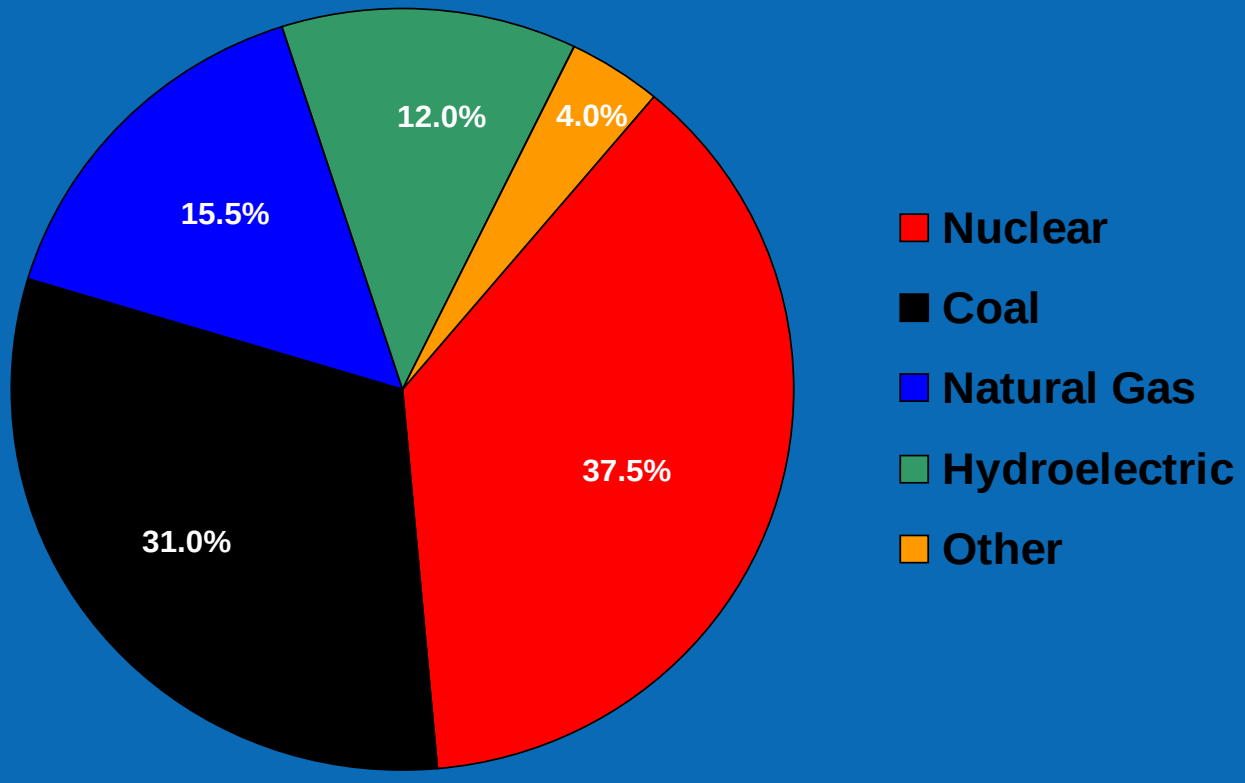
Water Resource Challenges From Energy Production

Major Types of Power Generation in SRB

- Total 15,300 Megawatts -



Marcellus Shale Gas Development in the Susquehanna River Basin

Susquehanna River Basin

The Basin:

- 27,510-square-mile watershed
- Comprises 43 percent of the Chesapeake Bay watershed
- 4.2 million population
- 60 percent forested
- 32,000+ miles of waterways

The Susquehanna River:

- 444 miles, largest tributary to the Chesapeake Bay
- Supplies 18 million gallons a minute to the Bay

