



west virginia department of environmental protection



**2009 Annual Report  
to the  
Joint Legislative Oversight Commission  
on State Water Resources**



**IMPLEMENTATION PROGRESS:  
WEST VIRGINIA WATER RESOURCES PROTECTION  
AND MANAGEMENT ACT**

**Prepared by**

**The Department of Environmental Protection**

**Division of Water and Waste Management**

**Water Use Section**

**November 17, 2009**

# TOPICS



- Large Quantity User Certification
- Data acquisition
- Logging Wells
- New groundwater monitoring wells
- Marcellus shale hydrofracturing
- Water withdrawal guidance
- Stimulus money
- Watershed meetings

# 2008 CERTIFICATION



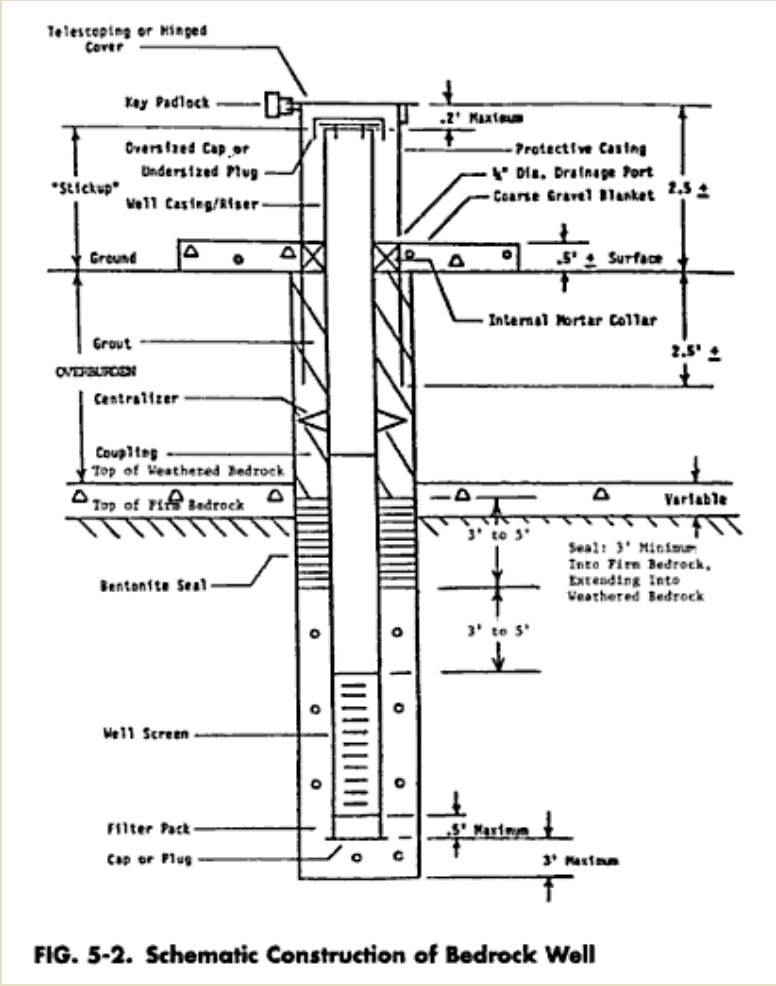
- Certification was conducted in May and June of 2009
- 432 facilities responded
- Total increase of 4 facilities since the 2005 survey
- Total average water use:
  - 2.75 trillion gallons surface water
  - 34.6 billion gallons ground water
- Next certification January – February, 2010

# DATA ACQUISITION



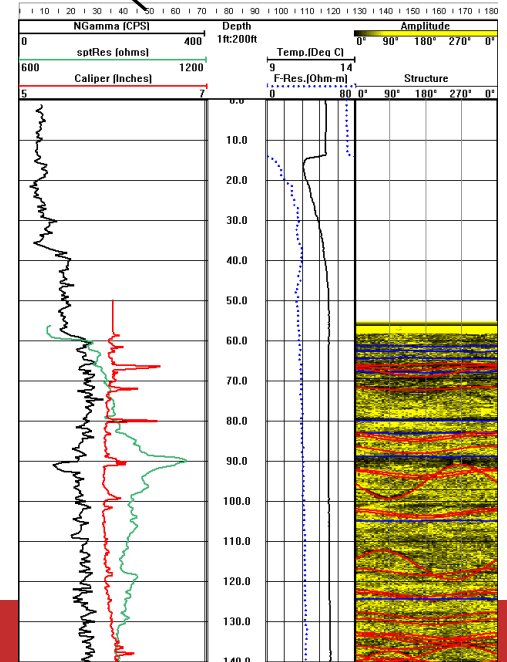
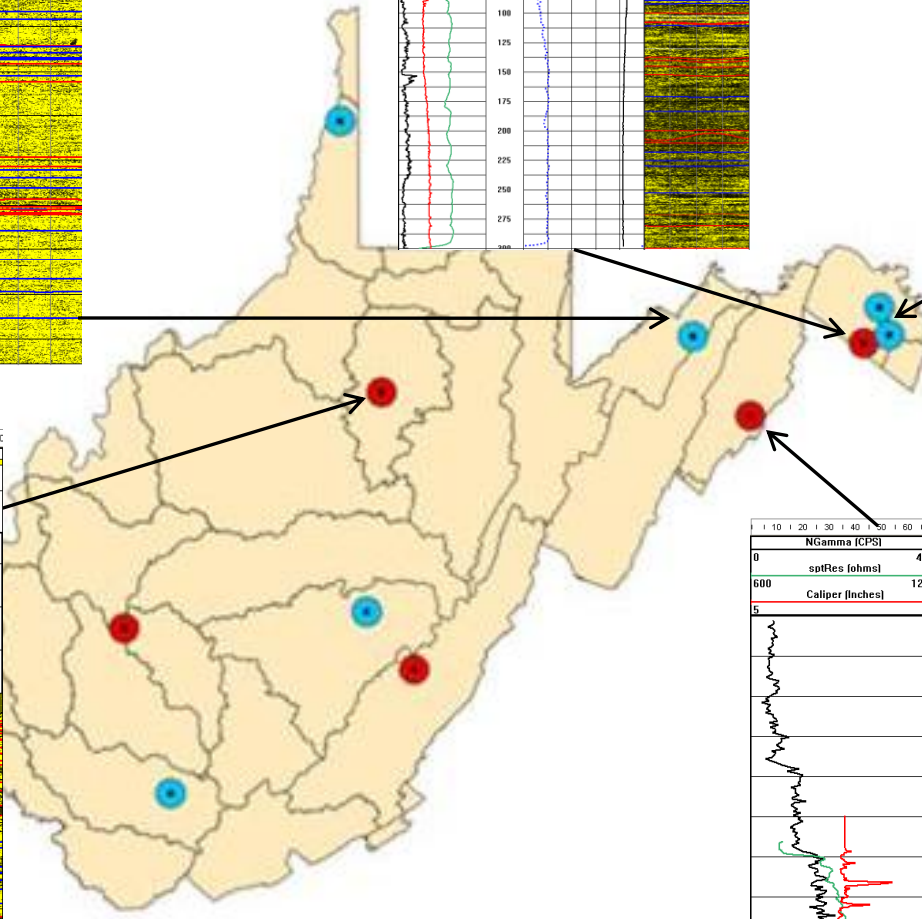
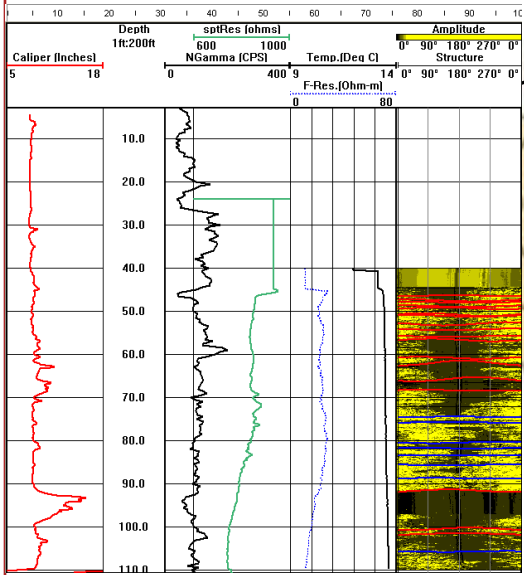
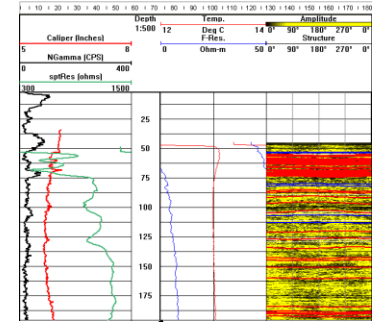
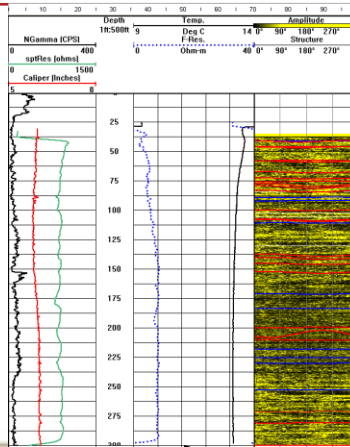
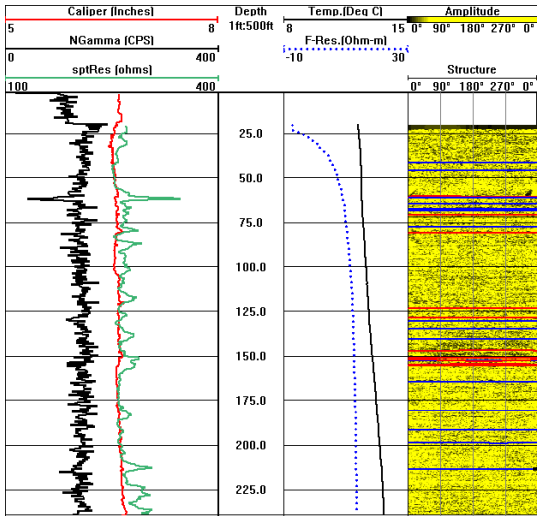
- Assess current data
- Wetlands
- NPDES outlets
- Land cover
- Public lands locations
- Soil drainage types
- Impervious surfaces
- Surface geology
- Abandoned mine lands
- Remediation sites
- Combined sewer overflows
- Large quantity users
- Source water assessment areas
- 303D Impaired streams
- TMDL Streams
  - Bio
  - Iron
  - Manganese
  - pH
- Category 1 streams
- Average annual temperature
- Average annual precipitation

