GROUNDWATER PROGRAM

Division of Water and Waste Management
West Virginia Department of Environmental Protection

Karst Database Needs

For the lower Shenandoah Valley

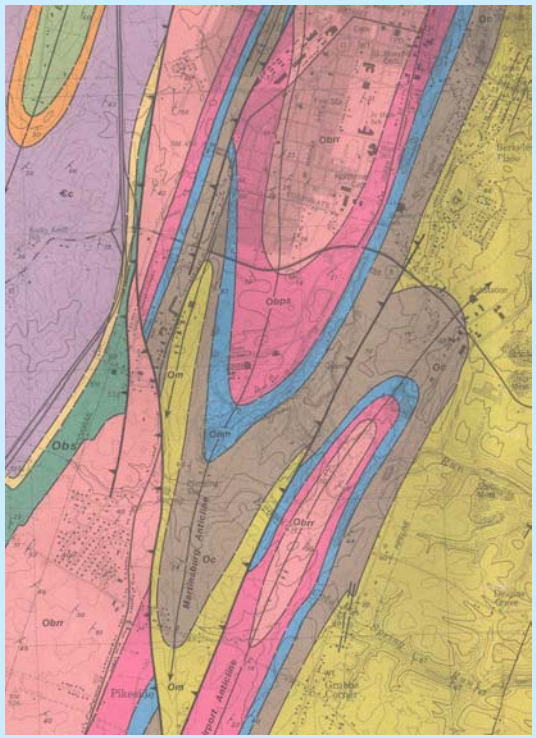
GROUNDWATER PROGRAM KARST OBLIGATIONS

- Underground Injection Control
- Groundwater Protection Plans
- Vulnerable Groundwater Use Areas
- Groundwater Remediation
- Research for other State Agencies
  - (This is a lot of what we do!)

GROUNDWATER PROGRAM RESEARCH TOOLS

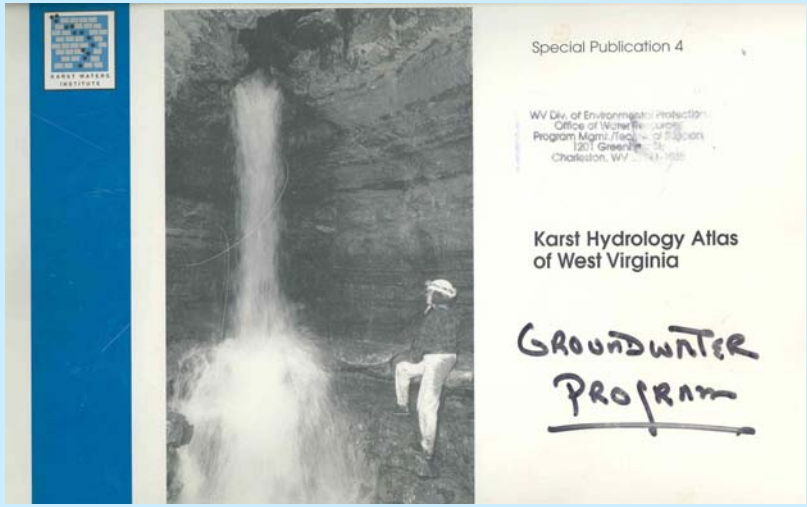
- **WVGS Geological Maps (1987 to present)**
- **W.K. Jones' 1997 *Karst Atlas of WV***
- **1986 *Springs of West Virginia***
- **1984 *Caves of the Eastern Panhandle***
- **1958 *Caverns of West Virginia***
- **In-house Arcview location maps of caves and springs**

WVGES GEOLOGICAL MAPS



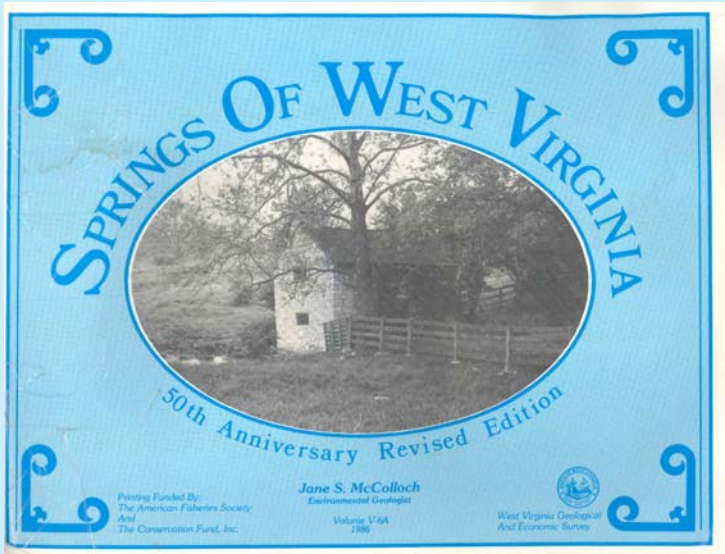
- **Excellent resource** (especially for the complex geology of the lower Shenandoah Valley!)
- **Includes a lot geological detail**
  - Outcrops
  - Structure
  - Faults!
- **Up to date (1987 to present)**
- **Only in paper form at present**

