



BOEM Bureau of
Ocean Energy Management

Carbon Sequestration on the Outer Continental Shelf

DOE National Energy Technology Laboratory
2022 Carbon Management Project Review Meeting
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Department of the Interior Offshore CS Authority

- Section 40307 of Bipartisan Infrastructure Law (BIL) amended the Outer Continental Shelf Lands Act (OCSLA) to authorize the Secretary of the Interior to grant a **lease, easement, or right-of-way** on the Outer Continental Shelf for activities that “provide for, support, or are directly related to the **injection of a carbon dioxide stream into sub-seabed geologic formations for the purpose of long-term carbon sequestration.**”
- Additionally, the law directs, “Not later than **1 year** after the date of enactment of this Act [November 14, 2022], the Secretary of the Interior shall **promulgate regulations** to carry out the amendments made by this section.”



Rulemaking Summary

- **Joint Bureau of Ocean Energy Management (BOEM) – Bureau of Safety and Environmental Enforcement (BSEE) rulemaking is underway**
- Rulemaking team established relying on existing expertise throughout the bureaus
- Extensive outreach underway
- Topics under consideration for the rulemaking include:
 - **Financial and economic considerations**
 - **Pre-lease exploration**
 - **Leasing**
 - **Site characterization**
 - **Plans**
 - **Environmental considerations**
 - **Risk assessment and management**
 - **Monitoring and reporting**
 - **Liability**
 - **Well and infrastructure qualification**
 - **Operations, facilities, and pipelines**
 - **Emergency response and mitigation**
 - **Decommissioning**



Leasing Considerations

- **Leasing Considerations:**

- BOEM will conduct pre-leasing analyses to determine lease areas
- Lease spacing and correlative rights
- Conservation of pore space
- Long-Term Liability
- What are the market drivers?

- **Potential Research:**

- Lease spacing considerations on the OCS:
 - How much buffer is appropriate between lease areas to prevent pressure front overlap/interference across leases?



Depleted Reservoirs

Advantages

- Potential for greater available pressure margins
- Abundant geologic, geophysical, engineering and production data
- Proven trap and seal

Disadvantages

- Numerous legacy wells
- Smaller storage capacity

Saline Aquifera

Advantages

- Large potential storage capacity
- Fewer legacy wells
- Abundant geologic, geophysical, engineering and production data
- Multiple Stacked Reservoirs

