

The following was presented at DMT'08  
(May 18-21, 2008).

The contents are provisional and will be  
superseded by a paper in the  
DMT'08 Proceedings.

See also earlier Proceedings (1997-2007)

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

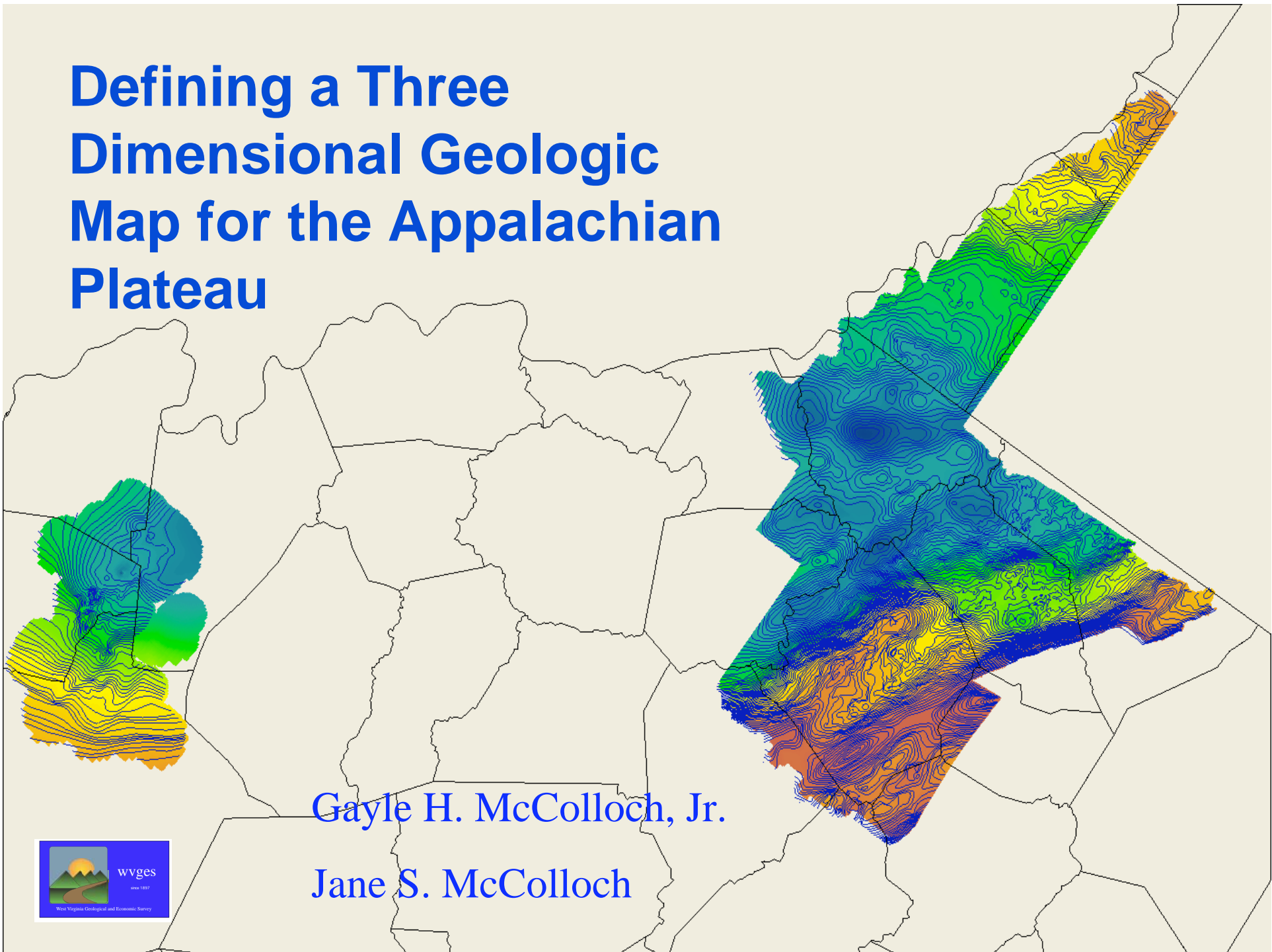
# West Virginia Geological and Economic Survey

