

# Project Lochridge (DE-FE0032270)

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On Behalf of the Lochridge Team

# Standard Disclaimer

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# Project Motivation

- Local industrial activity and associated emissions (90 MMT/yr)
- Motivated commercial partners NRW and Repsol with assets and offshore expertise
- Goal: Establish the basis for a commercial CO<sub>2</sub> storage hub in the federal waters of the US Gulf of Mexico
  - Saline Reservoirs
- Serve as an opportunity for knowledge sharing with other project developers – collaborate with DOI
- Community and stakeholder engagement

## Carbon-Zero and Repsol Sign Agreement to Evaluate Opportunities for Innovative Carbon Sequestration on US Gulf Coast

Carbon Capture and Sequestration projects on the U.S. Gulf Coast

*GlobeNewsWire press release announcing the partnership between Carbon-Zero and Repsol.*



**Awarded:** October 1, 2024

**Awarded Period of Performance:** September 1, 2023 – August 31, 2025

**NCTE:** + 8 months, through April 30, 2026

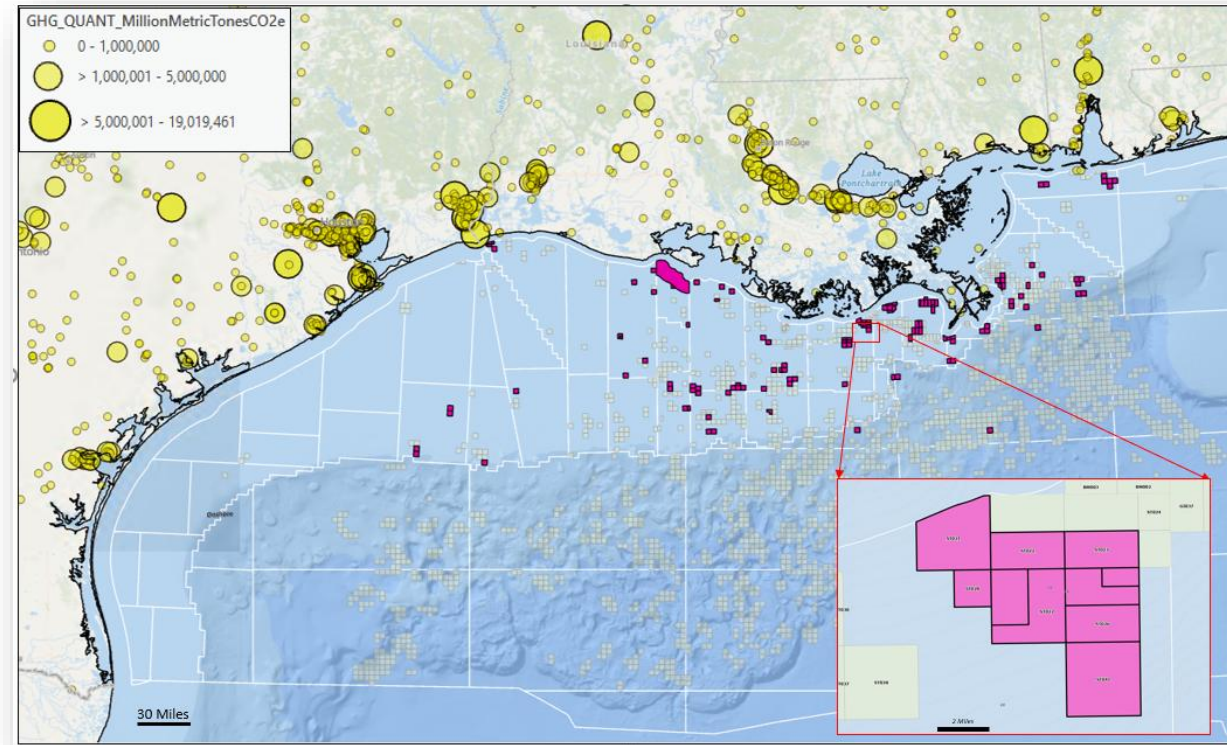
**Budget:** \$10,575,268 (\$2,133,353 cost-share)



