Geologic Mapping Activities of the USGS KARST PROJECT in 2009/2010

David Weary USGS, Reston, VA

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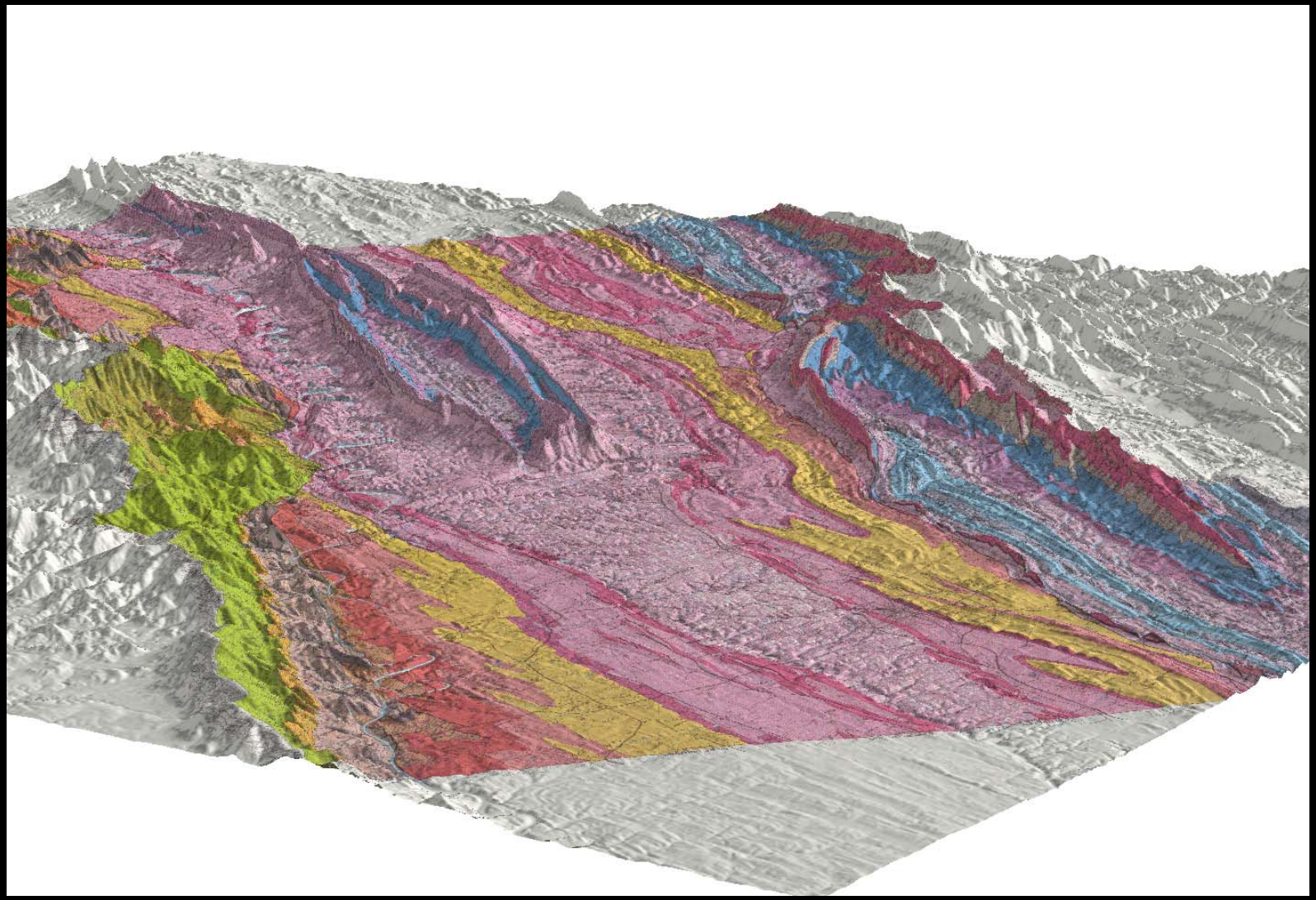
Geologic maps are two-dimensional portrayals of our 3-dimensional (sometimes 4!) understanding of the composition and structure of the earth



Rader, E.K., McDowell, R.C., Gathright, T.M., II, and Orndorff, R.C., 1996, Geologic map of Clarke, Frederick, Page, Shenandoah, and Warren Counties, Virginia: Lord Fairfax Planning district: Virginia Division of Mineral Resources Publication 143, scale 1:100,000.

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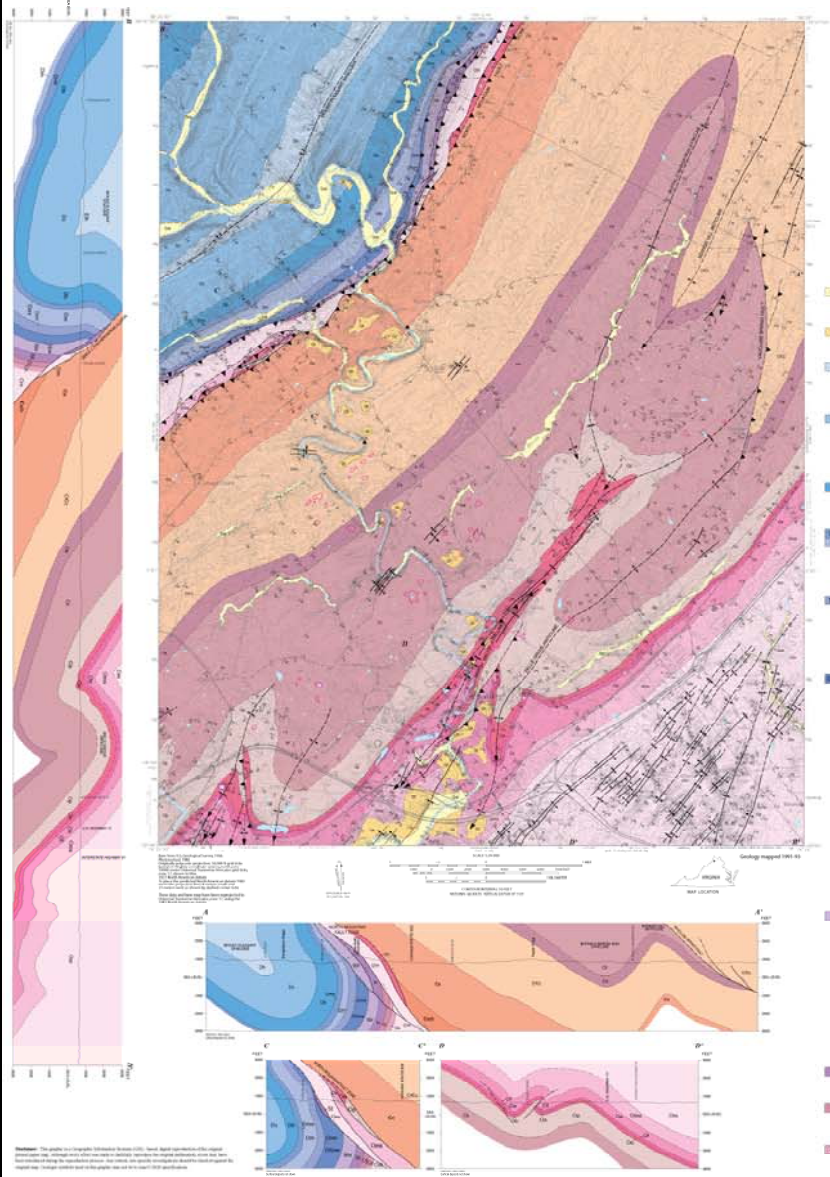

