

**Executive summary: Task 15 – NATCARB atlas update –
CO2 sequestration capacity, offshore western Gulf of
Mexico**

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EXECUTIVE SUMMARY

Task 15 – NATCARB Atlas Update – CO₂ Sequestration Capacity Offshore Western Gulf of Mexico

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The Gulf of Mexico Basin (GOM) is a world-class sedimentary wedge that offers huge potential for CO₂ sequestration. The GOM contains up to 50,000 ft of sedimentary rocks in which a multitude of deep-saline sandstone aquifers and traps occur. Cenozoic rocks of Oligocene, Miocene and Pliocene age are the best CO₂ sequestration targets due to the favorable occurrence of thick sandstone reservoirs at appropriate depths beneath the GOM shelf.

An excellent source-sink relationship exists for the GOM. Many anthropogenic CO₂ point sources (coal-fired power plants, refineries and other industrial plants) are located on the Gulf Coastal Plain adjacent to the GOM's large offshore subsurface capacity. In addition, a mature infrastructure exists from over 60 years of oil and gas exploration and production in the region. The long-term petroleum activity in the GOM has also provided voluminous information, data, and methodologies to draw upon. There is general cultural acceptance of subsurface operations in the region as a result of decades of interaction.

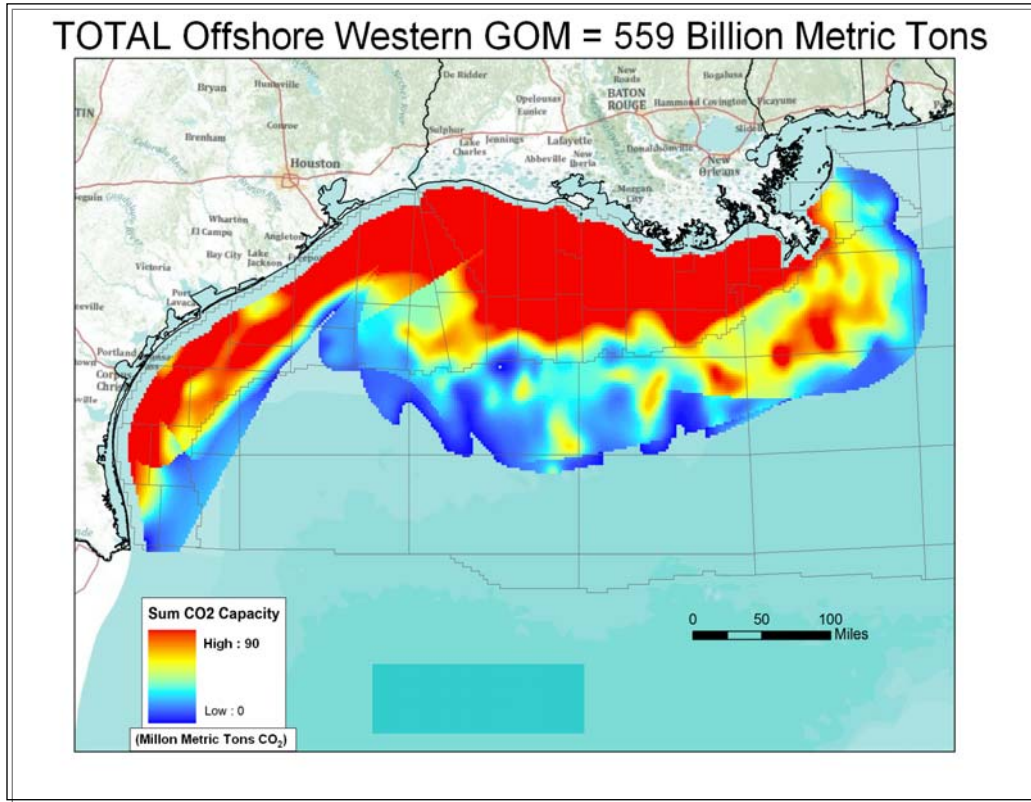
Our specific study area encompassed the western portions of the offshore Gulf of Mexico (GOM) that is under Federal jurisdiction (Bureau of Ocean Energy Management, Regulation and Enforcement "BOEMRE"; formerly MMS) and adjacent state waters of Louisiana and Mississippi. The study refined a previous assessment of the capacity of selected potential storage targets and inventoried existing infrastructure such as pipelines and wells. Data from potential storage targets and existing infrastructure will feed into planned studies of regulatory requirements for the potential of re-using existing wells for carbon dioxide injection and long-term sequestration. The mapping information will be incorporated into the SECARB regional data base and will be made available for incorporation into the next NATCARB ATLAS update.

RESULTS:

The total CO₂ capacity within our Offshore Western GOM project area is 559 billion metric tons. This capacity is distributed in 5 major Geological Sequestration Units (GSU) as follows:

Offshore Gulf of Mexico CO ₂ Capacity Estimate (P50)	
Geological Sequestration Unit	CO ₂ Capacity, Billion Metric Tons
Upper Pliocene	105
Lower Pliocene	144
Upper Miocene	199
Lower Miocene	89
Oligocene	21
Total Capacity	559

The greatest CO₂ capacity in the western GOM lies in Miocene and Pliocene deep saline sandstones. These reservoirs are particularly abundant offshore Louisiana, although substantial capacity, particularly in the Miocene also occurs along most of the Texas coast.



Methodology

We leveraged voluminous previous geological results, commercial data, and public data to obtain the subsurface reservoir architecture beneath GOM waters. Major data sources included the Bureau of Ocean Management Regulation and Enforcement (MMS), the University of Texas Gulf Basin Depositional Synthesis, and IHS Energy.

We followed the MIT capacity method*, in which mass resource estimate potential of CO₂, saline formations is:

$$GCO_2 = A_t h_g \phi_t \rho E_{\text{saline}} \text{ (metric tons)}$$

Where

A_t = geographical area defining region of CO₂ storage

h_g = gross formation thickness

ϕ_t = total porosity

ρ = density of CO₂ at reservoir temperature and pressure

E_{saline} = CO₂ storage efficiency factor (we used $E_{p50} = 0.02$)

* U.S. DOE/NETL Carbon Sequestration Program, 2010, Draft Report: *Method from Methodology for Development of Geologic Storage Potential for Carbon Dioxide*