*Transcending Boundaries*

# Location

- Initial screening was conducted to identify areas prospective for further investigation
- Criteria included:
  - Lease control
  - Close proximity to the coast and regional emitters
  - Large volumes of geological, geophysical, and drilling information available
  - Ideally, limited number of legacy well penetrations
  - Limited proximal resource development
- South Timbalier lease blocks

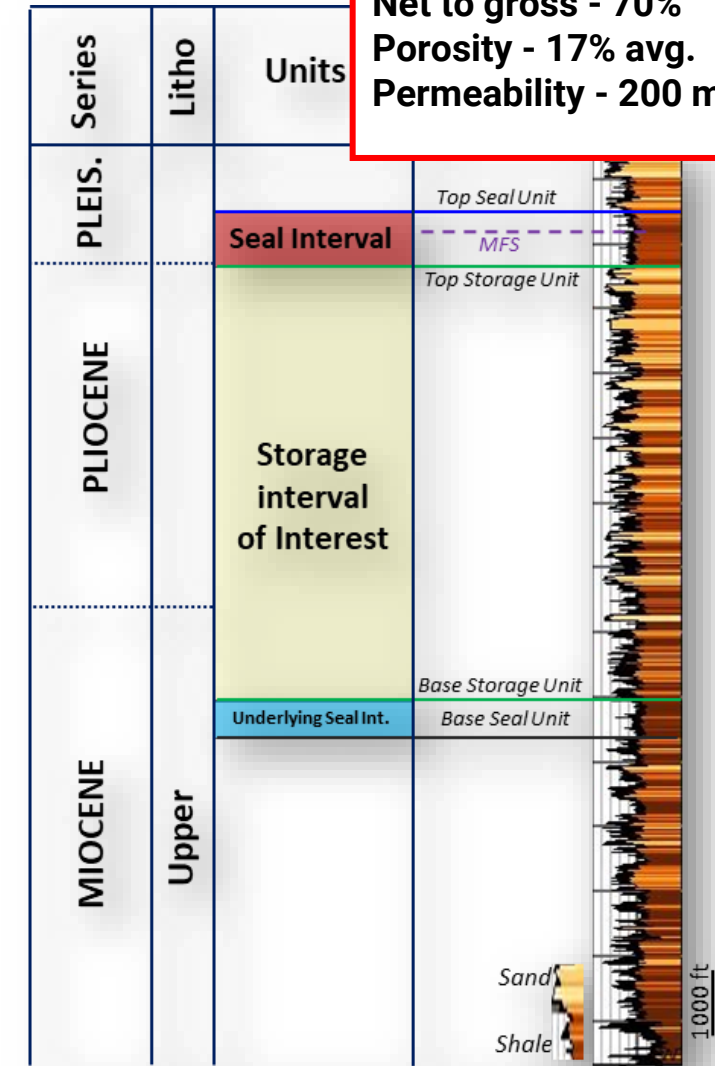


Map illustrating the location of the South Timbalier lease blocks and regional emitters from the EPA Greenhouse Gas Reporting Database.



# Geology

- Storage window depth was used to ascertain approximate depth
  - Storage window is the interval wherein CO<sub>2</sub> is stored a supercritical conditions, but the reservoir is not at risk for over pressure
  - Burke et al. (2012) was utilized to constrain pore pressure
  - 3,000 to 10,000 feet below seabed
- Type logs used to identify thick, sandy intervals in the Upper Miocene/Pliocene



Interval – 5,000 ft thick  
 Sand units - 137 feet avg.  
 Net to gross - 70%  
 Porosity - 17% avg.  
 Permeability - 200 mD avg.