GEOLOGIC MAP OF THE MIDDLETOWN QUADRANGLE, FREDERICK, SHENANDOAH, AND WARREN COUNTIES, VIRGINIA

By
Randall C. Orndorff, Jack B. Epstein, and Robert C. McDowell

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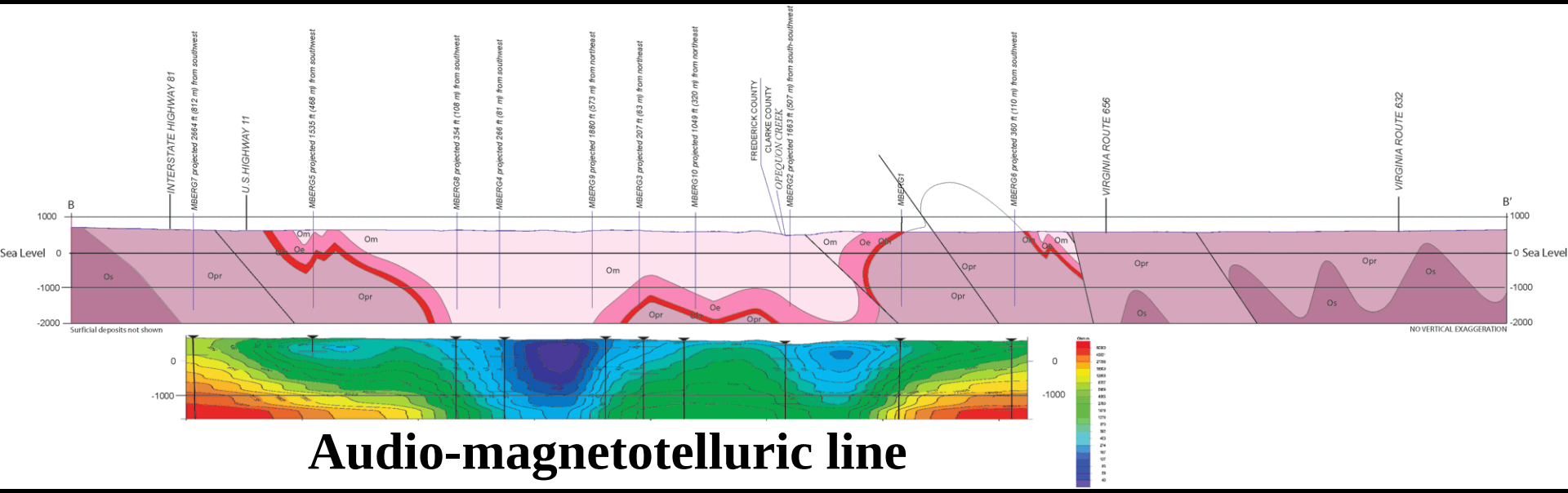
Geologic cross section north of Route 7, Clarke and Frederick Counties, VA



Audio-magnetotelluric line

DRAFT Geologic map of the Stephenson quadrangle, Clarke and Frederick Counties, Virginia, and Jefferson County West Virginia
David J. Weary, Randall, C. Orndorff, and Herbert A. Pierce

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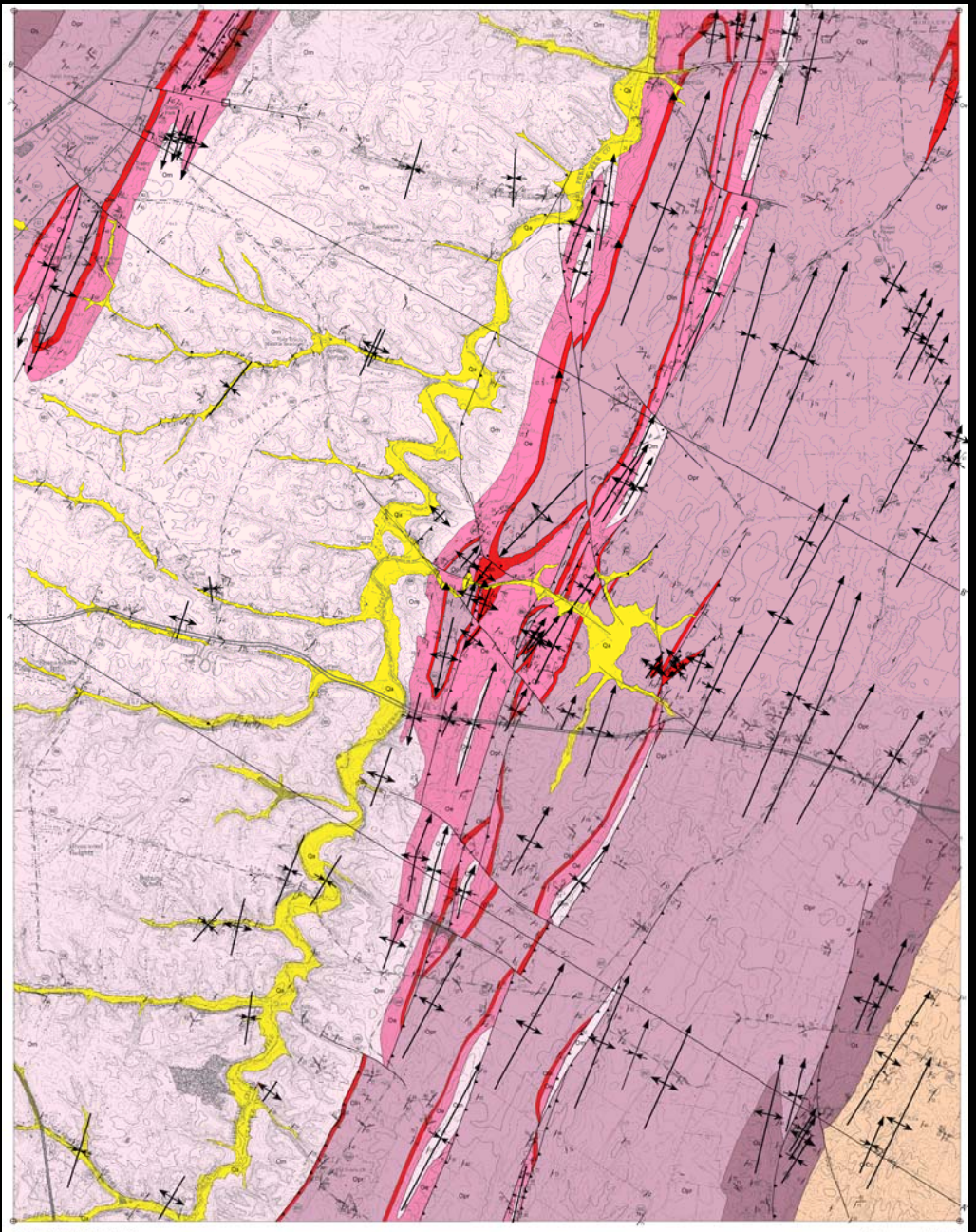

Base from U.S. Geological Survey, 1966
Photorevised 1986
Originally polyconic projection. 10,000 ft grid ticks based on Virginia coordinate system, north zone
10000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue
1927 North American datum
To place the predicted North American datum 1983 move the projection lines 8 meters south and

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 2005

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

VIRGINIA

MAP LOCATION

Geology mapped 2005–2007

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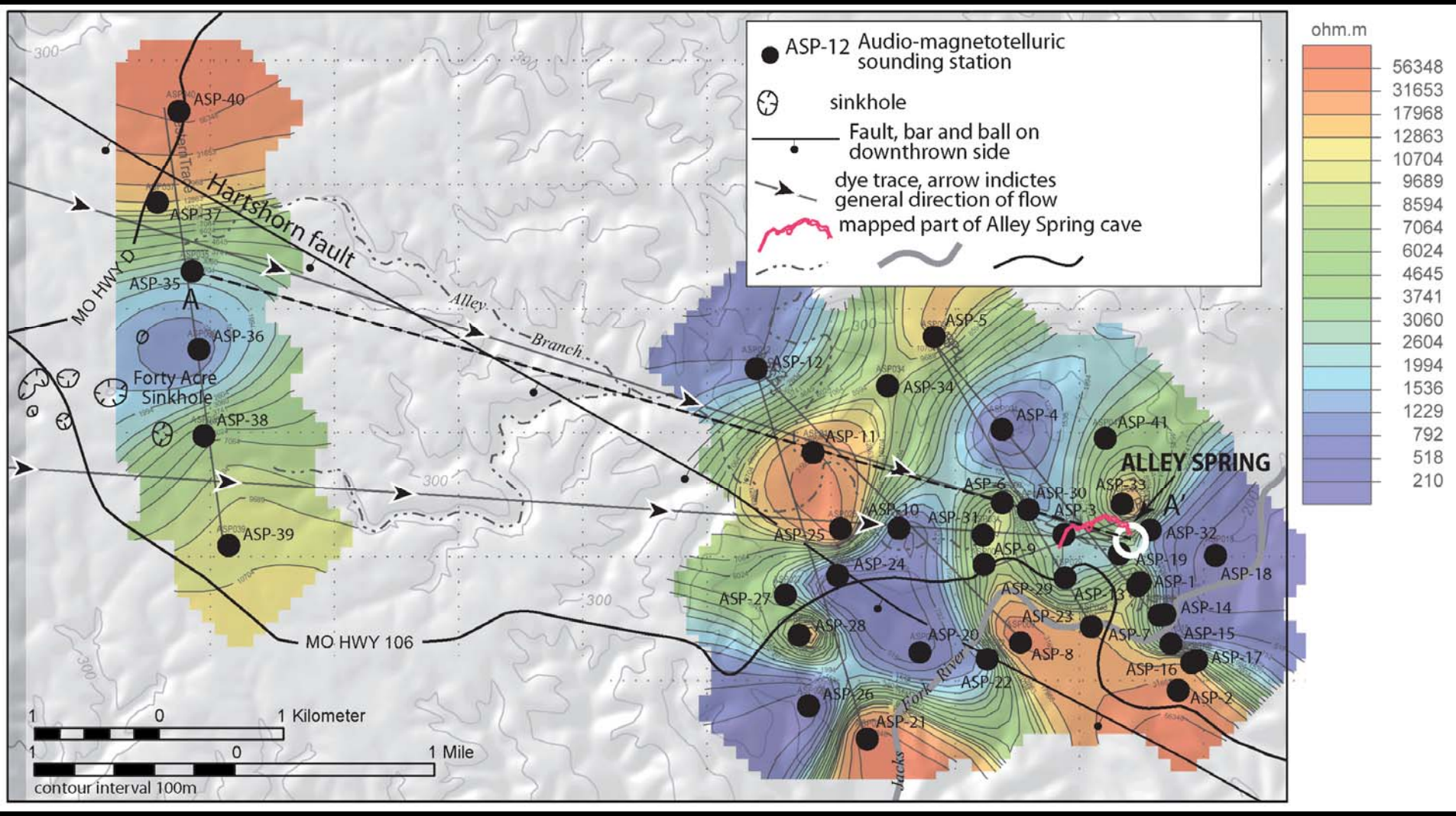

