

Toward Sustainable Water Information: Are Existing Water Monitoring Data Sufficient to Make Scientifically Sound Water Policy Decisions?

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National Monitoring Conference
April 30, 2014
Cincinnati, Ohio

Toward Sustainable Water Information

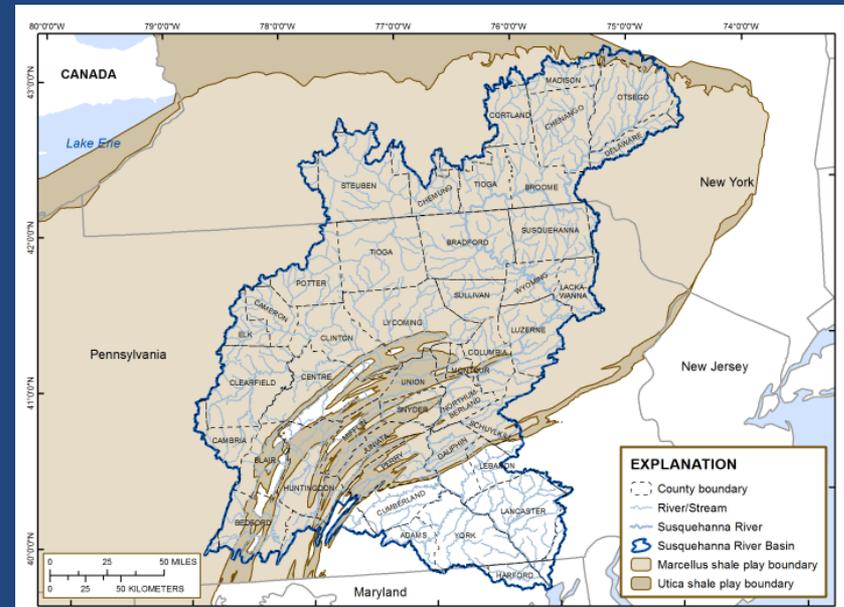
- Objective:
 - Investigate and describe the ability of the NEMW region's water monitoring programs to support decision making
- Primary Audience:
 - Congress and regional decision makers
- Case Study Goal:
 - Evaluate availability of water monitoring data to answer two policy questions



Case Studies: Do we have the water quality data needed to answer these questions?

How effective are BMPs at reducing nutrients from nonpoint sources at the watershed scale in the Lake Erie Basin?

Does shale gas development contaminate groundwater or surface water in the Susquehanna River Basin?



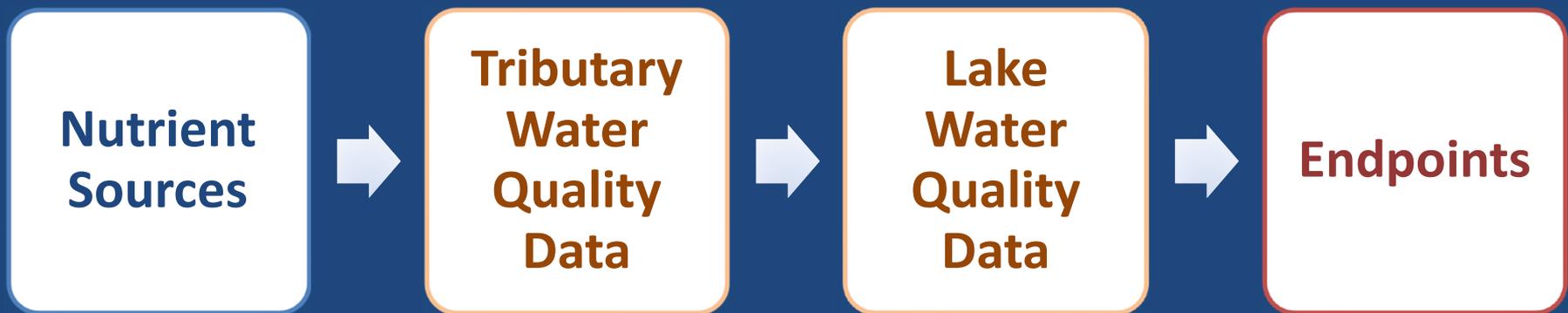
Are Existing Water Monitoring Data Sufficient to Make Scientifically Sound Water Policy Decisions?

