

# CarbonSAFE Illinois – Macon County

FE-0029381

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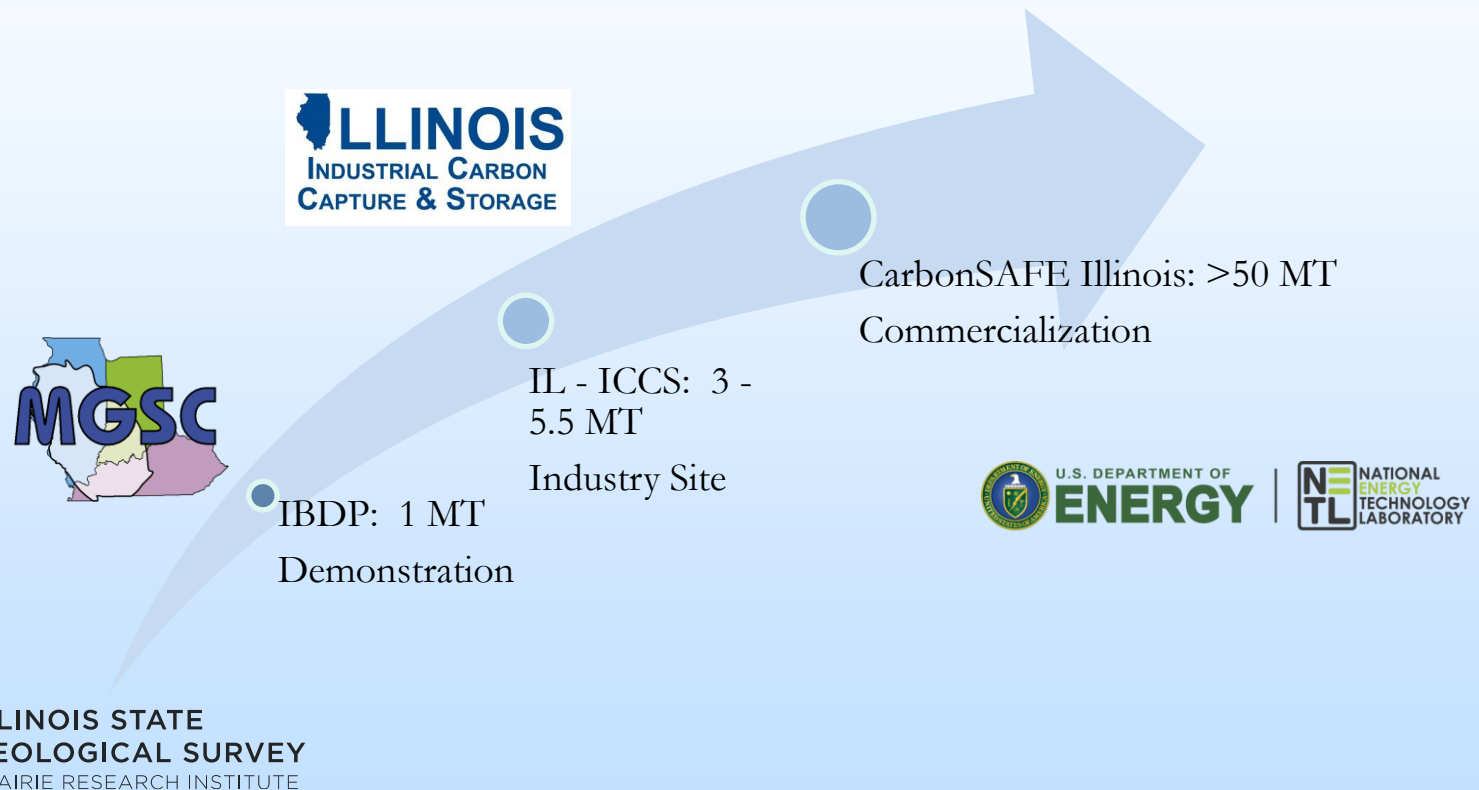
U.S. Department of Energy  
National Energy Technology Laboratory  
Mastering the Subsurface Through Technology Innovation, Partnerships and Collaboration:  
Carbon Storage and Oil and Natural Gas Technologies Review Meeting  
August 1-3, 2017

# Presentation Outline

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- Project Objectives & Setting
- Technical Status
- Accomplishments
- Lessons
- Synergistic Opportunities
- Summary

# CCS Progression to Commercialization in Illinois



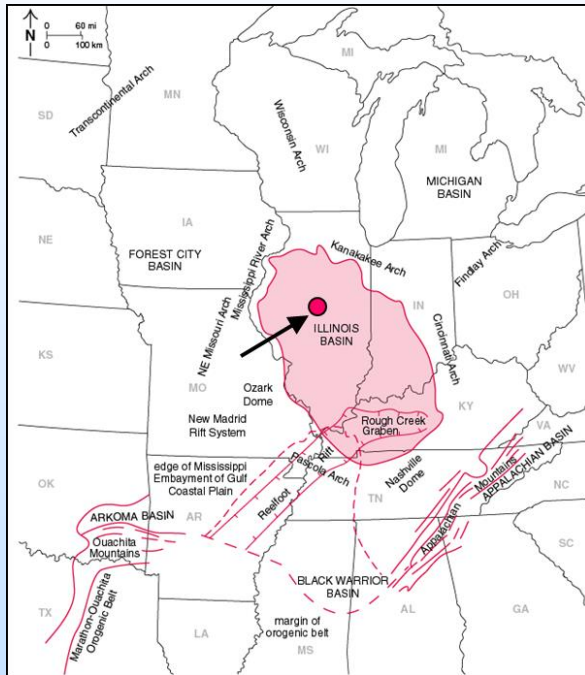
# Project Aspects

Address technical and non-technical questions around developing commercial-scale storage complexes.