Alley Spring, Missouri AMT study (Pierce and Weary)

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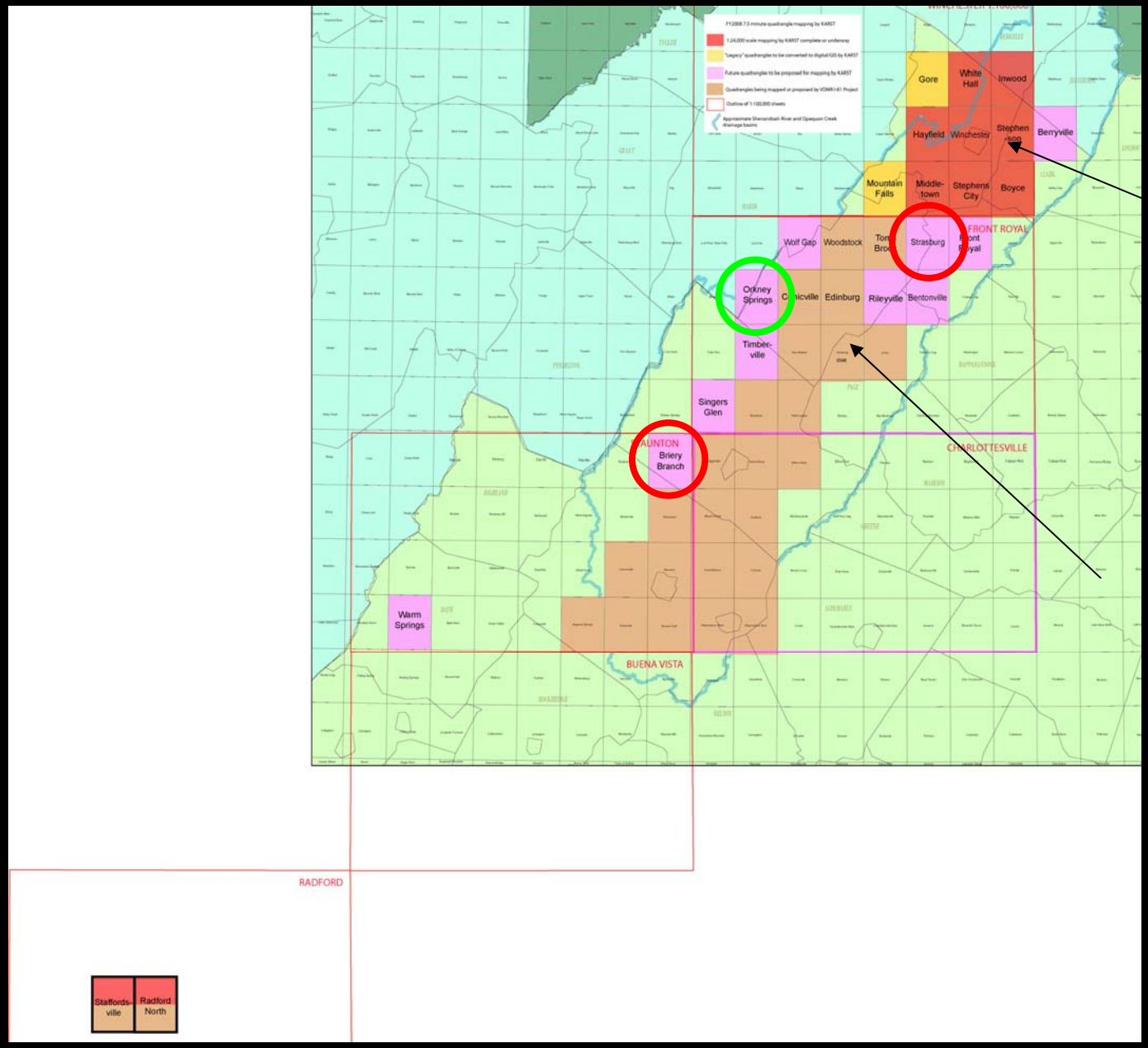

USGS KARST Project mapping

Virginia Division of Geology and Mineral Resources I-81 Project mapping

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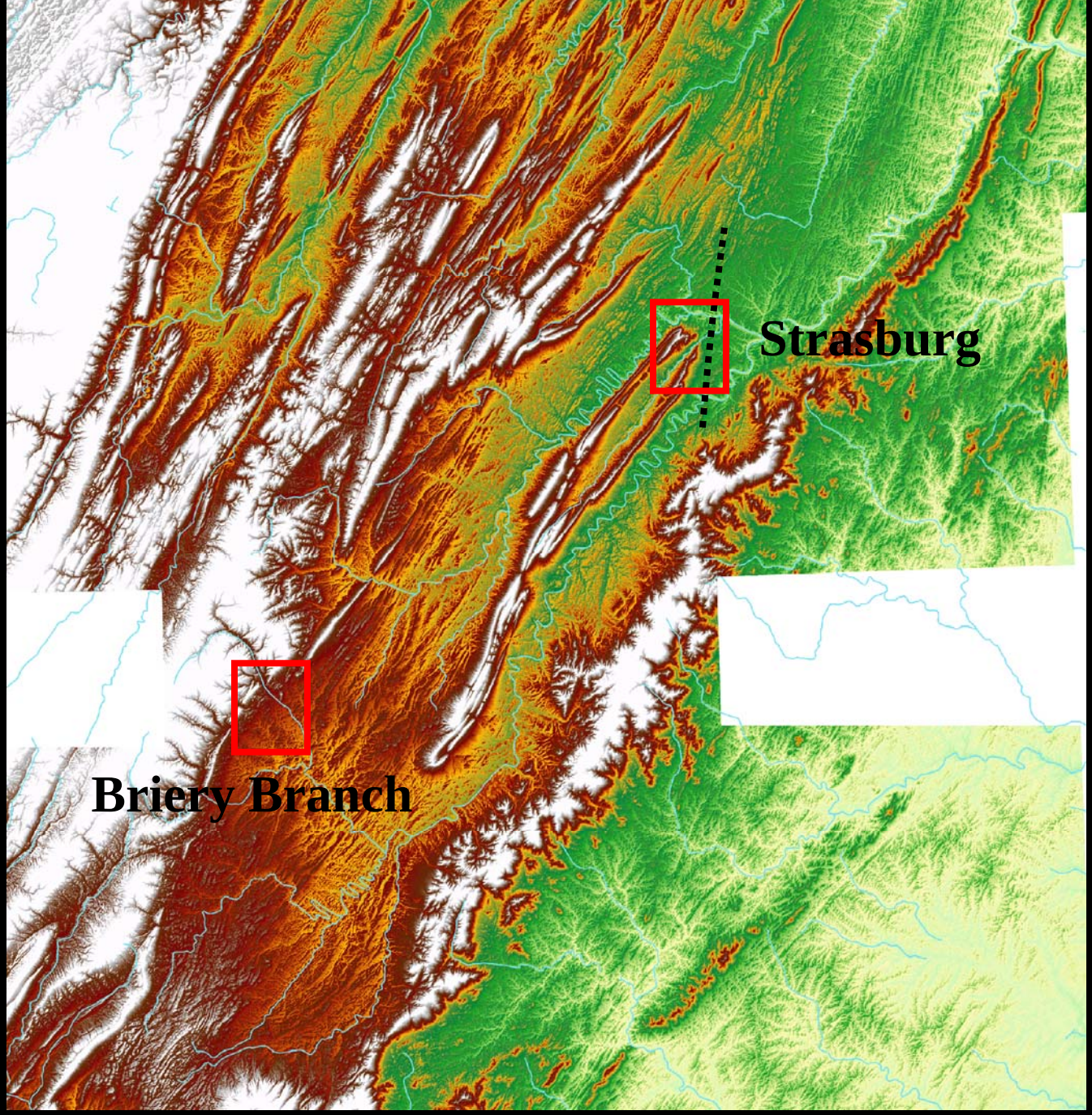