- Available water monitoring data are insufficient to inform the case study policy questions
- Small priority watersheds are the most practicable scale for detecting a signal of BMP effectiveness, but limited data are available
- The suite of monitoring parameters needed to identify potential groundwater contamination from shale gas development are generally not available

Approach

- Form Steering and Technical Advisory Committees
- Select case study regions
- Determine data needed to answer policy question
- Identify available data
- Evaluate suitability to answer policy question
- Identify data gaps and additional data needs

What Data are Needed to Understand the Effectiveness of BMPs in the Lake Erie Basin?

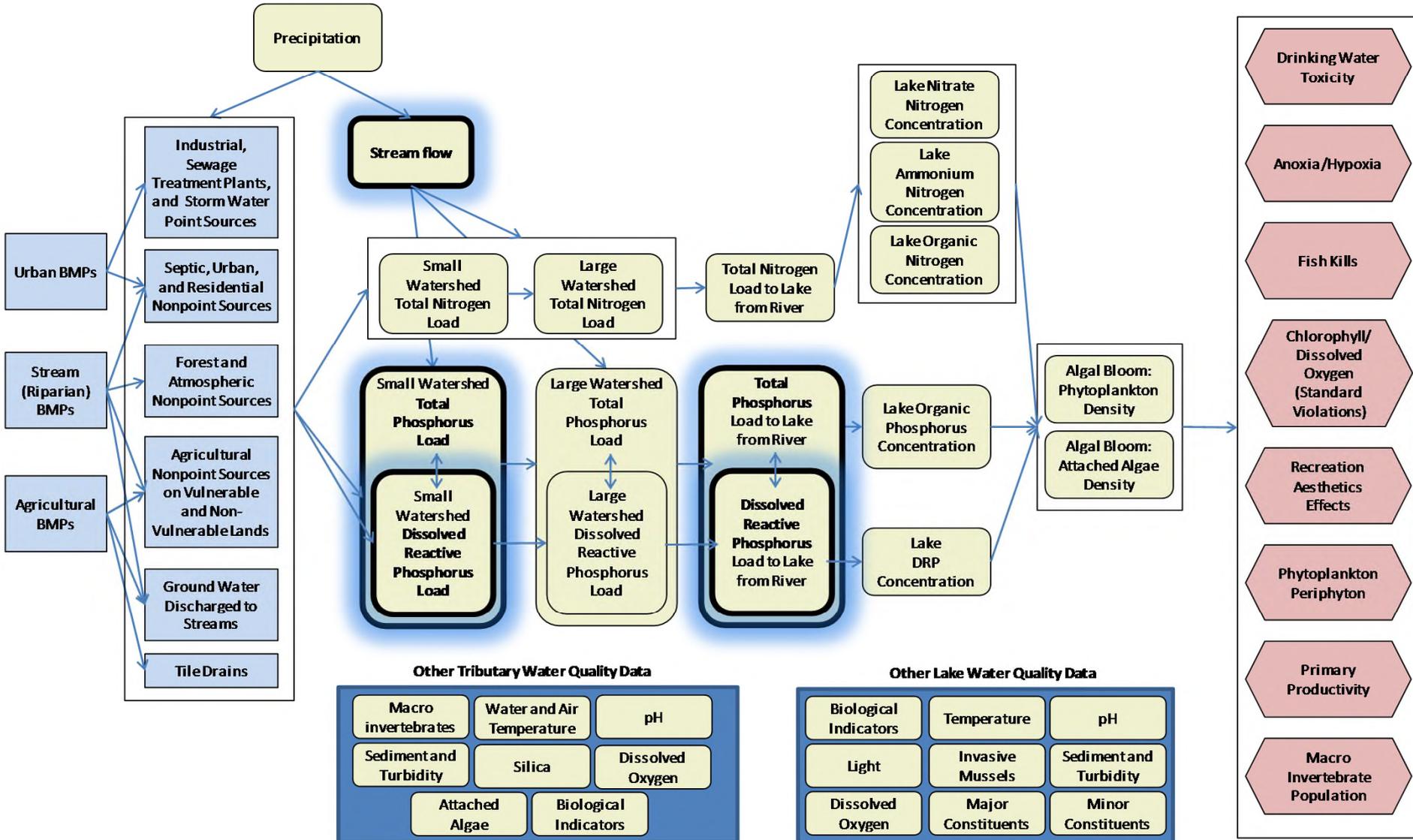


Nutrient Sources

Tributary Water Quality Data

Lake Water Quality Data

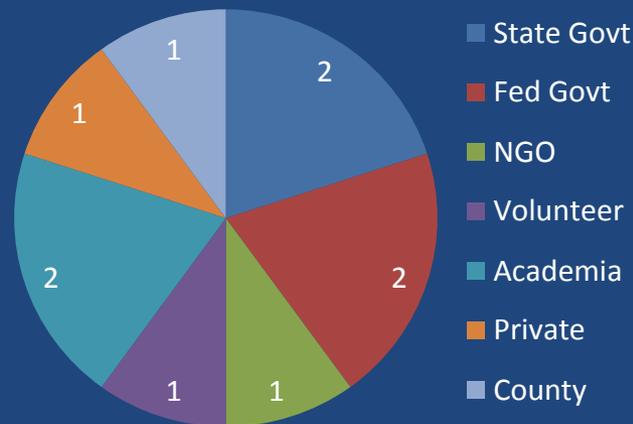
Endpoints



Existing Data are Challenging to Compile and Organize for Analysis

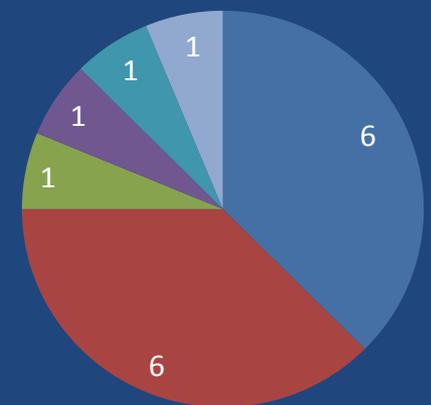
- Different naming and coding conventions
- Lack of metadata
- Different monitoring objectives
- Data stored in multiple databases; duplicate records