# WELL LOGGING



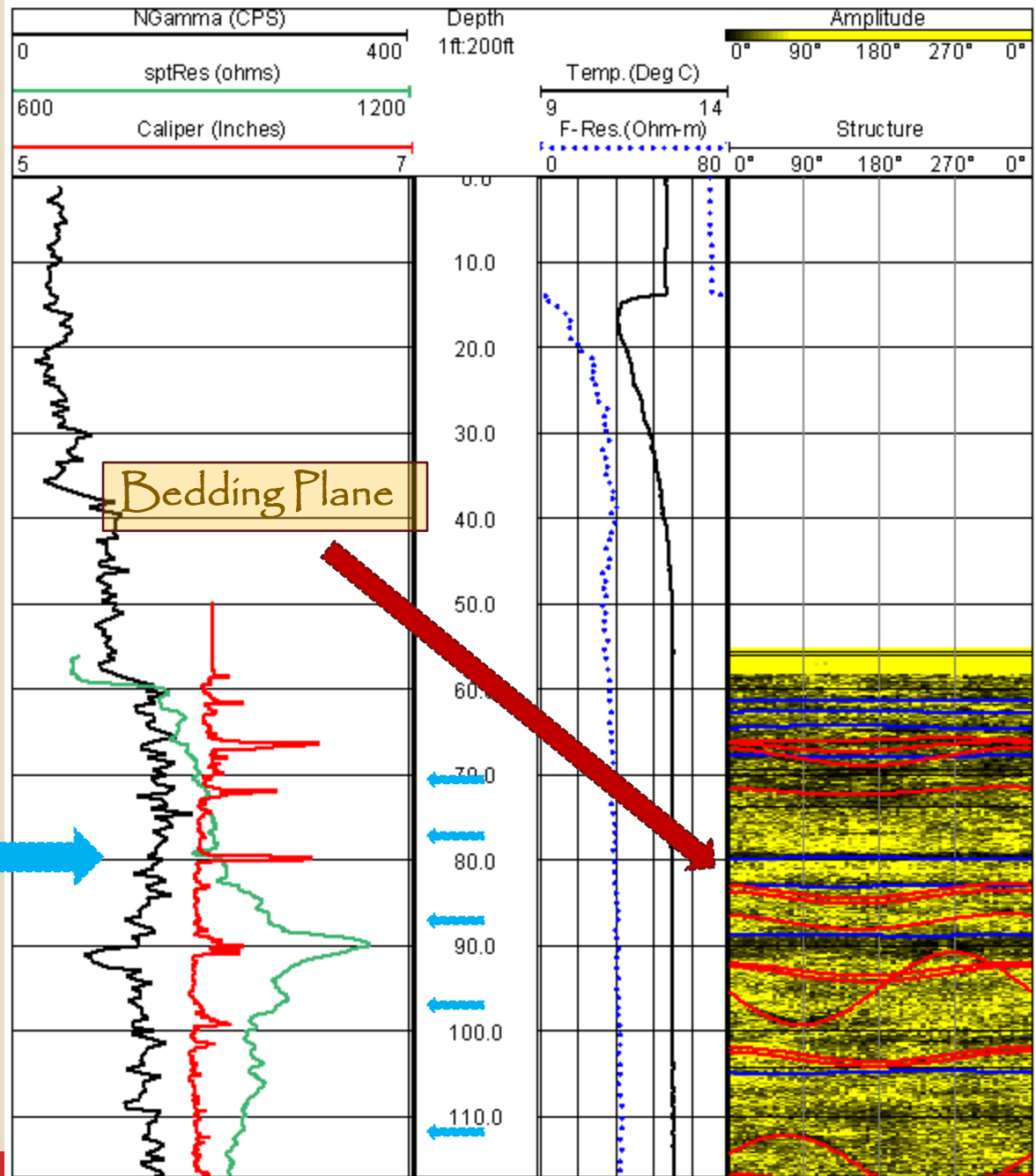
**FIG. 5-2. Schematic Construction of Bedrock Well**







# Borehole Geophysical Logs for Hrd-0301



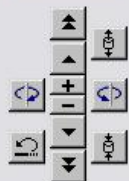
Major source of flow into the borehole

Display

- 0° Marker
- Depth Marker
- Nominal Radii
- Pipe
- Grid
- Max/Min Value
- Finger Data
- Statistics
- Legend
- Halve Core
- Cross Section

Core Settings

Statistics



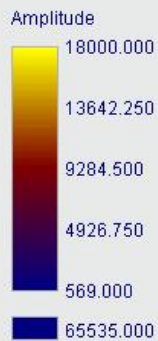
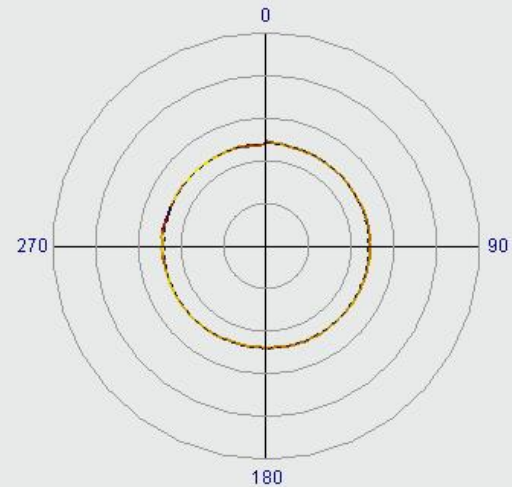
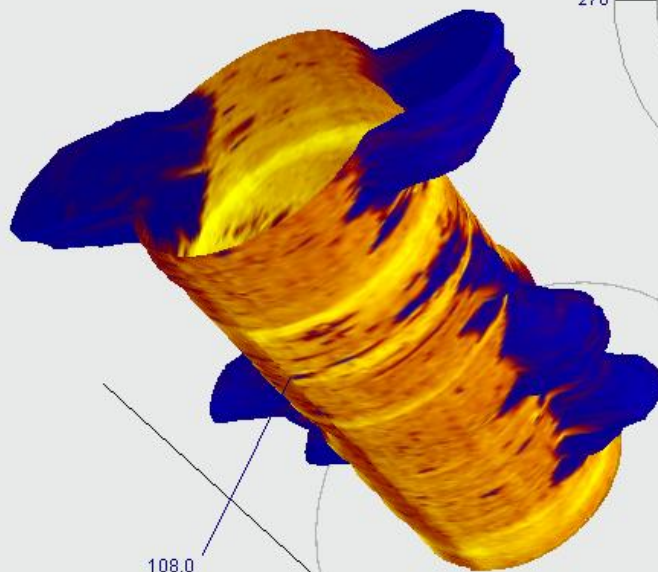
Top Depth :

