

Marcellus Shale Drilling



West Virginia Water Resources Training Workshops

Presented by the Interstate Commission on the
Potomac River Basin

Sponsored by the West Virginia Department of
Environmental Protection

With funding from the American Reinvestment
& Recovery Act



Marcellus Shale Drilling

- Basics (geology, location)
- Drilling procedure
- Concerns
- Resources

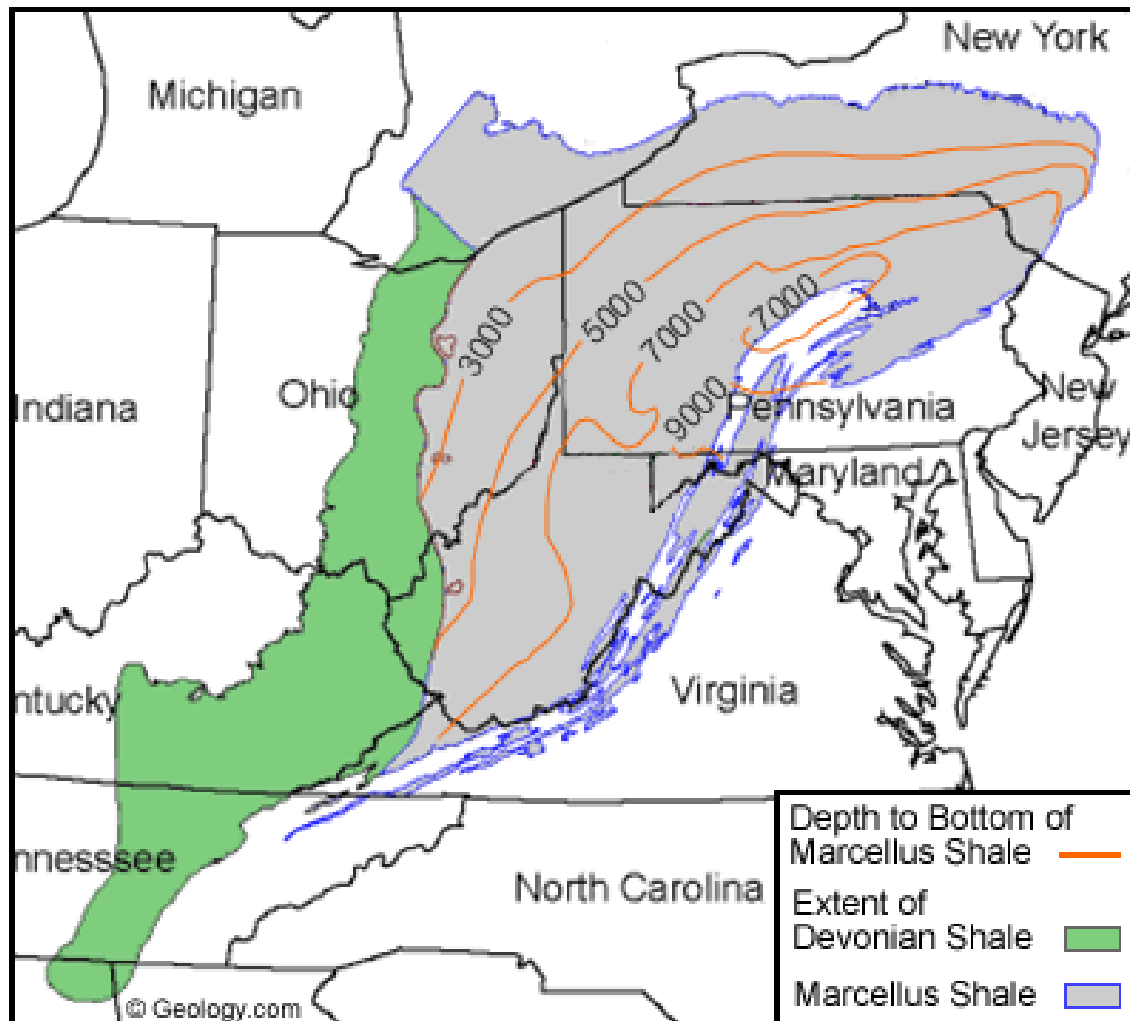


Why Marcellus? Why now?

- Oil and gas prices
- Better horizontal drilling and hydrofracking techniques
(Barnett Shale in Texas)
- Close to existing pipeline infrastructure
- Water availability