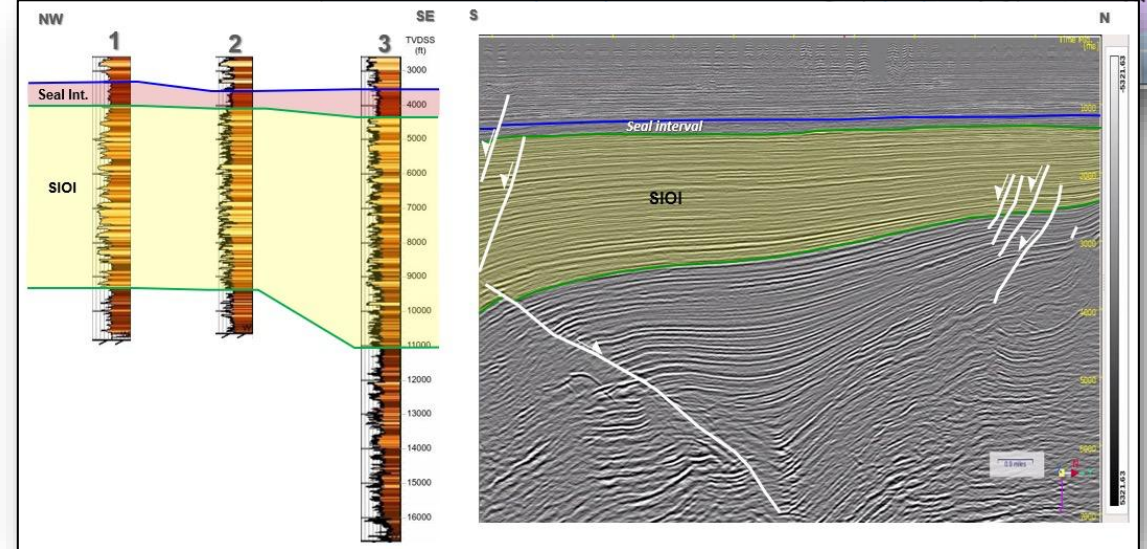
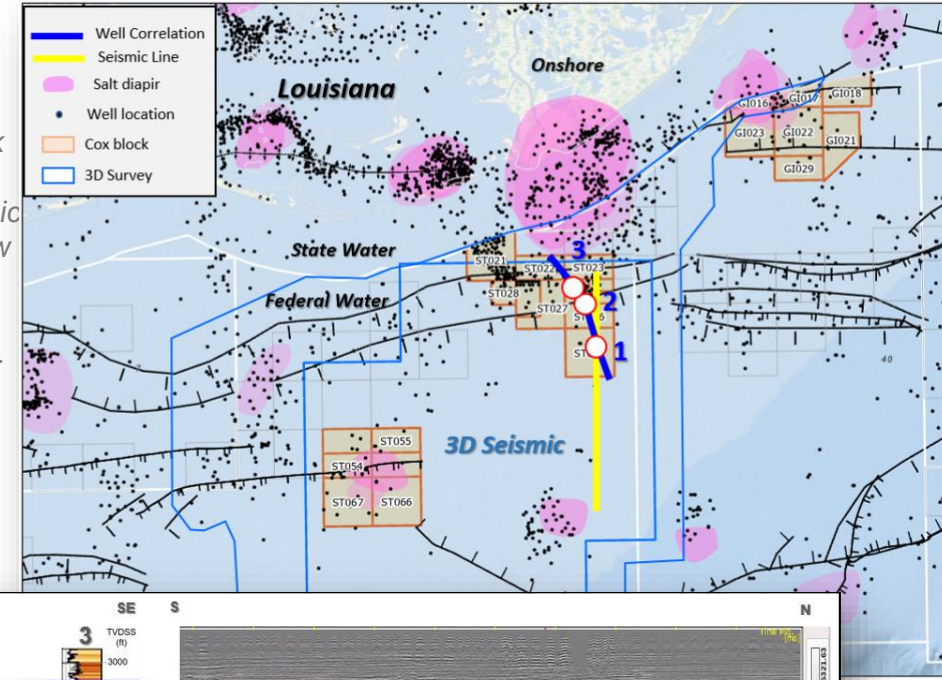
Stratigraphic column and type log for the ST lease blocks.



# Geology

- Initial seismic interpretations confirm the storage interval of interest and confining interval are laterally continuous
- Well correlation confirm observations and show numerous shale baffles that act as composite confining system for individual sand units
- Structural considerations include large extensional faults to the north and salt diapirs to the north and south

Map of the South Timbalier lease area. Also shown are regional faults (black lines), wells (black dots), existing seismic lines (blue and yellow lines), and publicly available 3D seismic data (blue polygons).



Cross section of three wells from the South Timbalier area (left). North-south seismic section that transects the project site location.