- Assess Public Outreach needs
- Analyze Regulatory Issues
- Analyze Business Aspects
- Characterize the Subsurface Storage Complex
- Analyze Infrastructure Needs
- Site Development Plan

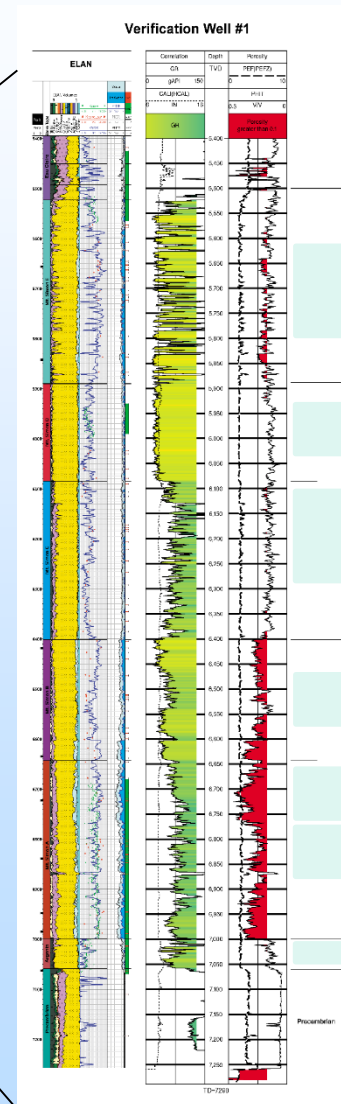
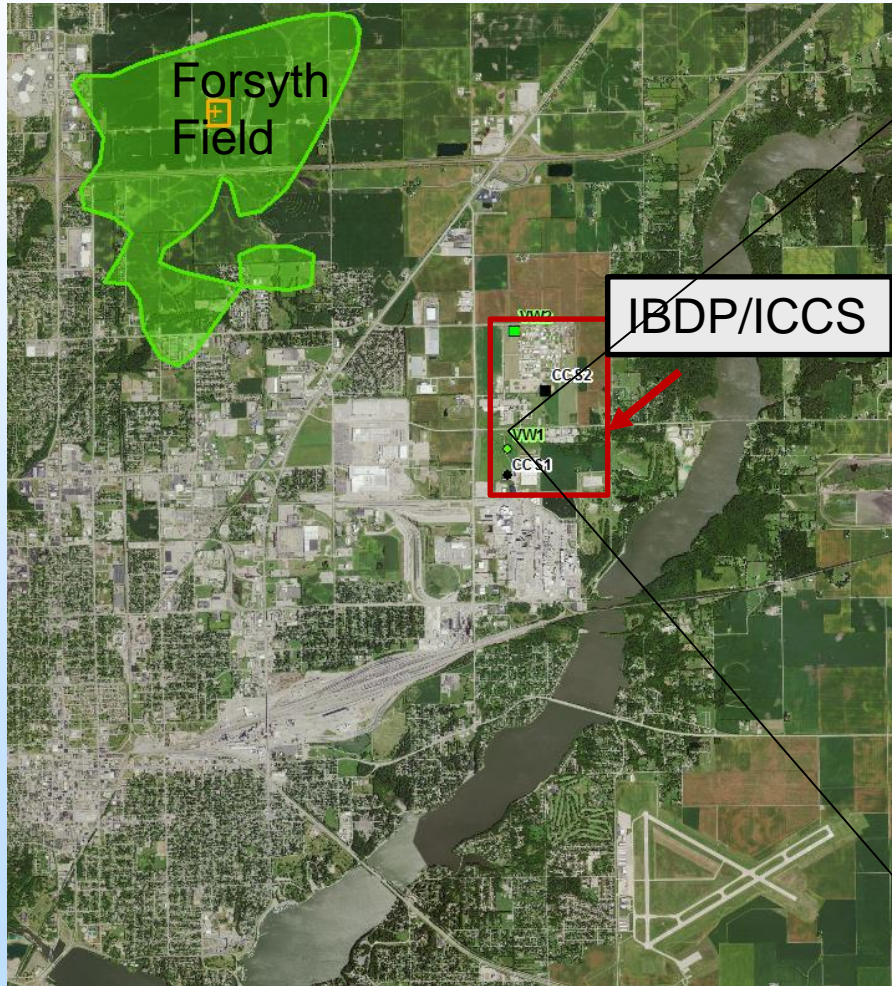
# Technical Status

## Storage options in Macon County



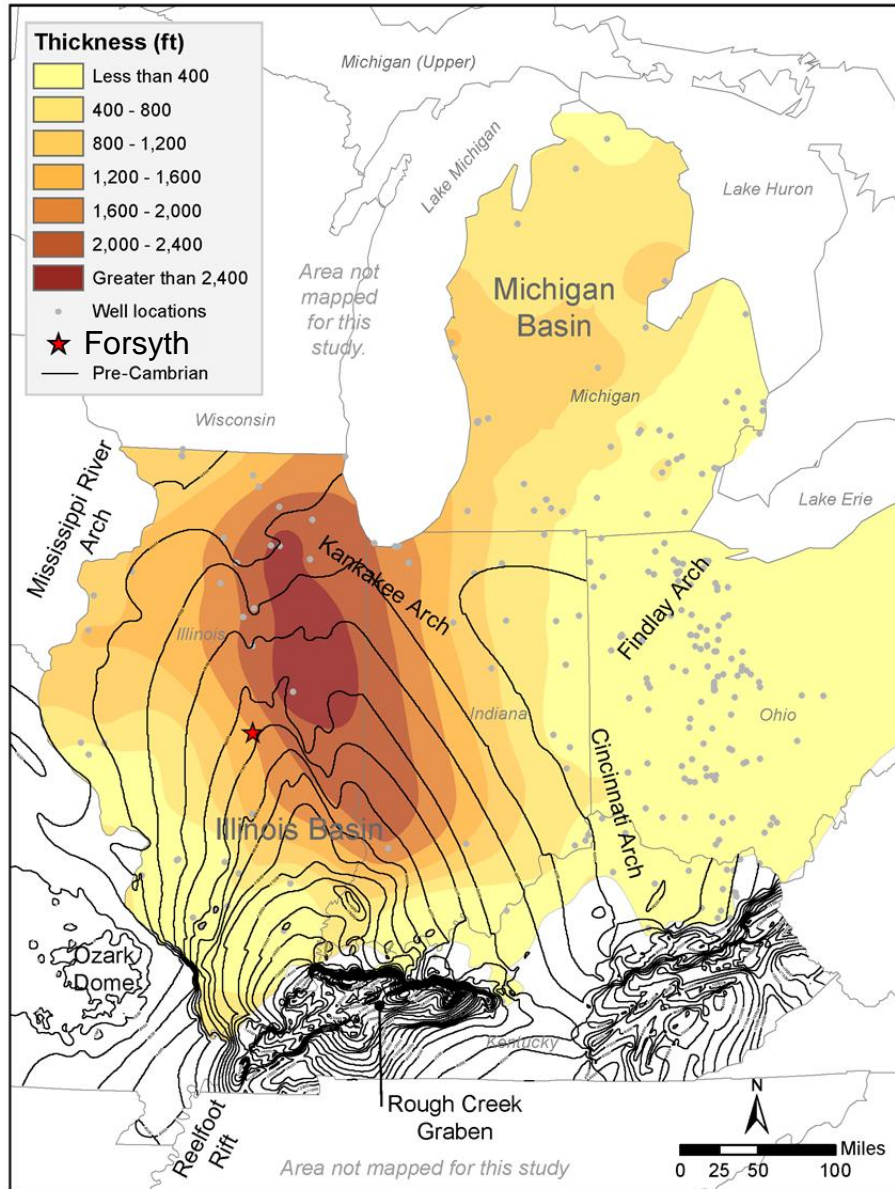
SYSTEM	GROUP	FORMATION	Storage Elements			
Ordovician	Maquoketa	Brainard	Secondary Seal	St. Peter-Knox Storage Complex	Cambro-Ordovician Storage Complex	
		Ft. Atkinson				
		Scales				
	Galena	Kimmswick	Potential target			
		Decorah				
	Plateville					
	Ansell	Joachim				
		St. Peter				
	Knox	Shakoppee				Secondary Seal/Reservoir
		New Richmond				
Oneota						
Gunter						
Eminence		Potential target				
Potosi						
Cambrian	Franconia	Ironton-Galesville	Mt. Simon Storage Complex			
				Eau Claire		Primary Seal
				Mt. Simon		Target reservoir
	Precambrian					