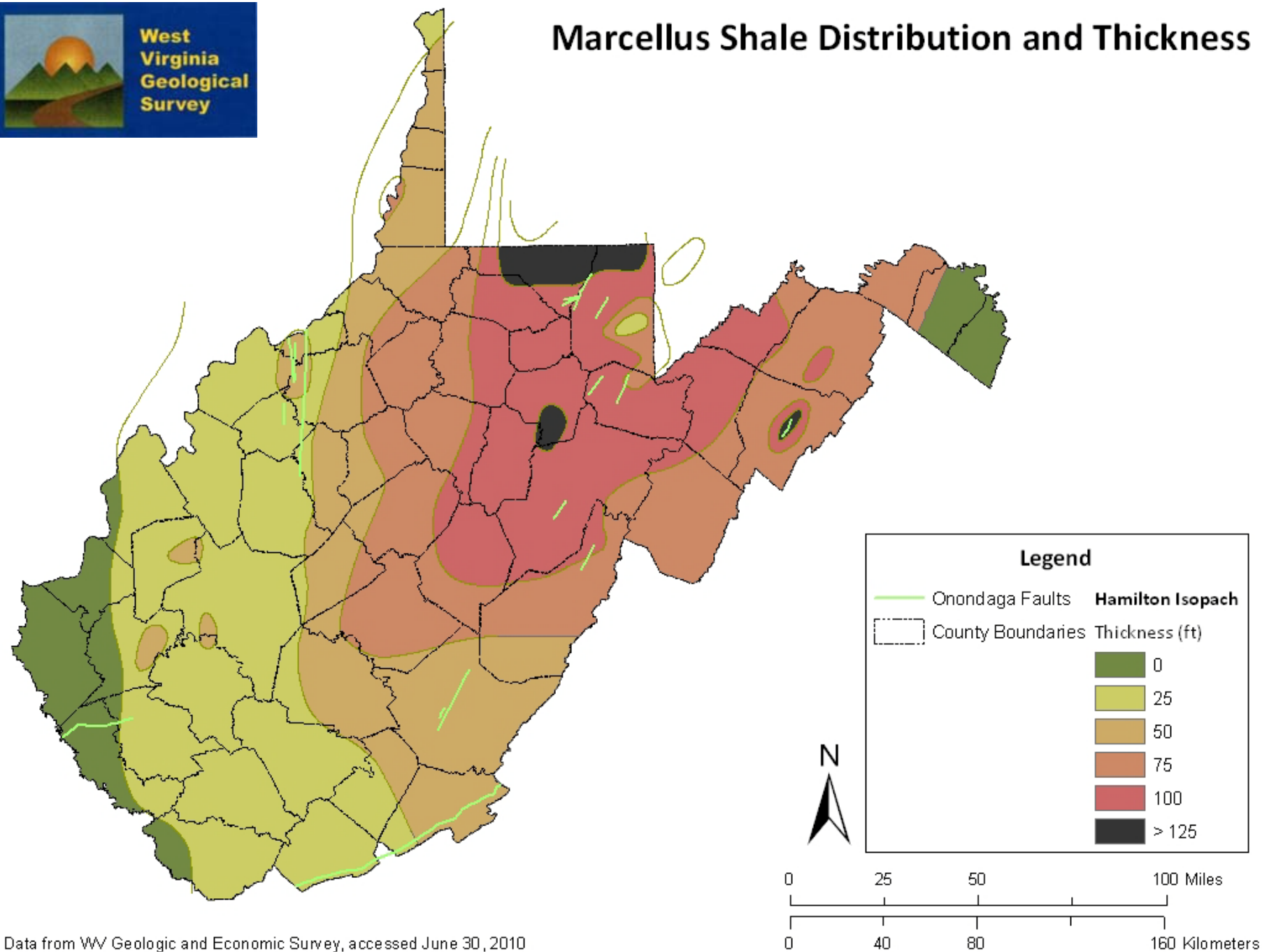
Depth to bottom of Marcellus Shale



Drinking
water wells:
100 – 300 feet
deep



Marcellus Shale Distribution and Thickness

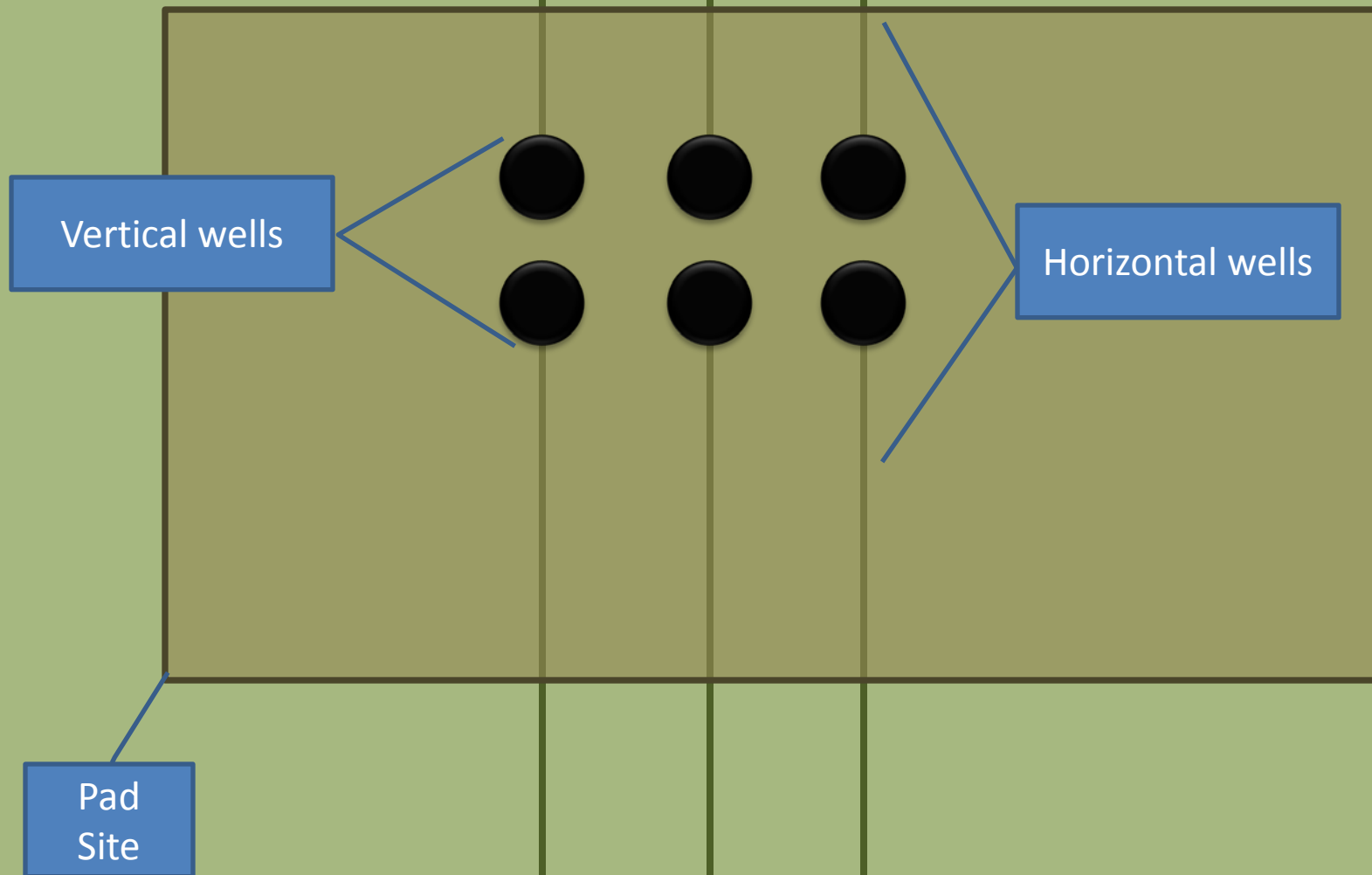


Data from WV Geologic and Economic Survey, accessed June 30, 2010

Drilling Process

- Locate potential site, acquire rights and permits
- Construct drilling pads and roads
- Hydrologic Fracturing (hydrofracking)
- Marcellus Shale Coalition [video](#)