Organizations Collecting Groundwater Data in the Susquehanna River Basin



#orgs: 10
#sites: 9,745
#records: 233,703

Organizations Collecting Stream Water Quality Data in the Lake Erie Basin



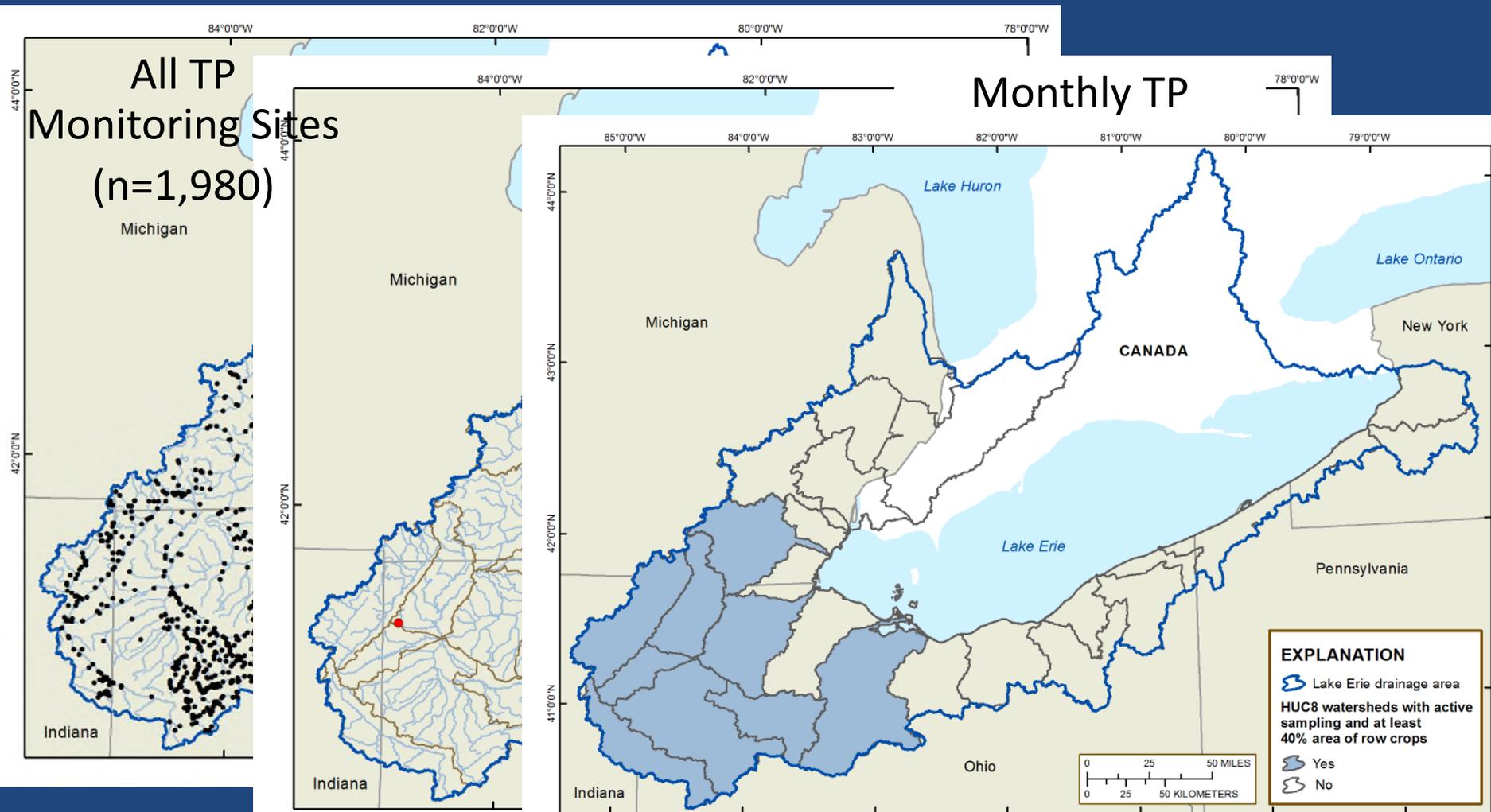
#orgs: 16
#sites: 2,968
#records: 1,141,899

Statistical Power Analysis: Magnitude of BMP Effectiveness and Phosphorus Variability Controls Ability to Detect Change

Station Name	Years of Monthly Sampling to detect 10% change from median TP value*	Years of Monthly Sampling to detect 40% change from median TP value*
Large Watersheds		
Maumee River at Waterville, OH	55	
Sandusky River near Fremont OH	92	
Saint Mary's River	36	
St. Joseph River near Newville, IN	77	
Small Watersheds		
Rock Creek at Tiffin, OH		9
Unnamed Tributary to Lost Creek near Farmer, OH		5

*At 20% Error level

Large Watersheds Collecting Data to Measure BMP Effectiveness, But Small Watersheds Are Not



Map 21. HUC8 watersheds that have at least 40% area of row crops and at least one monitoring station

What Water Quality Data are Needed to Understand the Impact of Shale Gas Activities on Groundwater?

