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Geologic Sequestration in the Gulf Coast: Subregional Considerations

The need for large-scale injection of carbon dioxide (CO₂) into subsurface formations (geologic sequestration) of the Gulf Coast may exceed the capacity of favorable sites in oil and gas reservoirs. Brine-bearing units are potential sites for additional sequestration projects. Information from existing structure maps of the upper Texas Gulf Coast was used to tabulate potential CO₂ trap size and closure, fetch area, fault throw, and potential leaks.

The study area covers 13,308 mi², stretching from Victoria and Calhoun Counties in the south to the Texas-Louisiana border. The southern and northeastern region is characterized by slightly sinuous gulfward-dipping growth faults trending northeast-southwest, whereas the central region is characterized by abundant salt domes. These two regions, with their different faulting styles, will have different sequestration behavior and potential. Four-way, and fault-bounded three-way, closures represent 17.2% of the study area and have mean potential column heights of 365 ft. Fetch areas that feed those closures constitute 58.2% of the area. Salt domes are considered areas of potential leakage because of greater extensional stress on associated normal faults. Salt domes and their fetch areas represent 15.8% of the study area. Other potential leaks include wellbores in oil fields (13.3% of the area) and gas fields (8.8% of the area).

These statistics are used to model the long-term fate of sequestered CO₂ and the maximum volume available for sequestration. This dataset can also be used to site large projects.