1897-2008

Over a Century of  
Geoscience Serving the  
Mountain State



# Defining a Three Dimensional Geologic Map for the Appalachian Plateau



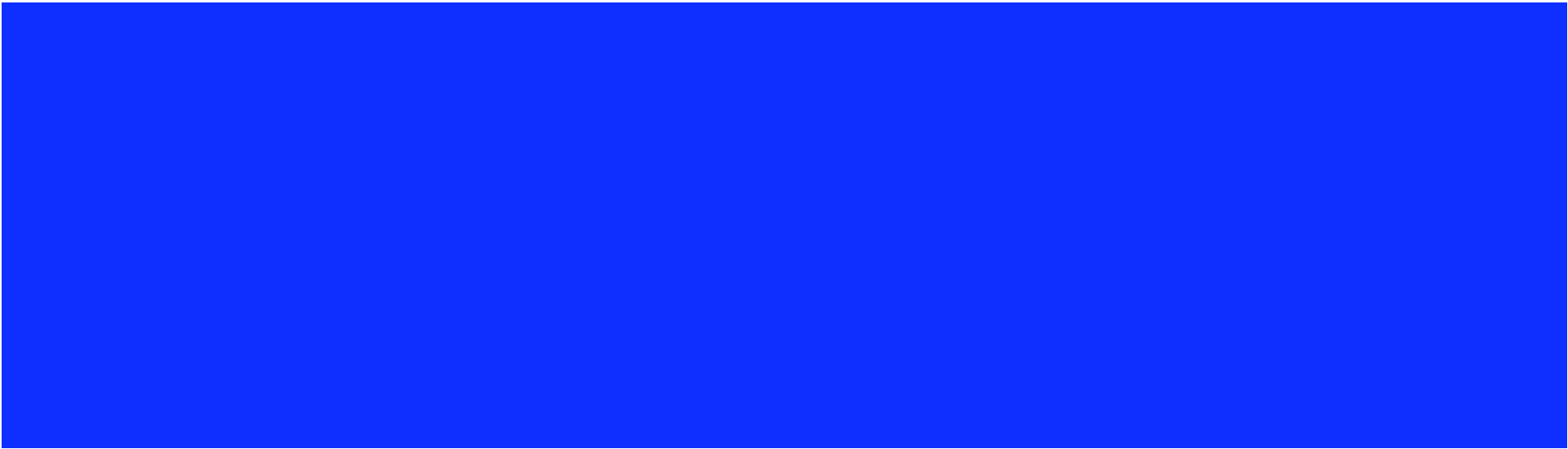
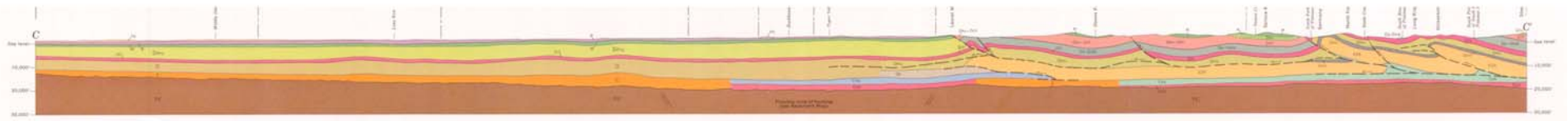
Gayle H. McColloch, Jr.

Jane S. McColloch



Price of software to support a  
three dimensional geologic map  
in 1991

If you had to ask you couldn't afford it.  
I was lucky to be able to afford 2-d GIS.