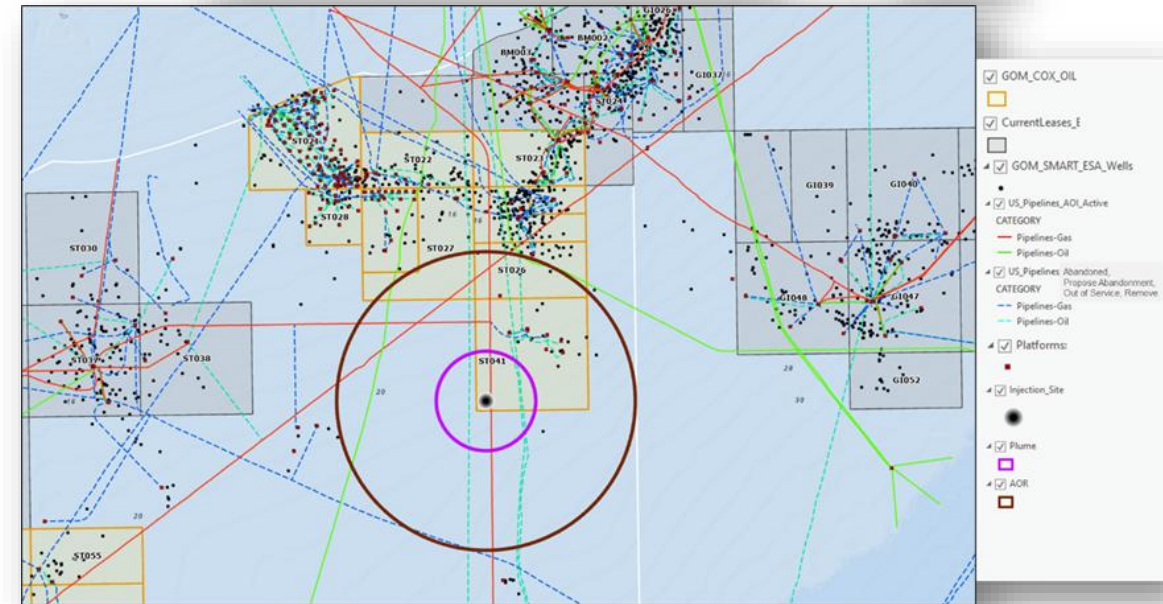


# Geology

- Capacity estimates calculated using efficiency factors from the NETL CO<sub>2</sub> Screen Tool
- In all instances, capacity exceeds 50 MMT over a 30-year period
- Likely much greater capacity as these calculation were conducted for only a portion of the storage interval of interest
- P50 area of review transects few existing wells