Geographic Location of Marcellus Shale within Susq. River Basin

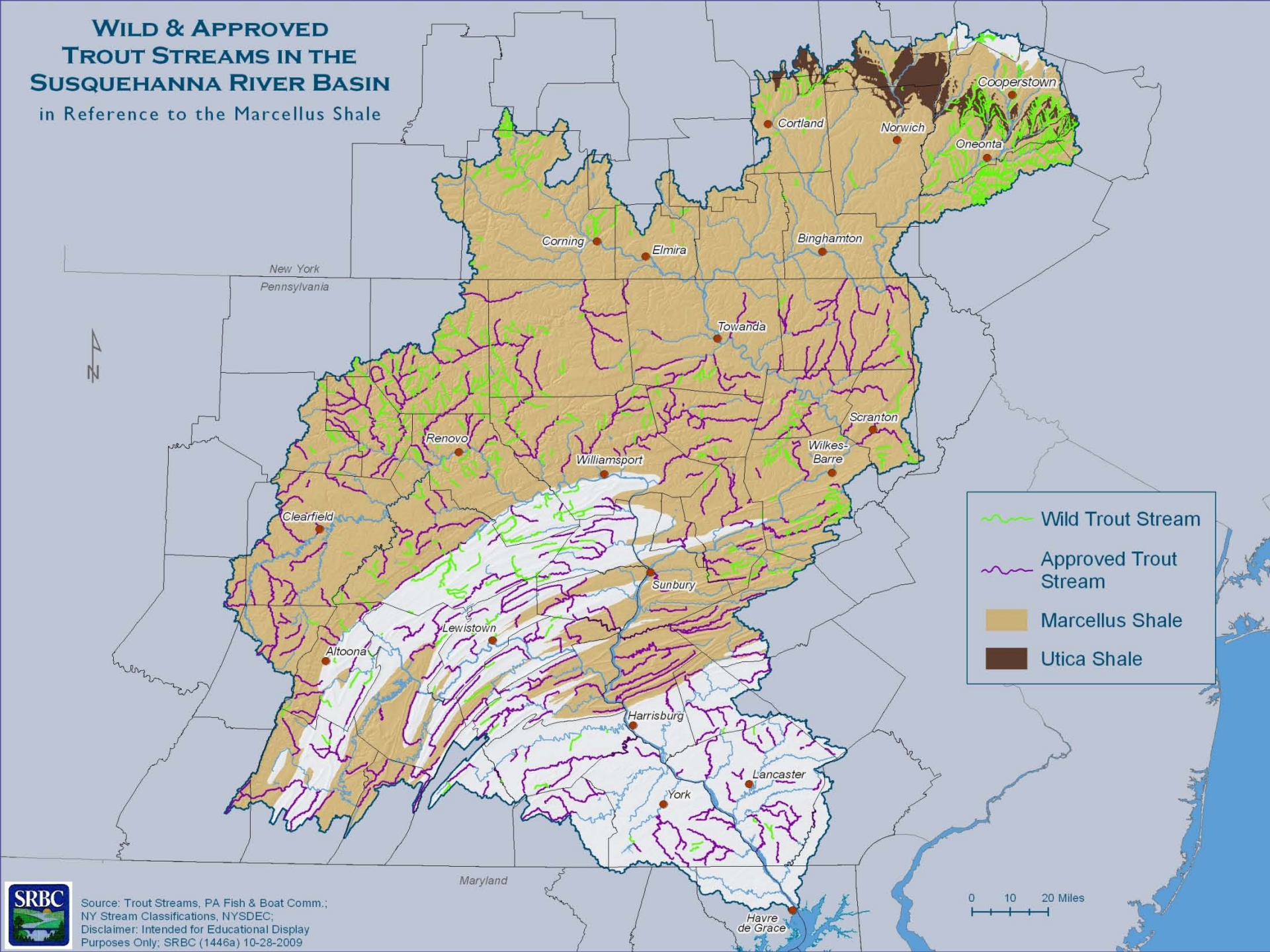
72% of Basin (20,000 Sq. Miles) Underlain by Marcellus Shale

Approximate Amount of Natural Gas in Marcellus Shale

- U.S. currently produces approx. 30 trillion cubic feet per year of natural gas.
- Estimates range from 200 to 1,000 trillion cubic feet contained in Marcellus Shale.
- Approx. 10% of that is recoverable.
- Approx. 20 to 100 trillion cubic feet available from Marcellus.