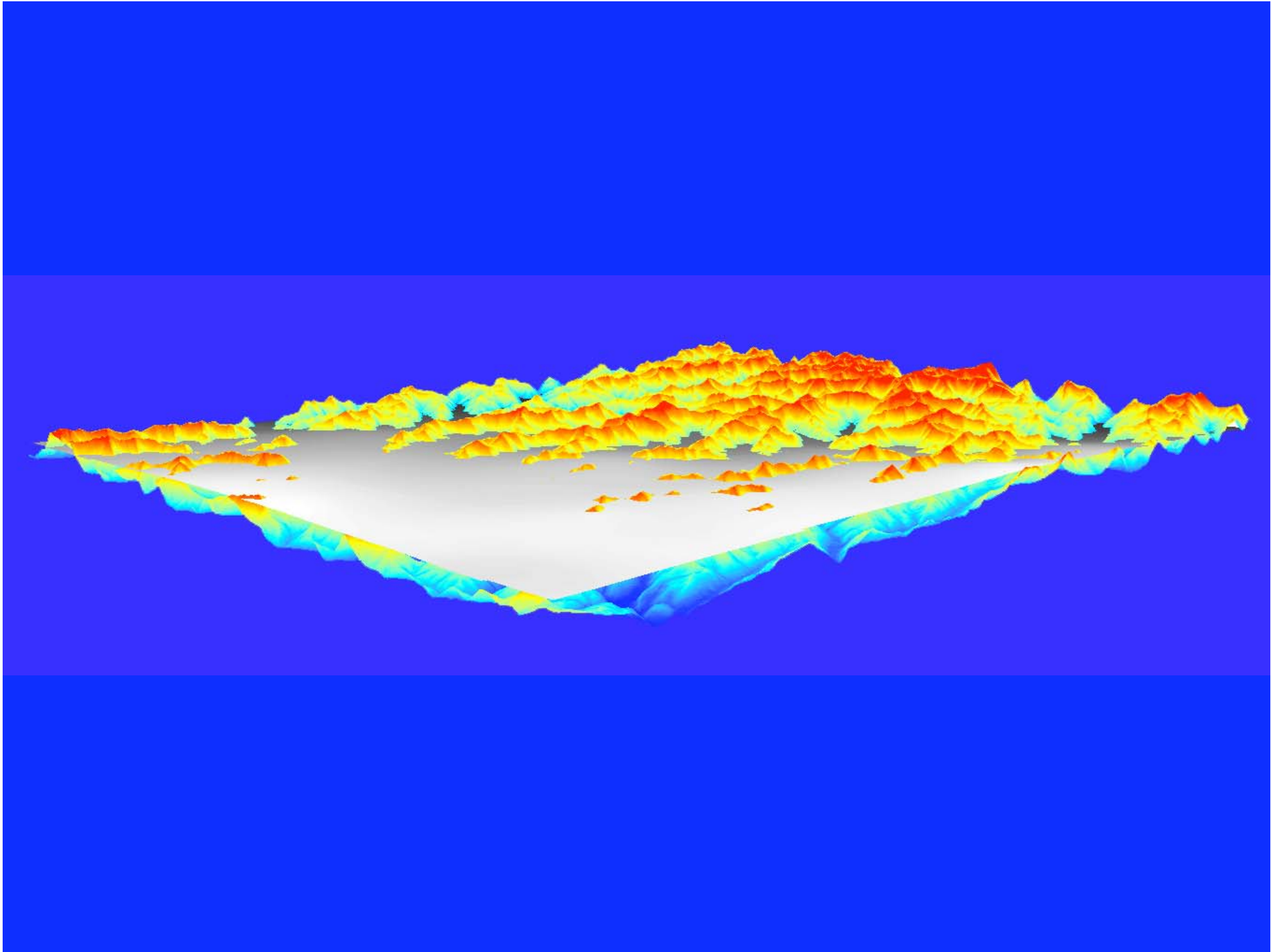


A true three dimensional geologic map is more likely a collection of related files, and possibly programming. It will not be hard copy maps.

