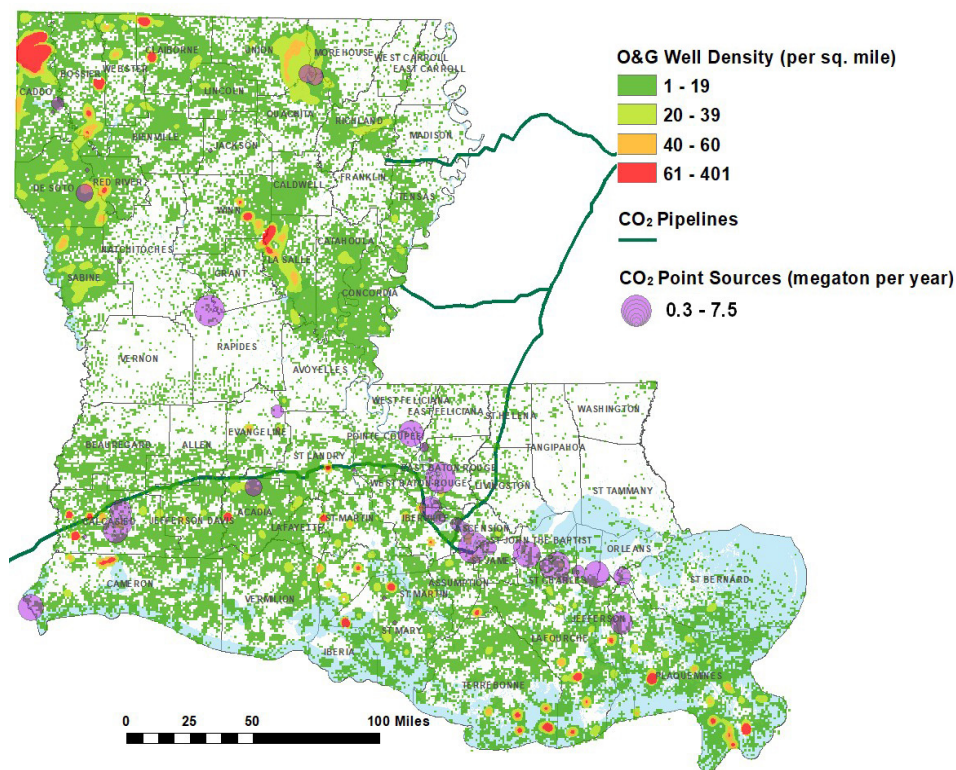


CARBON STORAGE SITE SELECTION FOR INDUSTRY

Summary

Global demands for clean energy require technology advancements and industry investment in carbon capture, use, and storage (CCUS). From its sediment to its geology to its manufacturing and transport infrastructure, Louisiana is positioned to lead the nation and world in the low-carbon energy revolution. Effective growth in CCUS needs site selection expertise, and the Louisiana Geological Survey (LGS) and Louisiana State University (LSU) – the state’s experts in subsurface, geological, and geophysical analysis – propose an innovative economic development asset: a statewide carbon storage site selection map for industry.



INSIGHT FOR INVESTMENT

A site selection map identifying carbon dioxide (CO₂) point sources, well density, and major pipeline infrastructure provides industry with unprecedented science-based insight for potential CCUS projects.

The integrated solution will offer information on:

- Subsurface geology
- Risk potentials
- Petrophysical and fluid dynamic reservoir models
- Expository reports
- ArcGIS for advanced analysis

The LGS and LSU Approach

The state’s great availability of reservoirs as potential carbon sinks (including depleted oil and gas wells and saline aquifers), ample and concentrated point sources of CO₂ that can be captured, and petroleum and chemical production facilities and infrastructure enable an end-to-end integrated approach for CCUS economic development activities. By mapping, characterizing, modeling, and monitoring possible CCUS locations, LGS and LSU translate technical expertise and research into valued practice and talent development that remains in Louisiana.



MAP



CHARACTERIZE



MODEL



MONITOR

Capabilities and Projects



MAP

Statewide and Regional Mapping of Opportunity vs. Risk

Statewide review of geologic features and related aspects to identify possible CCUS sites: Increase resolution of currently available maps (reservoir seal tops and thicknesses) by 4X the well density, from one per 6-to-10 miles in published folios to one per 3 miles. Highlight existing wells, pipelines, CO₂ point sources, land use, underground sources of drinking water (USDW), populated areas, state-protected areas, and potential risk factors in an open-access ArcGIS system.



CHARACTERIZE

Characterization of Potential Storage Sites

Detailed stratigraphy of reservoirs and seals (impermeable strata as “lids” on reservoirs) across extensive marine shale and sand intervals: Geologists with expertise in prediction and interpolation of lithofacies architecture will team with geophysicists using seismic imagery to produce high-resolution models of potential storage sites, including geophysical logs, seismic imagery, and petrophysical data for fluid dynamic parameters of porosity and permeability of favorable sand and barrier shale layers.



MODEL

Static and Dynamic Modeling of CO₂ Storage

Static and dynamic models to determine the extent of possible CO₂ plume as a function of injection rate and duration: The models will predict CO₂ plume geometry, pressure front distribution, and migration during injection and storage to inform a full evaluation of identified sites, especially with regard to potential risks.



MONITOR

Environmental Health, Historical Resources, and Infrastructure Impacts

Monitor the impacts of CCUS on the state’s surficial resources and infrastructure: Baseline environmental data including surface and groundwater chemistry and seismic activity will be collected, and regular multi-year monitoring will prepare for or mitigate against potential contamination events and seismicity that could damage bridges, dams, levees, and roads. Archaeological and geoarchaeological assessments will be required during installation and expansion of CO₂ injection facilities.

The Team

Dr. Douglas Carlson – Aquifer characterization; surface geophysical and geophysical well logging; groundwater and aquifer quality, budgets, and surface interactions and impacts; hydraulic fracturing; wastewater injection; and CO₂ sequestration.

Dr. Richard Hughes – Reservoir engineering; natural gas engineering; CO₂ enhanced oil recovery; and carbon sequestration.

Dr. Greg Upton – Economics and policies around energy, including utilities.

Dr. Mehdi Zeidouni – Carbon capture and sequestration; petroleum and reservoir engineering, particularly along the Gulf Coast and in related environments.

Dr. Patricia Persaud – Geology and geophysics.

Research Support Team – Expertise in petroleum engineering; geology; geological, petrophysical, and fluid dynamic modeling; predictive lithostratigraphic and lithofacies models; signal processing and seismic images.

Deliverables

The Year 1 effort has a proposed cost of \$997,000, and will include development of CO₂ flow models and collection and integration of geological and geophysical data both statewide and for specific CO₂ storage prospects. The data compilation will be published as an LGS Open File report containing maps, GIS files, and expository text.

