GEOMECHANICAL HAZARD ASSESSMENT

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Partnership for carbon capture & offshore geologic storage
GoMCarb

GCCC
Gulf Coast Carbon Center

Bureau of Economic Geology

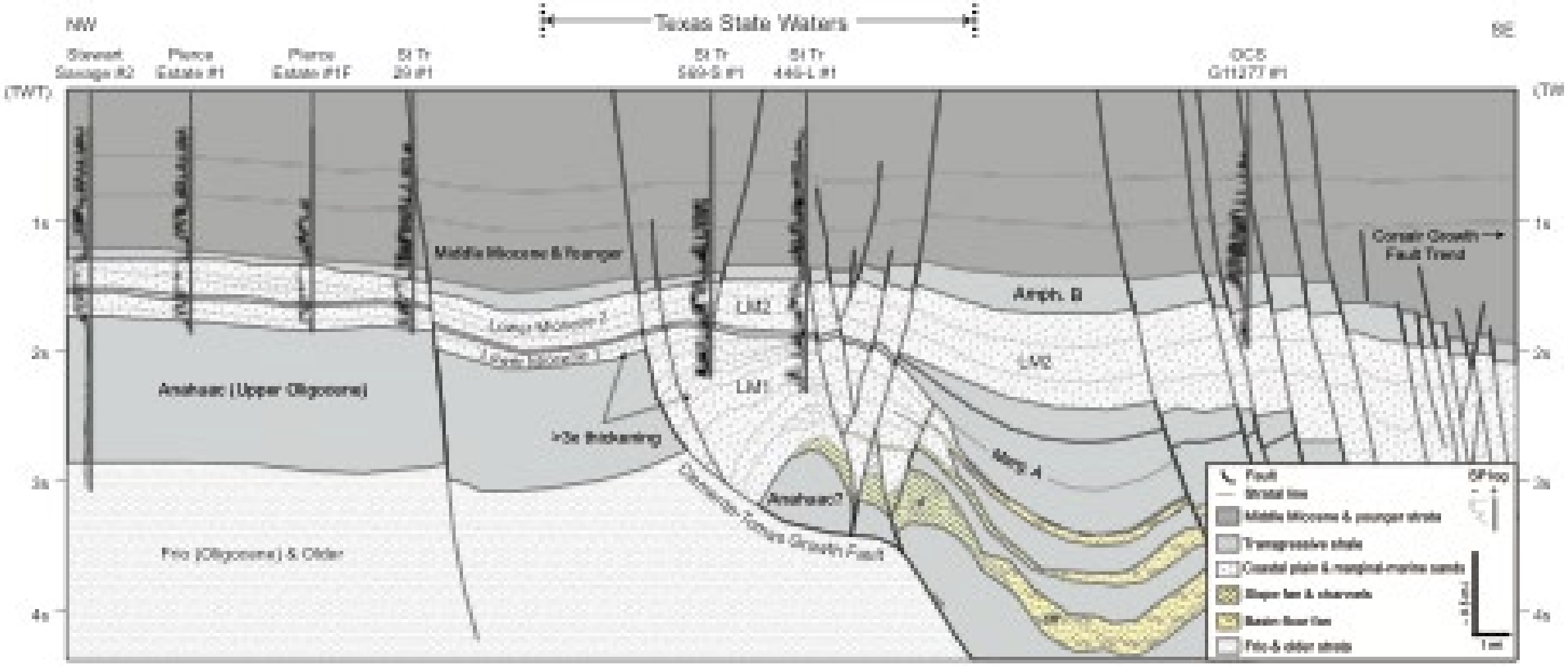
NETL
National Energy Technology Laboratory

Overall Objective

Develop a geomechanical hazard assessment for potential storage targets in the Gulf-of-Mexico