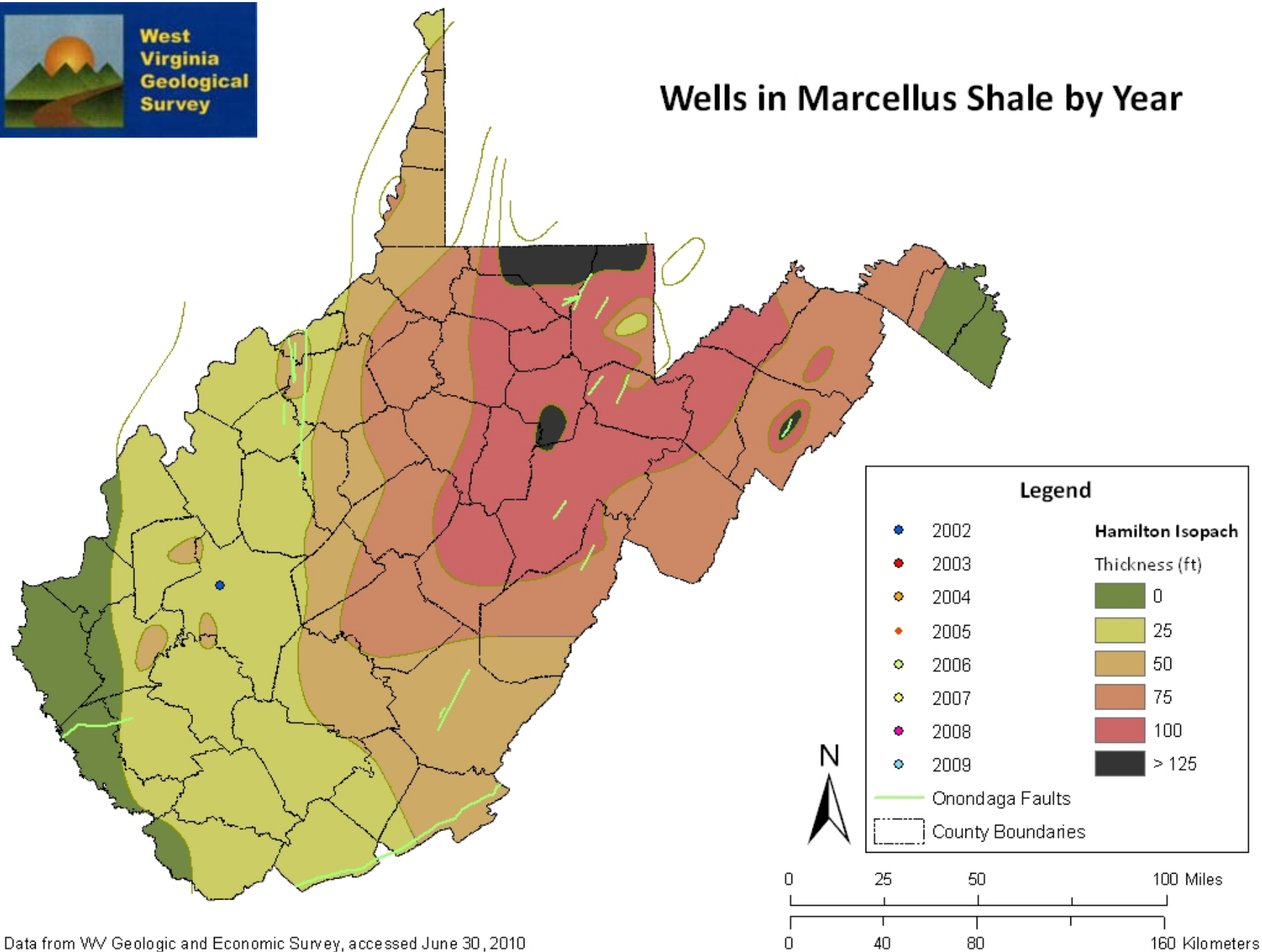


Drilling

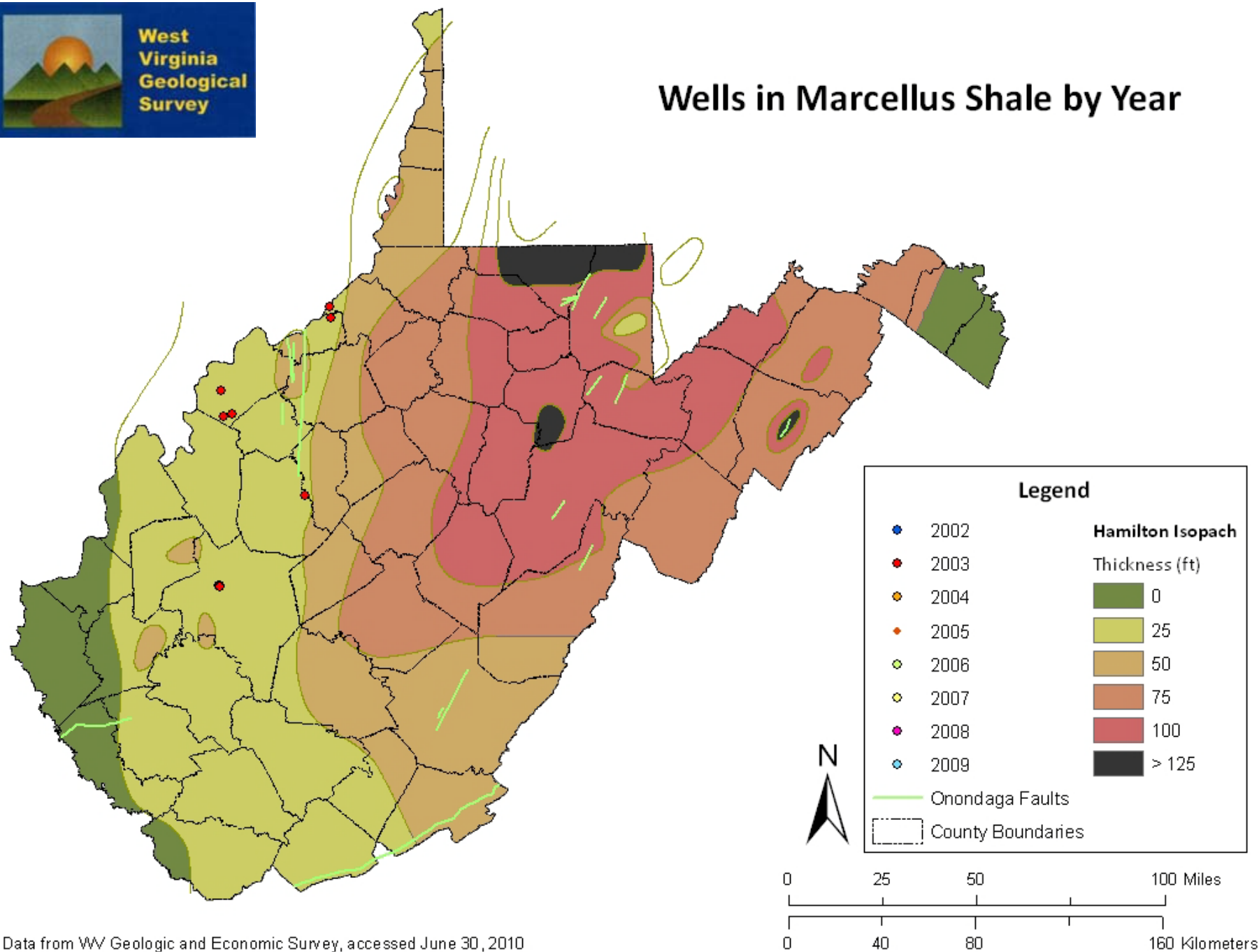
- Vertical well depth:
~7000 feet
 - avg 3300 feet (WVGES permit data)
- Horizontal well length:
4,000 to 5,000 feet
- Water use
 - Approximately 4 to 7 million gallons for entire drilling and fracturing process