# Subsurface Characterization



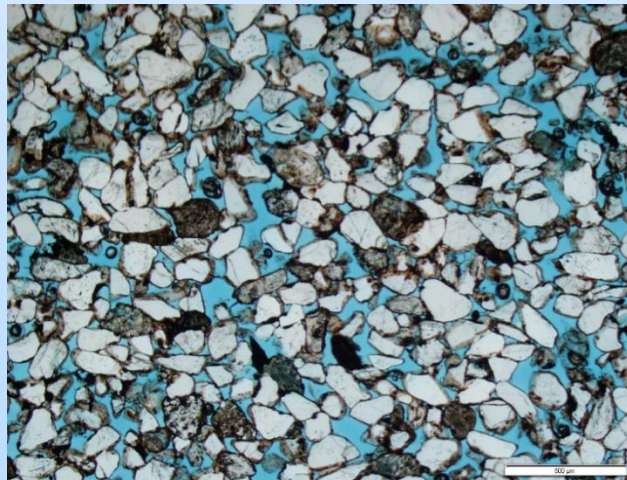
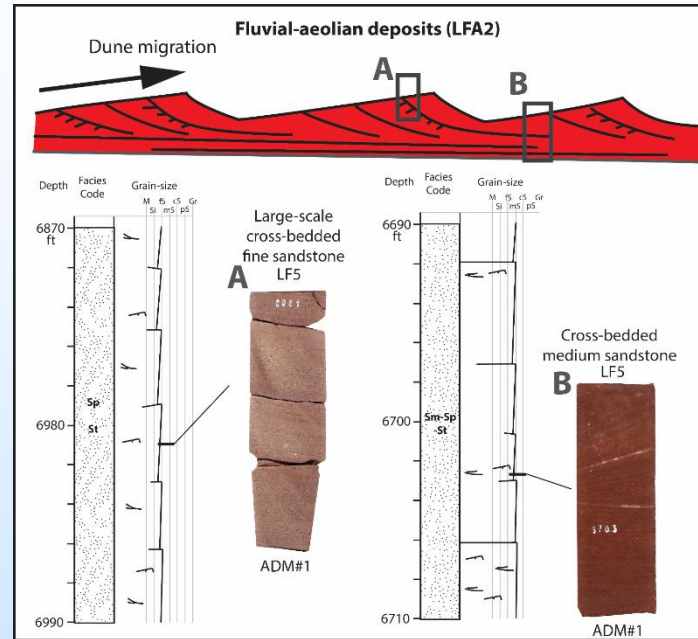
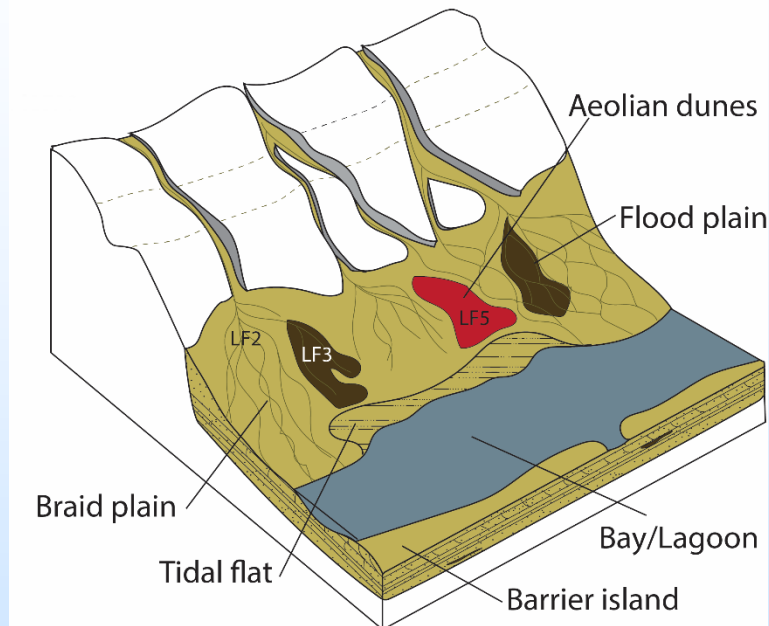


# Mt Simon Sandstone



- Mt. Simon Sandstone is ~ 1500 ft thick at Forsyth Field, Macon County
- In Macon County (IBDP), the Mt. Simon can be divided into three major sections
- Underlying unit (Argenta), has highly variable thickness.
- Argenta is unconformably bound and overlies weathered Precambrian surface