Calculated static storage capacity estimates for a single interval of the SIOI

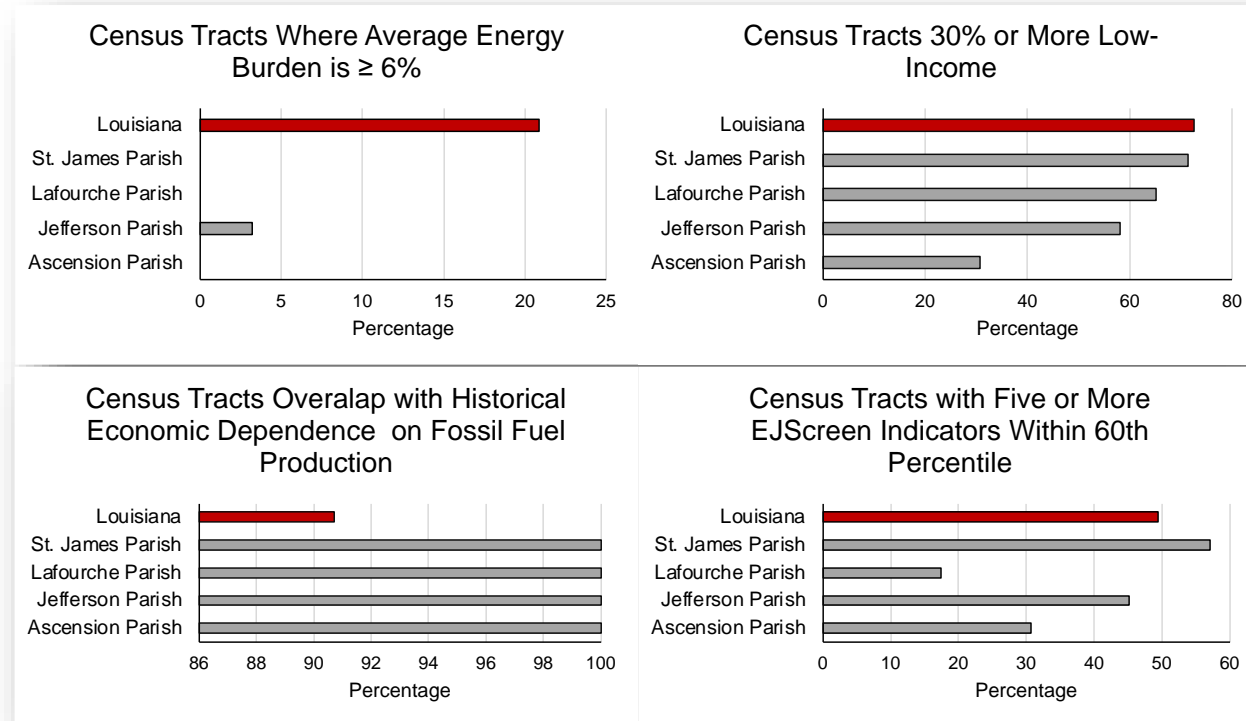
	Parameters	P10	P50	P90
Physical Parameters	Area (sq. km)	5	20	35
	Gross Thickness (m)	550	650	750
	Effective Porosity (%)	20	24	28
	Pressure (MPa)	30	35	40
	Temperature (degC)	65	75	85
Efficiency Factors (COBRA 2022)	Injection Duration (years)	30	30	30
	Net-to-Toal Area	1	1	1
	Net-to-Gross Thickness	0.4	0.45	0.5
	Effective-to-Total Porosity	1	1	1
	Volumetric Displacement	0.38		0.58
	Microscopic Displacement	0.31		0.39
Output	Saline Efficiency Factor	5.59	7.48	9.64
	CO2 Storage Capacity (Mt)	56	145	368



Calculated CO<sub>2</sub> and pressure plume at the proposed site location (ST041 lease block).

# Evaluating Community Dynamics

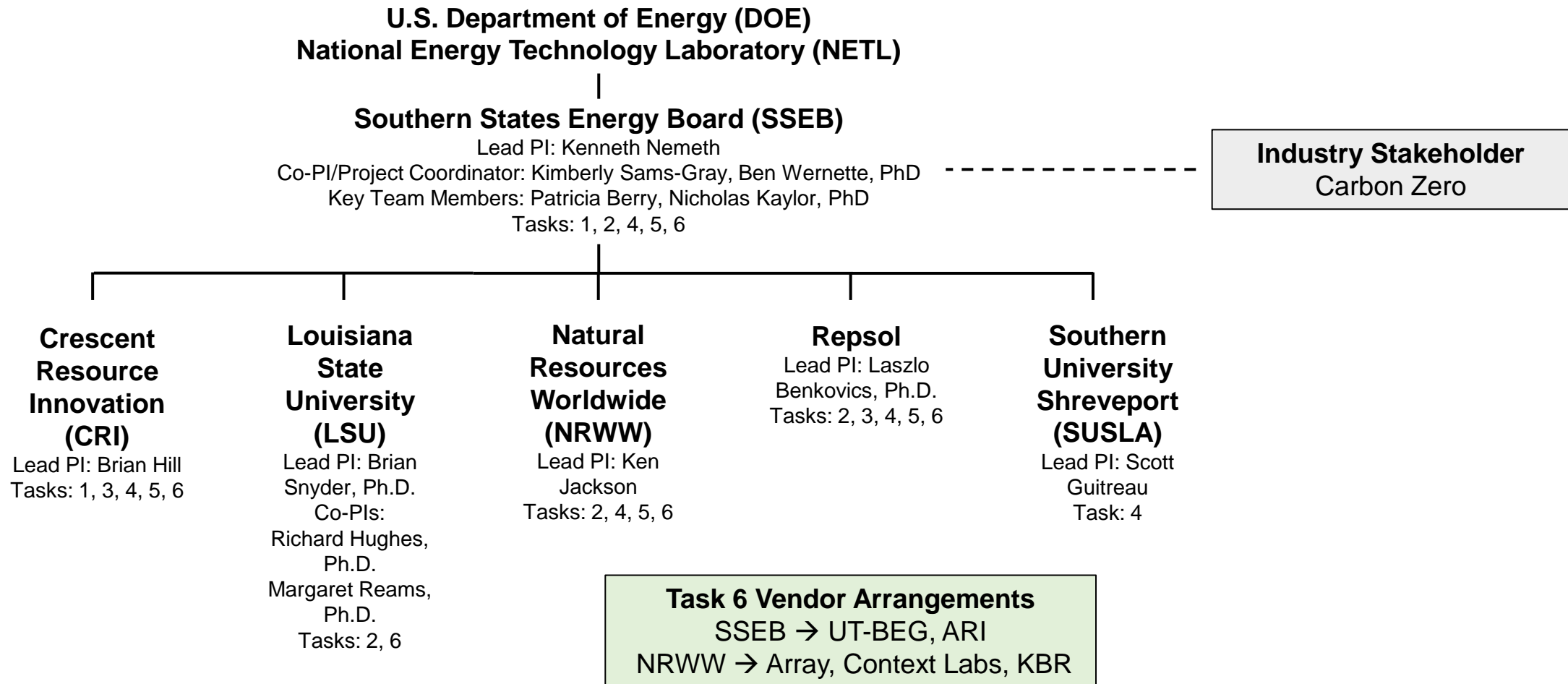
- No direct impacts as part of this phase of the project
- Assumed an integrated project transporting CO<sub>2</sub> onshore to the offshore environment – 4 parishes transected
- Different legacy burdens will certainly point to different concerns between parishes
- More attention needed moving forward
- **Working through LSU and SUSLA as local hubs**



