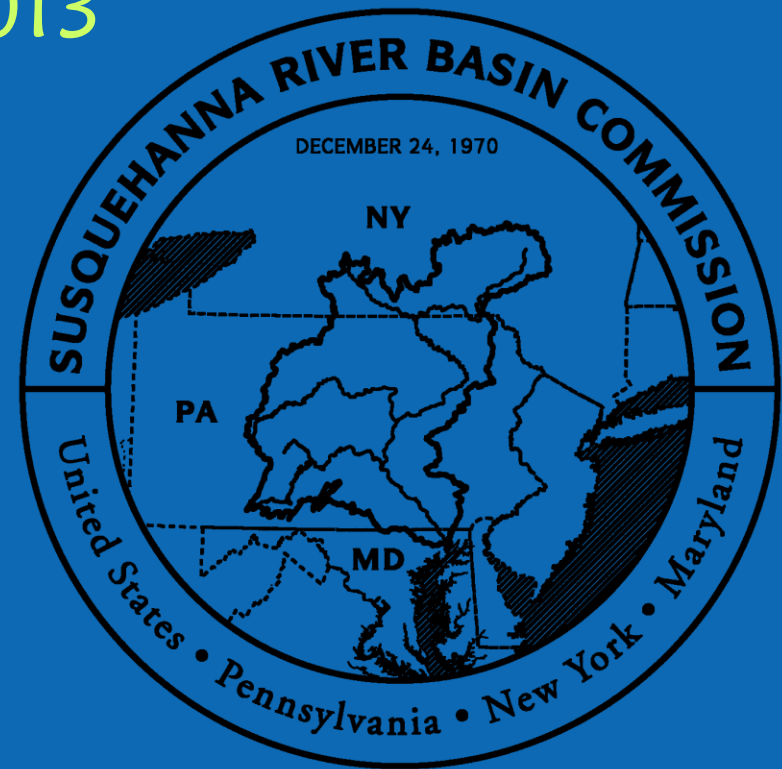


National Capital Area Chapter U.S. Assoc. for Energy Economics Energy-Water Nexus April 9, 2013

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What Does SRBC Regulate?

- Surface Water Withdrawals; Threshold (100,000 gpd)
- Groundwater Withdrawals; Threshold (100,000 gpd)
- Consumptive Use; Threshold (20,000 gpd)
- Diversions; Thresholds (Any Amt. In; 20,000 gpd Out)
- For Unconventional Natural Gas Industry, all Regulatory Thresholds are Set at Gallon One.

“Withdrawals” (Groundwater or Surface Water)

Definition:

A taking or removal of water from any source within the basin for use within the basin.

“Consumptive Use” “CU”

Simplified Definition:

Water that is used but not
returned to the basin
undiminished in quantity.

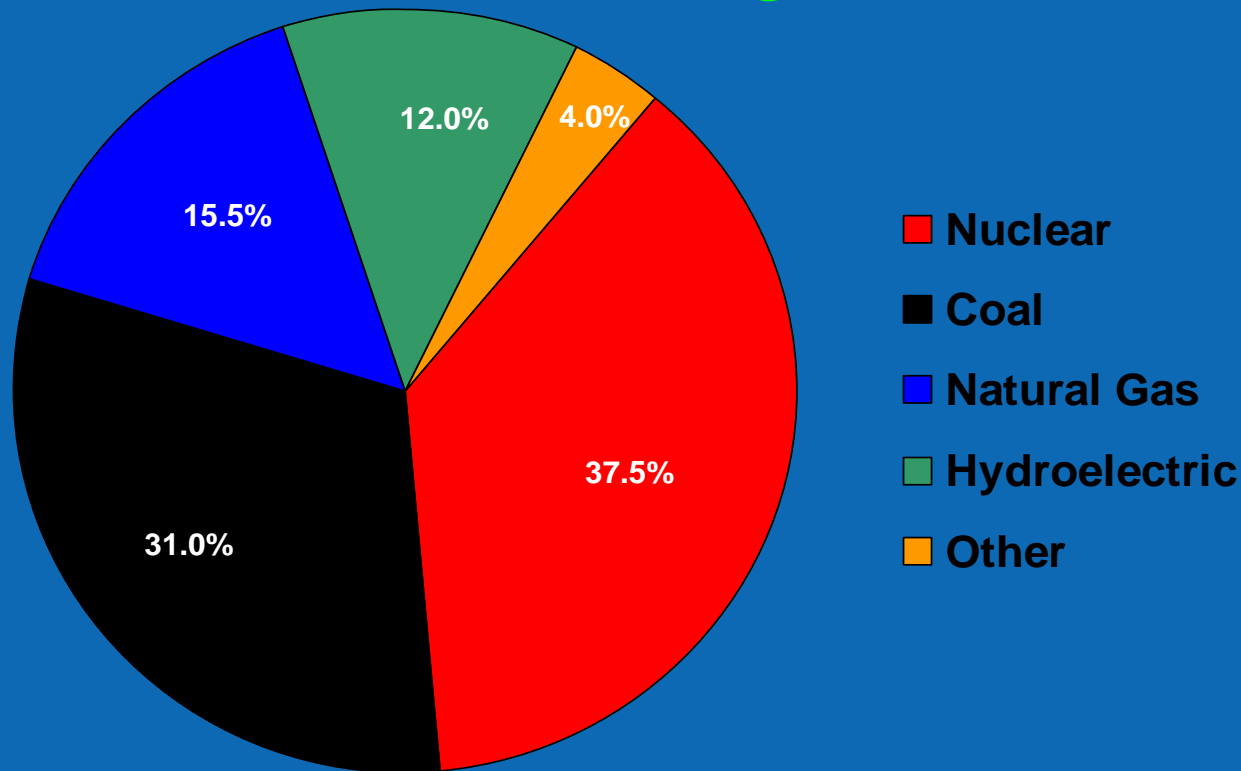
“Diversions”