107.3 [m]

Bottom Depth :

108.3 [m]

Top depth: 107.3 [m]  
Caliper - max: 104.862 mm  
Caliper - ave: 104.442 mm



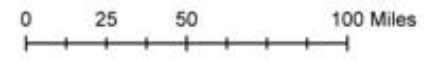
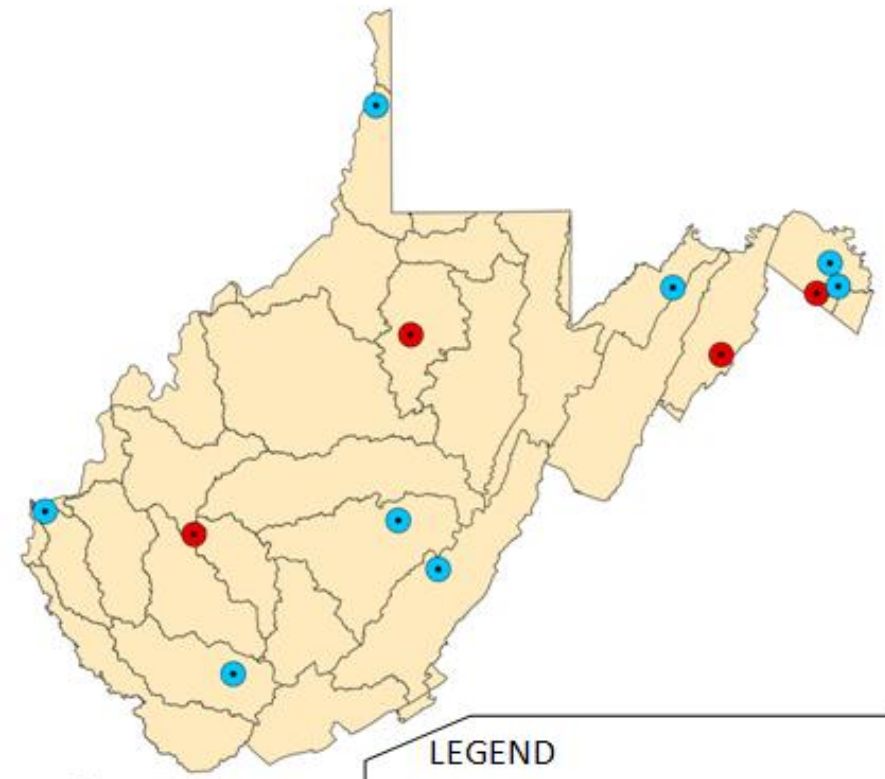
108.0  
107.5



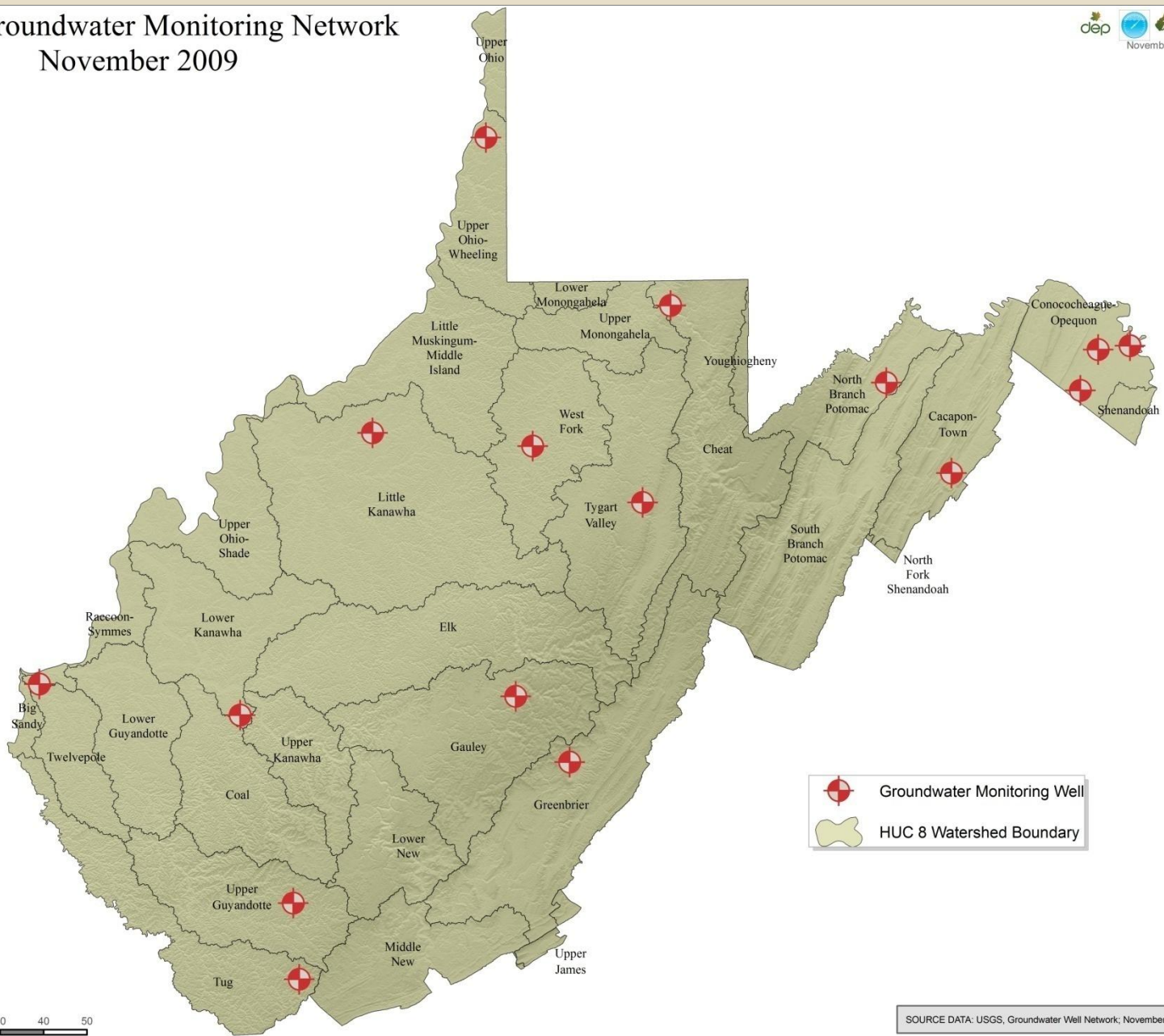
# 2008 Ground Water Monitoring Well Network

As reported in the 2008 annual report.