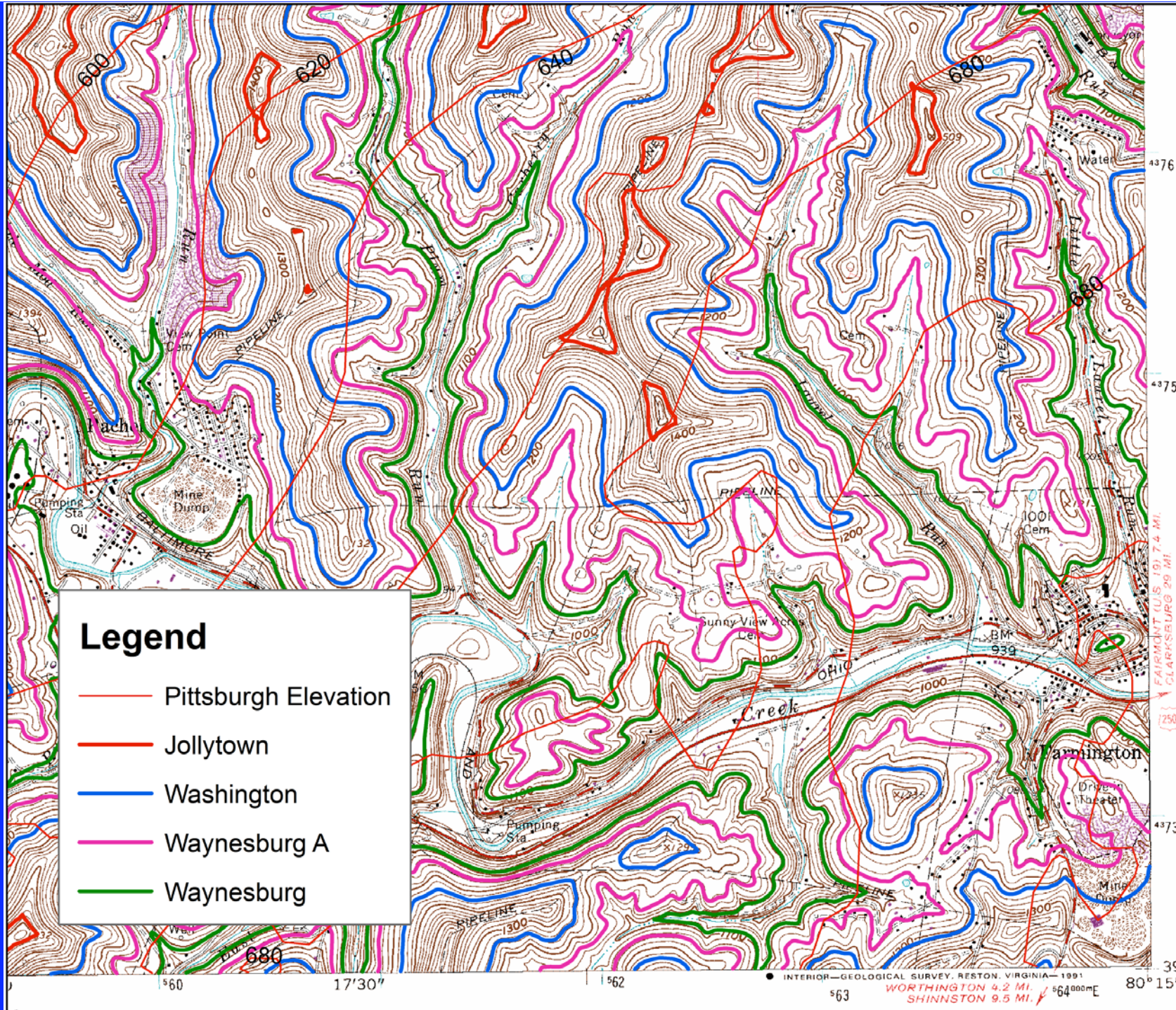
# Recently prices are a lot better!

Free is best, if the software works!

