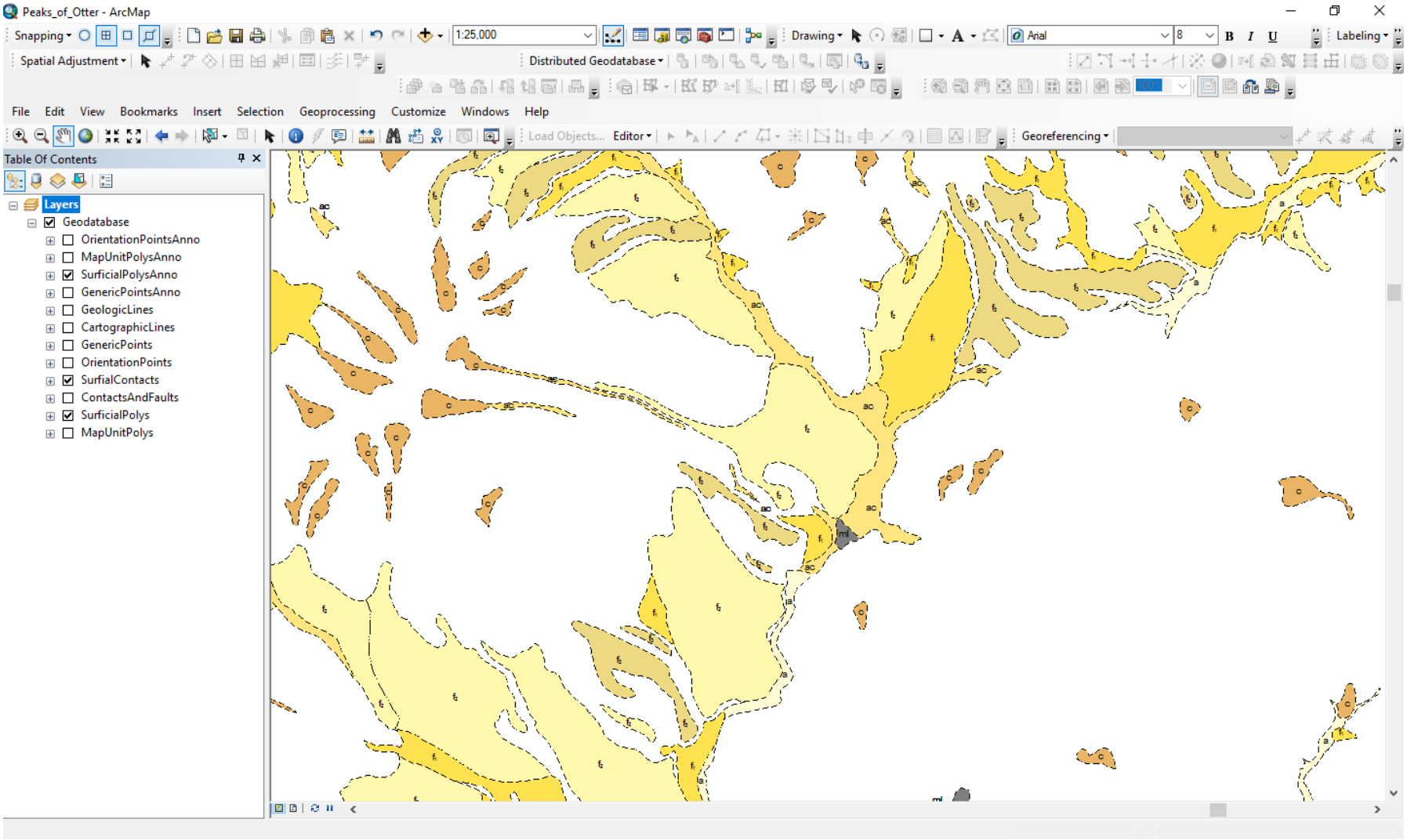
	Virginia	NCGMP09	Proposed GeMS
MapUnit Polys	bedrock	bedrock units surficial deposits water	bedrock units surficial deposits water
MapUnitOverlay Polys	N/A	N/A	artificial fill
Other Polys/ Overlay Polys	surficial deposits water artificial fill alteration zones	artificial fill alteration zones, etc.	alteration zones, etc.
Contact and Faults	bedrock contacts	all contacts	all contacts
Other Contacts/ Overlay Contacts	surficial deposit contacts water contacts	N/A	N/A