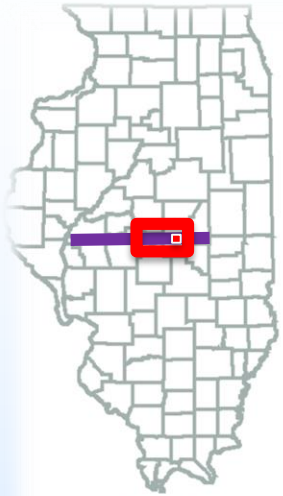
# Mt Simon Depositional Environment



**Lower Mt. Simon can have up to 30% porosity. Porosity largely secondary via feldspar dissolution.**

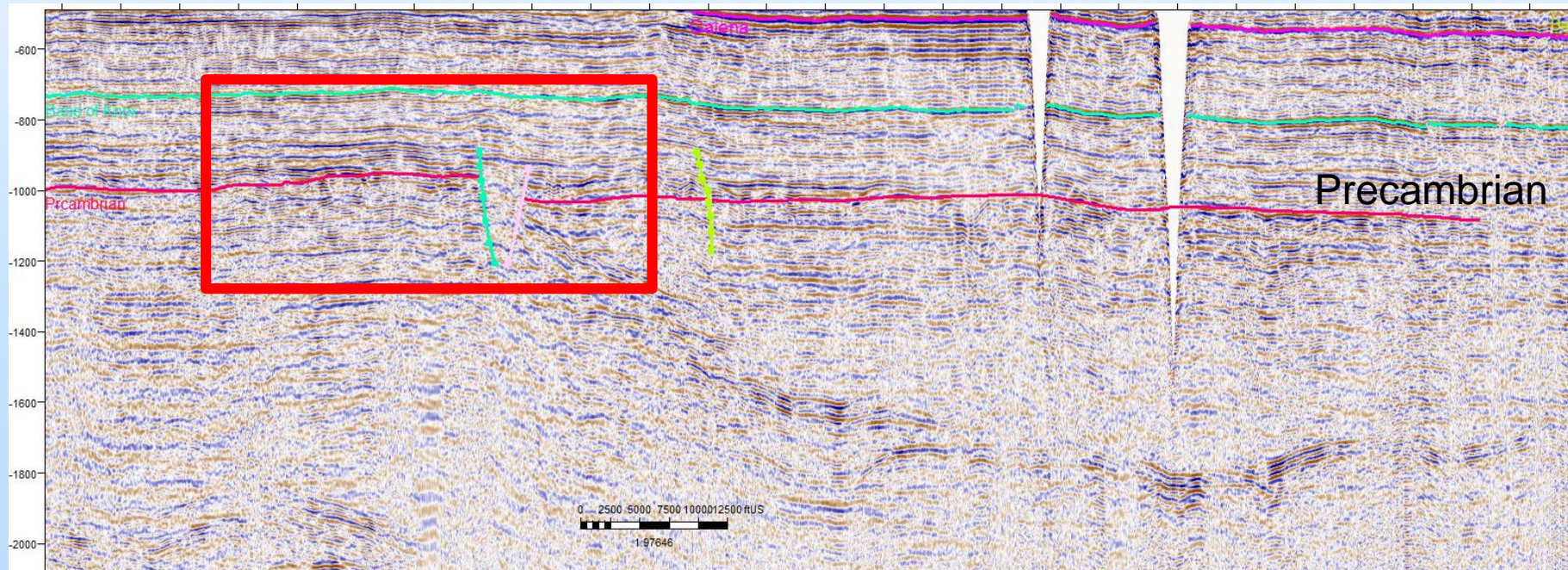


# Lateral Continuity and Basement Highs

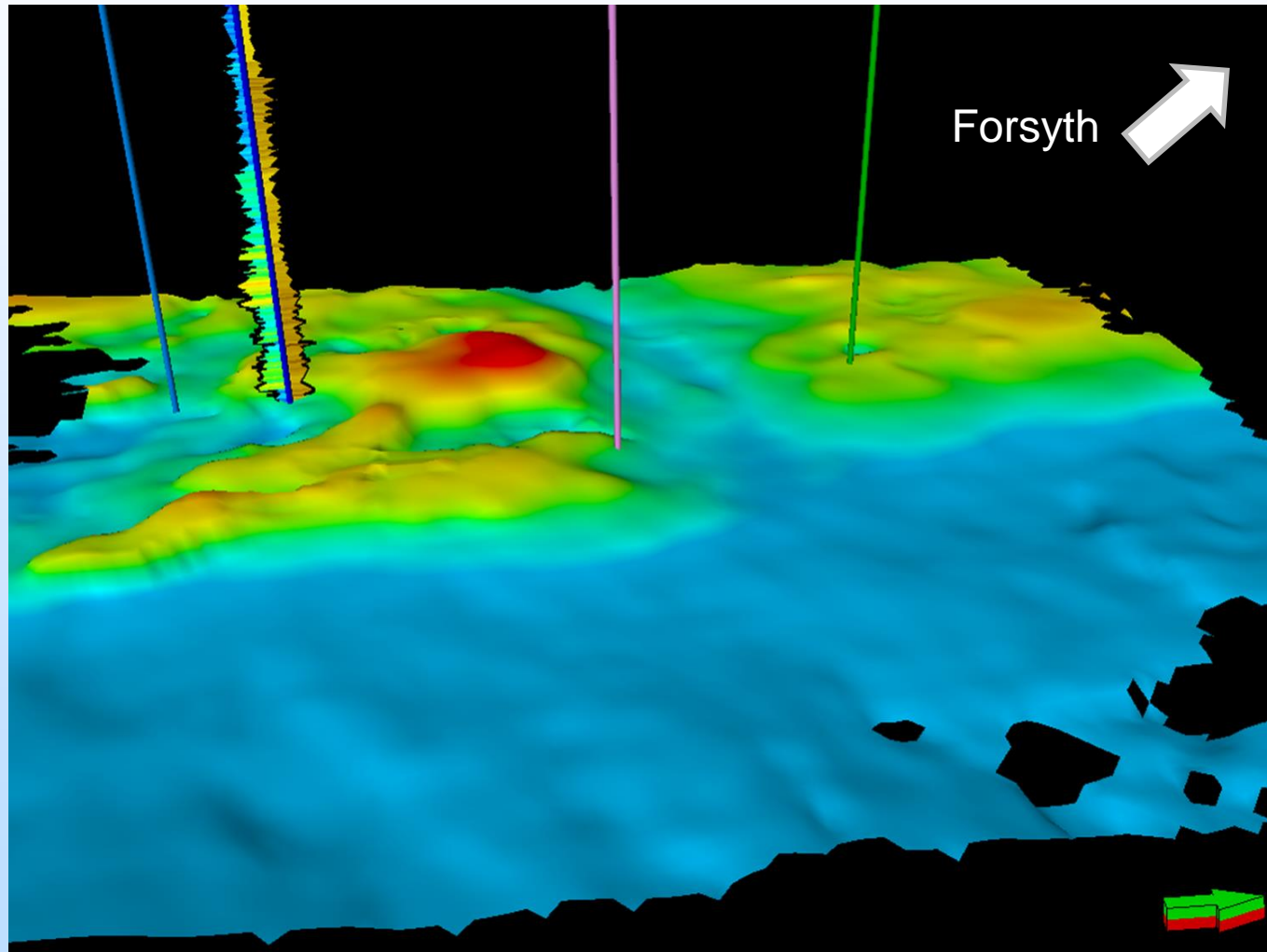


0 25 50 100 150 200  
Miles

- What is the relationship of Precambrian highs and arkosic high porosity sands?
- Where is it thickest?