Several visualizations in this presentation were produced with GRASS GIS running in Ubuntu Linux and now Windows





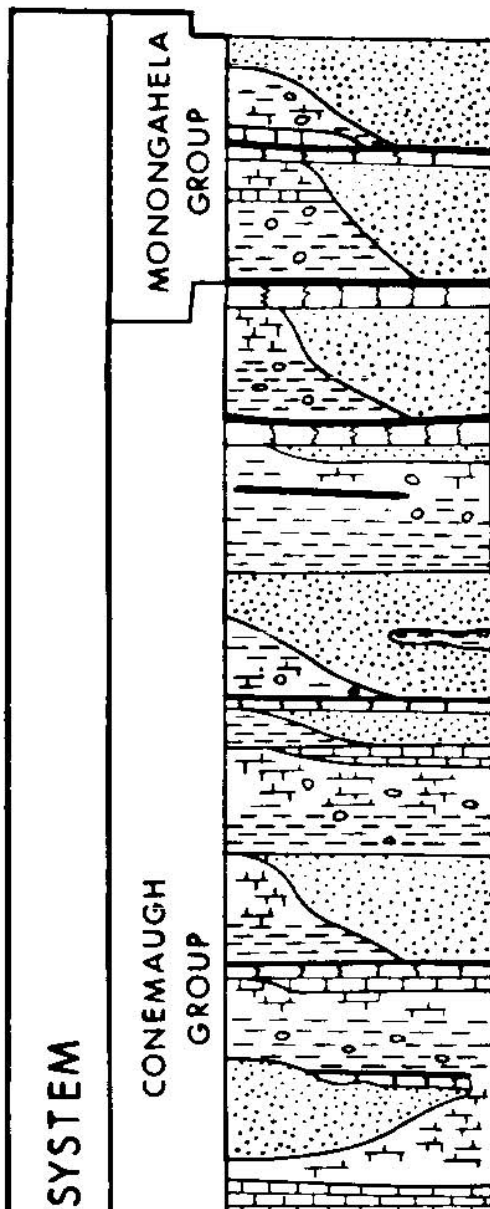
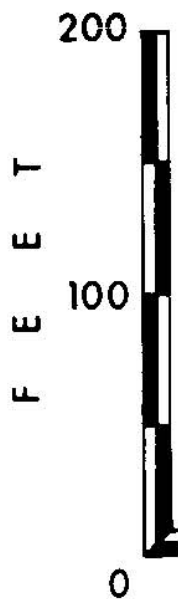


### Legend

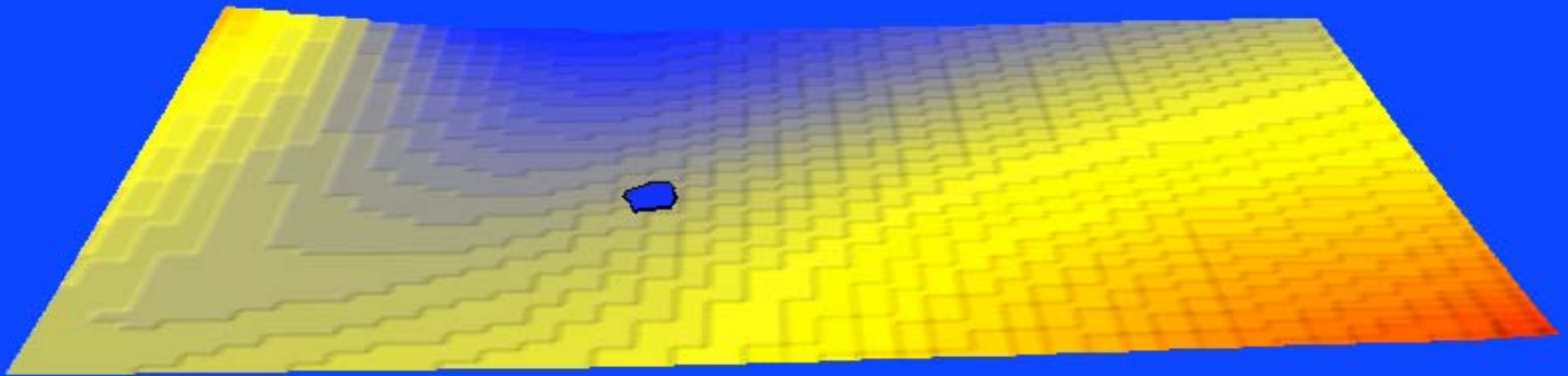
- Pittsburgh Elevation
- Jollytown
- Washington
- Waynesburg A
- Waynesburg