### Ground Water Monitoring Wells as of October 2008



# Current Groundwater Monitoring Network November 2009

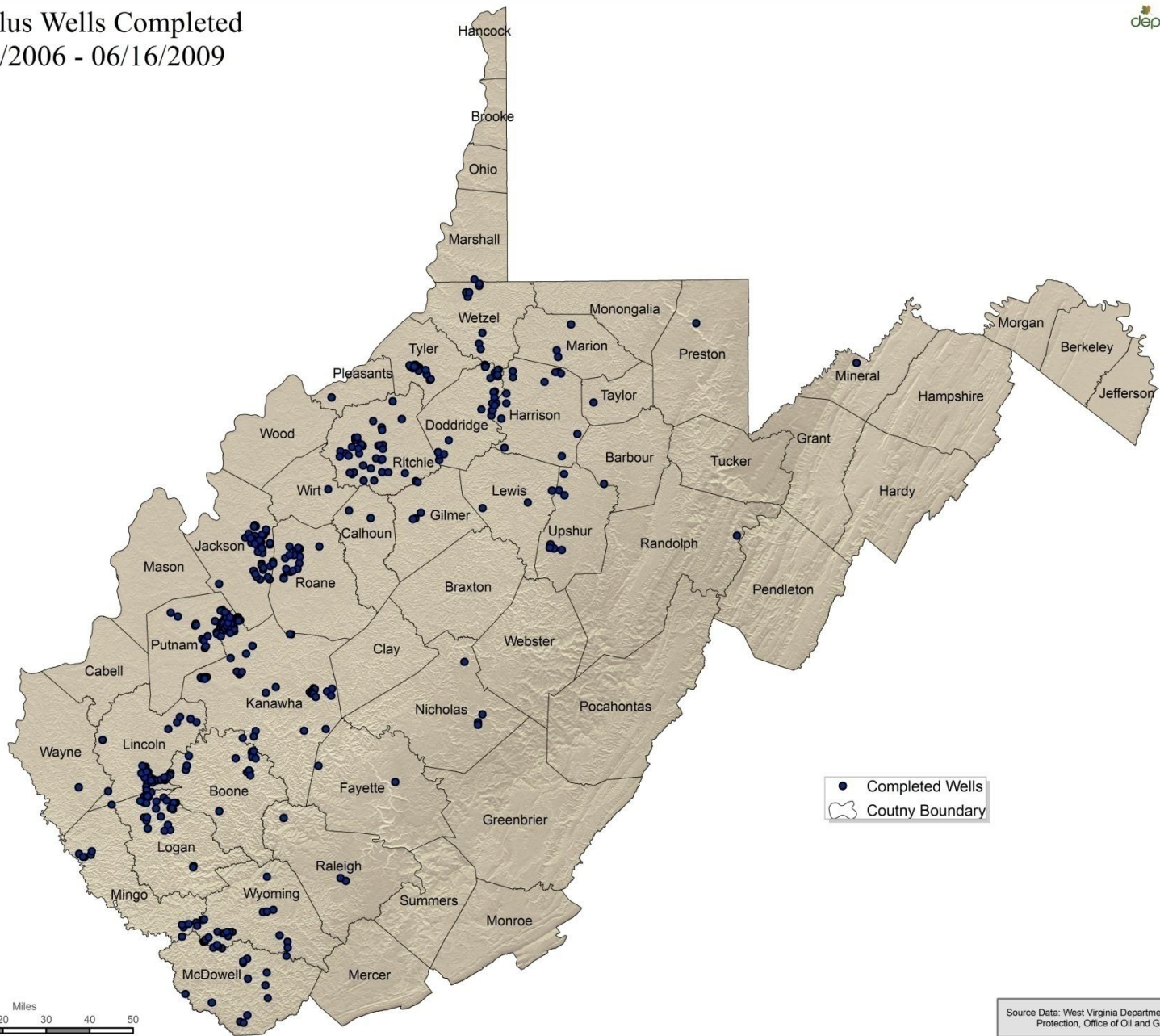


SOURCE DATA: USGS, Groundwater Well Network; November 2009.



# Marcellus Wells Completed

07/15/2006 - 06/16/2009



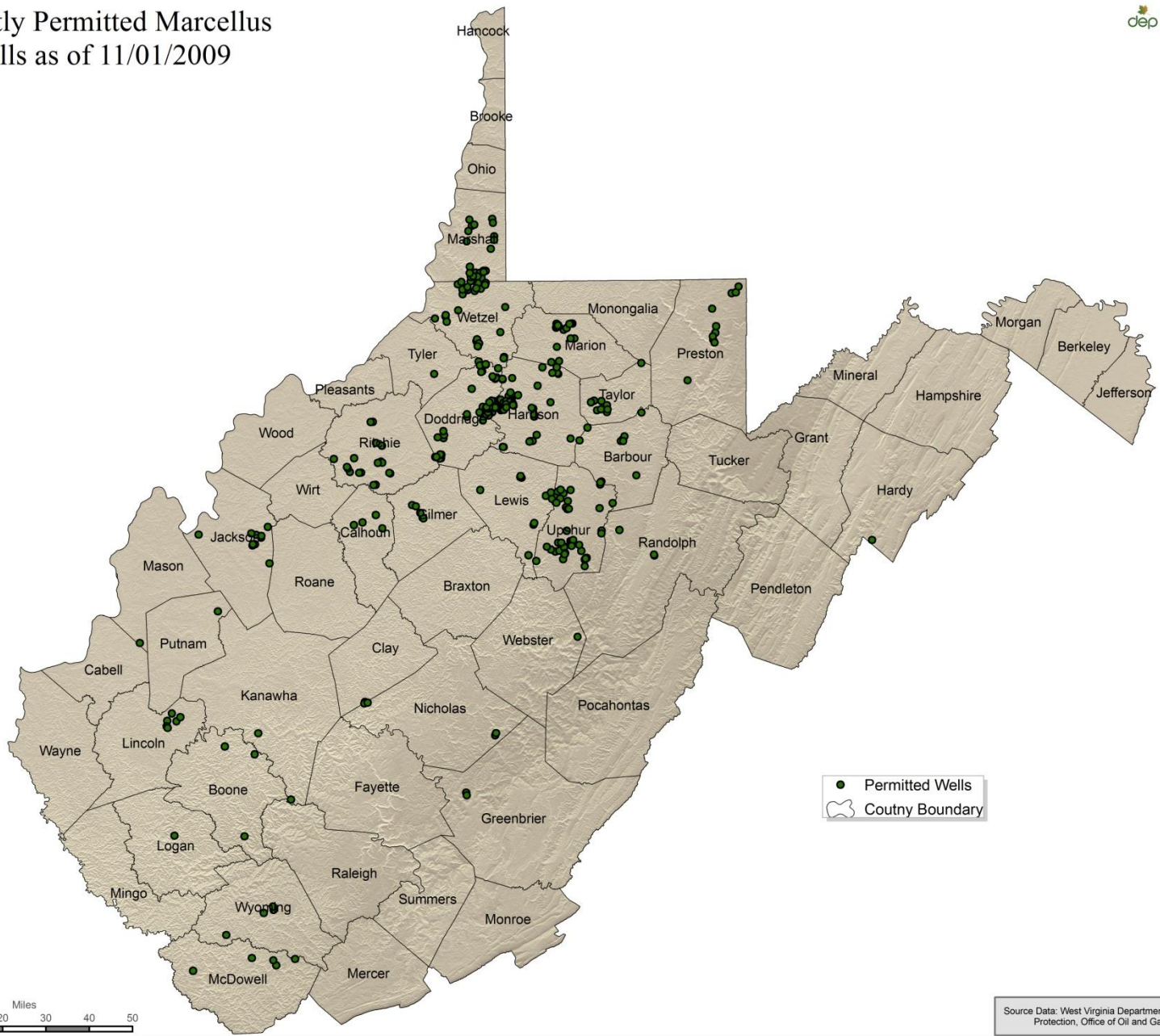
Source Data: West Virginia Department of Environmental Protection, Office of Oil and Gas, November 2009.

# MARCELLUS SHALE HYDROFRACTURING



- Meeting held October 1, 2008
- October – November 2008 Survey – conducted by WVONGA/IOGA
- July 2009 Alpha test of reporting software
- October 2009 Beta test of reporting software by petroleum companies

# Currently Permitted Marcellus Wells as of 11/01/2009





# MARCELLUS SHALE HYDROFRACTURING

## (Continued)



- Reporting form requires:
  - Company information
  - Withdrawal locations
  - Withdrawal amounts
  - Holding pond locations
  - Amount used for frac in each well
  - Where blowback was disposed
  - Amount of disposal
  - Amount of recycled fluids (if any)

[Logout](#) Test005

**Company Information**

Company Name:   
Address:   
City:   
State:   
Zip:

**Company Contact Person Information**

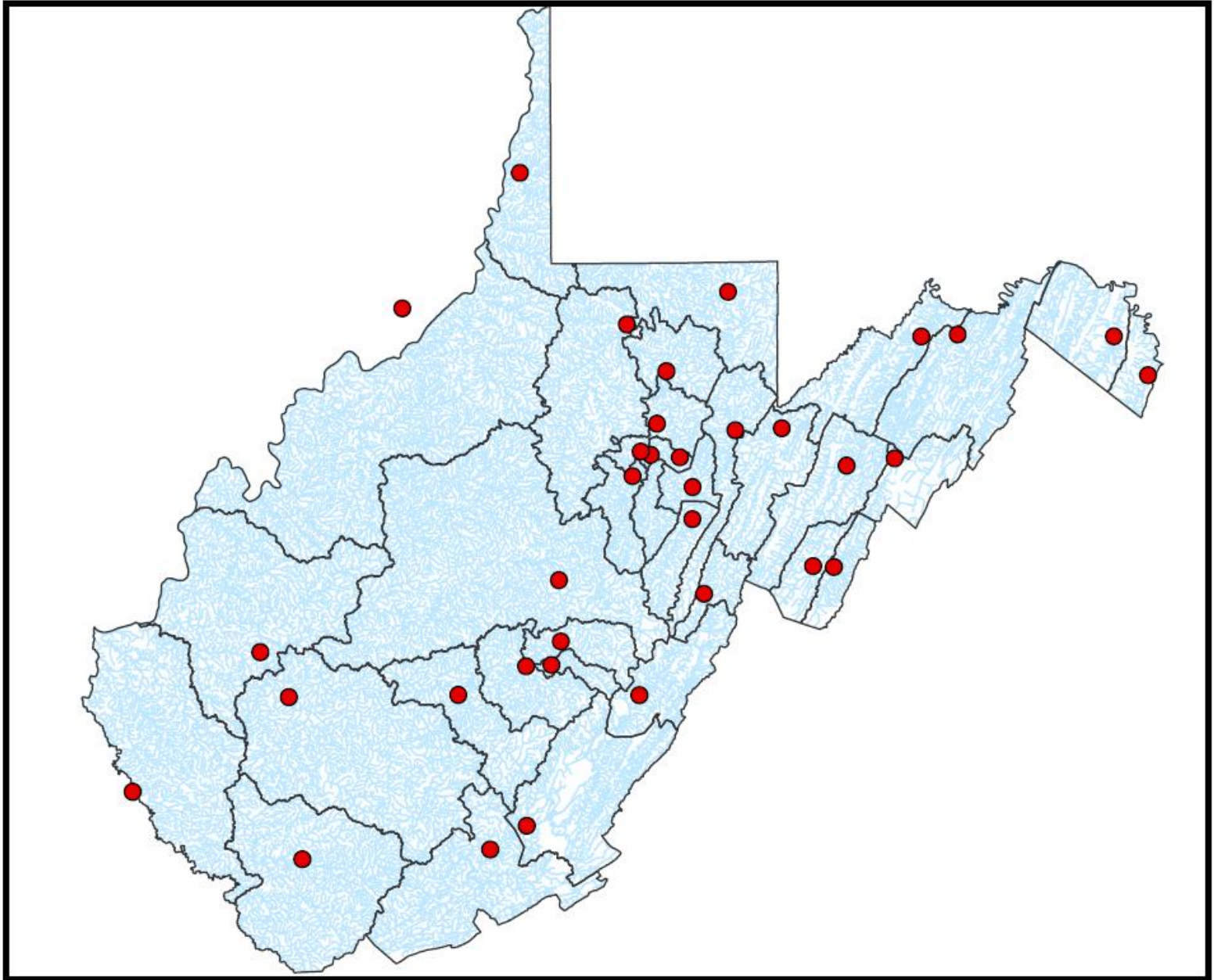
Last Name:   
First Name:   
Middle Initial:   
Title:   
Telephone Number:   
*format: xxx-xxx-xxxx*  
Telephone Ext. :   
Fax Number:   
*format: xxx-xxx-xxxx*  
E-mail Address:   
Confirm Email Address:

Save company and contact information.

# WATER WITHDRAWAL GUIDANCE



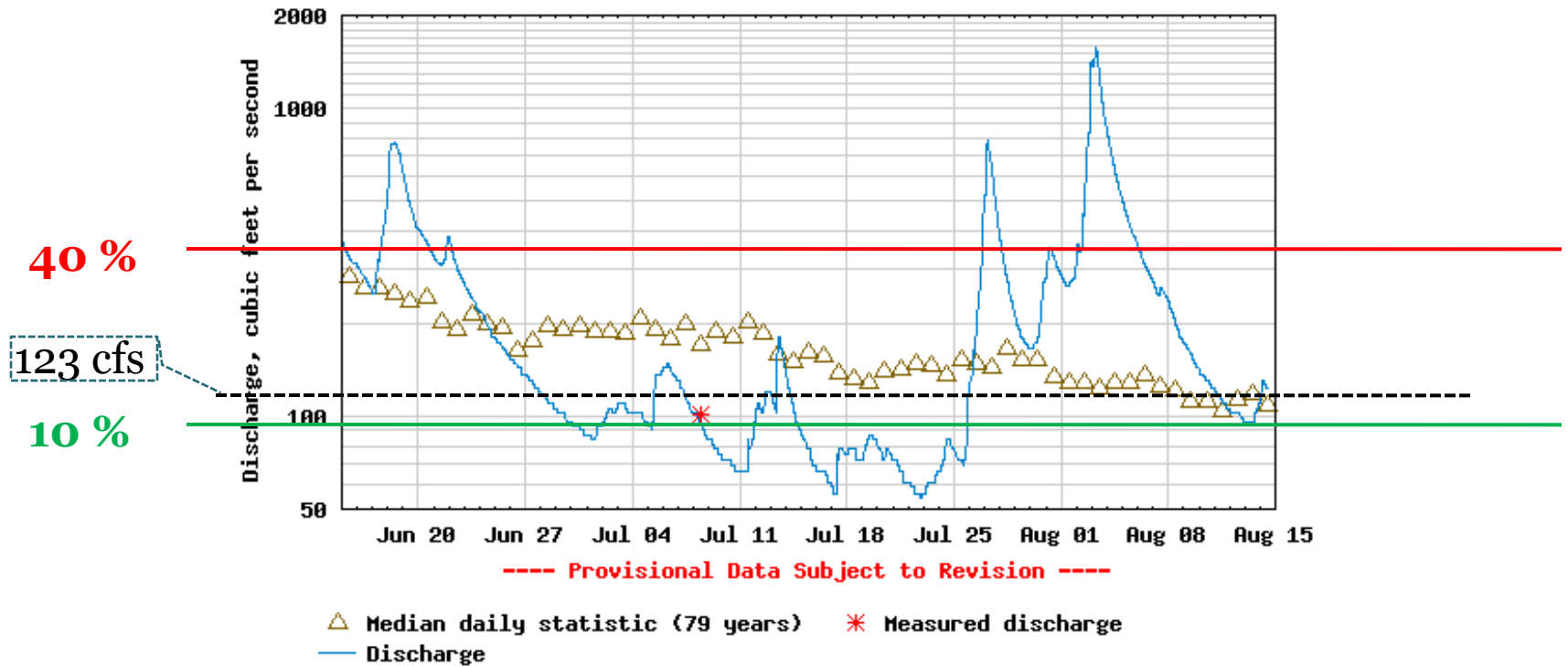
- No regulations governing the quantity of water withdrawn from streams
- Some complaints about water withdrawals associated with petroleum companies
- Addendum developed for Oil and Gas Drilling Permits
- Water withdrawal guidelines developed based on flow