Specific Objectives

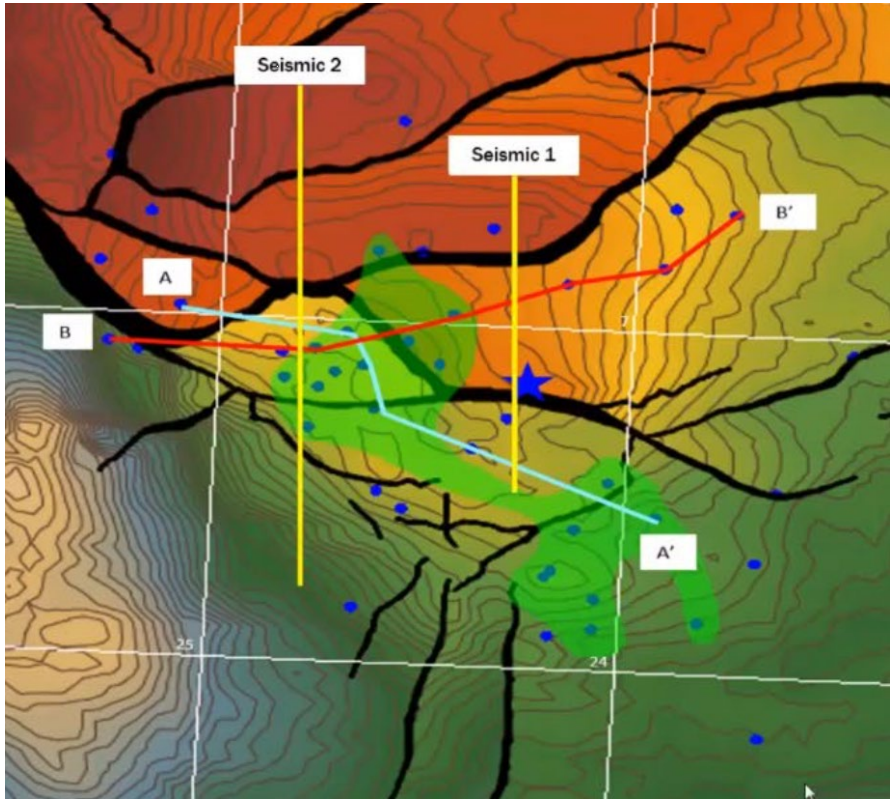
1. Estimate potential deformation of poorly-consolidated Miocene-age rocks
2. Refine understanding of how fault bounded structures could respond to injection
3. Make recommendations regarding further characterization efforts and geophysical monitoring designs

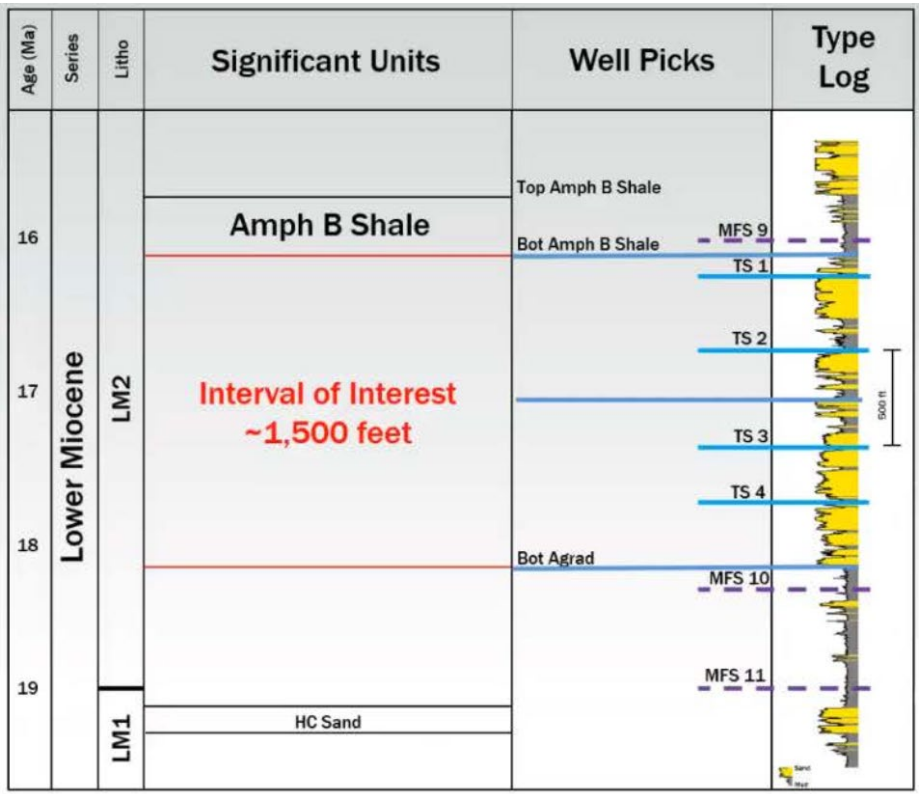


[Nicolson 2012]

Using High Island 24L as an analogue storage target

Specific enough to support detailed analysis, but underlying goal is regional knowledge that may be transferred to other storage targets.