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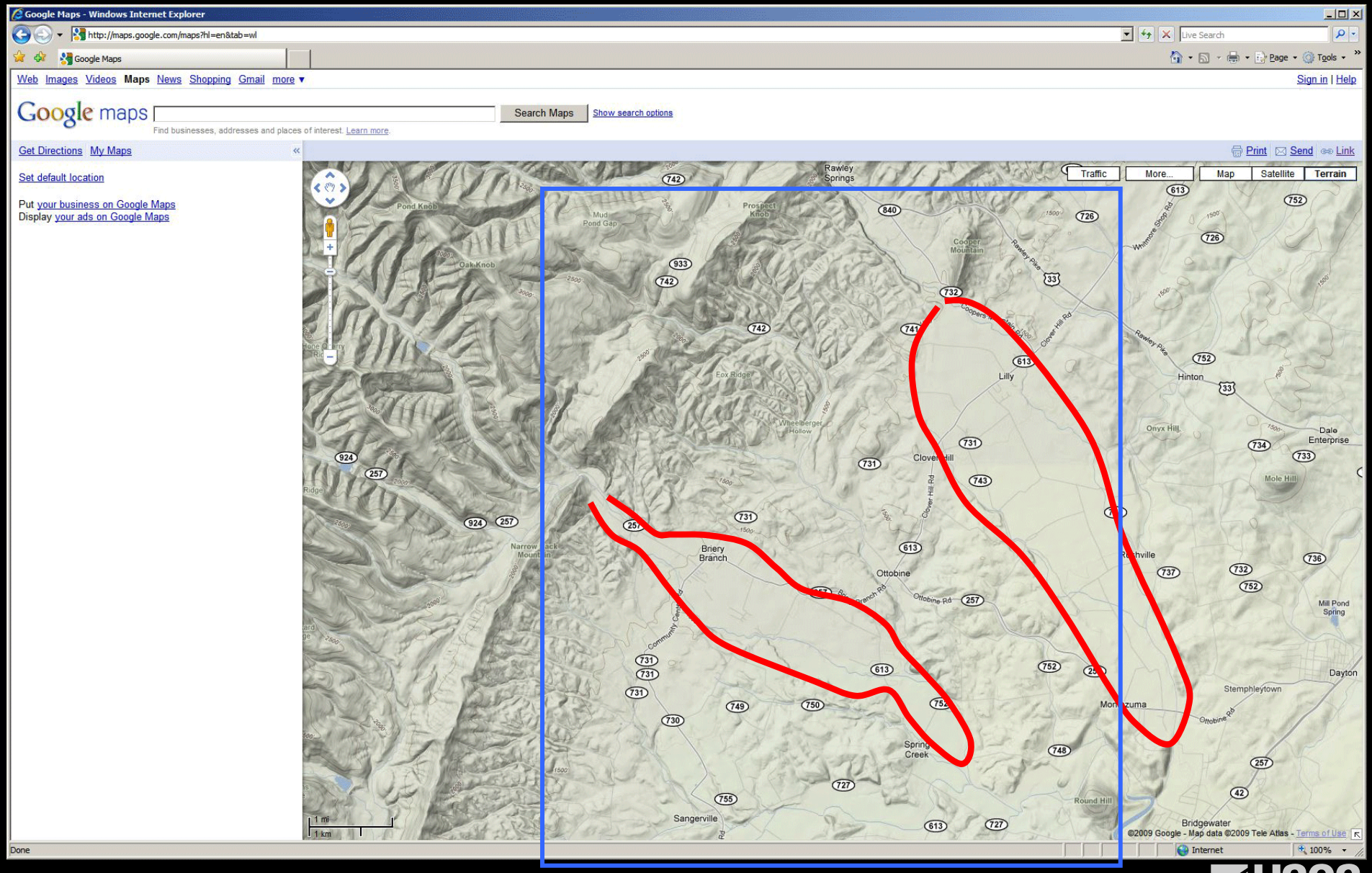
Clastic fans and surface/groundwater system in the Briery Branch area, Augusta and Rockingham Counties



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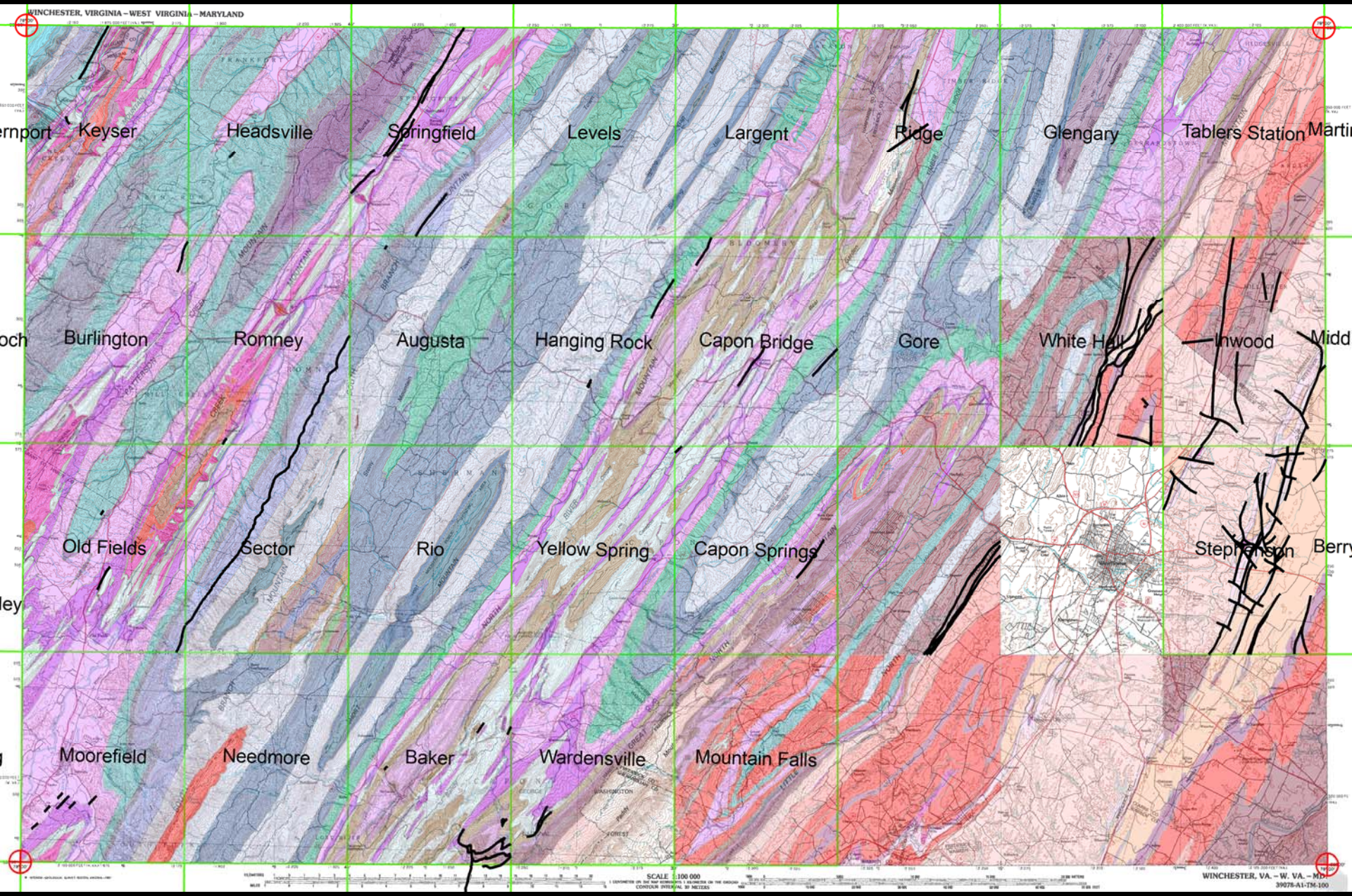