Definition:

The transfer of water into or out of the hydrologic boundary of the Susquehanna River basin.

Major Types of Power Generation in Susquehanna River Basin

Total 15,300 Megawatts



“Unconventional Natural
Gas Development?”

“High Volume Hydraulic
Fracturing?”



Major Changes in SRBC Regulations Relevant to Unconventional Natural Gas Development

- On-line application process,
- Regulate CU through Approval-by-Rule (ABR); Ave. 30-Day Turn-Around of CU approvals,
- Multiple withdrawals/sources for multiple pad sites,
- Source water sharing between companies,
- Reuse of flowback, pad-to-pad transfers of flowback, and interbasin transfers of flowback,
- Pipeline docket approvals, facilitates ABR source water approvals,

Major Changes in SRBC Regulations Relevant to Unconventional Natural Gas Development (Cont.)

- PWS and wastewater source approvals,
- Facilitate/encourage use of lesser quality waters,
- Allow on-pad use of top-hole water, direct precip., stormwater with ABR approval,
- Hydrocarbon water storage facility registration (Third Party Owners),
- Named additional geologic formations eligible for ABR approval process.

Major SRBC Challenges Posed by Unconventional Natural Gas Development

- Operates in headwaters - historically least developed portions of basin,
- Nomadic and short-term nature of projects,
- Volume of applications received and processed,
- Withdrawals distant from consumptive use locations,
- Rapid pace of industry is at odds with bureaucracy,
- Public scrutiny/opposition.

Marcellus – Basin Water Use Profile

(July 1, 2008 thru Dec. 31, 2012)

- 1,977 Unconv. Gas Wells Hydro-fractured,
- 10.4 billion gallons of water consumptively used,
- 8.0 billion gallons of water withdrawn from docketed sources,
- 2.4 billion gallons of water withdrawn from non-docketed approved sources (primarily PWS).

Marcellus – Basin Water Use Profile

(July 1, 2008 thru Dec. 31, 2012)

(Cont.)

- 4.4 million gallons (ave.) used per well for hydro-fracturing (86% freshwater, 14% flowback reused).
- 8% - 10% of injected water is recovered as flowback w/i first 30 days after release of pressure.
- 87% of water brought on-site is used, balance of 13% temporarily stored on site, or transferred to another site.











Summary of SRBC “Reviews”

- Science-based decision making,
- Cumulative impacts are critical,
- “Locations” of withdrawals more important than “amounts” of withdrawals,
- Use “interruptible sources” (passby’s) to minimize impacts on aquatic ecosystems during low flow periods.