KARST ATLAS OF WEST VIRGINIA



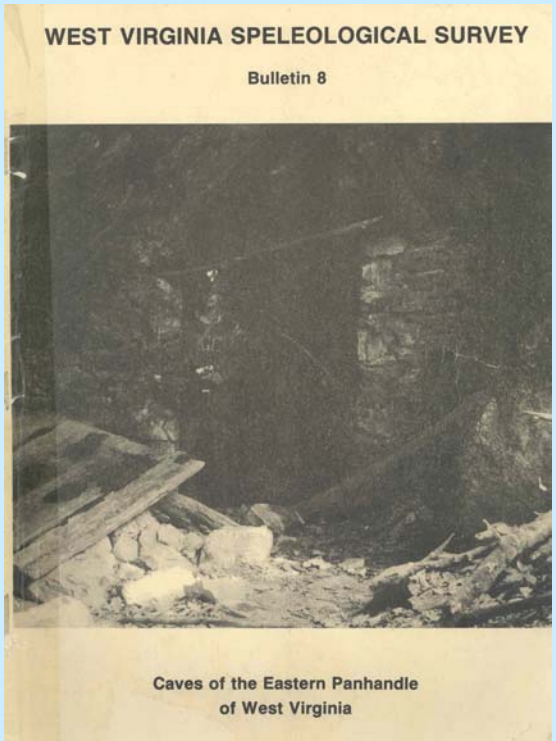
- **Excellent resource**
- **Up to date (1997)**
- **Limited information**
  - **Only six dye traces in Berkeley County**
  - **Only five dye traces in Jefferson County**

SPRINGS OF WEST VIRGINIA



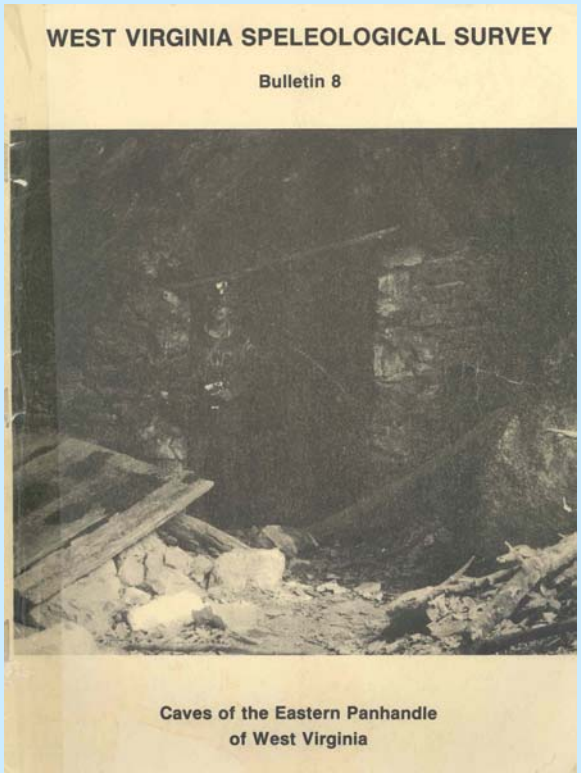
- Fairly up to date (1986)
- Contains location information
  - Some locations are “off”
- Contains geological and hydrological information
- Is it a complete inventory?
  - 40 karst springs in Berkeley
  - 59 karst springs in Jefferson