Winchester 100k compilation

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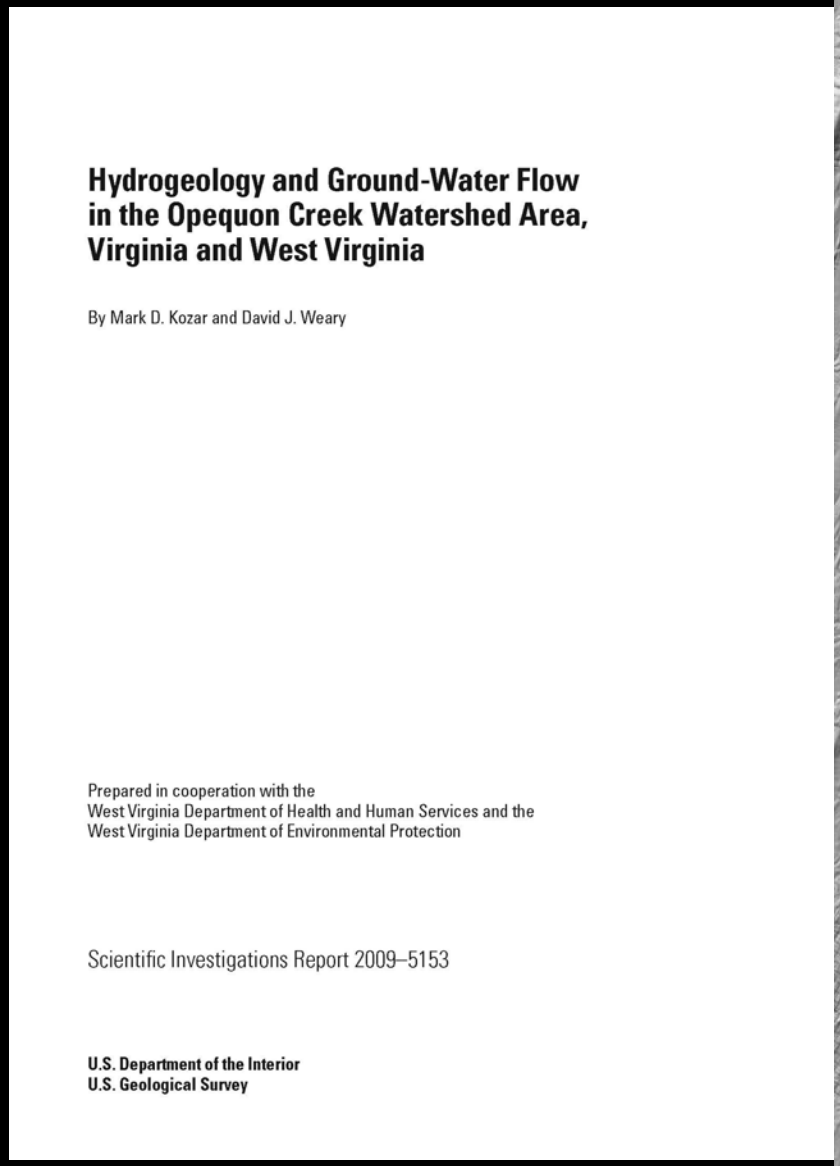
Static Model



Hydrogeology and Ground-Water Flow in the Opequon Creek Watershed Area, Virginia and West Virginia

By Mark D. Kozar and David J. Weary

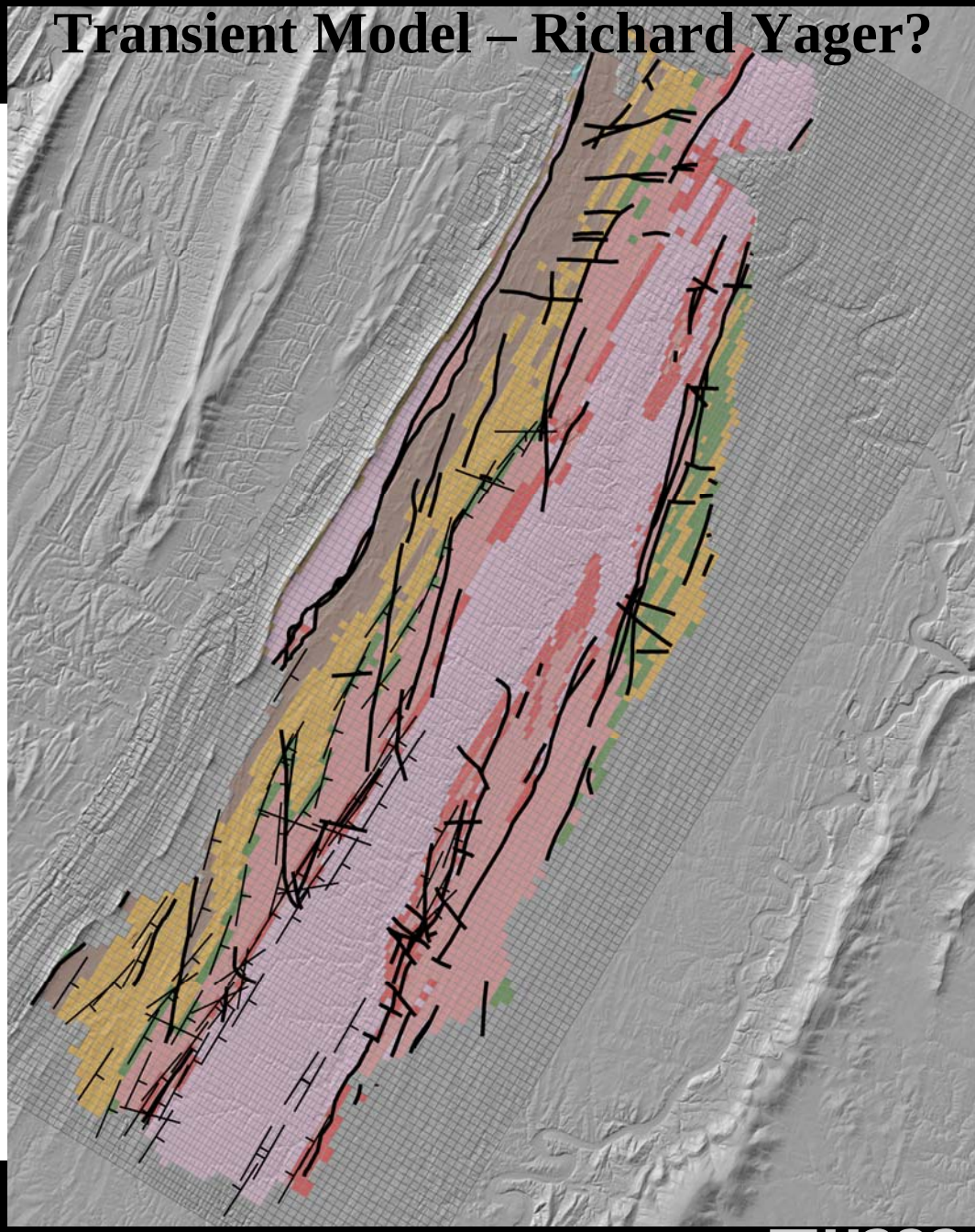
Prepared in cooperation with the
West Virginia Department of Health and Human Services and the
West Virginia Department of Environmental Protection

Scientific Investigations Report 2009–5153

U.S. Department of the Interior
U.S. Geological Survey

http://pubs.usgs.gov/sir/2009/5153

Transient Model – Richard Yager?