**Shale Gas
Activities**



**Contaminant
Drivers and
Processes**



**Selected
Parameters**



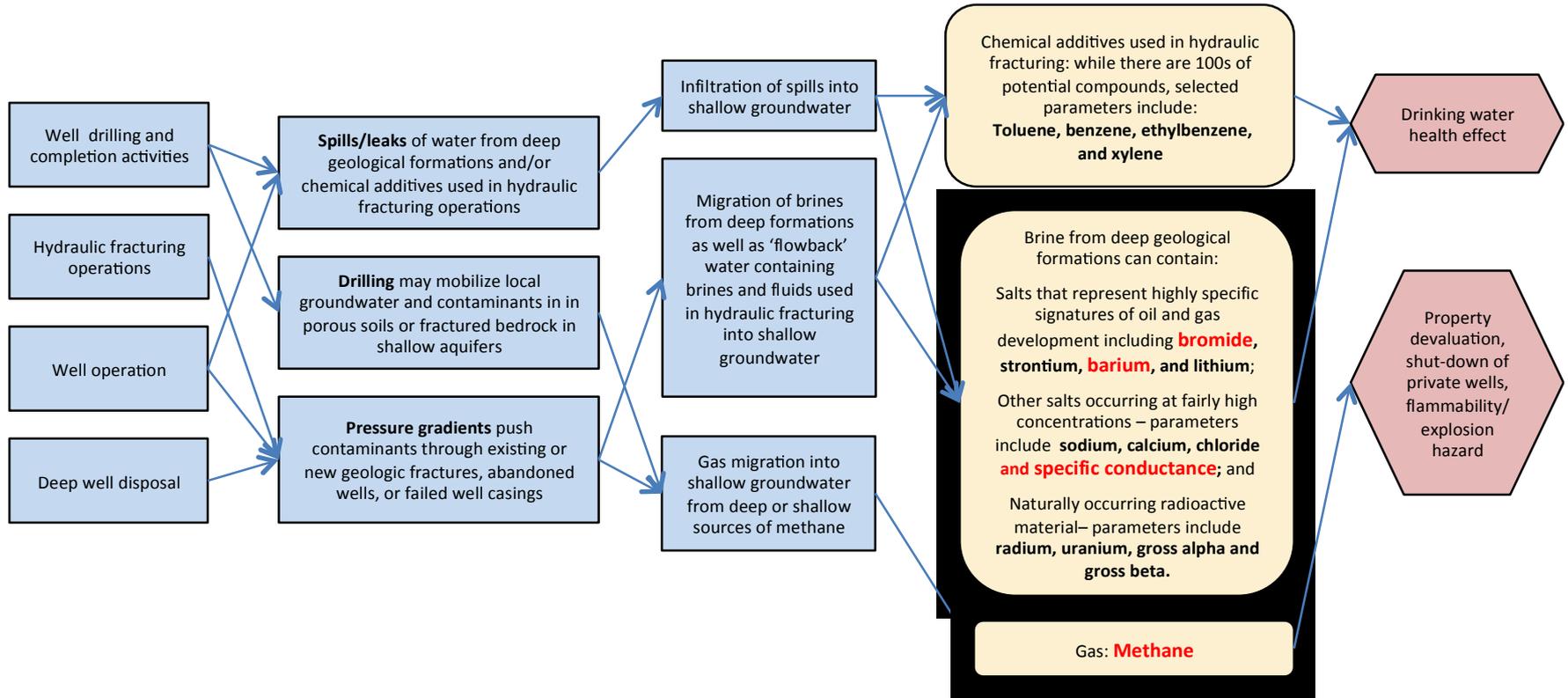
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Shale Gas Activities