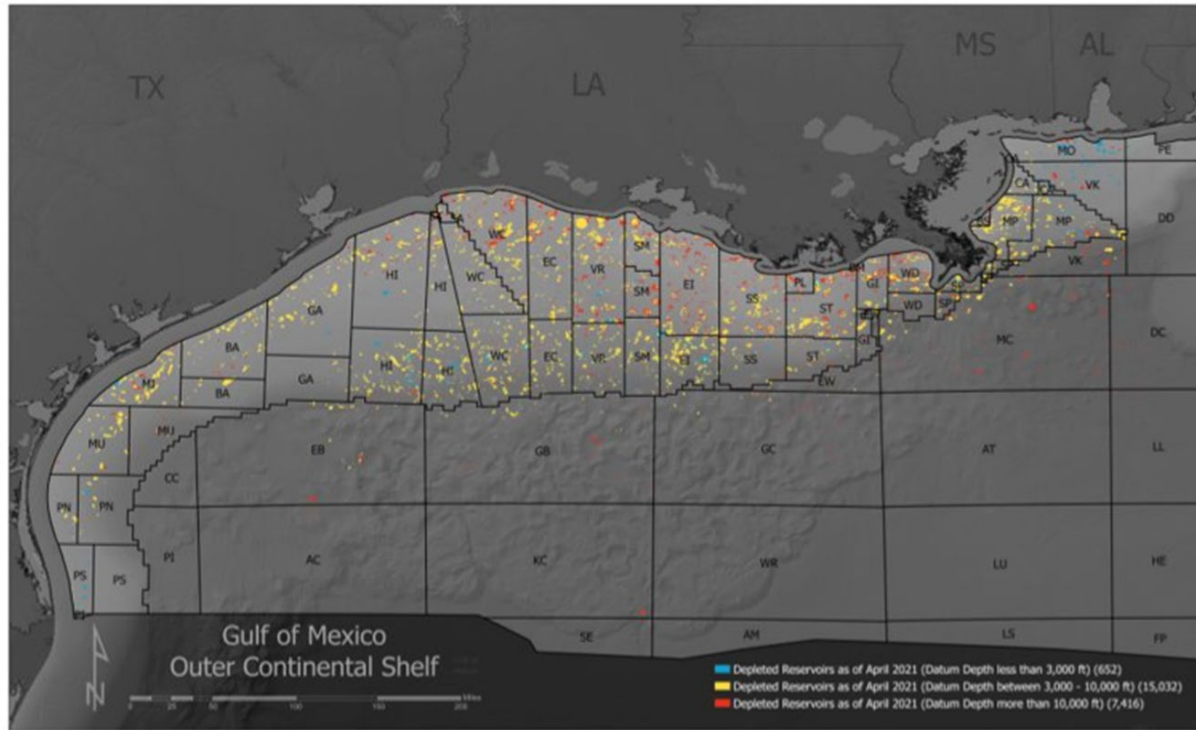
Disadvantages

- Unknown seal integrity
- Smaller available pressure margin



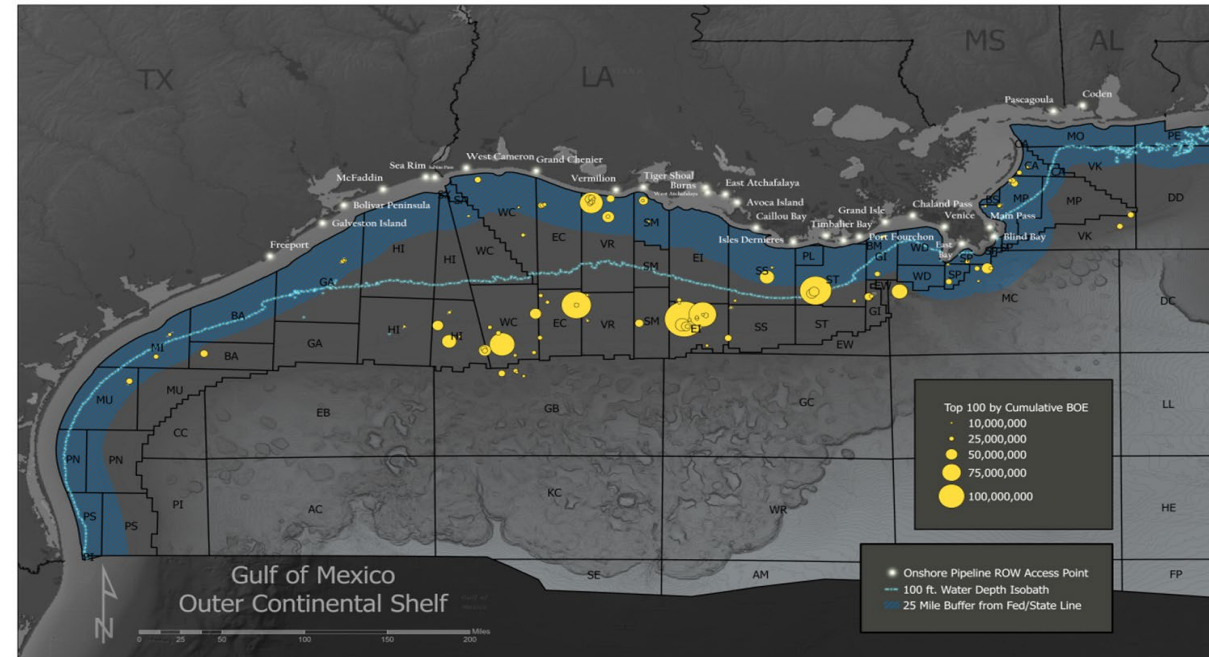
Geologic Considerations

- GOM extensive, world-class data
- High porosity and permeability
- Over 23,000 depleted reservoirs