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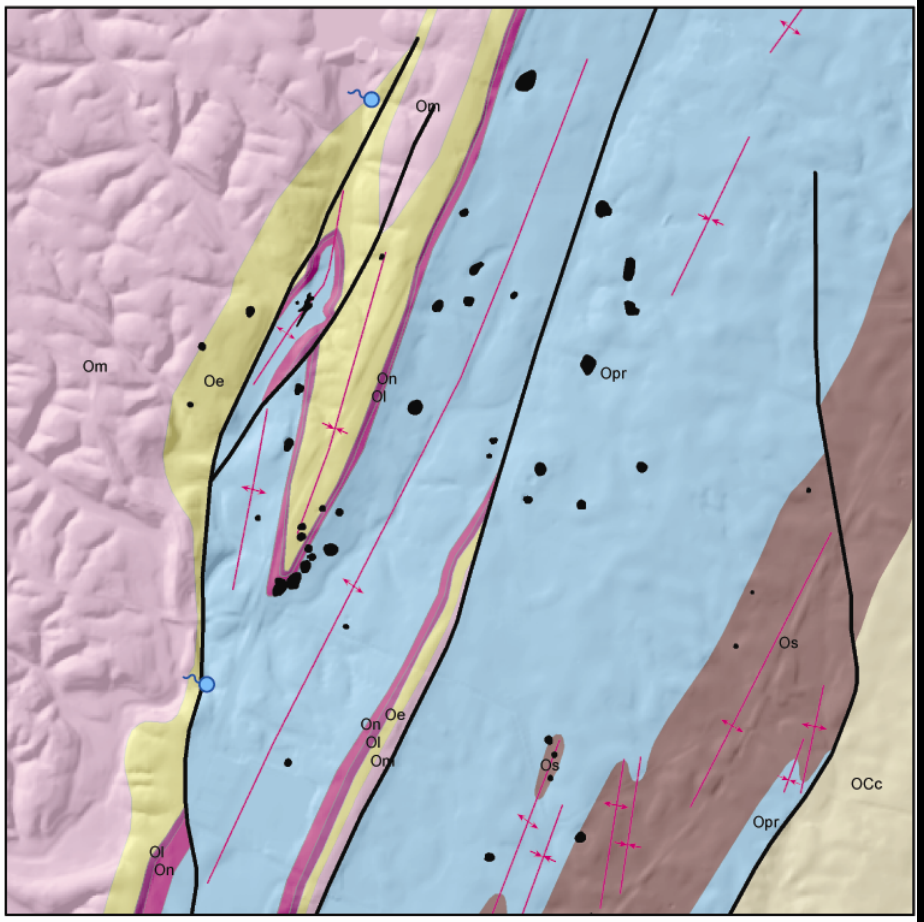
Stephens City Quadrangle



1,000 500 0 1,000 meters

Explanation

Sinkholes

Springs

Anticline

Syncline

Faults

MAP UNITS

Om - Martinsburg Formation (shale and sandstone)

Oe - Edinburgh Limestone

Ol - Lincolnshire Limestone

On - New Market

Opr - Rockdale Run/Pinesburg Station (limestone and dolomite)

Os - Stonehenge

OCc - Conococheague Limestone

Ce - Elbrook Formation (dolomite and limestone)

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Nathan Farrar, July, 2009 dye trace to Sempeles and Fay Springs

Thanks to the Clearbrook Volunteer Fire and Rescue!

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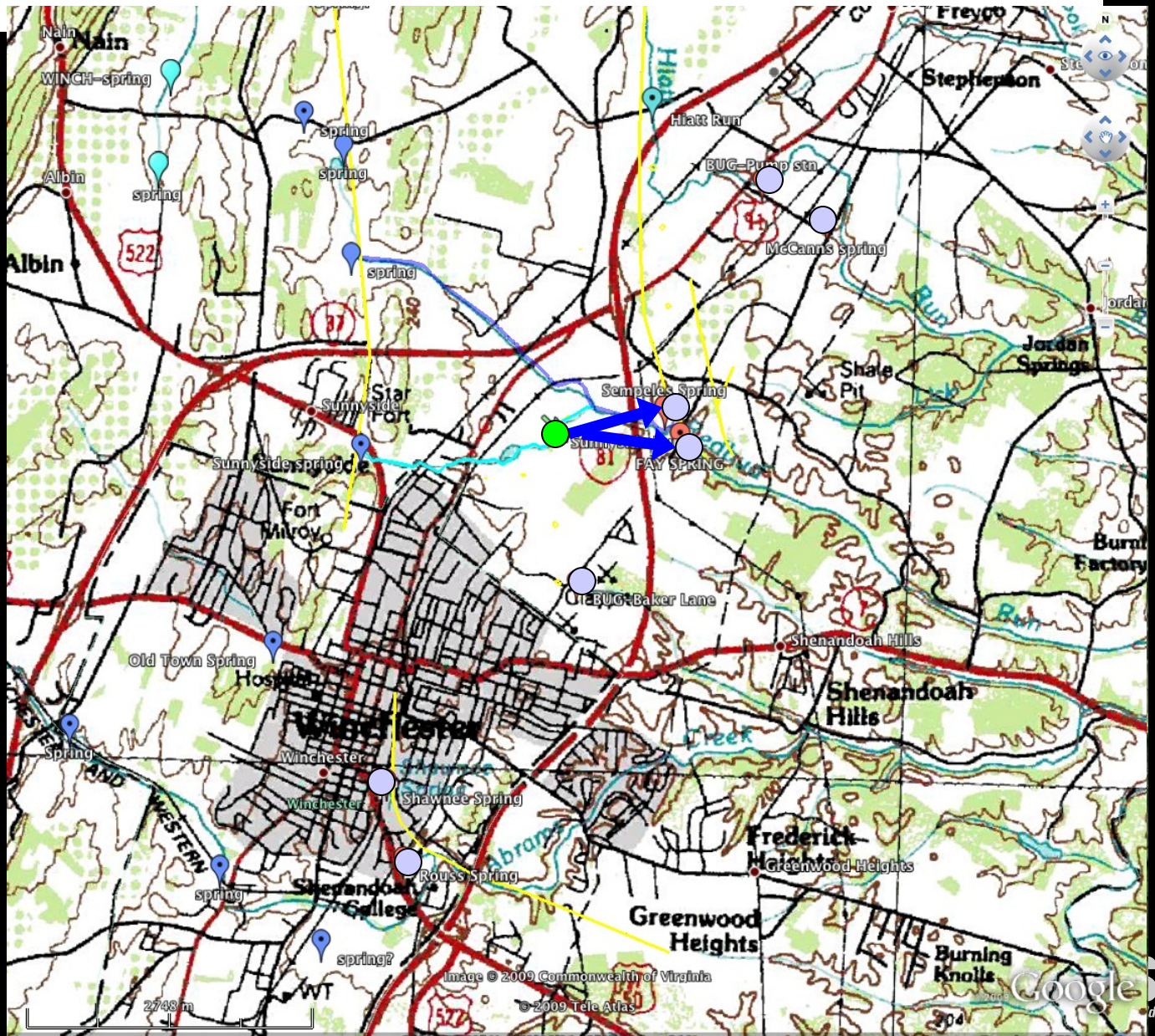
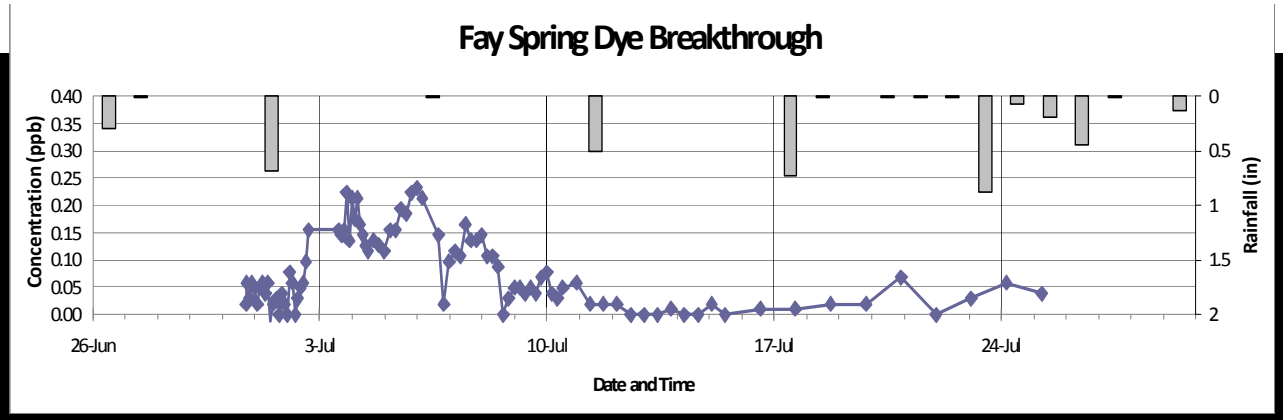
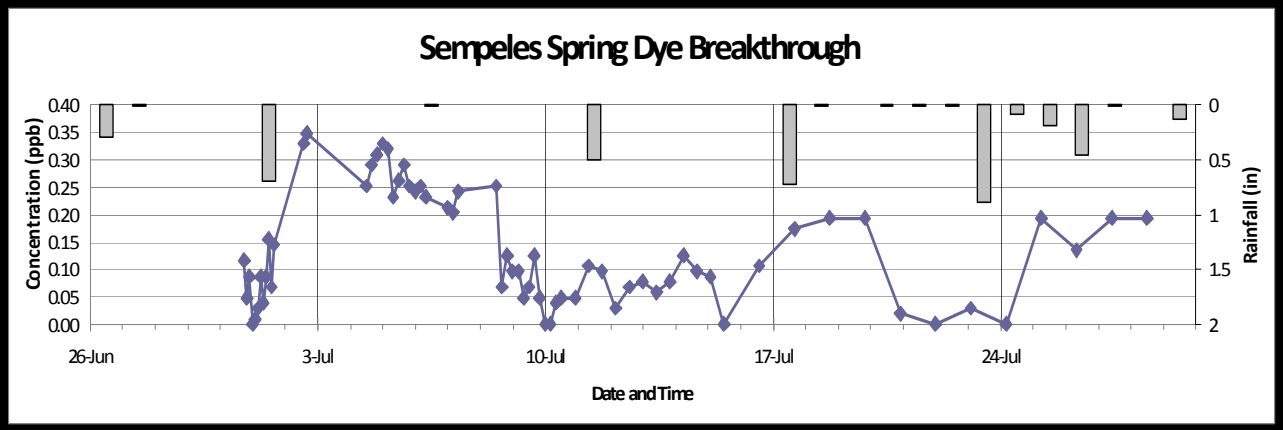
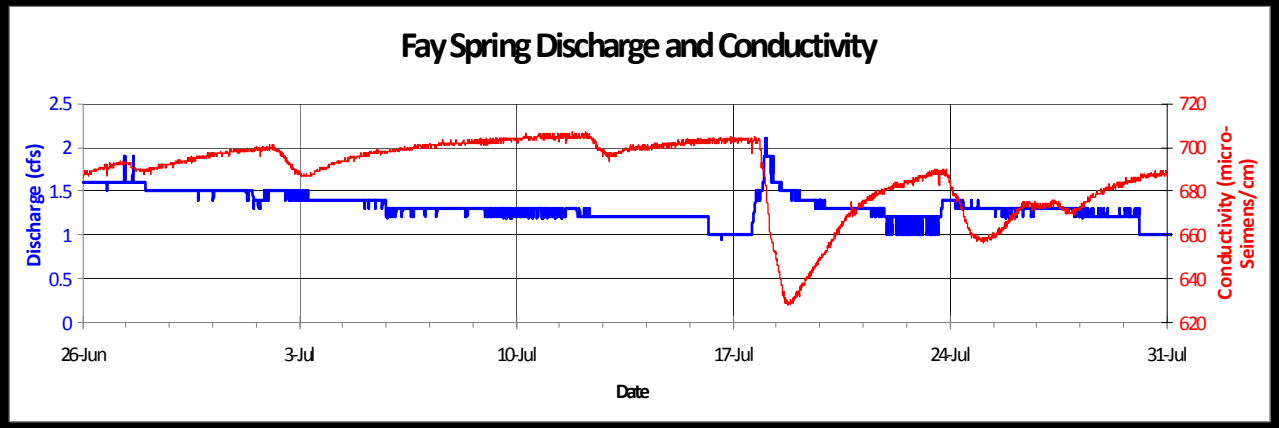
DYE TRACE TO FAY SPRING