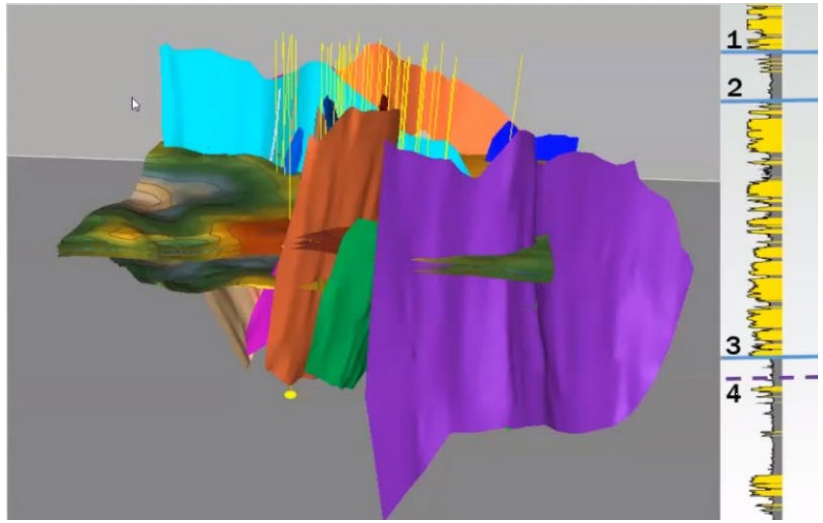
Work Packages

WP 1: State-of-stress characterization

WP 2: Rock property characterization

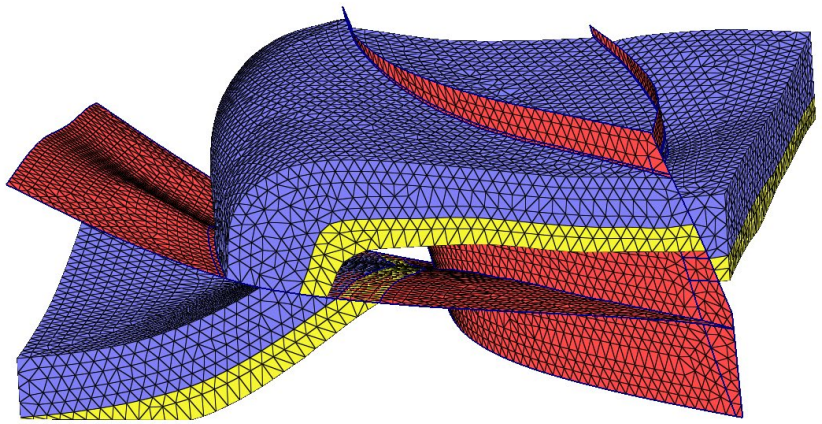
WP 3: Coupled geomechanical / compositional flow simulations