Overview of EJScreen data for the four administrative areas that may be impacted by an integrated project in the future. Data are compared to Louisiana.. Note that EJScreen Indicators include percentage of pre-1960 housing (lead paint indicator), diesel particulate matter, air toxics cancer risk, air toxics respiratory hazards, traffic proximity and volume, major direct discharges of water, proximity to national priorities list sites, proximity to risk management plan facilities, proximity to treatment storage and disposal facilities, index for ozone in the air, and index for PM2.5 in the air. The aggregate metric (i.e., five or more EJ indicators in the 60<sup>th</sup> percentile) is adopted from the U.S. DOE Communities LEAP eligibility criteria



# Organization Chart



# Project Objectives

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Demonstrate that the subsurface saline formations at the Storage Complex can store at least 50 million metric tons of captured CO<sub>2</sub> safely and permanently over a 30-year period

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Conduct meaningful engagement and two-way communications with communities and stakeholders

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Identify commercial project risks and develop a comprehensive mitigation strategy

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Complete a technical and economic feasibility assessment

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Develop a plan for subsequent detailed site characterization to support the U.S. Department of Interior's Bureau of Safety and Environmental Enforcement (BSEE) Outer Continental Shelf (OCS) permit readiness



# Tasks

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Task 1 – Project Management and Planning

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Task 2 – Community Benefits Plan

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Task 3 – Site Specific Characterization and Assessment of the CO<sub>2</sub> Storage Complex

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Task 4 – Preliminary Project Risk Assessment with Mitigation and Management Plans

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Task 5 – Plan for Subsequent Detailed Site Characterization and BSEE OCS Permitting

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Task 6 – Project Technical and Economic Feasibility Assessment, including Conceptual-Level Design Study for CO<sub>2</sub> Transport