Example Geodatabase



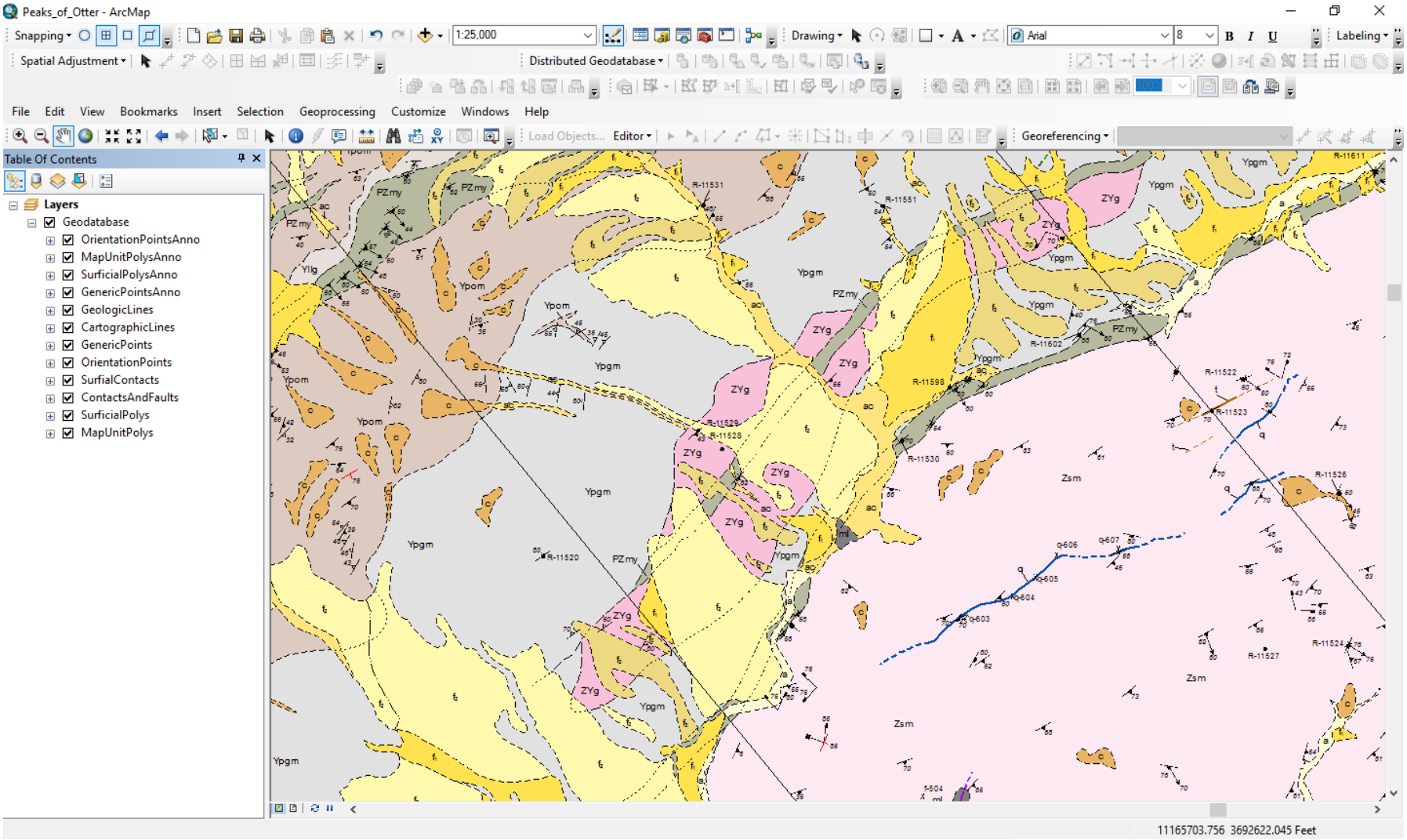
Peaks of Otter Quadrangle – Heller and Smith

Example Geodatabase



Peaks of Otter Quadrangle – Heller and Smith

Example Geodatabase



Peaks of Otter Quadrangle – Heller and Smith

Possible solutions to be compliant and meet user needs

- Use existing feature class MapUnitOverlayPolys for discontinuous surficial deposits and water AND create a new optional feature class for "MapUnitOverlayContacts" in GeMS.
- Keep surficial and bedrock polygons and lines together, but use symbol levels and attribution to ensure proper display and make features easy to separate. NOTE: this would require change to GeMS rule about no overlapping polygons.
- Create separate geodatabases for surficial and bedrock geologic maps.