# Basement Topography

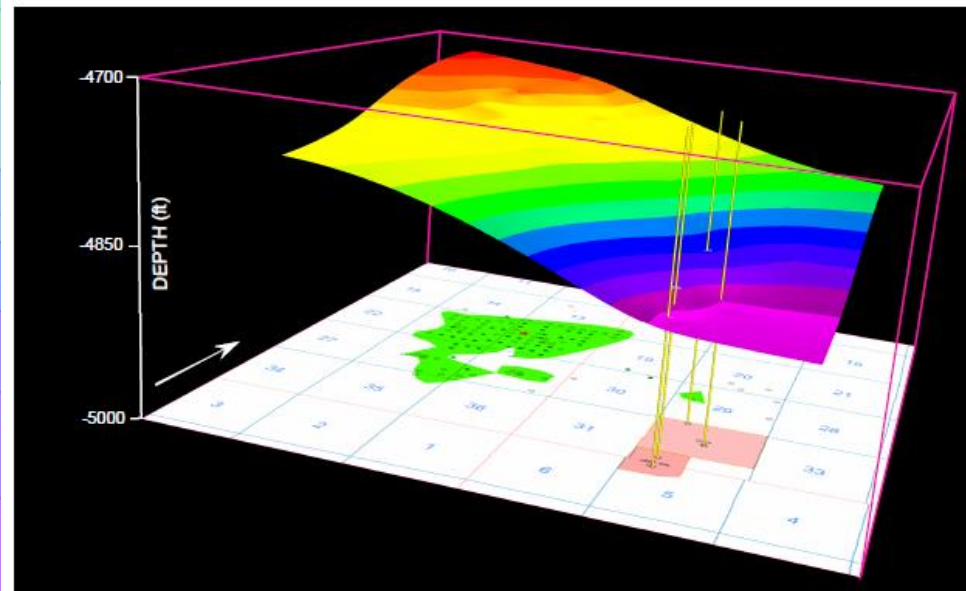
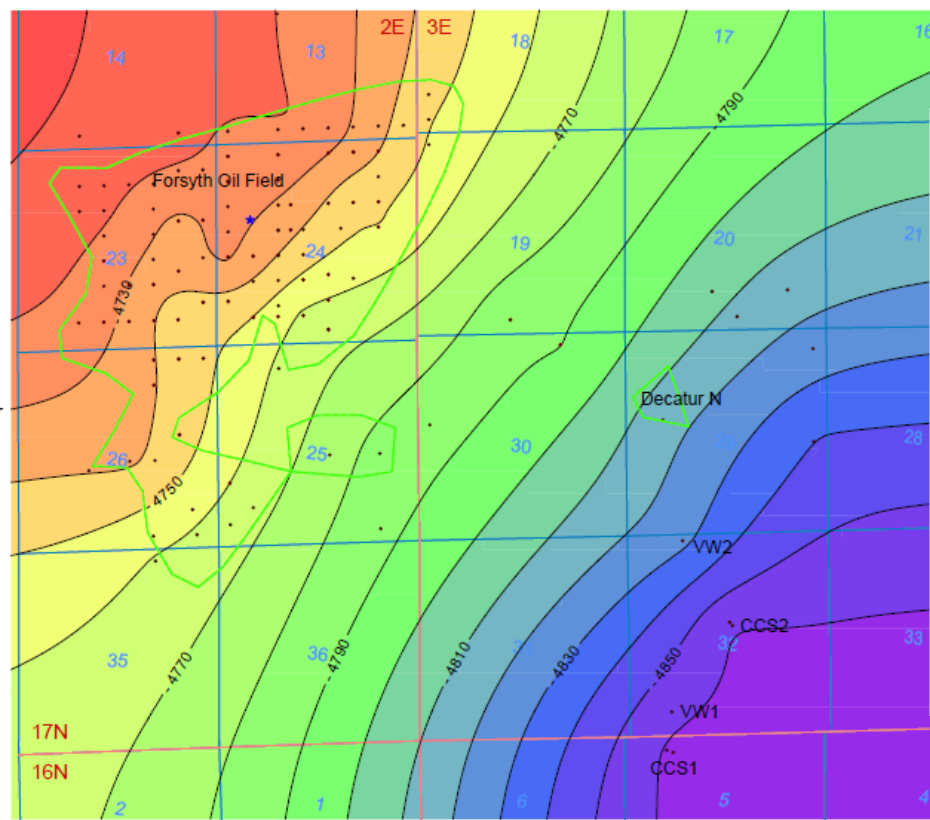