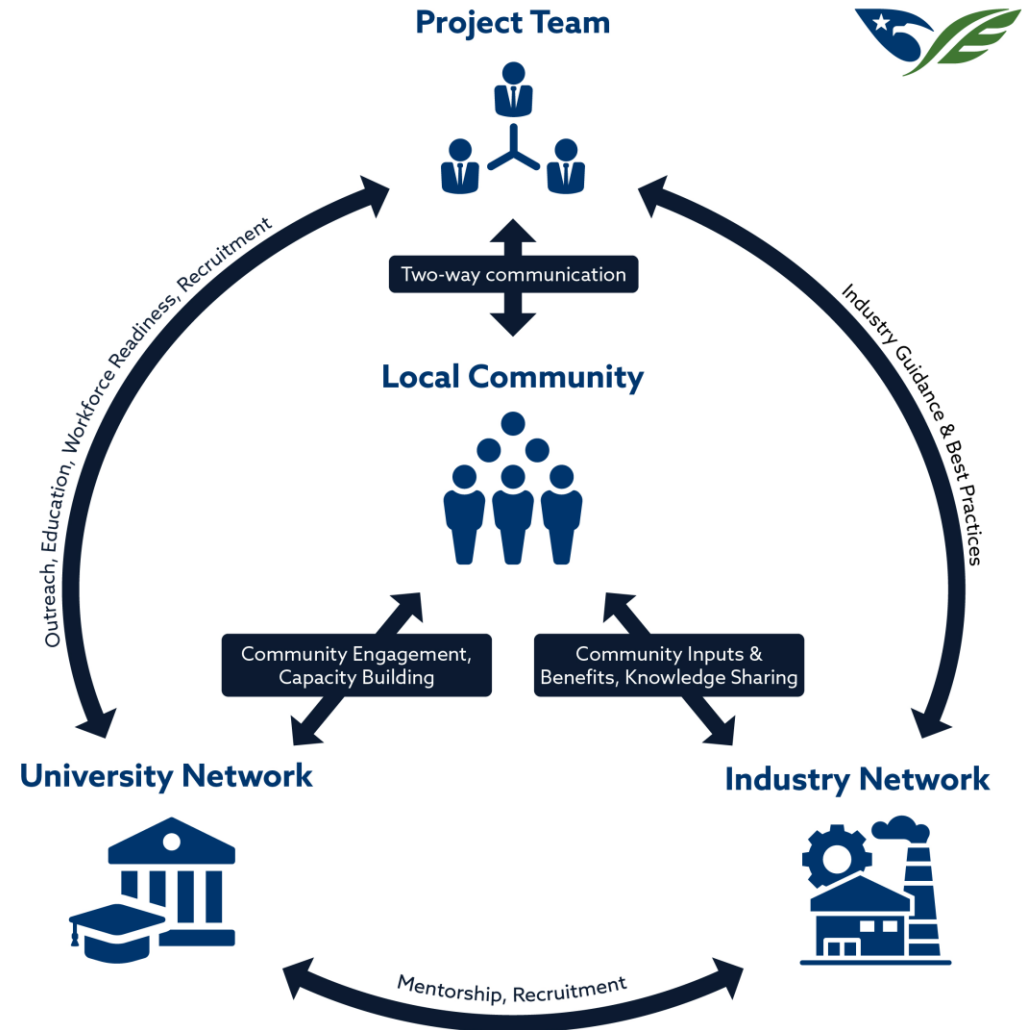
# Task 1 – Project Management

- Notified that ST041 ownership was in doubt on October 11, 2023
- SSEB issued a stop work order to ensure opportunities to retain the lease and preserve the long-term viability of the project could be explored
  - In total, 8-month process
- Updated the PMP, applied for and received NCTE
- Lifted stop work order on May 22, 2024