Wells in Marcellus Shale by Year

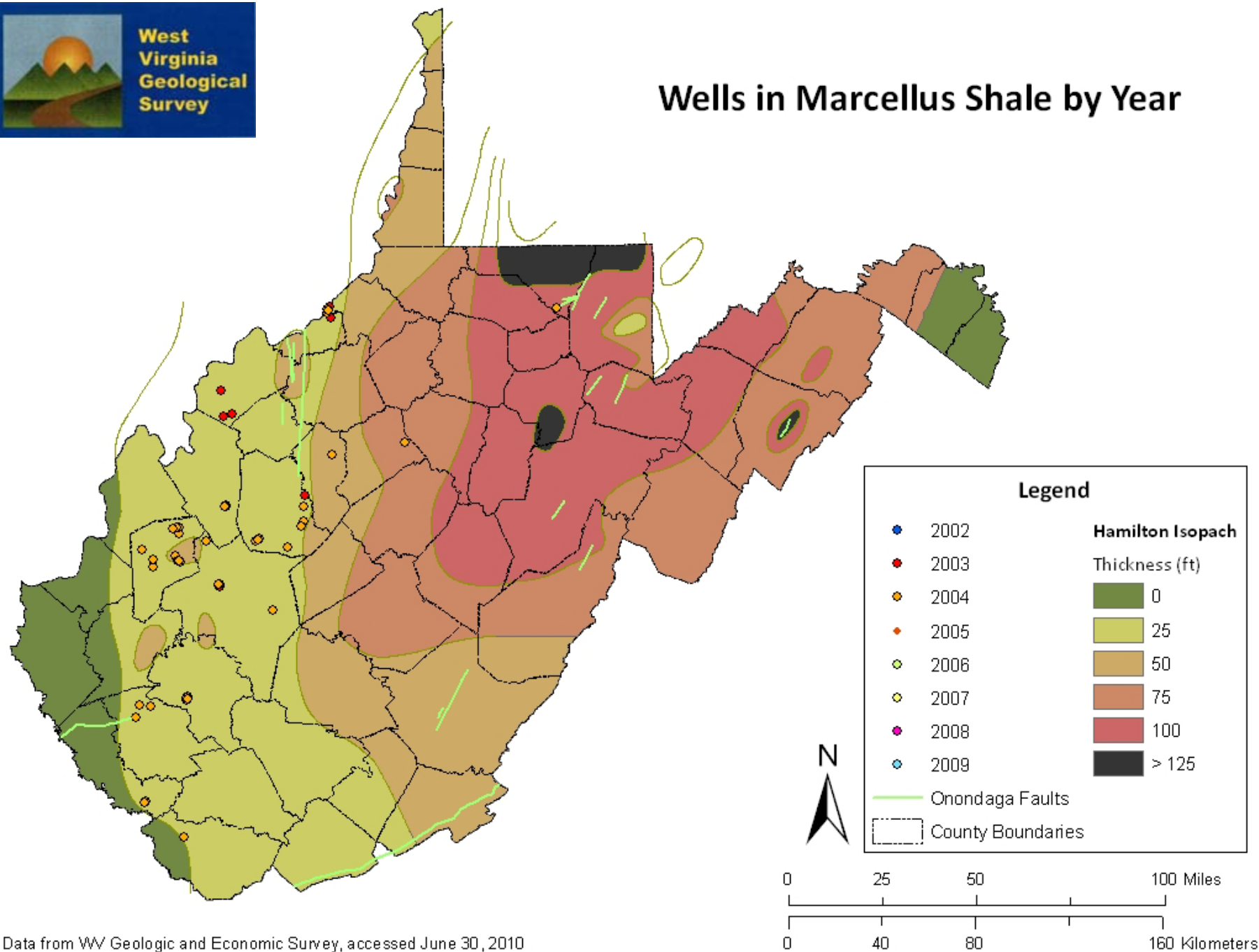


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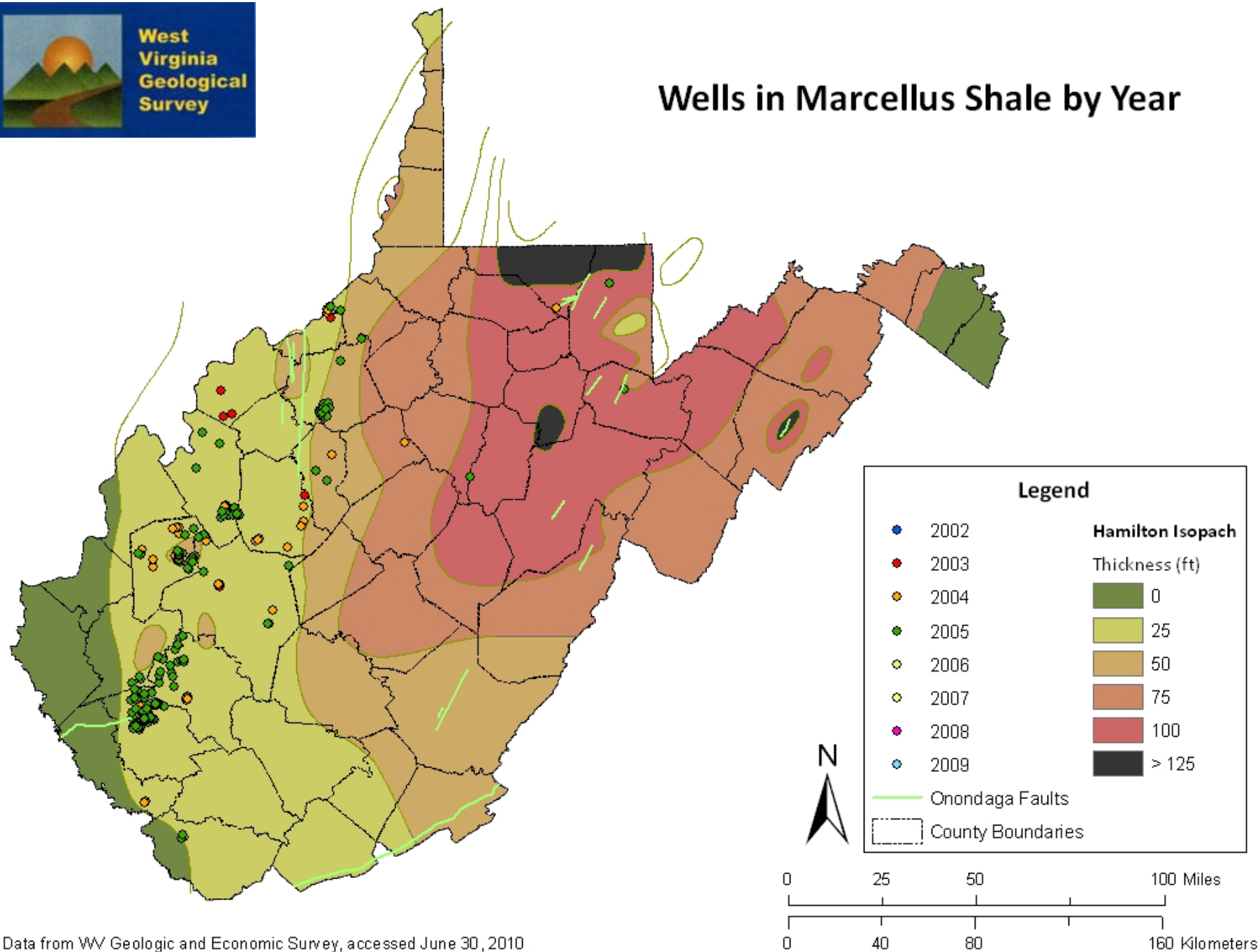