3D  
Seismic  
IBDP

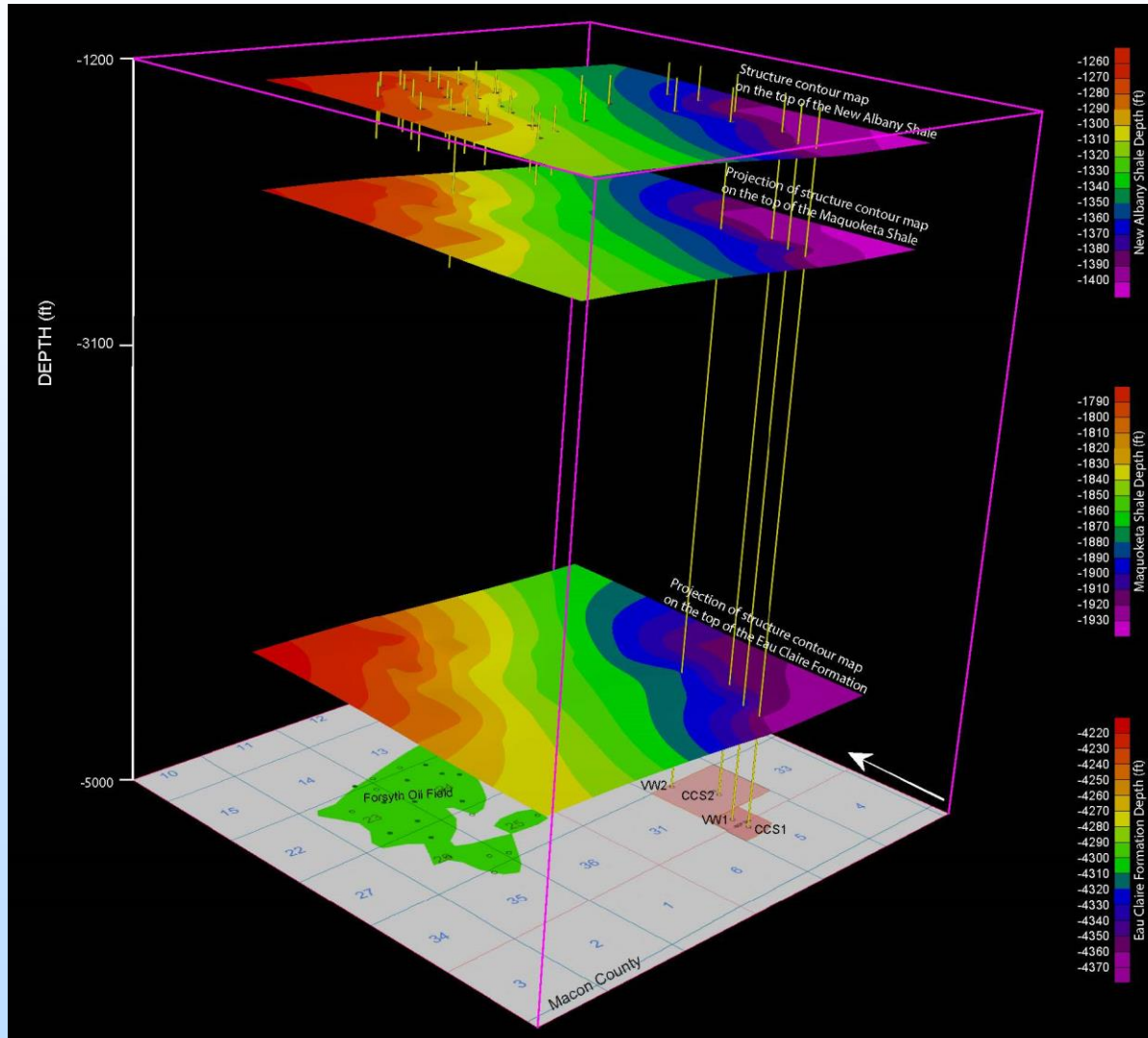




# Mt. Simon Structure at Forsyth



# Structure on Seals



## New Albany Shale

## Maquoketa Shale

Eau Claire Fm

# Stratigraphic Well

Drill ca 7500 ft depth

Core 4 to 5 intervals

Silurian;

Eau Claire – U Mt Simon;

L Mt Simon;