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1991  
 WORTHINGTON 4.2 MI. ↙  
 SHINNSTON 9.5 MI. ↘  
 FAIRMONT (U.S.) 19.1 MI.  
 CLARKSBURG 29 MI.





- Z LOWER SEWICKLY SANDSTONE (OR SHALE)
- Y *REDSTONE COAL*
- UPPER PITTSBURGH SANDSTONE
- X *PITTSBURGH COAL*
- W LOWER PITTSBURGH SANDSTONE
- V *LITTLE PITTSBURGH COAL*
- U<sub>1</sub> LOWER PITTSBURGH LIMESTONE
- U CONNELLSVILLE SANDSTONE
- LITTLE CLARKSBURG COAL*
- LOWER CONNELLSVILLE SANDSTONE
- CLARKSBURG LIMESTONE
- T CLARKSBURG RED SHALE
- S MORGANTOWN SANDSTONE
- ELK LICK COAL*
- ELK LICK LIMESTONE
- BIRMINGHAM RED SHALE
- WEST MILFORD COAL*
- R GRAFTON SANDSTONE
- Q AMES LIMESTONE AND SHALE



What should be included in a three dimensional geologic map?

# Useful base layers

- Orthorectified imagery
- Dem
- Hypsography
- Hydrography
- Infrastructure lines
- Cultural points

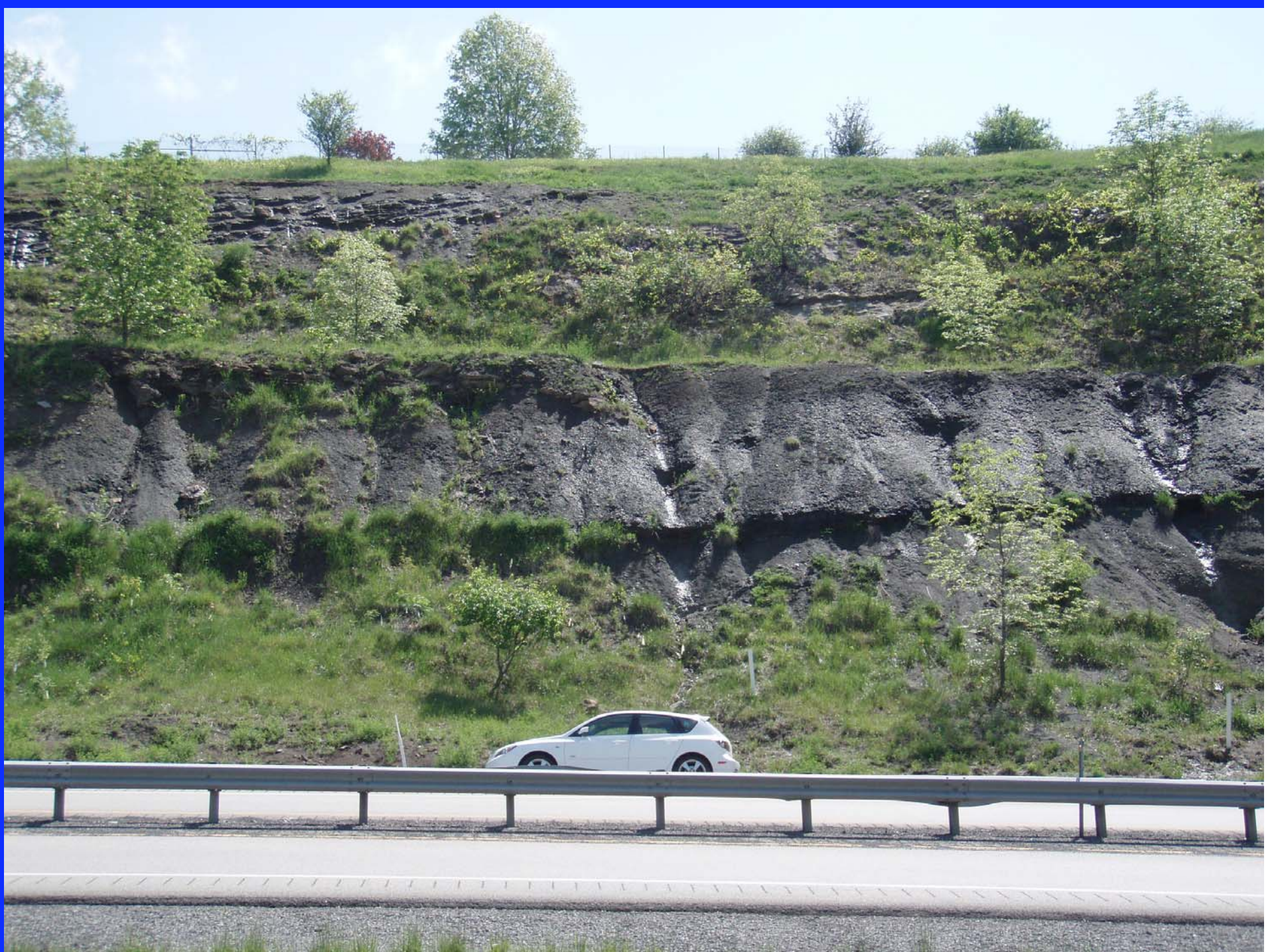
# Geologic mapping in gently folded sedimentary rocks