Fay Spring, Winchester – Dye Tracing







TOTAL DYE RECOVERED AFTER ONE MONTH:

1.7%

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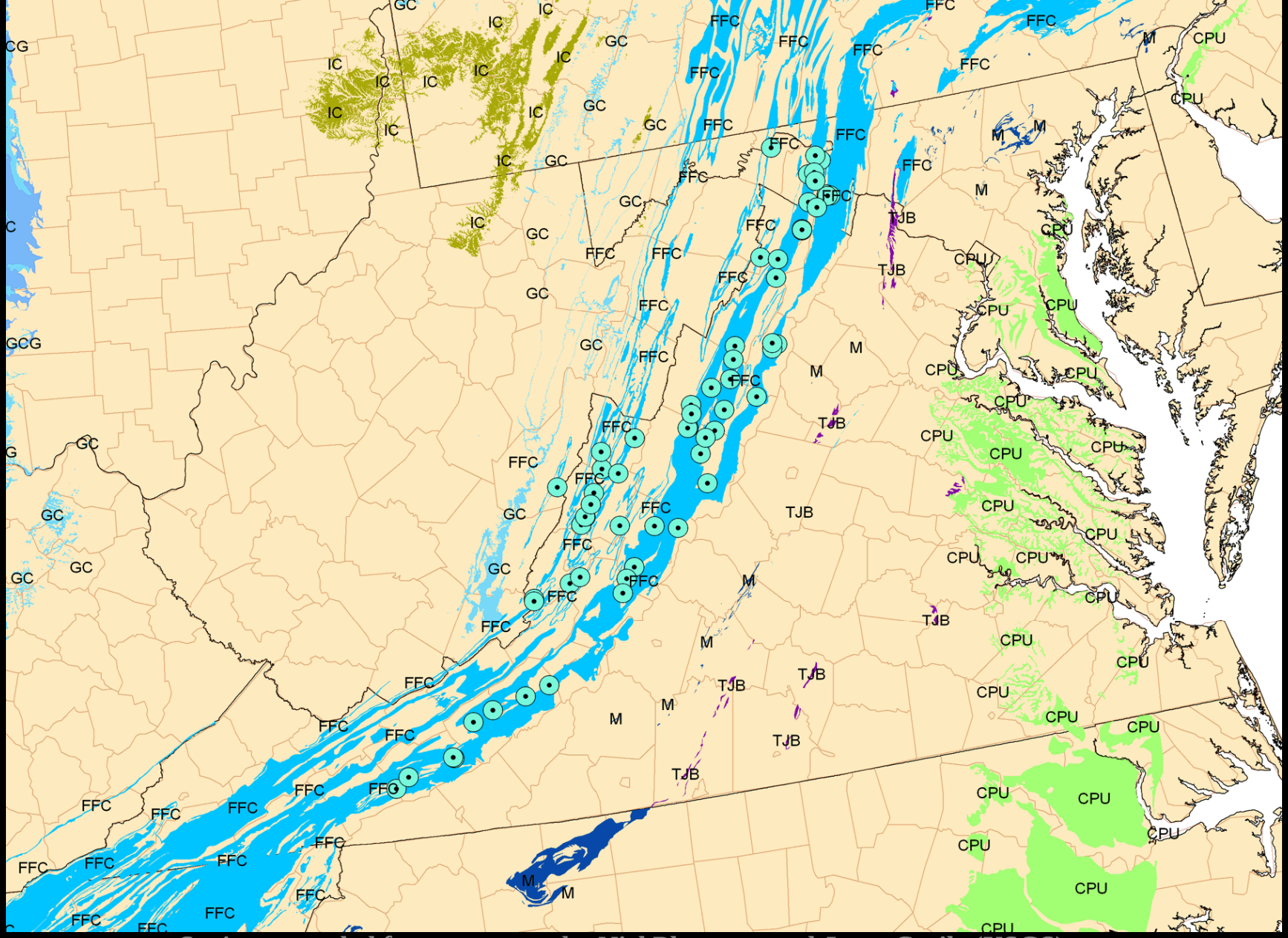

Springs sampled for age tracers by Niel Plummer and Jerry Casile (USGS)