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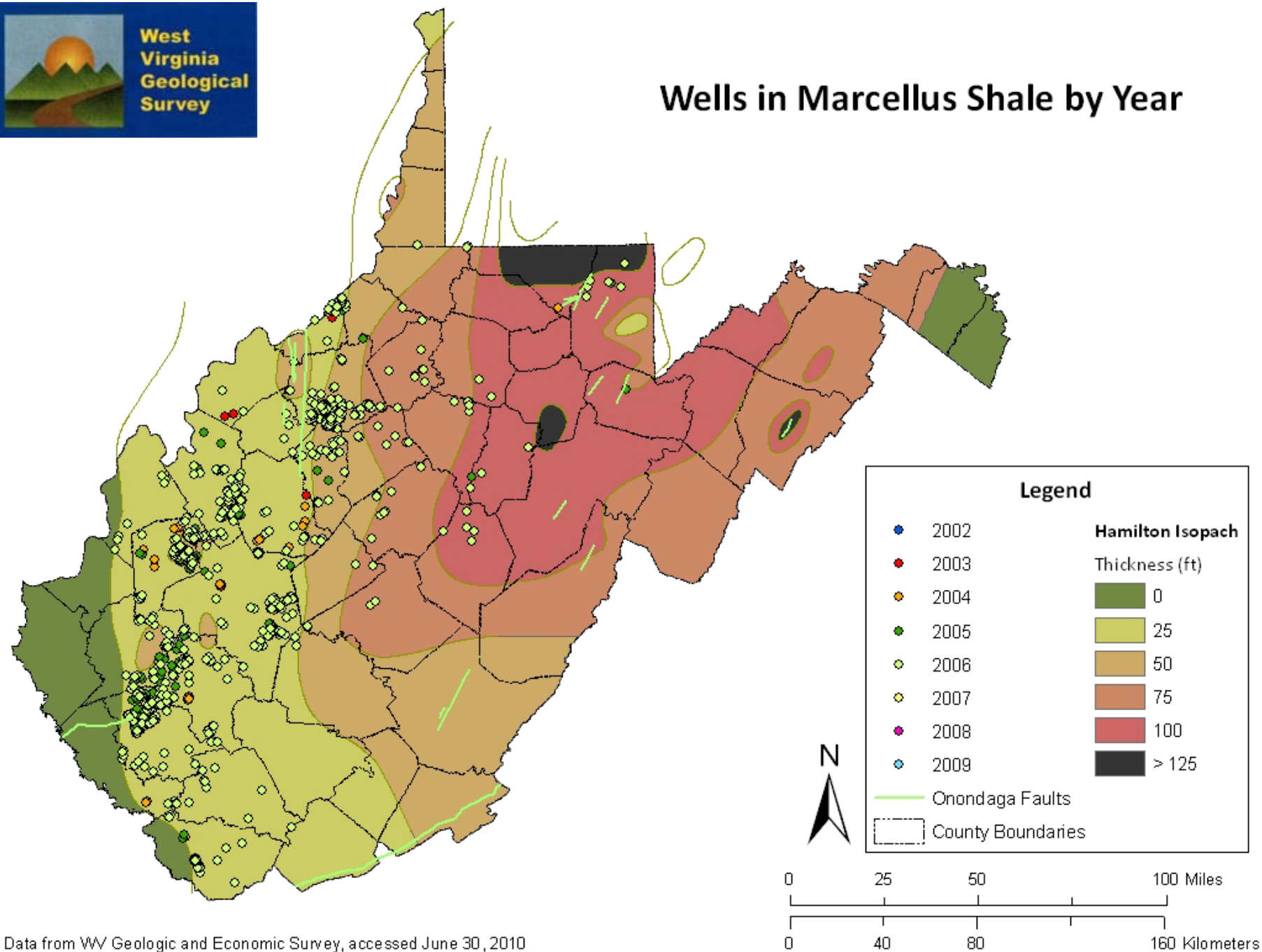


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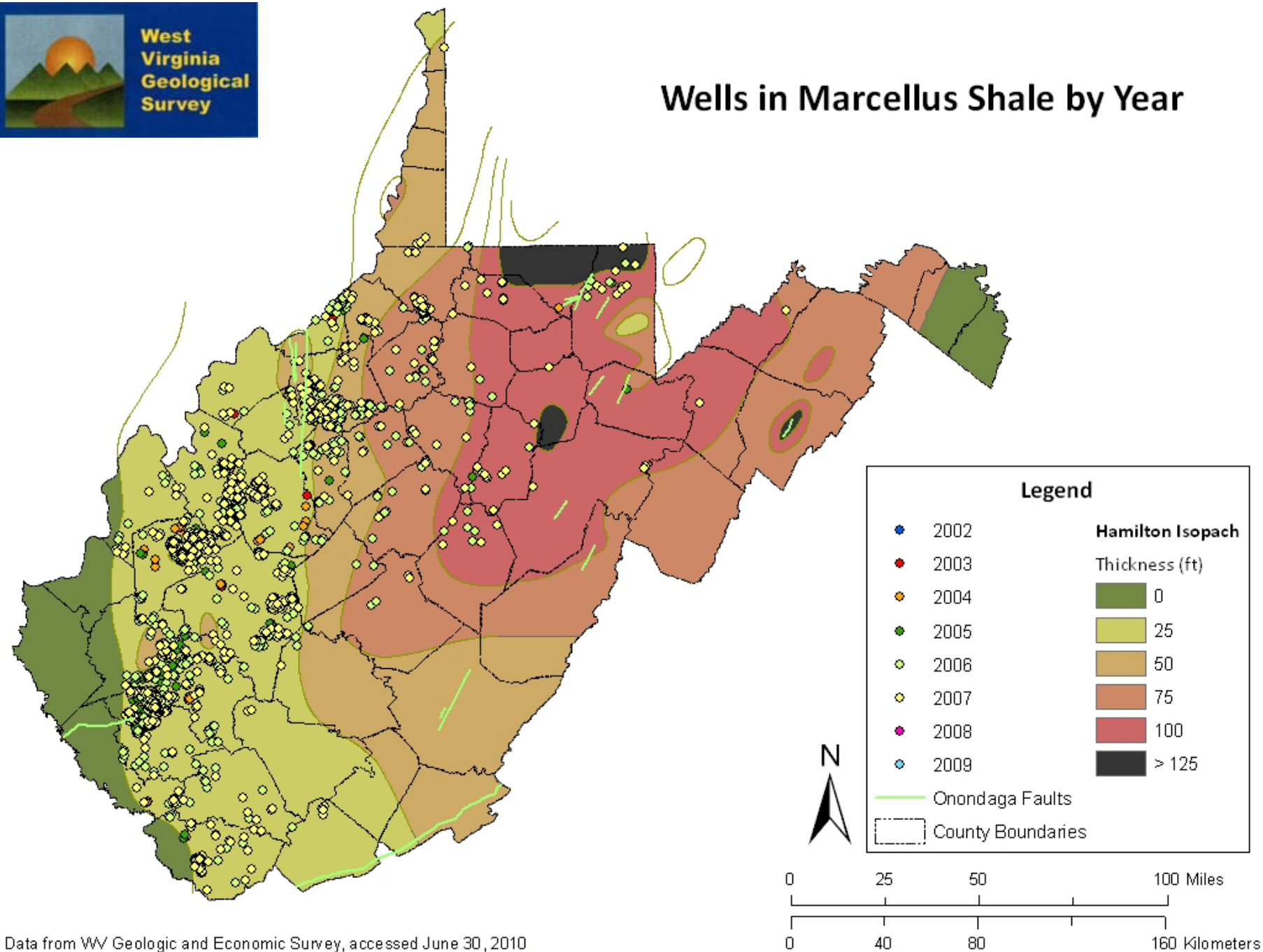