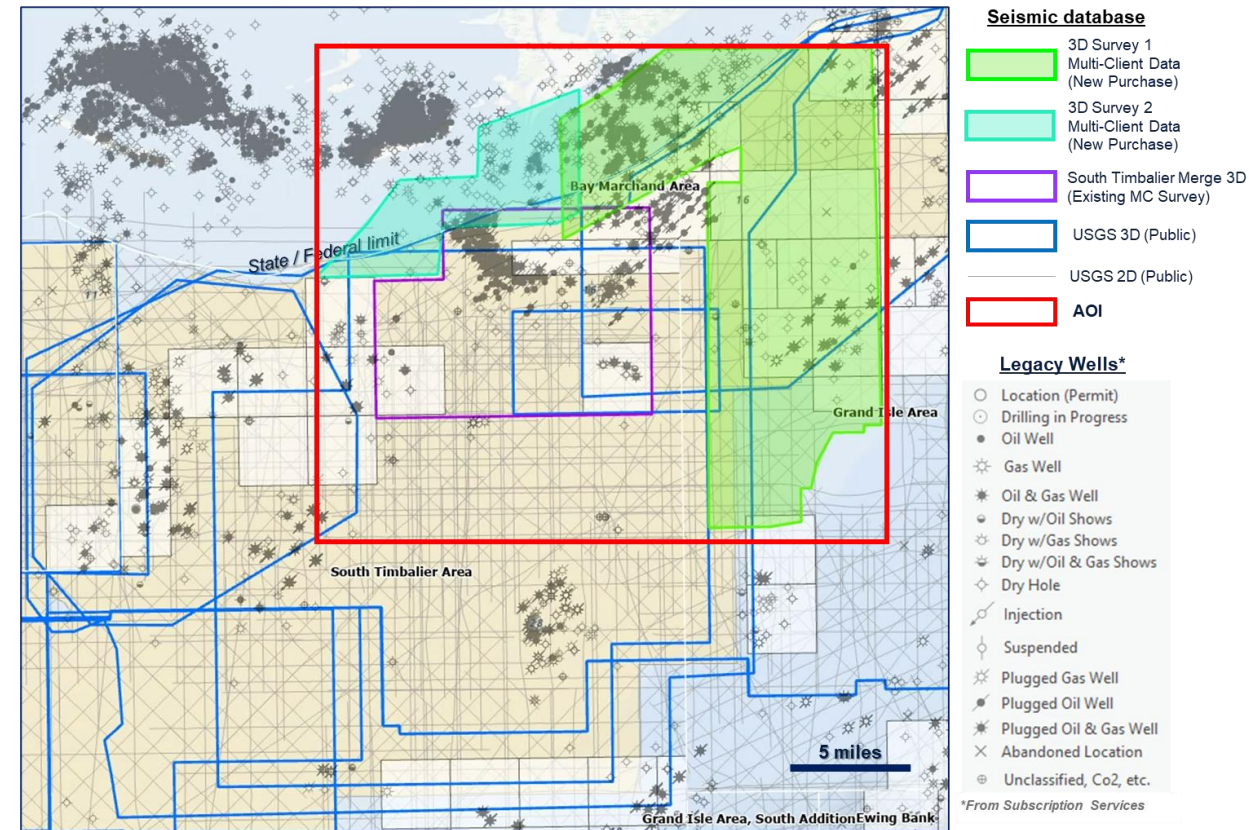
# Task 2 – Community Benefits Plan

- Develop a diverse and comprehensive list of stakeholders
- Host at least one community and stakeholder engagement event
- Partner LSU to develop economic impact assessment
- Host engagement events to communicate CCUS job opportunities
- Actively engaged with state and federal regulators



# Task 3 - Site Specific Characterization and Assessment of the CO<sub>2</sub> Storage Complex

Subtask	Goal
Data collection through open sources & subscription services	Build a comprehensive geologic database for completing subsequent tasks
Review existing well and well data & purchase new data	Fill in data gaps where applicable. Purchase multi-client 3D surveys and well data within AOI
Seismic Reprocessing	Post-Stack re-processing to enhance features and combine all available surveys (Public and proprietary) to create one merge in AOI
Geologic & Geophysical Analysis	Detailed seismic and well interpretation for storage reservoir, sealing intervals, and main structural features
Subsurface Model	Build static model in the AOI integrating all data and interpretations
Dynamic Model	Run scenarios for updated CO <sub>2</sub> and pressure plumes



Public data, subscription data, and multi-client data within the Area of Interest that will be serve as the foundation of the geologic database.



Transcending Boundaries

# Deliverables

Task/Subtask	Deliverable Title	Due Date
1.0	Project Management Plan	Update due 30 days after award. Revisions to the PMP shall be submitted as requested by the NETL Project Manager.
3.0	Storage Complex Characterization and Assessment Report	30 Days Prior to End of Performance Period
4.2	Risk Assessment with Mitigation and Management Plans for an Offshore Storage Project	30 Days Prior to End of Performance Period
5.0	Detailed Plan for Subsequent Site Characterization and BSEE OCS Permitting	30 Days Prior to End of Performance Period
6.0	Technical and Economic Feasibility Assessment, Including Conceptual-Level Design Study for CO <sub>2</sub> Transport, and Stakeholder Evaluation	30 Days Prior to End of Performance Period



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