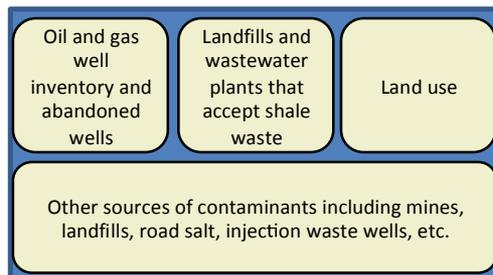
Contaminant Drivers and Processes

Selected Parameters

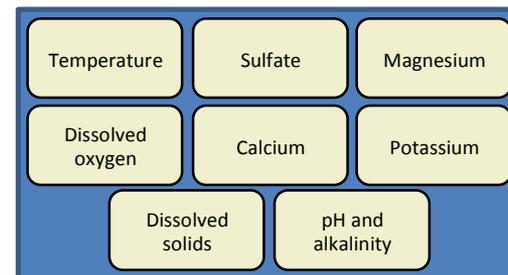
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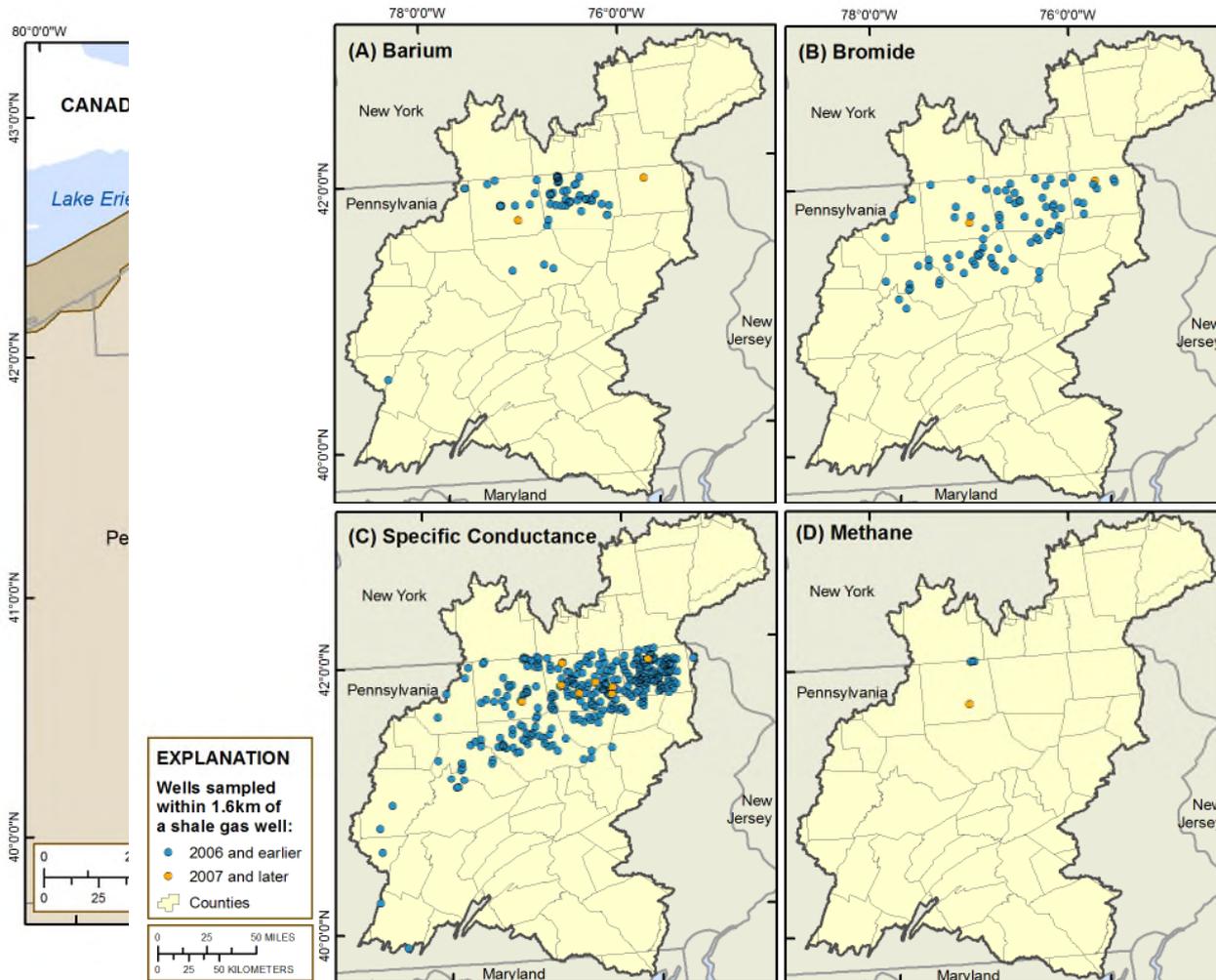
Ancillary Data