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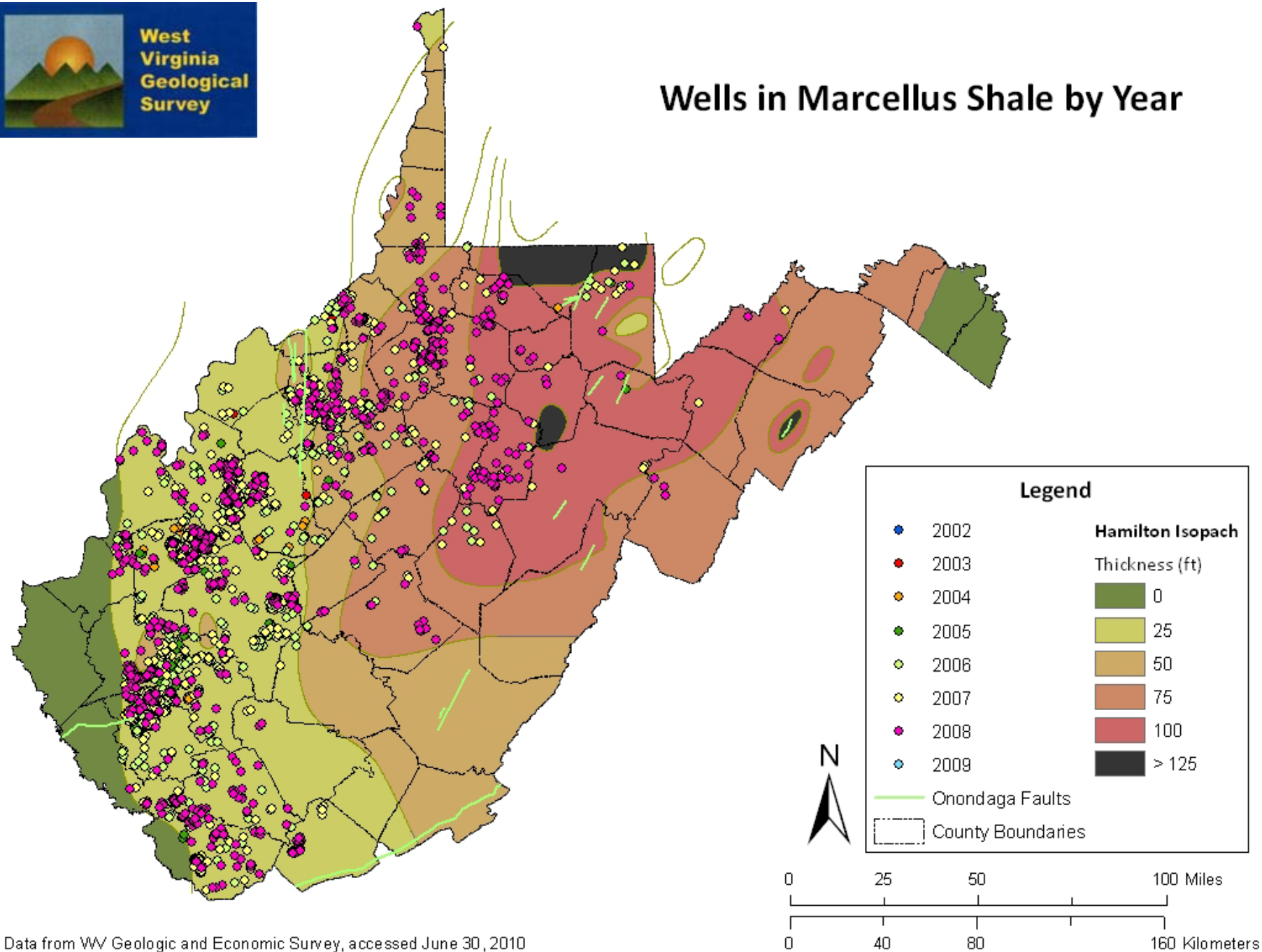