*Argenta (pre-Mt Simon) TBD;*

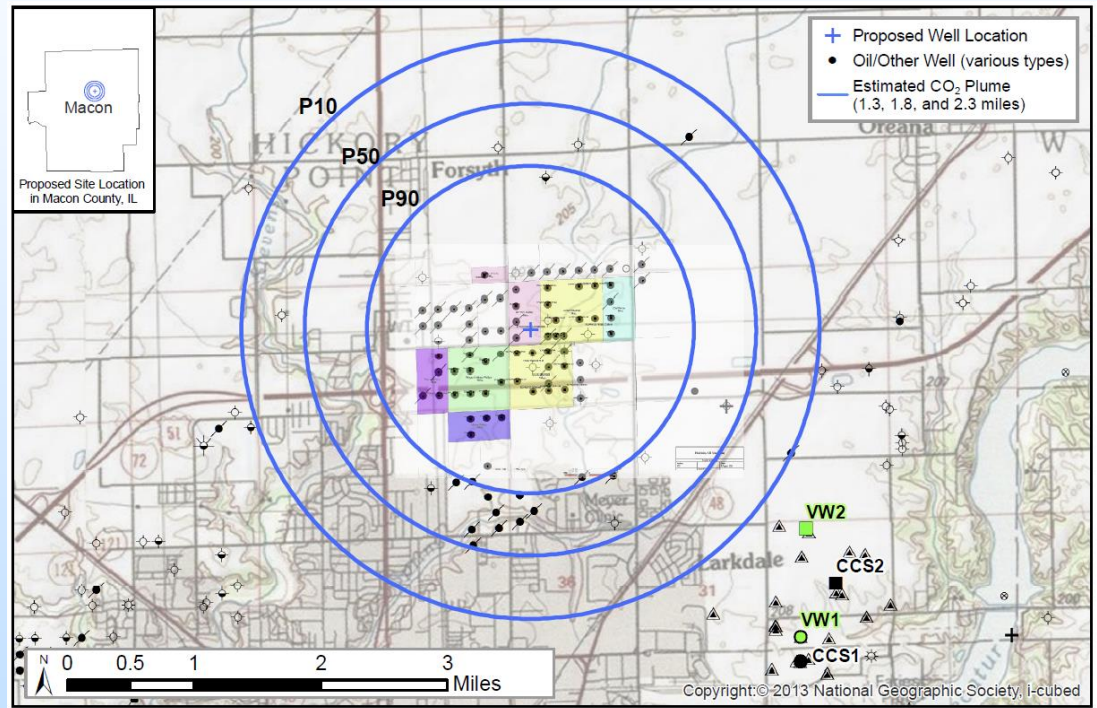
Precambrian

Sidewall core

Extensive logging suite

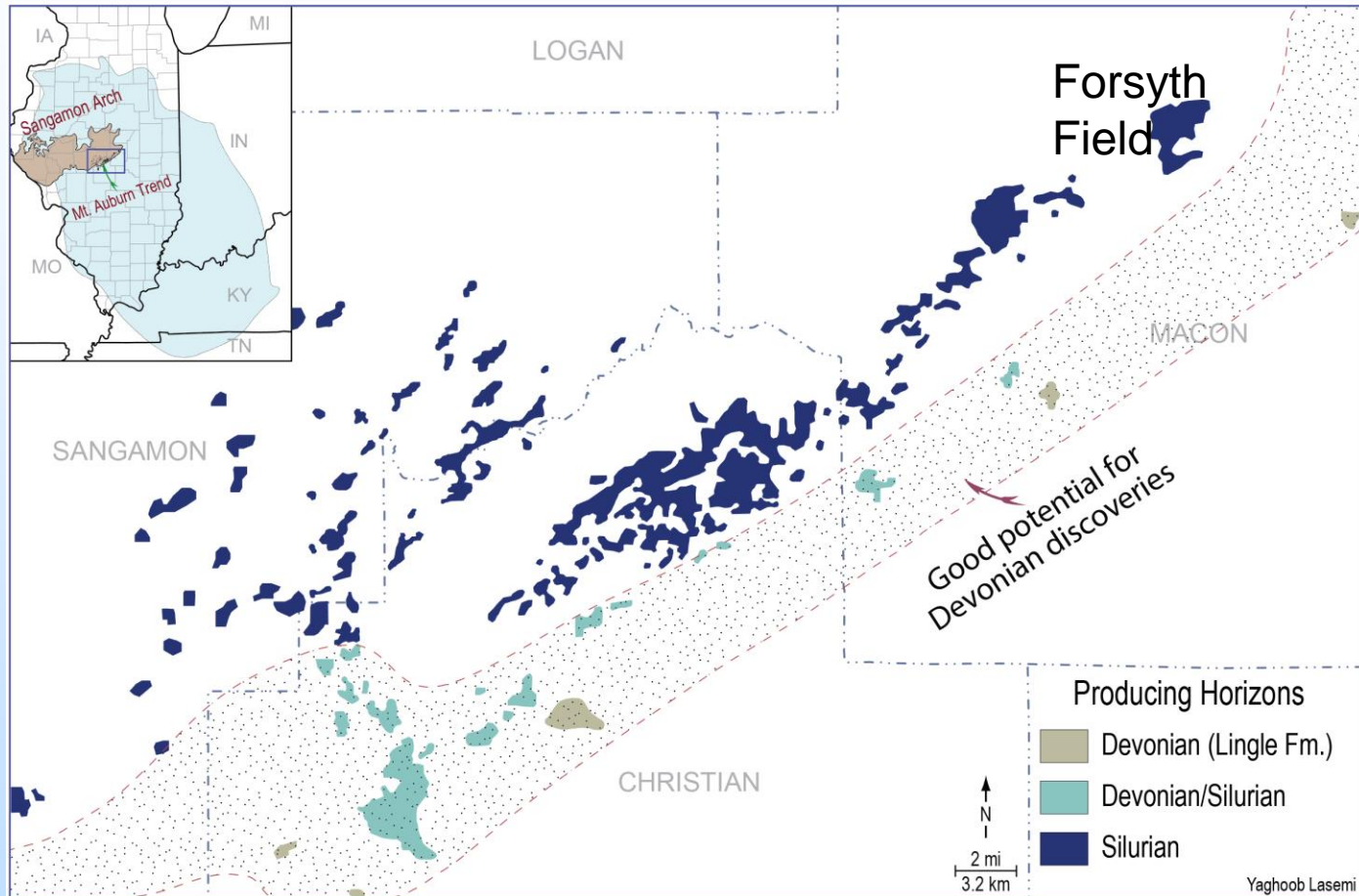
Well tests

Core Studies & Measurements





# Mt Auburn Trend – EOR potential

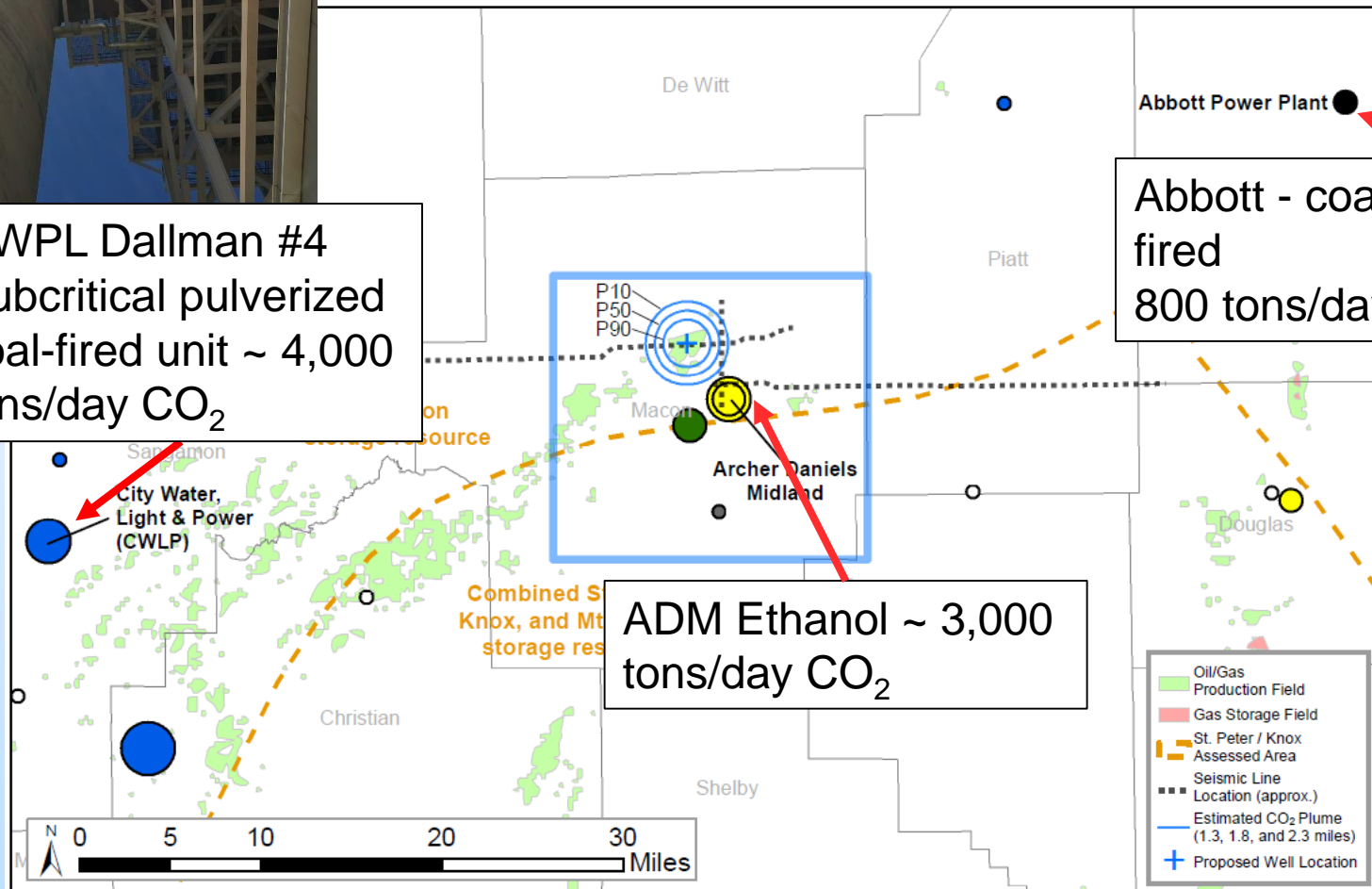


# CO<sub>2</sub> Sources

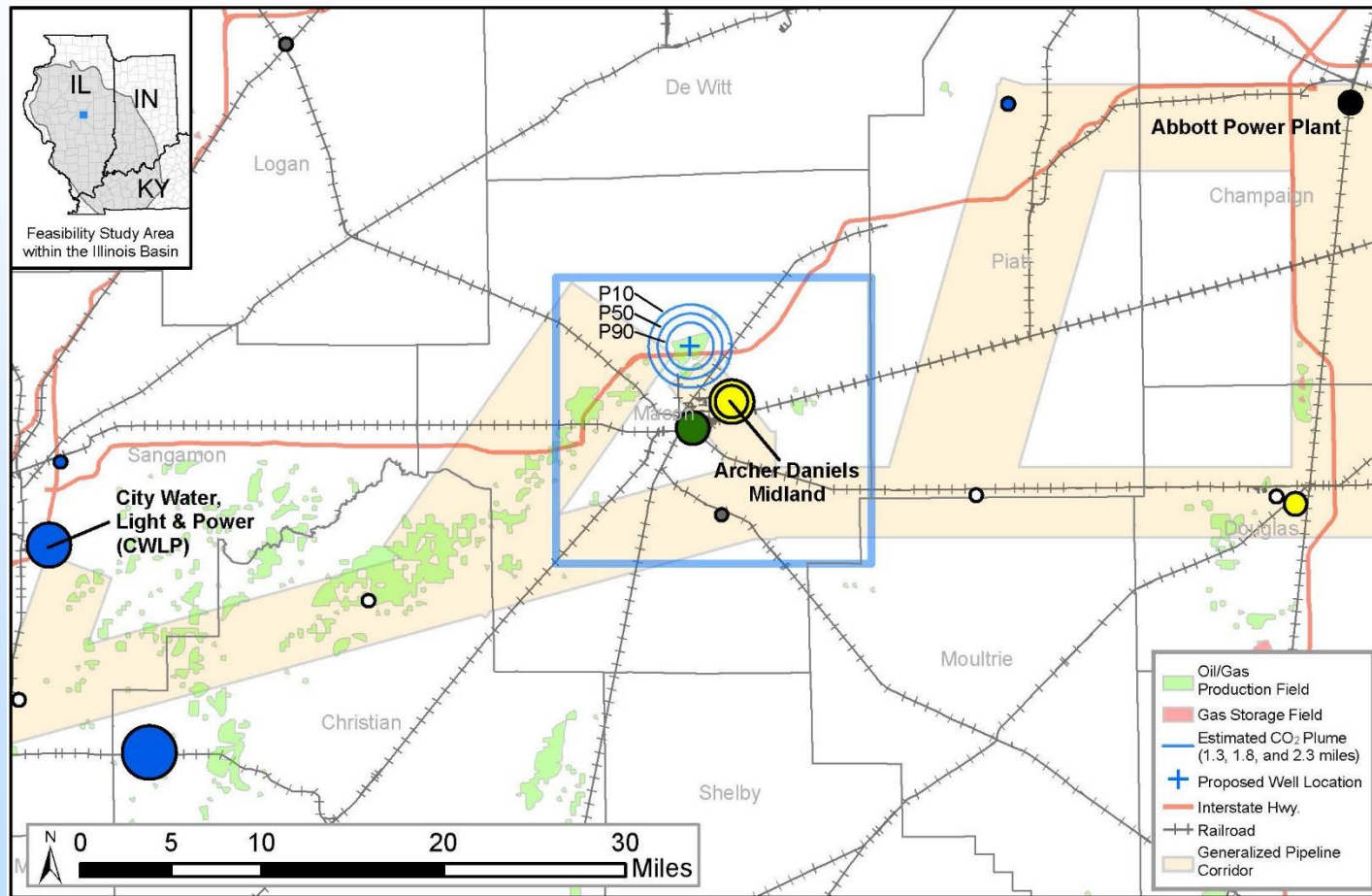
CWPL Dallman #4  
Subcritical pulverized  
coal-fired unit ~ 4,000  
tons/day CO<sub>2</sub>

Abbott - coal & gas  
fired  
800 tons/day CO<sub>2</sub>

ADM Ethanol ~ 3,000  
tons/day CO<sub>2</sub>



# Potential CO<sub>2</sub> Transportation Corridors



# Accomplishments to Date

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- Conducted Project Kick-off
- Updated mapping and GIS with additional Forsyth Field data
- Constructed structure and isopach maps of Forsyth area for drilling plan
- Initiated model development of target site
- Site visit at Springfield CWPL CO<sub>2</sub> source
- Started data exchange for NRAP

# Lessons Learned

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- Challenge in understanding lateral continuity of reservoir quality in Lower Mt Simon
- Challenge in addressing economic questions from potential CO<sub>2</sub> sources



# Synergy Opportunities

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- Business case development
- Addressing permitting issues
- Addressing regulatory and policy issues
- Aspects of Stakeholder Engagement process
- Knowledge Sharing – NRAP screening
- Site development issues

# Project Summary

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- Drilling location identified for stratigraphic test well to evaluate feasibility of commercial-scale carbon storage in Macon County
- Geological mapping at drilling site near complete for well-drilling plan
- Next Steps
  - permitting
  - detailed well design
  - Drilling plan
  - Contracts and agreements for site access