# Discharge, cubic feet per second

Most recent instantaneous value: 123 08-14-2009 12:00

USGS 03182500 GREENBRIER RIVER AT BUCKEYE, WV



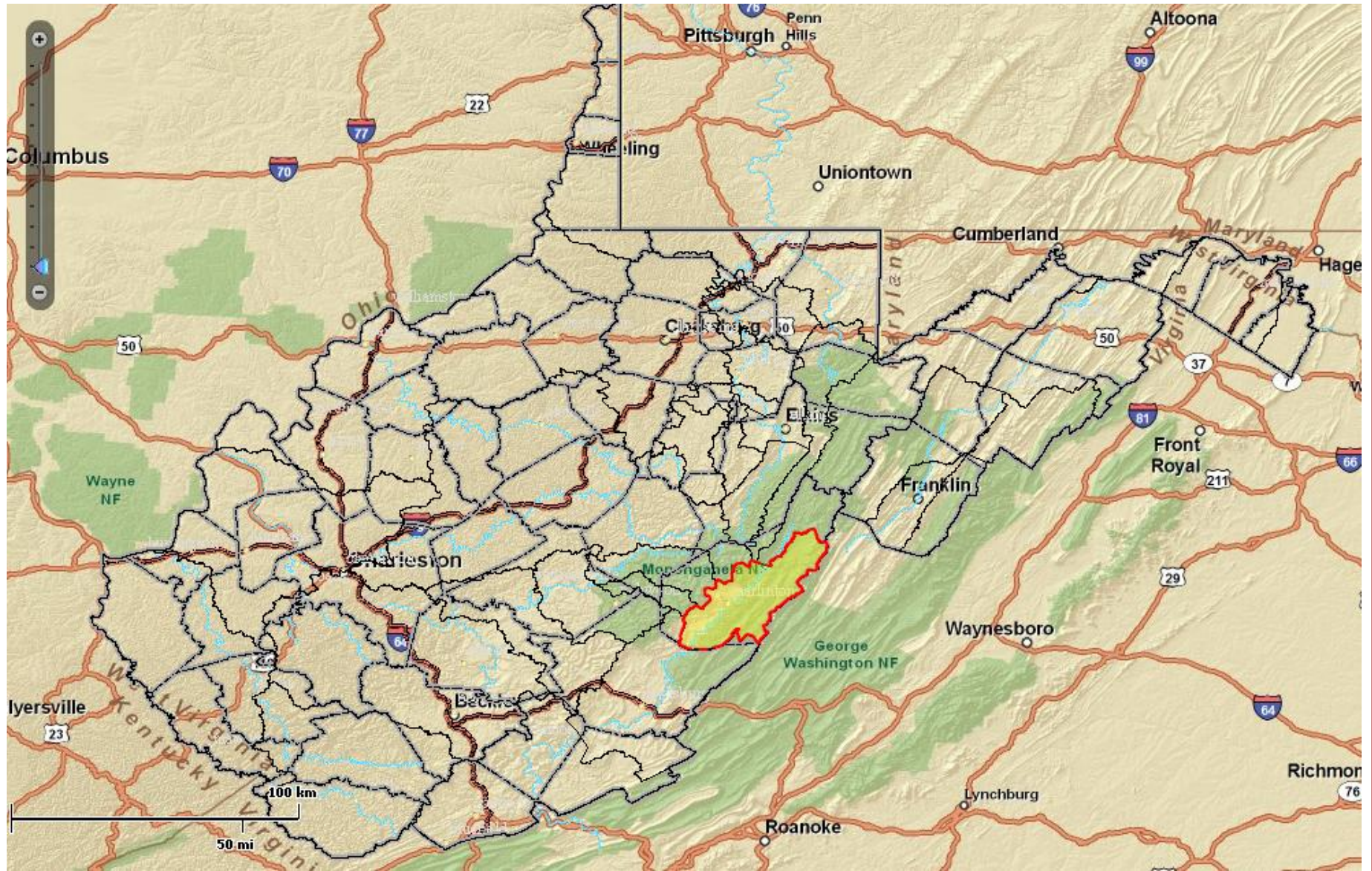
[Create presentation-quality graph](#)

Parameter 00060; DD 01

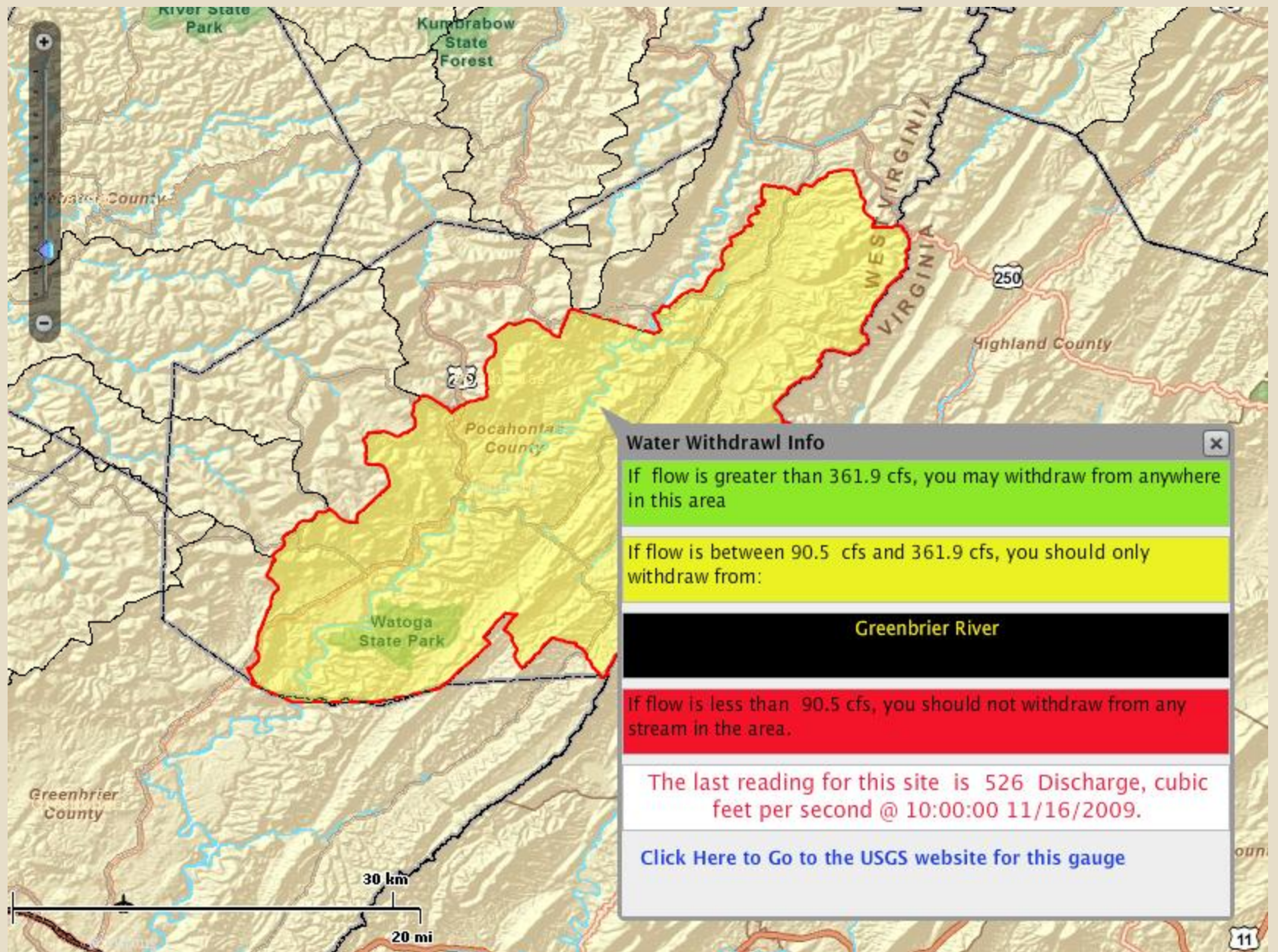
Daily discharge statistics, in cfs, for Aug 14 based on 79 years of record [more](#)

Min (1934)	20th percentile	Median	Most Recent Instantaneous Value	80th percentile	Mean	Max (1984)
14	56	109	123	293	458	11900











# AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009



- Provided funds under Section 604(b) of the Clean Water Act for water quality management
- DEP was able to secure grants for:
  - Compilation of a mine pool atlas
  - Four training sessions on water management science for county and regional development council representatives
  - Support for Pocahontas County's Water Resources Task Force (through the Region 4 Planning and Development Council)

# AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

(CONTINUED)



- Mine pool atlas (West Virginia Geological and Economic Survey)
  - Map abandoned mines, including thickness
  - Determine quantity of water based on volumetric calculations
  - Use GIS to determine which public water supply wells penetrate the mine pool
  - Compile quality data from pws wells that penetrate a pool
  - Completion time of one year

# AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (CONTINUED)



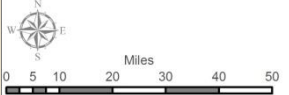
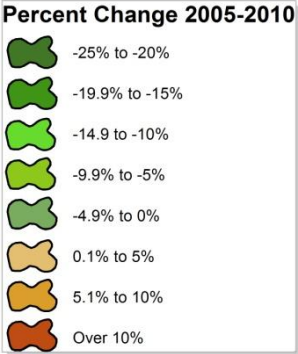
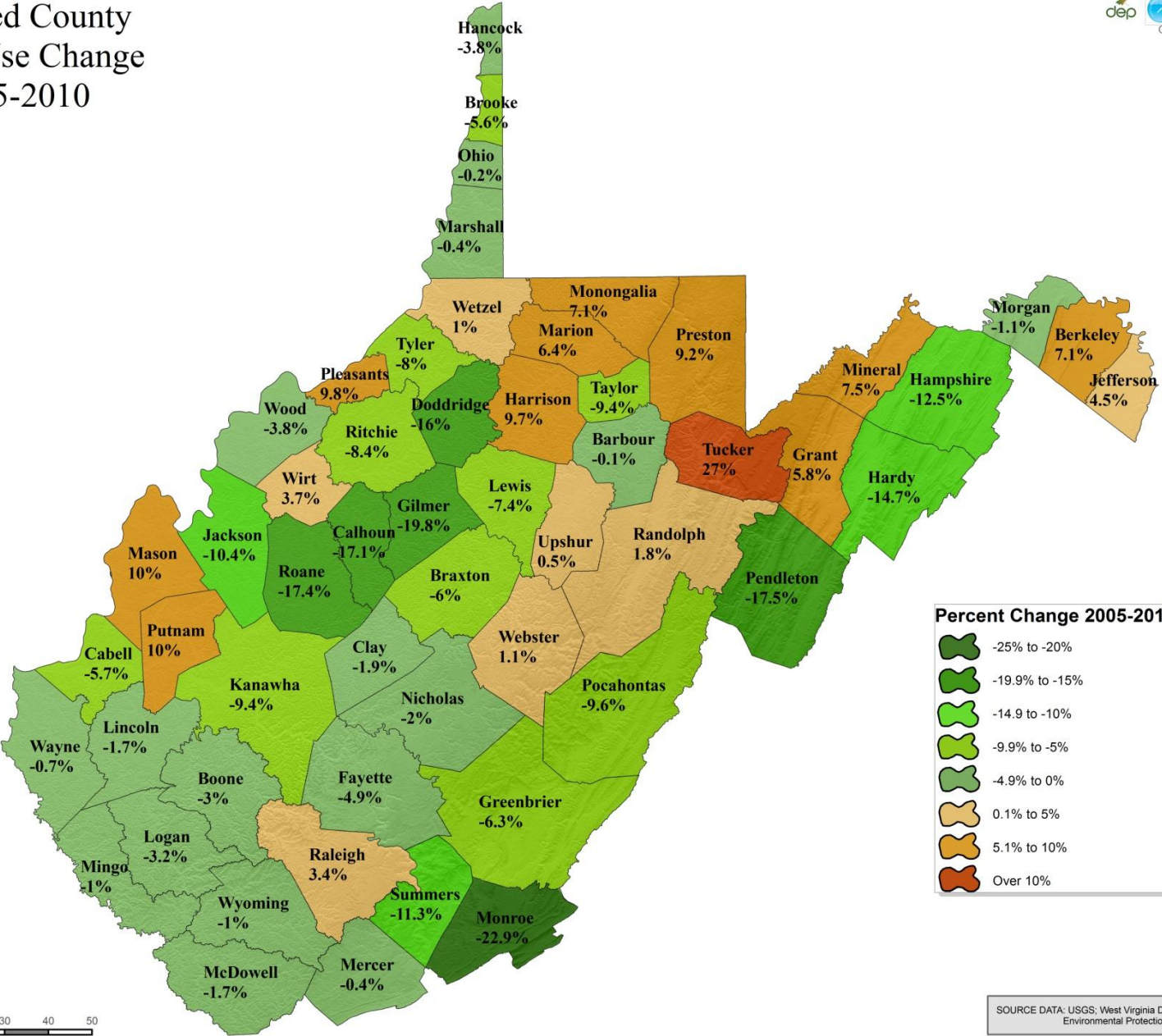
- Water management training (Interstate Commission on the Potomac River Basin)
  - Four classes for county commissioners and Regional Development Commission members
- Pocahontas County Water Resources Task Force
  - Money to support VISTA volunteer (travel)
  - Purchase GIS software

# STATE PLAN: WATERSHED MEETINGS



- We have chosen to develop the plan in volumes.
- One volume will be for general data applied to the entire state.
- There will be approximately 32 watershed volumes.
- An executive summary will highlight proposed legislation (if any).
- The plan will be available for download from the web.

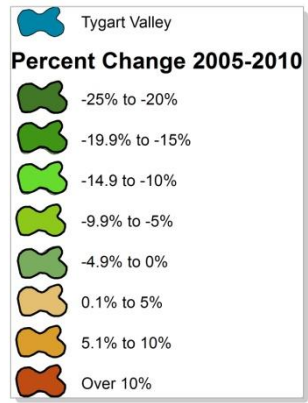
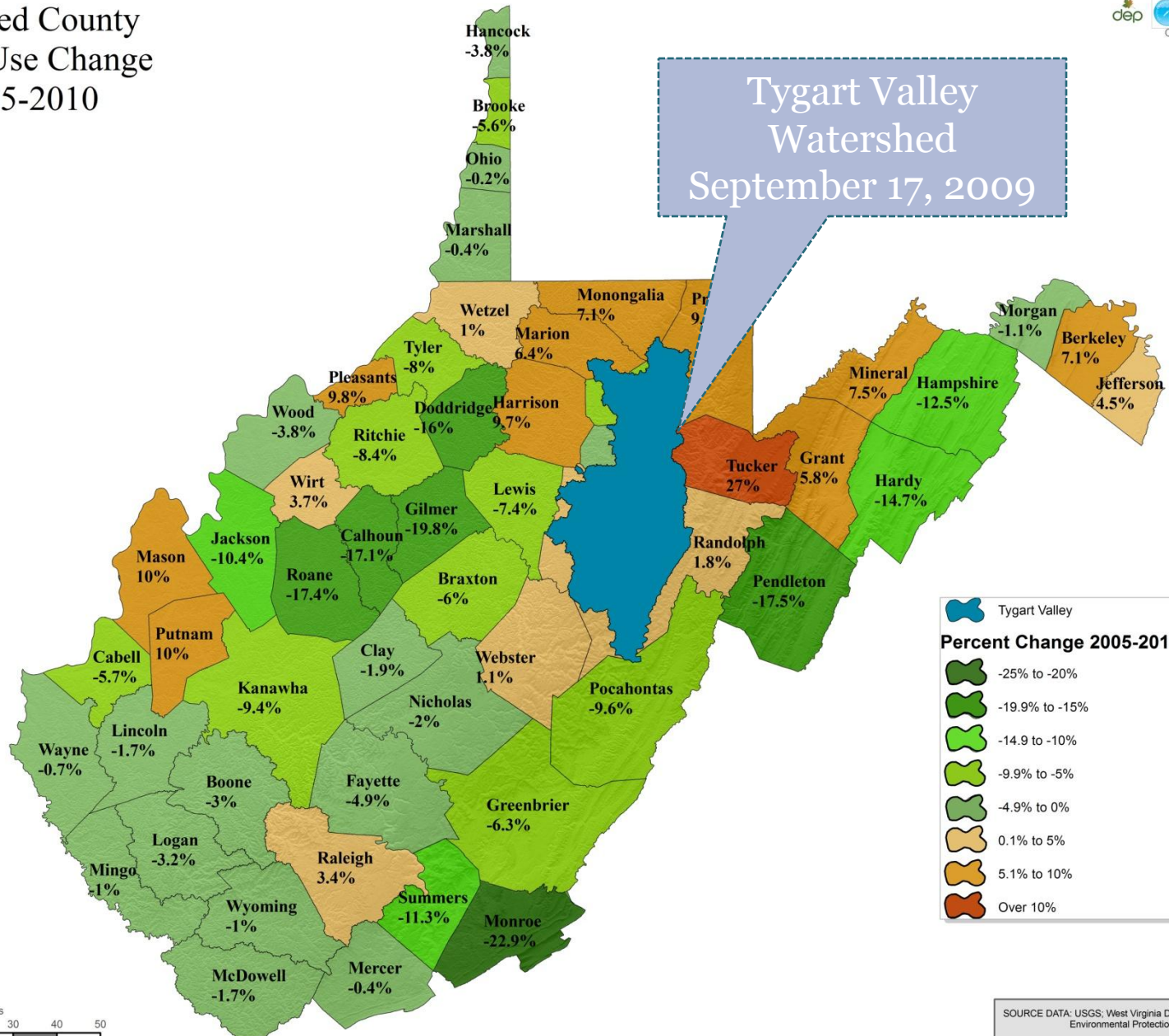
# Projected County Water Use Change 2005-2010



SOURCE DATA: USGS; West Virginia Department of Environmental Protection, June 2005.