CAVES OF THE EASTERN PANHANDLE



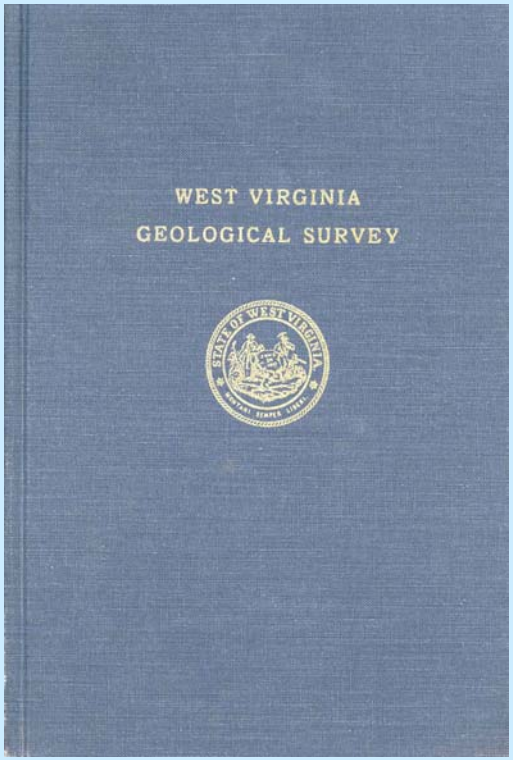
- Fairly up to date (1986)
- Contains maps and text descriptions
- Contains geological information
- Contains some spring information
- Contains cave locations
  - Some locations are “off,” and are not to one datum

CAVES OF THE EASTERN PANHANDLE



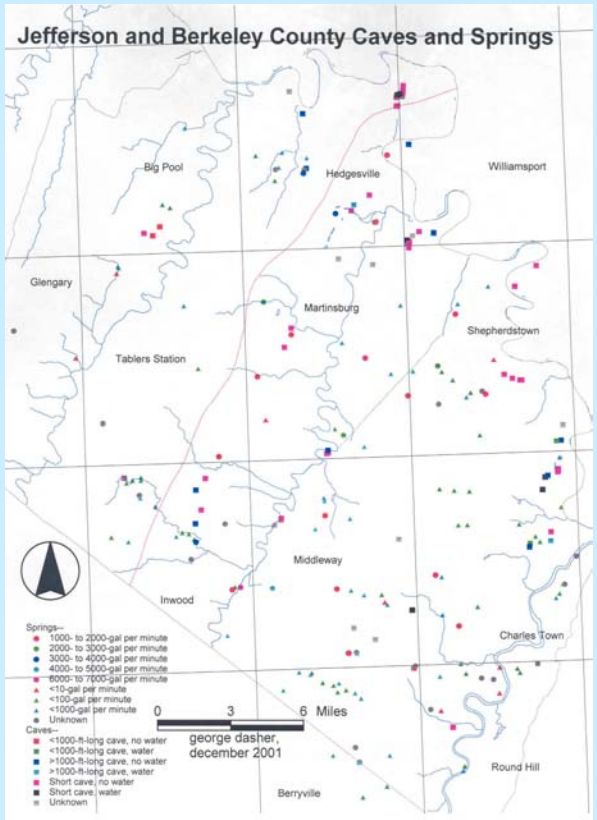
- Not that many caves
  - 42 known caves in Jefferson County
  - 48 known caves in Berkeley County
- Most are short and not of hydrological interest
- Copyrighted data!

CAVERNS OF WEST VIRGINIA



- **Very out of date! (1958!)**
- **Most of the information is also in the *Caves of the Eastern Panhandle***
- **Contains maps and text descriptions**
- **Contains geological information**
- **Contains cave locations**
  - **Many of which are “off”**

IN-HOUSE ARCVIEW LOCATION MAPS



- **Quick location maps showing springs and caves**
- **The data is from:**
  - ***Springs of West Virginia***
  - ***Caves of the Eastern Panhandle***
- **This is really a very basic set of location maps**
  - **Just colored dots on maps**
  - **But it does the job!**

Where to go with a comprehensive database?

Or what the Groundwater Program best needs?

Perhaps Something Like the Kentucky Geological Survey Dye-Tracing Maps

- Are in “paper” format
- Show large areas
- Show individual dye traces
  - With individual sinks and resurgences
- Shows karst basins
  - If that is possible
- Cave information is not that critical

But the disadvantages…

- The Kentucky System works well with...
  - Conduit-dominant karst aquifers
  - Converging water flows
  - (Broad, high plateau)
  - (Relatively horizontal strata)
- It may not work as well with…
  - Diffuse-flow karst aquifers
  - Diverging water flows
  - (A valley with a more consistent relief)
  - (Vertical or steeply dipping strata)