Other Water Quality Data



Few Sites Are Sampled for Shale Gas Focus Parameters Near Gas Wells

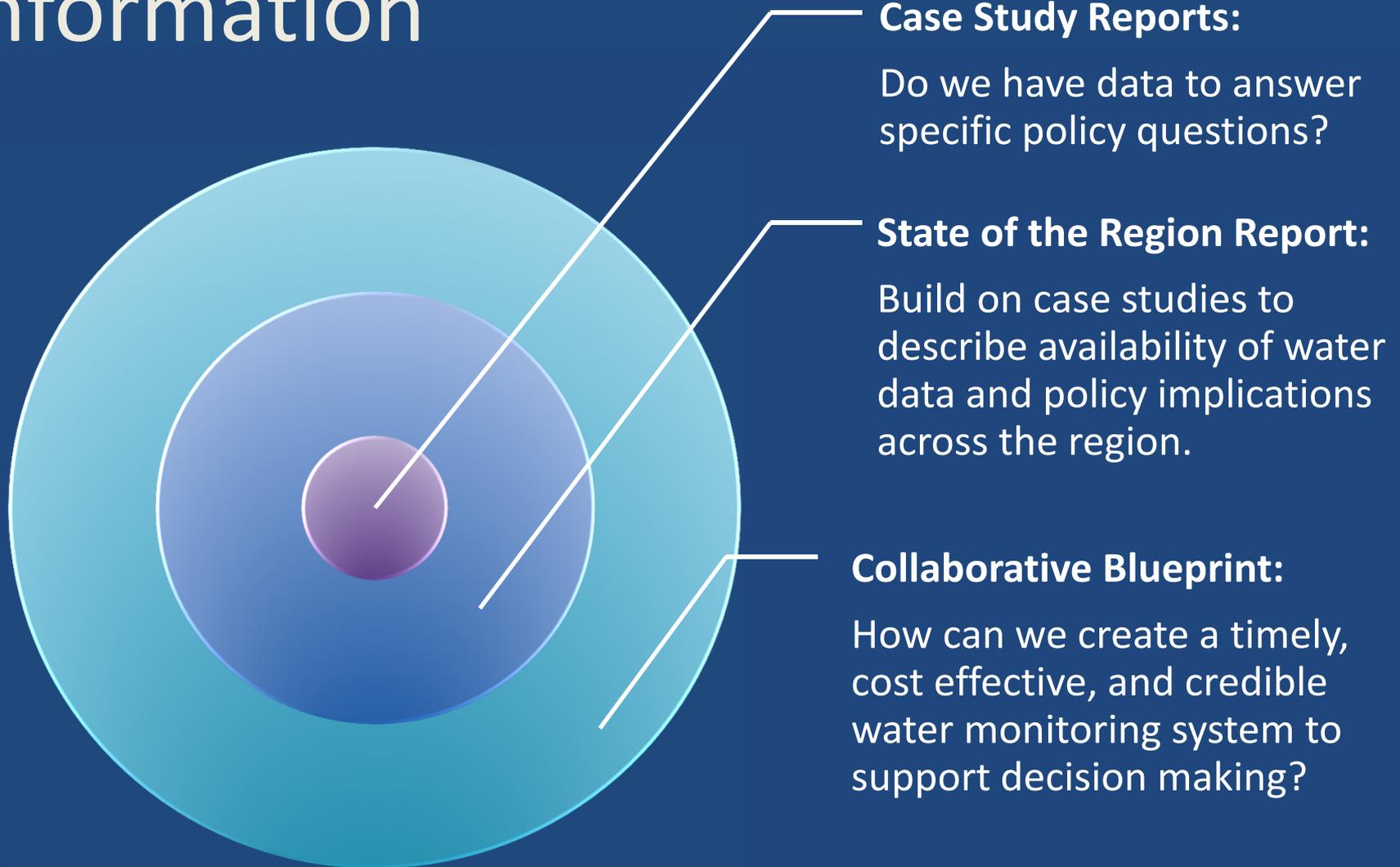


All groundwater sites monitoring focus parameters within 1.6 km of gas wells

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- The suite of monitoring parameters needed to identify potential groundwater contamination from shale gas development are generally not available in the Susquehanna River Basin

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Questions?