- Tracing wide spread beds that define the boundaries of rock units
- Tracing locally persistent intra-formational markers
- Mapping other units of interest, where possible









Other units of interest



## BETHANY TURNPIKE TUNNELS

First highway tunnels constructed west of Alleghenies. They were built in 1831 by Richard Waugh at personal expense to ease transportation to his flour mills. The tunnels, a mile apart, were removed by the State in 1957.

WEST VIRGINIA DEPARTMENT OF ARCHIVES AND HISTORY, 1975















# Base layers

- Orthorectified imagery
- Dem
- Hypsography
- Hydrography
- Infrastructure lines
- Cultural points

## Elements useful for three dimensional geologic map in the Appalachian Plateau

- Grids representing elevations and possibly volumes of all important horizons occurring between the surface and sea level or bottom of known geology
- Two dimensional elements of geologic map
- Stratigraphic information to fill in gaps
- Deep sub-surface information, if available

# West Virginia Geological and Economic Survey

1897-2008

Come join us in  
Morgantown, WV for  
DMT'09



DEC 24 1897



Bank of America, National Bk.  
 267012  
 Quarry Hill  
 West Virginia Building  
 Carnegie Hall  
 Agricultural Experiment Station  
 University  
 Public School  
 Masonic Temple  
 Y. M. C. A. Building  
 Y. W. C. A. Building  
 Morgantown Planning Mill

**MORGANTOWN,**  
 WEST VIRGINIA,  
 1897.

THE MORGANTOWN TEXTILE CO.  
 MORGANTOWN & PAUL CO.  
 TOWN OF MORGANTOWN, JEFFERSON TOWN.  
 YARNING FACTORY, T. A. HENNING, PROP.  
 R. & A. B. STATION  
 CHURCHES  
 PRESBYTERIAN CHURCH  
 METHODIST  
 BAPTIST  
 LUTHERAN  
 CATHOLIC  
 P. O.

6014  
 1115  
 1110  
 11