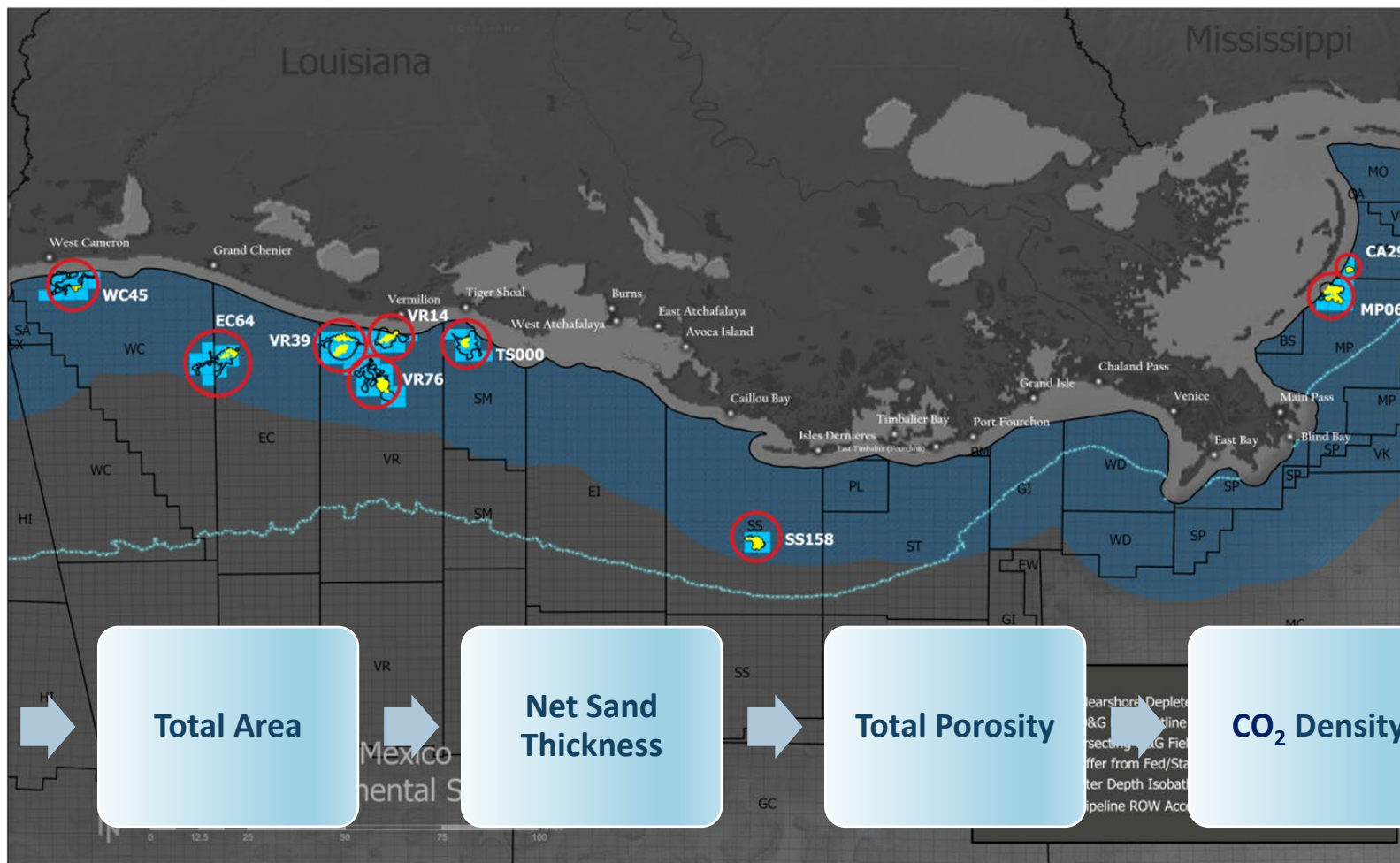
Analysis identified 100 largest producing reservoirs

Distance to shore and water depth refined the list to 21 Reservoirs in 9 fields.



GOM – 21 Depleted Reservoirs / 9 Fields

<https://www.boem.gov/about-boem/regulations-guidance/carbon-sequestration>



21 Tier 1 depleted reservoirs in the Gulf of Mexico based on:

- Production (>25MMBOE)
- Distance to Shore (<25 miles)
- Water Depth (<100ft)



Geologic Considerations cont'd

- **Geologic Considerations:**
 - Depleted O&G Reservoirs vs. Saline Reservoirs vs. Basaltic Reservoirs
 - Legacy Wells:
 - Potential leakage pathways? Can there be too many? Re-entry?
- **Potential Research:**
 - Injection Pilot Project to full-scale Demonstration Project
 - Consider starting with a depleted O&G reservoir
 - Environmental Monitoring
 - CO₂ Release Project/Modeling



Environmental Considerations

- **Environmental Considerations:**

- Environmental Impacts from CO₂ Leakage – Risk Assessments, CO₂ Blowouts, Legacy Wells, Pipeline Ruptures, Geologic Leakage
- “Baseline” Environmental Conditions
- Monitoring – Plume. Water Column? Atmosphere? Frequency?
- Cumulative Impacts?
- Transportation – Vessel vs. Pipeline

- **Potential Research:**

- What are the important considerations for establishing “baseline” conditions in the OCS environment?
- What needs to be monitored and what are the appropriate monitoring protocols and frequency?
- Transportation



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