Wild & Approved Trout Streams in the Susquehanna River Basin

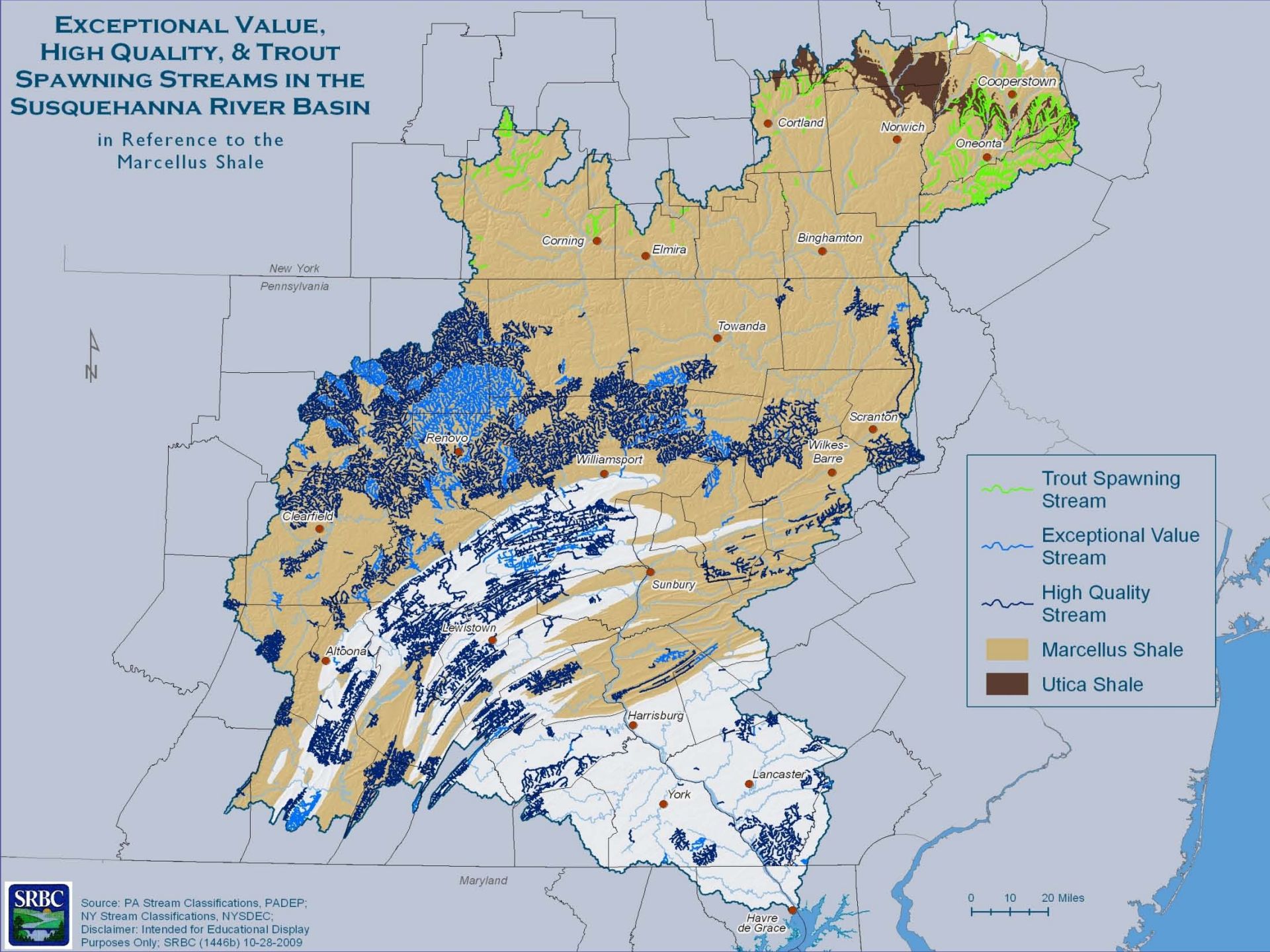
in Reference to the Marcellus Shale



Source: Trout Streams, PA Fish & Boat Comm.; NY Stream Classifications, NYSDEC;
Disclaimer: Intended for Educational Display Purposes Only; SRBC (1446a) 10-28-2009

Exceptional Value, High Quality, & Trout Spawning Streams in the Susquehanna River Basin