http://pubs.usgs.gov/of/2008/1154/

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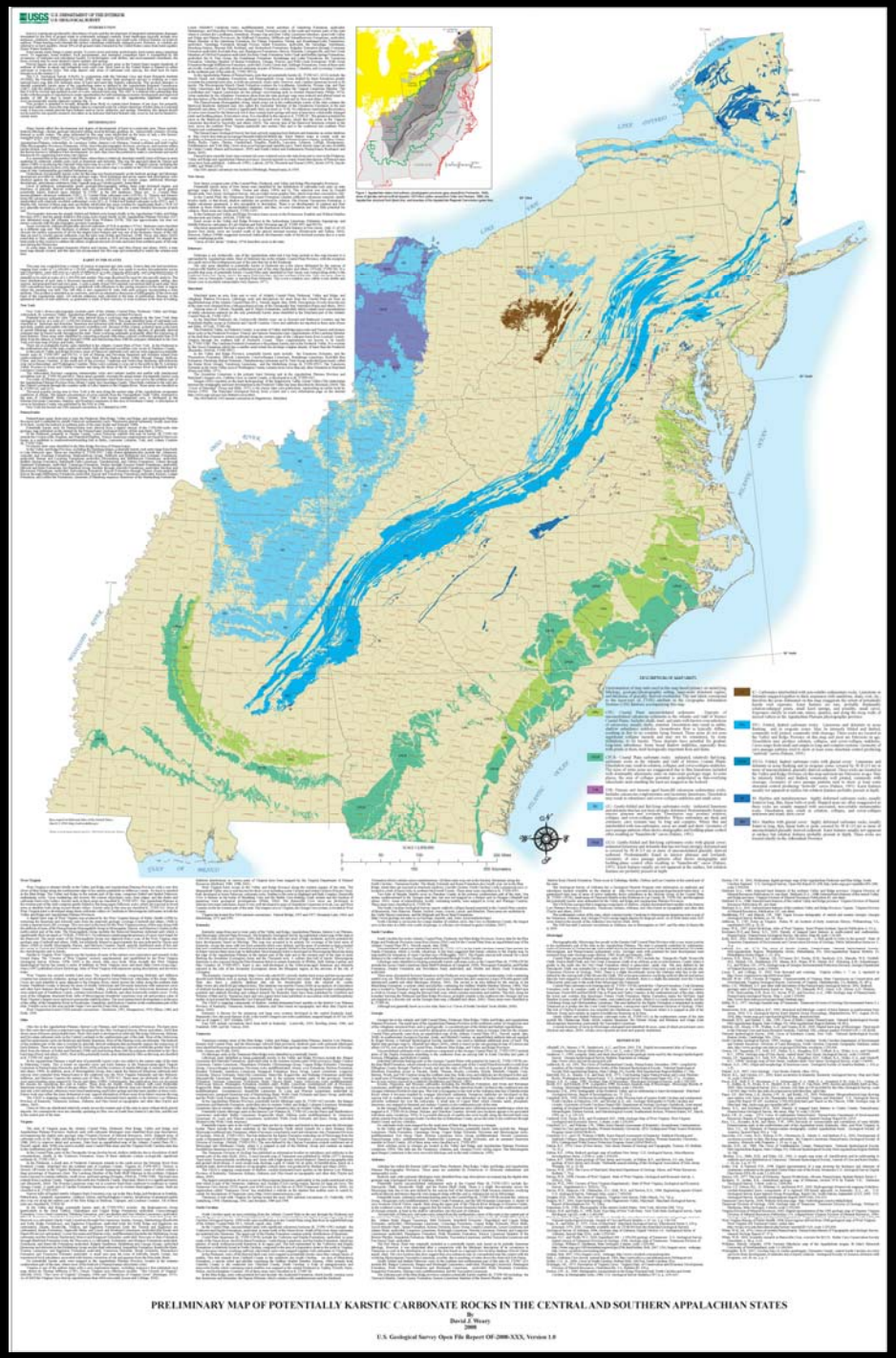

Data compiled at 1:1,000,000

Graphic at 100% prints at 1:2,000,000 scale

http://pubs.usgs.gov/of/2008/1154/

Text includes compilation methodology, description of map units, state-by-state discussion of karst areas in various physiographic provinces and counties, and notes on caving and cave/karst publications

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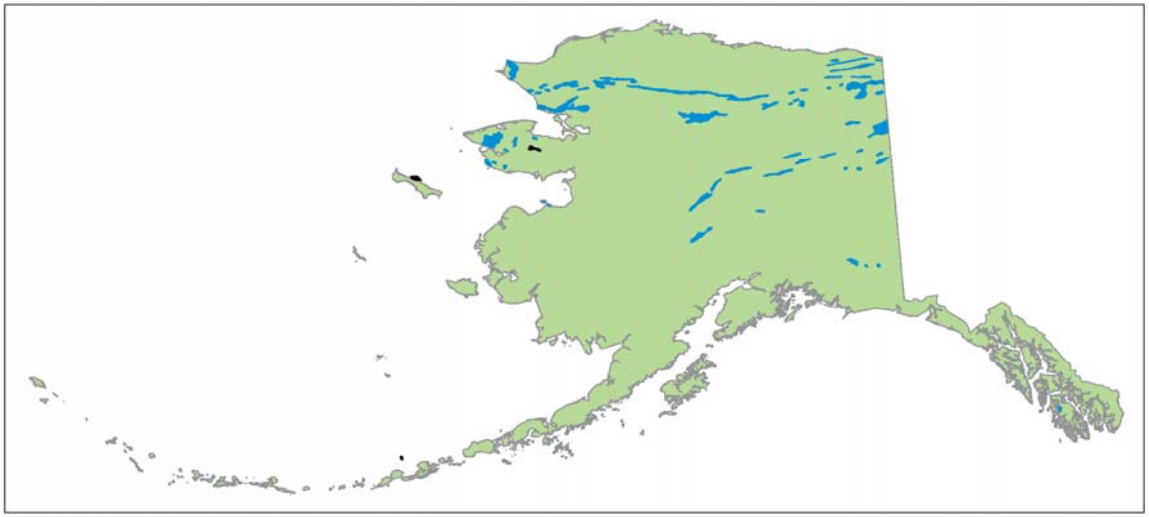
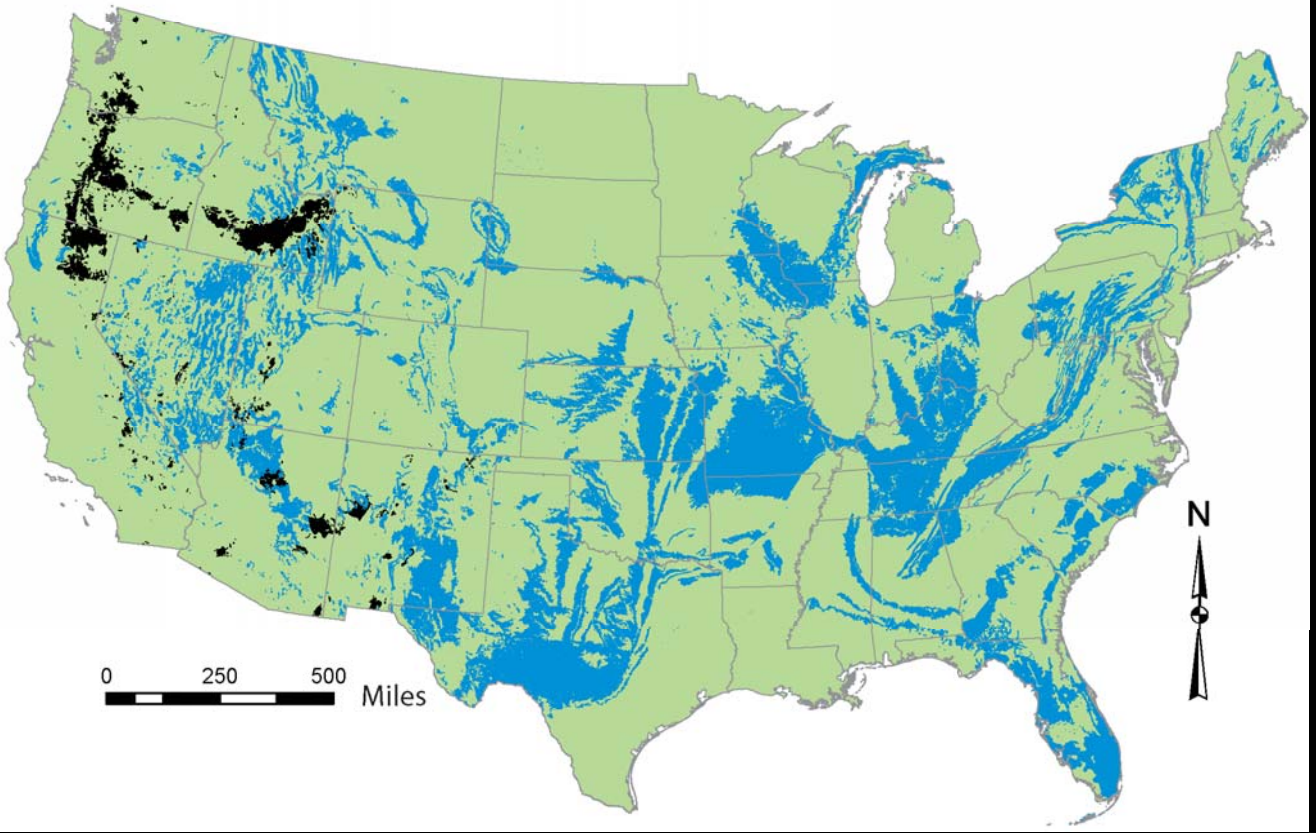


Areas of karst in soluble rocks

Areas of pseudokarst in volcanic rocks



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