Wells in Marcellus Shale by Year



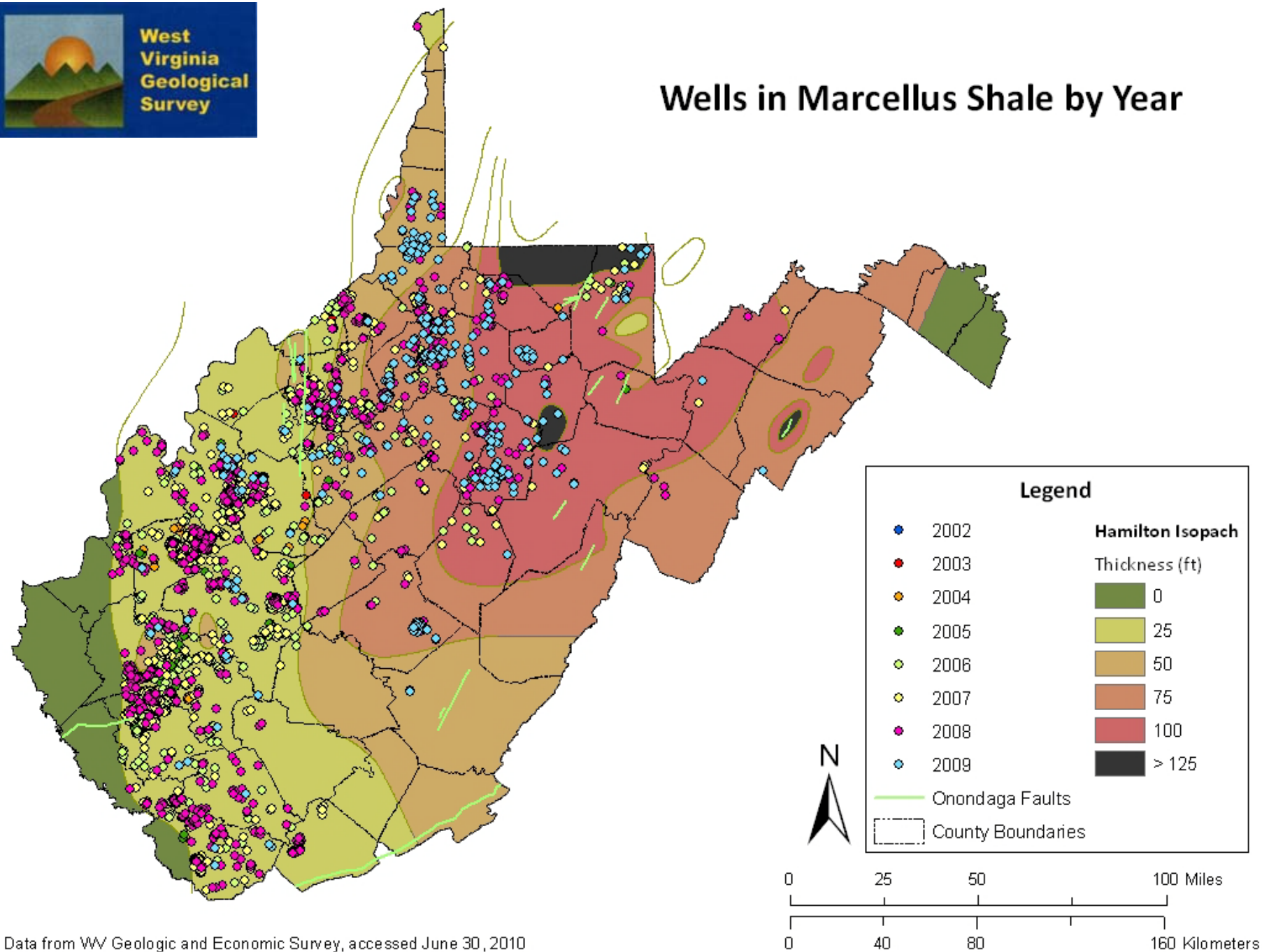


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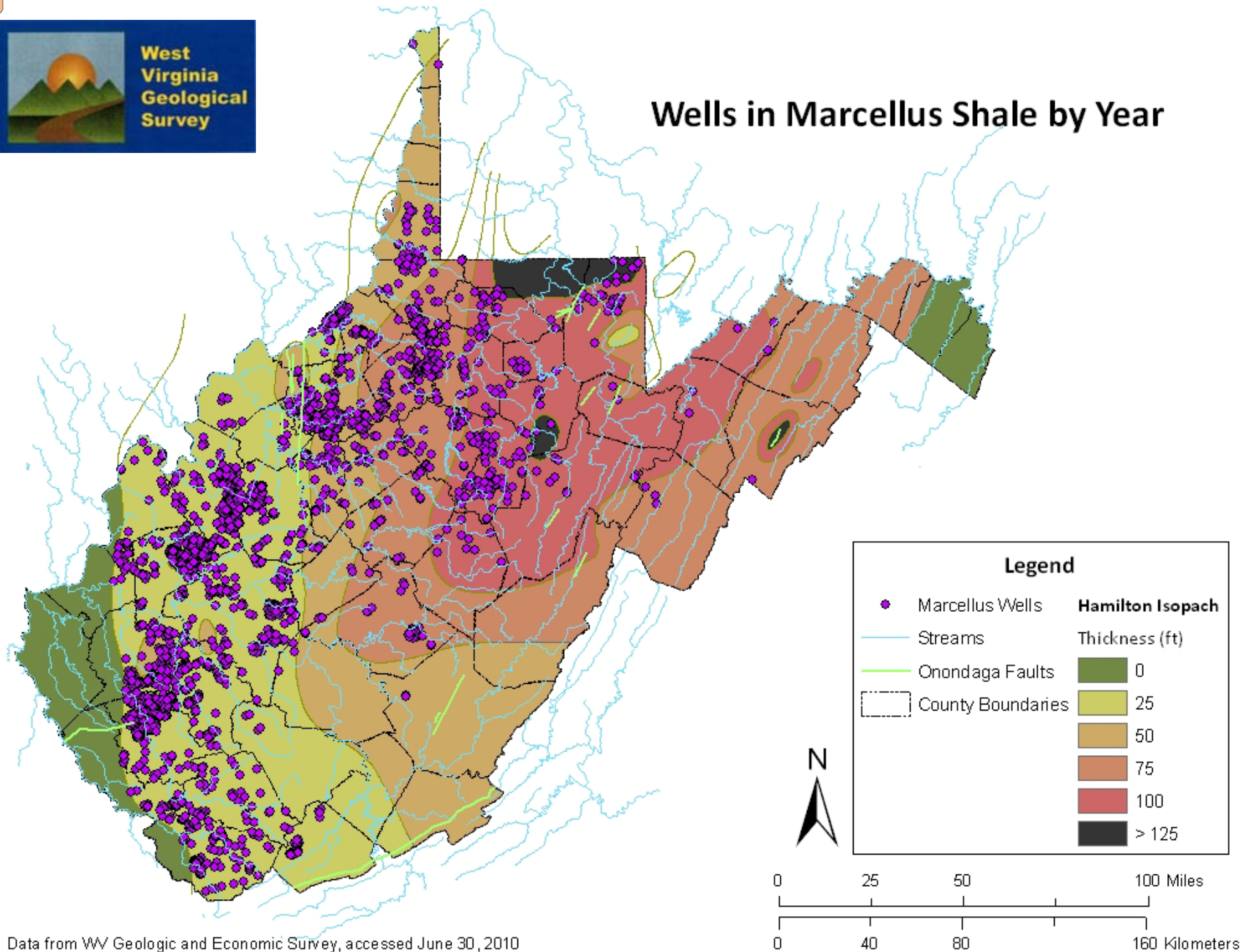


Wells in Marcellus Shale by Year





Wells in Marcellus Shale by Year





Concerns

- Large withdrawals
 - Local streams
 - Water utility
 - Trucked in
- Drinking water
 - Effects on surface and groundwater sources
 - Flow back quantity and quality
 - Spills

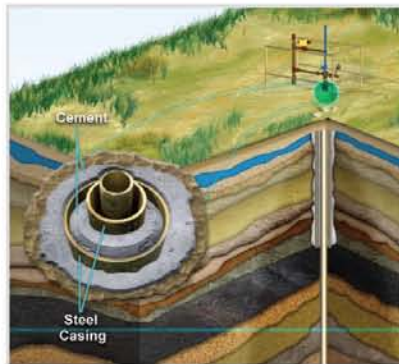
Concerns

- Roads, traffic, accidents (trucks and spills)
- Stormwater on site
- Noise and air pollution
- Soil compaction