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Remote Water Quality Monitoring Network

Susquehanna River Basin - Monitoring Station Map



Legend

Layer Visibility

- ☒ Monitoring Stations
- ☒ Approved Gas Pads
- ☒ PADCNR Lands
- ☒ Watersheds
- ☒ Political Boundaries

Zoom to Station

Apalachin Cr. - Apalachin, NY

Baker Run - Glen Union, PA

Baldwin Cr. - Lowman, NY

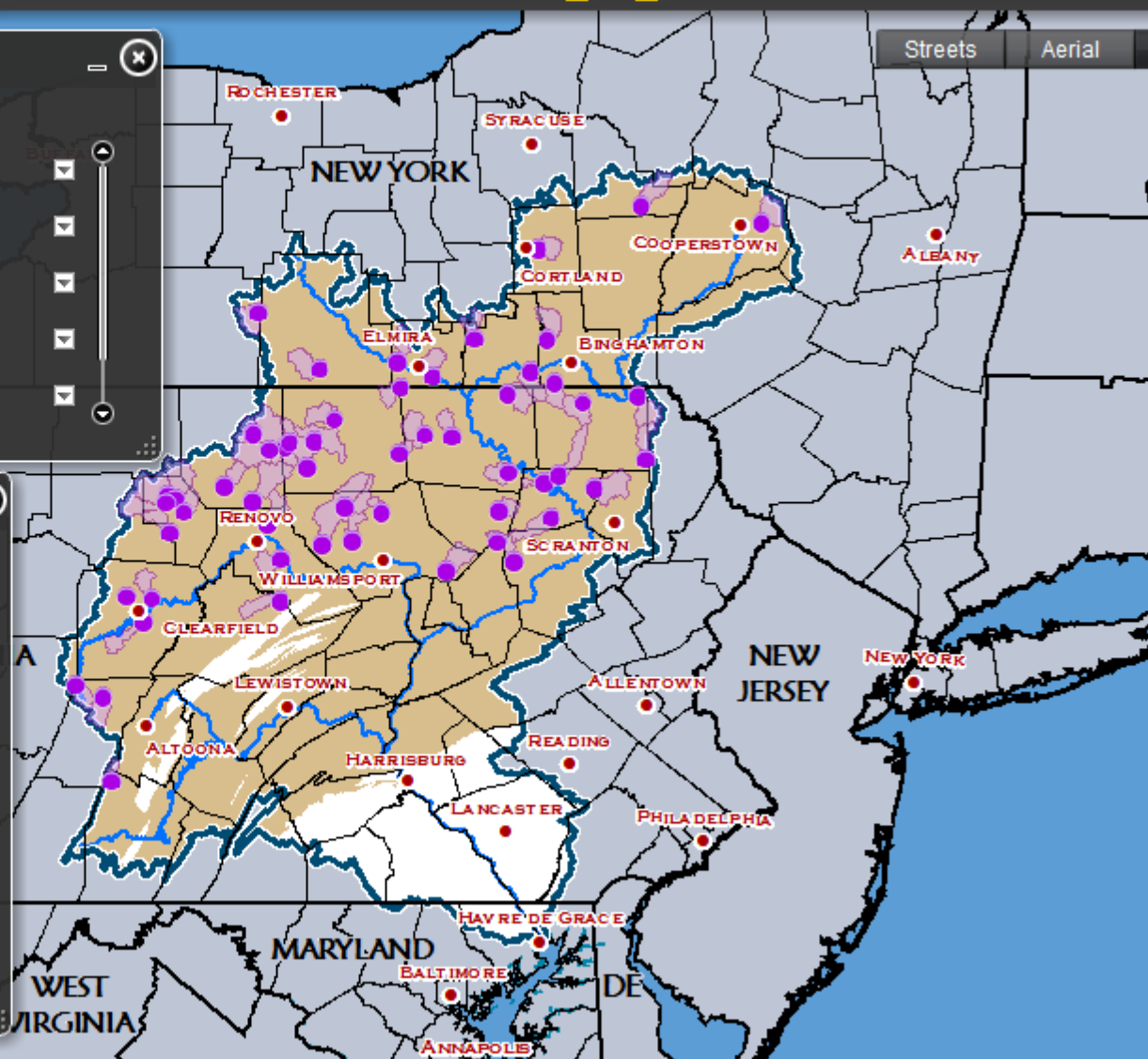
Blockhouse Cr. - English Center, PA

Bobs Cr. - Pavia, PA

Bowman Cr. - Bowman Creek, PA

Canacadea Cr. - Almond, NY

Cherry Valley Cr. - Middlefield, NY







Credit: Photo taken by Nicholas Tonelli



Questions?