WP 4: Analysis and recommendations

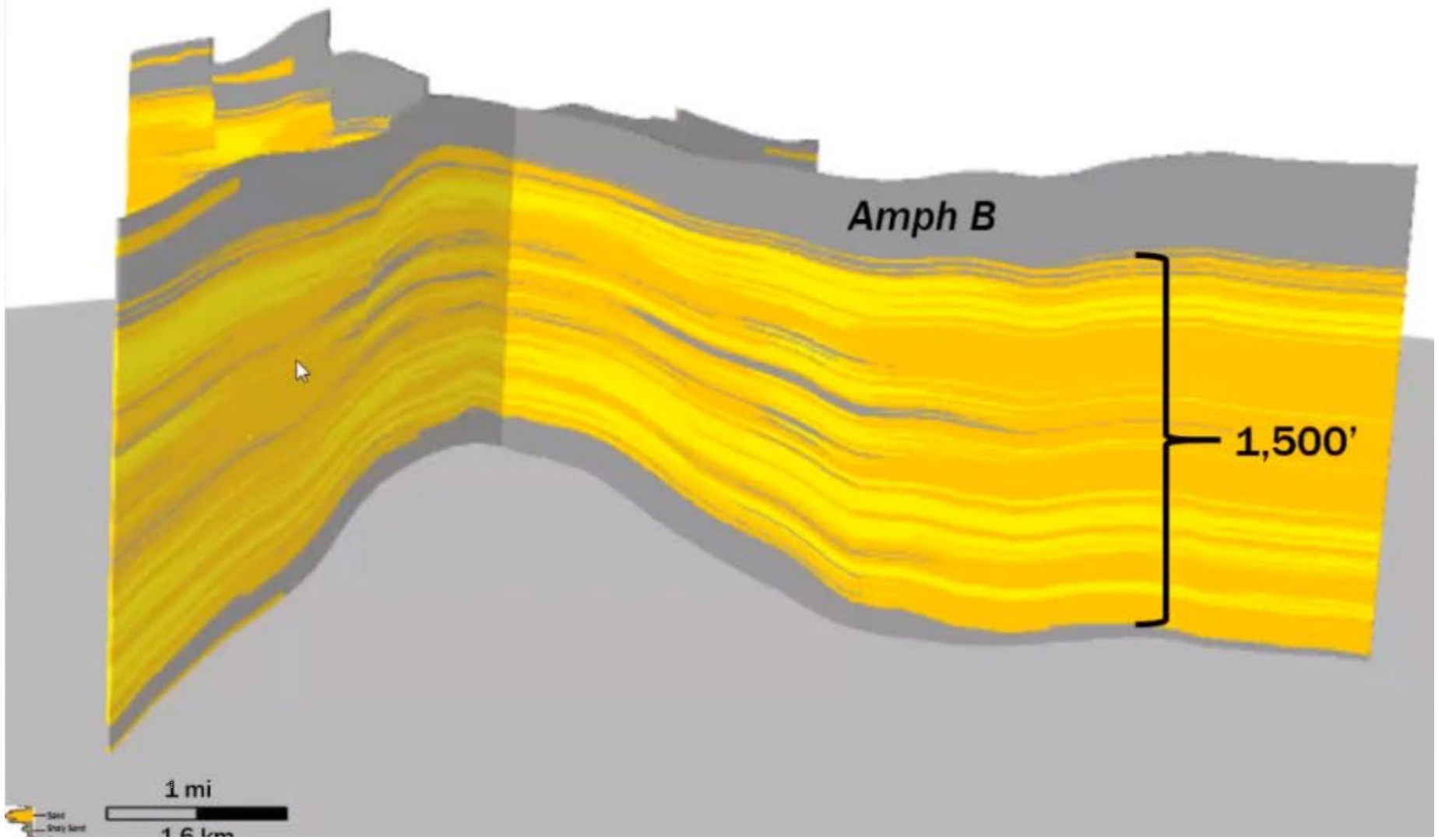


HI 24L Geologic Model Framework
Landmark Decision Space

Meshing & Properties



Simulation Model (generic example, not HI 24L)
GEOSX



Current Focus: Translating the GCCC Framework Model into a numerical mesh

Transfer formats:

- RESQML project
- ZMAP for faults / horizons
- XYZ for wells

Key Model Inputs

Input	"Path Forward"	Sources
Lithology + structure	Clear	GCCC Framework Model
Absolute perm + porosity	Clear	GCCC Framework Model
Relative perm	Maybe	Wallace et al. 2017
Fault seal behavior	Clear	Meckel et al. 2017, Nicholson 2012
Formation pressure, temp, salinity	Maybe	Well data?
Static elastic moduli	Clear	GCCC Framework Model (with dynamic/static correlation)
Inelastic properties	Unclear	Vastar and Atlantic Richfield Core? Analogue data?
Fault friction properties	Clear	Correlations + Limit Analysis
Stress orientation	Maybe	Regionally consistent
Stress magnitude	Unclear	Local stress indicators? Gas-trap and faulting constraints.