# Projected County Water Use Change 2005-2010

Tygart Valley Watershed  
September 17, 2009



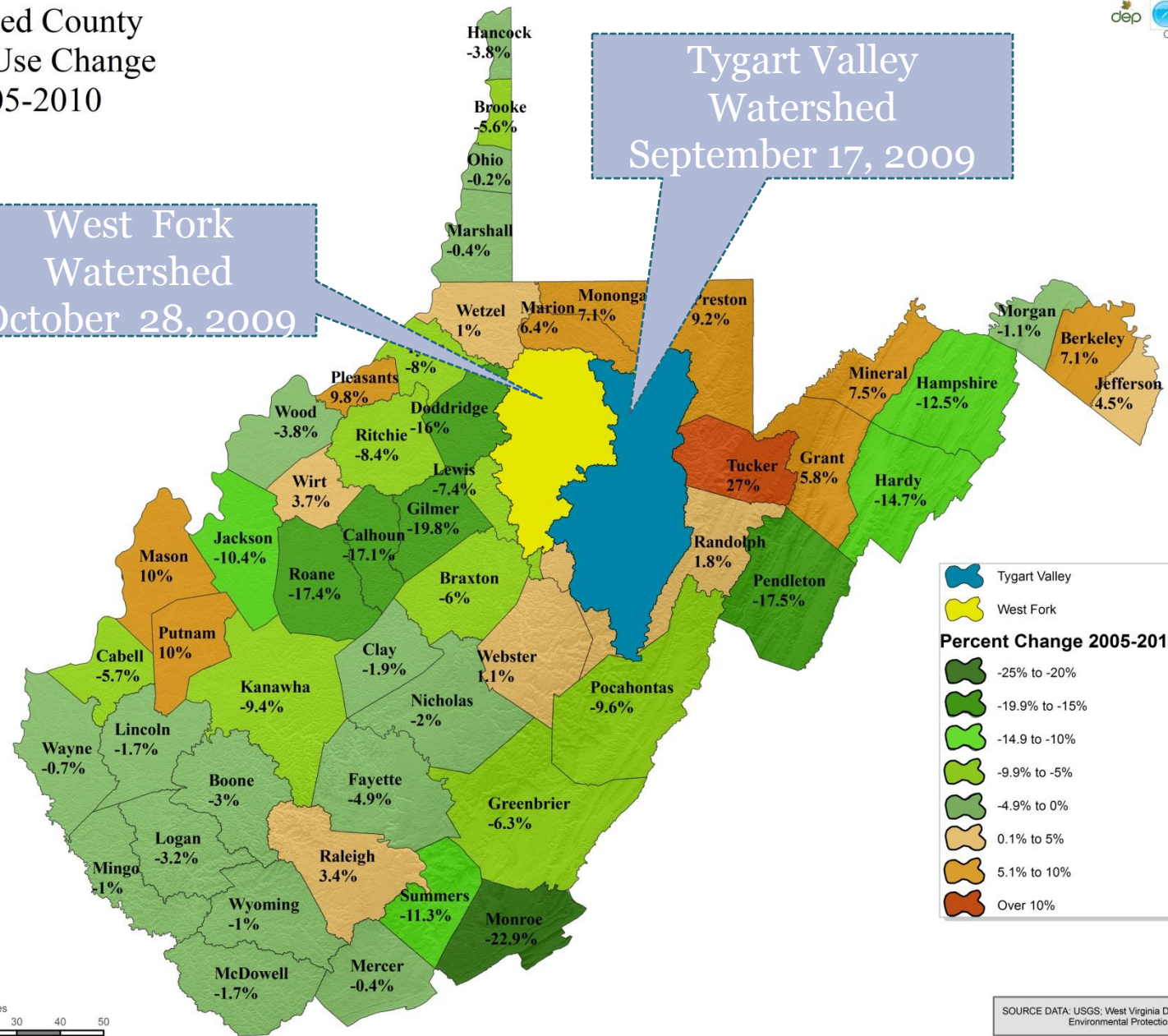
SOURCE DATA: USGS; West Virginia Department of Environmental Protection, June 2005.



# Projected County Water Use Change 2005-2010

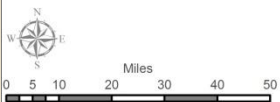
West Fork  
Watershed  
October 28, 2009

Tygart Valley  
Watershed  
September 17, 2009



**Percent Change 2005-2010**

- Tygart Valley
- West Fork
- 25% to -20%
- 19.9% to -15%
- 14.9% to -10%
- 9.9% to -5%
- 4.9% to 0%
- 0.1% to 5%
- 5.1% to 10%
- Over 10%



SOURCE DATA: USGS; West Virginia Department of Environmental Protection, June 2005.

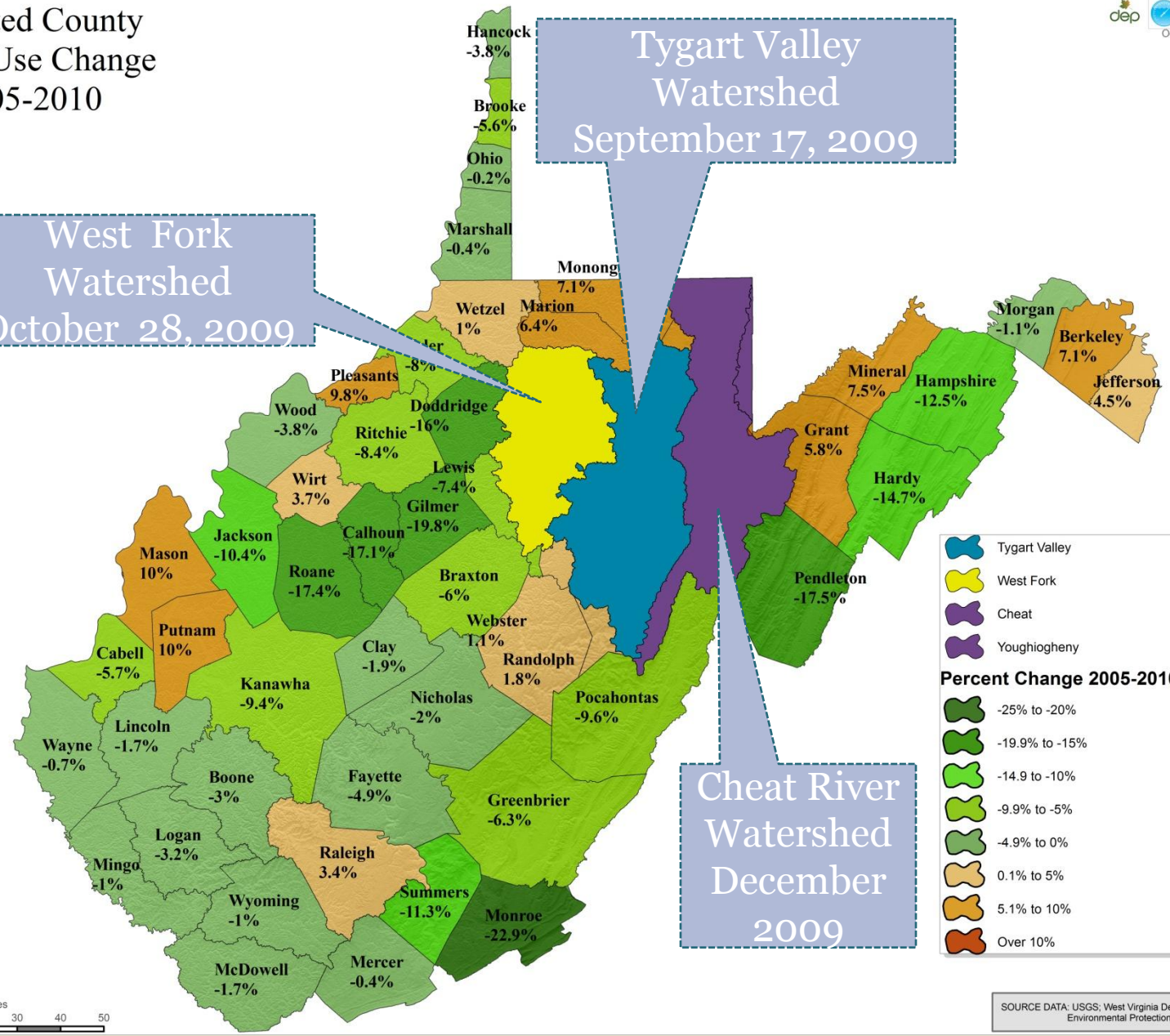


# Projected County Water Use Change 2005-2010

West Fork Watershed  
October 28, 2009

Tygart Valley Watershed  
September 17, 2009

Cheat River Watershed  
December 2009

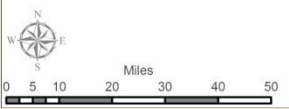


Legend for Watersheds:

- Tygart Valley
- West Fork
- Cheat
- Youghiogheny

**Percent Change 2005-2010**

- 25% to -20%
- 19.9% to -15%
- 14.9% to -10%
- 9.9% to -5%
- 4.9% to 0%
- 0.1% to 5%
- 5.1% to 10%
- Over 10%



SOURCE DATA: USGS; West Virginia Department of Environmental Protection, June 2005.

# QUESTIONS?



west virginia department of environmental protection