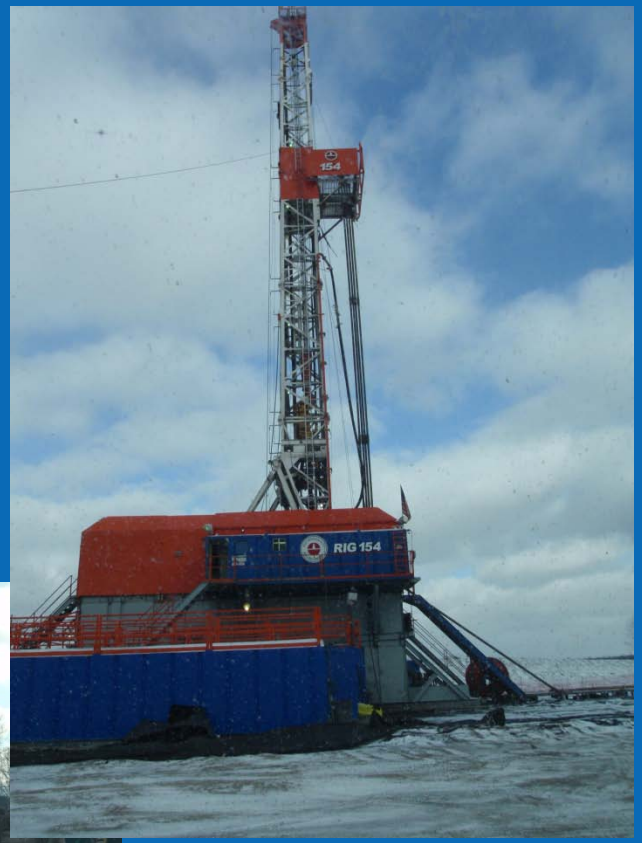
in Reference to the Marcellus Shale



Source: PA Stream Classifications, PADEP; NY Stream Classifications, NYSDEC; Disclaimer: Intended for Educational Display Purposes Only; SRBC (1446b) 10-28-2009

Shale Gas Well Development

Year	# Pads Approved
2008	~50
2009	321
2010	(est.) ~1,000
2015	????



Actual Water Use
Marcellus Gas Wells

- Total Water Withdrawn (6/08 – 3/10): 433.0 MGal
  - Approximately 200 wells drilled to date
  - 177.2 MGal from public water supply (41%)
  - 255.8 MGal from surface water sites (59%)

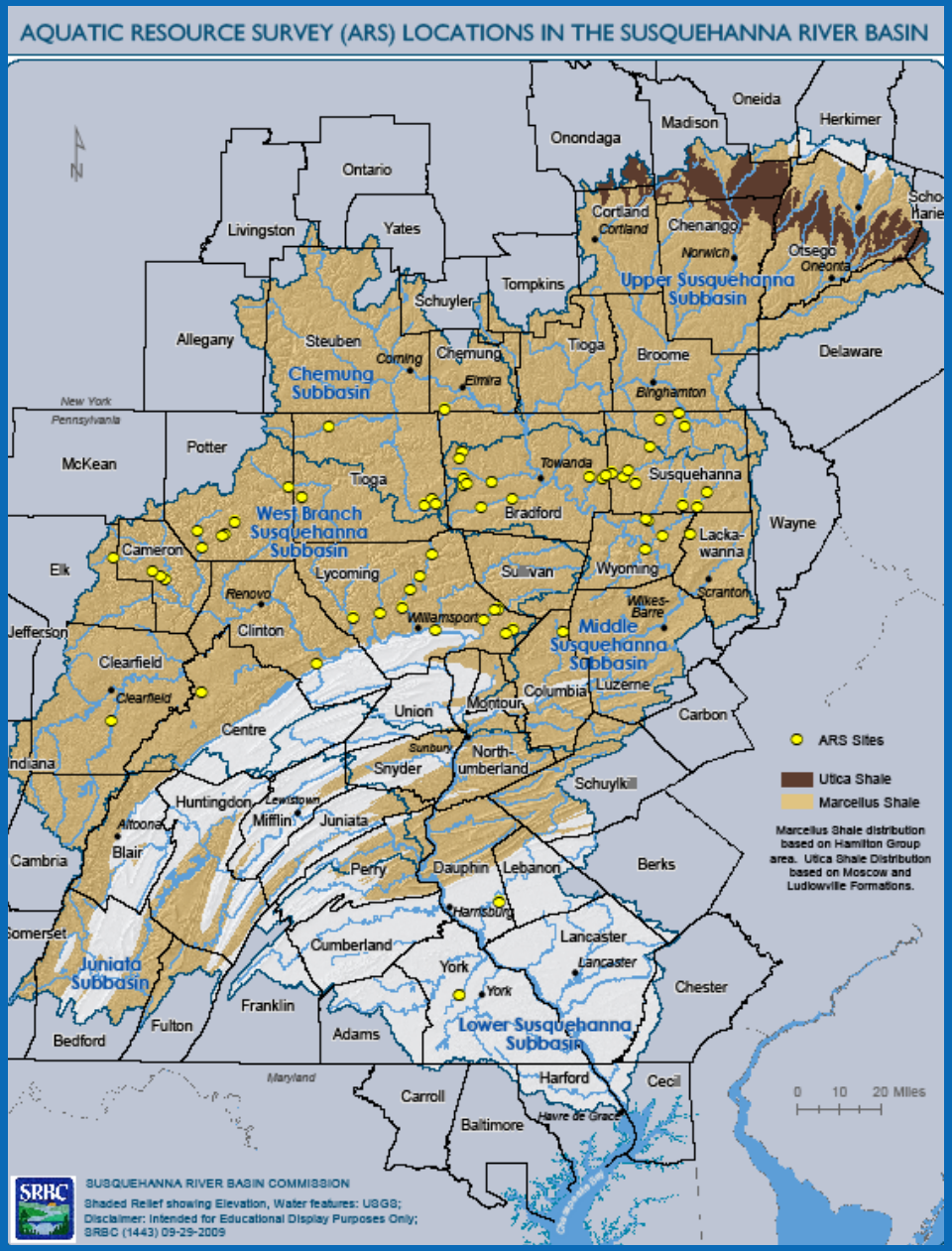
- Average Total Vol. of Fluid Used per Well: 2.8 MGal
  - Average fresh water used per well: 2.4 MGal (86%)
  - Average flowback reuse per well: 0.4 MGal (14%)