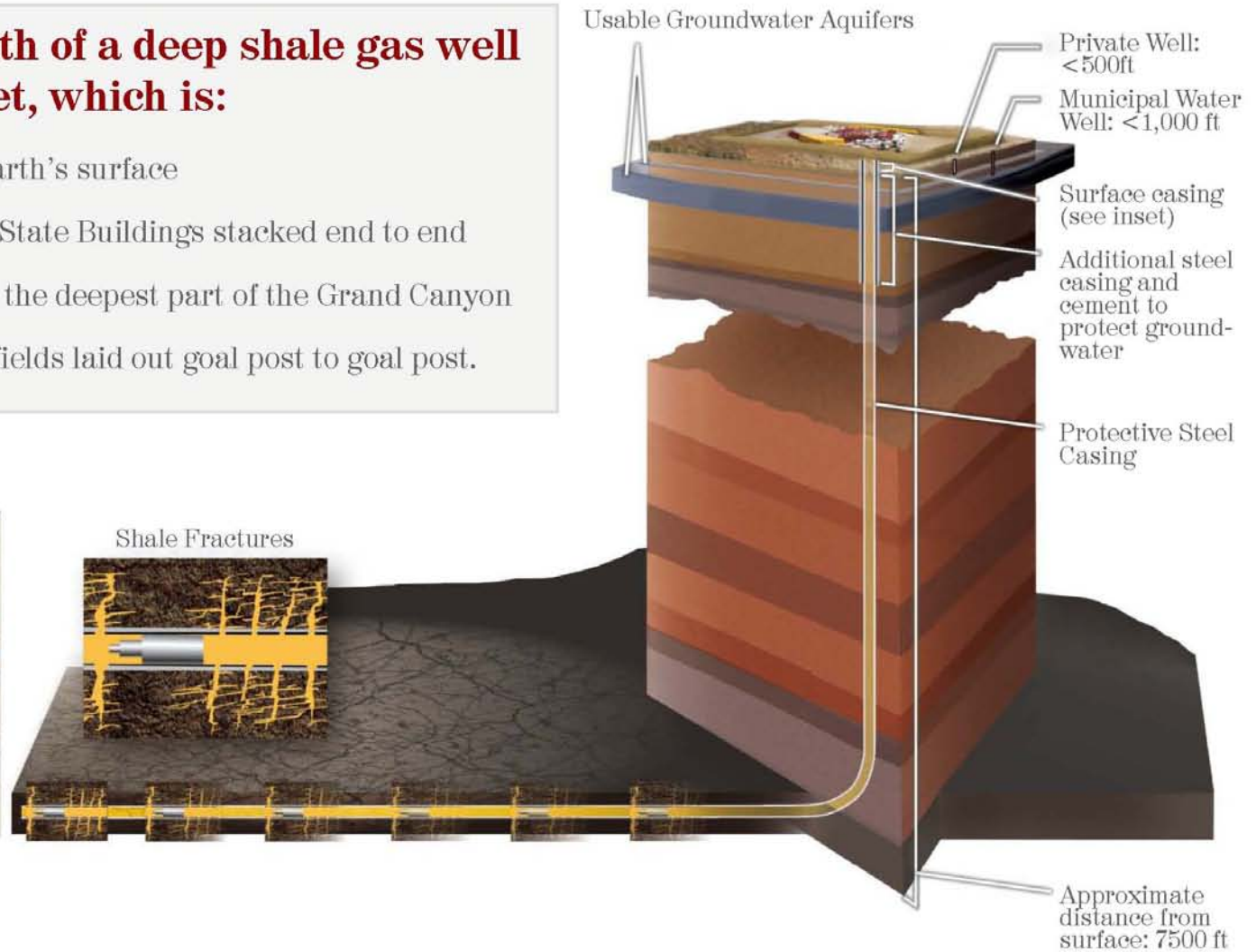


The average depth of a deep shale gas well is about 7,500 feet, which is:

- 1 ½ miles below the Earth's surface
- More than six Empire State Buildings stacked end to end
- 1 ½ times deeper than the deepest part of the Grand Canyon
- More than 25 football fields laid out goal post to goal post.



Inset



Hydrofracking fluid

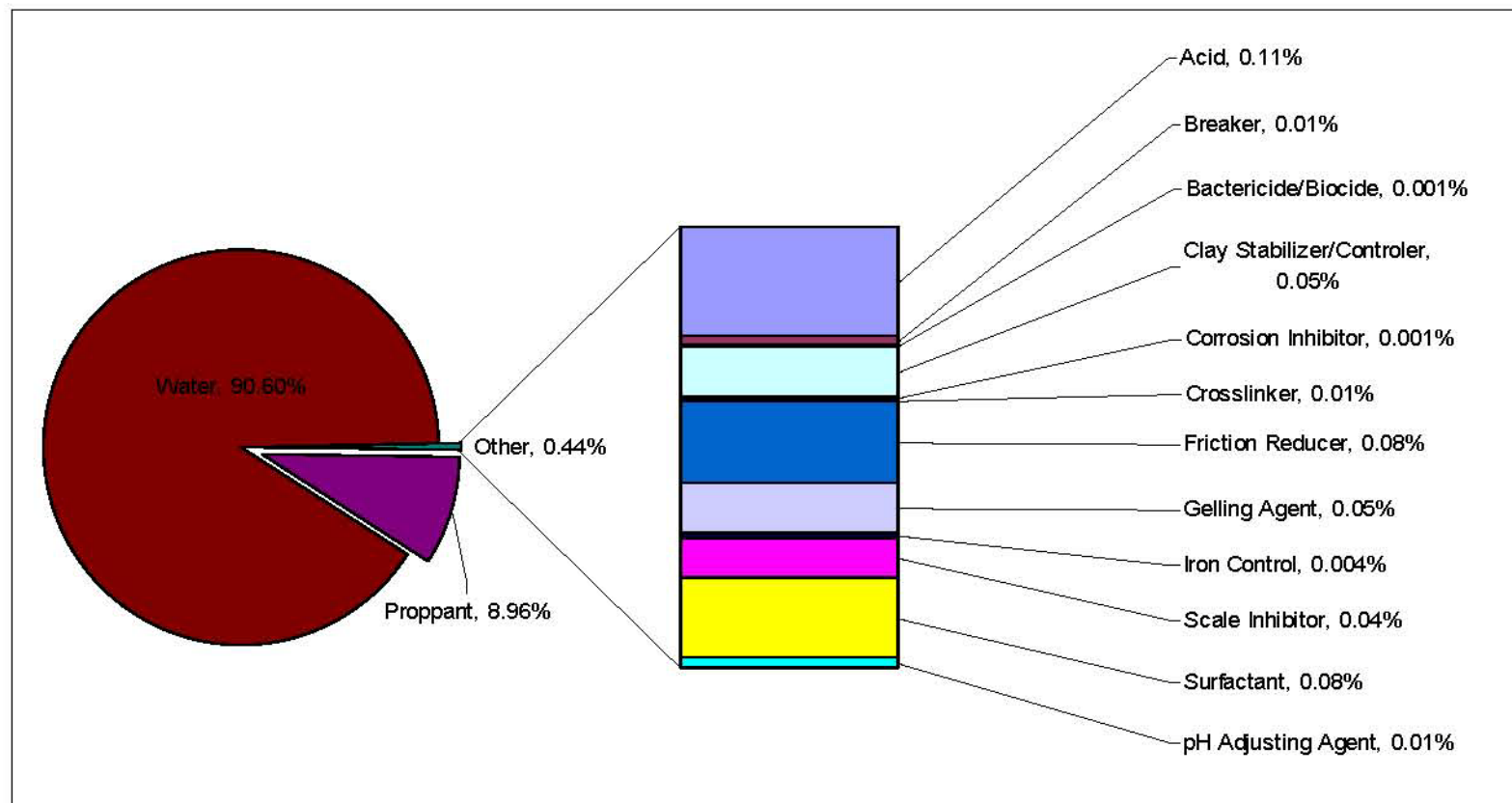


Figure 5-3 - Sample Fracture Fluid Composition by Weight

More info

- WV Geologic and Economic Survey
- WV Surface Owners' Rights Association
- Ground Water Protection Council
- Penn State Cooperative Extension
- PA Department of Environmental Protection
- NY Department of Environmental Conservation