- Average Recovery of Fluids: 11.9% (First 30-days)
  - Reuse Approx. 60 %
  - Disposal Approx. 40 %

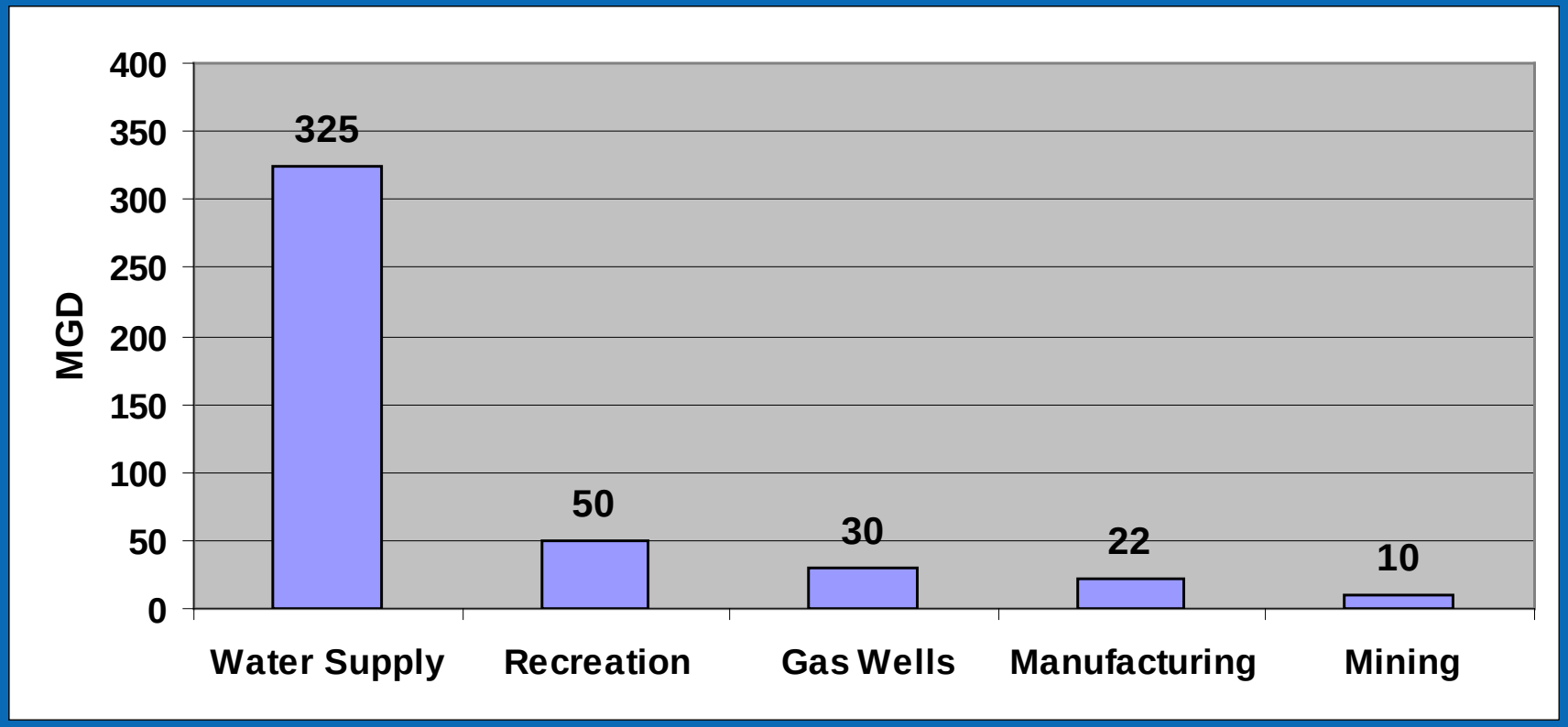
184 Wells Reported

Surface Water Review

- Waterbody classification
- Aquatic resource survey
- Passby evaluation
- Natural diversity inventory
- Land access agreement
- Cumulative impact evaluation
- Aquatic invasive species
- Intake design & metering plan



Maximum Daily Consumptive Use in Susquehanna River Basin

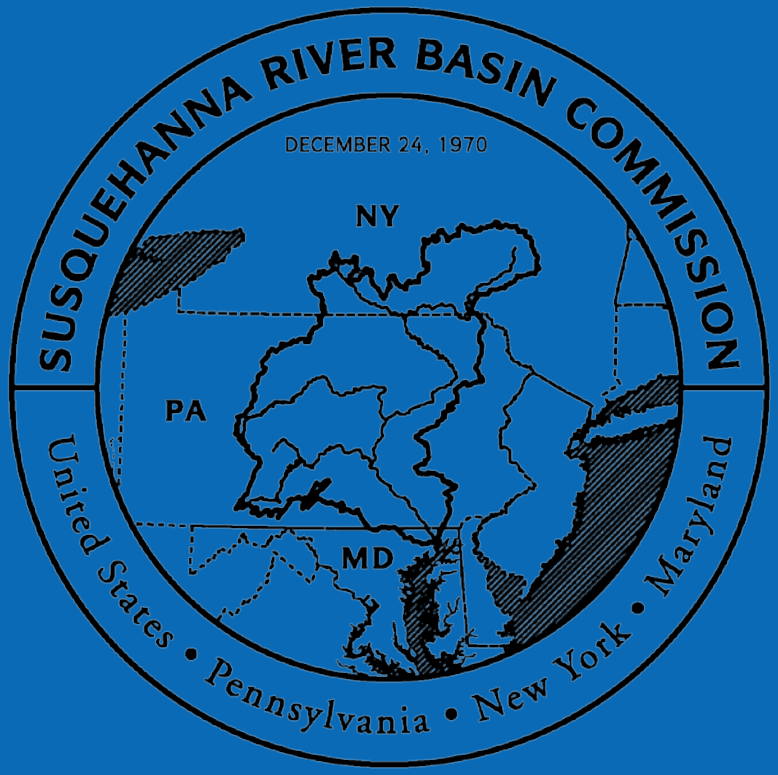


Current Consideration

- Science-based decision making,
- Cumulative impacts – data driven,
- Timing and location of withdrawals important,
- Disposal of produced fluids and brines,
- Remote real-time water quality monitoring,
- The move from exploration to production may necessitate yet more regulatory changes,
- Water use can be accommodated.

Shale Gas Development in the Susquehanna River Basin

Jim Richenderfer, Ph.D.
Acting Chief
Water Resources Management Div.
Susquehanna River Basin Commission
Telephone: (717) 238-0425
E-mail: jrichenderfer@srbc.net



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