BOEM BUREAU OF OCEAN ENERGY MANAGEMENT

Modeling Carbon Dioxide Leakage and Potential Environmental Impacts from Carbon Sequestration Projects on the OCS

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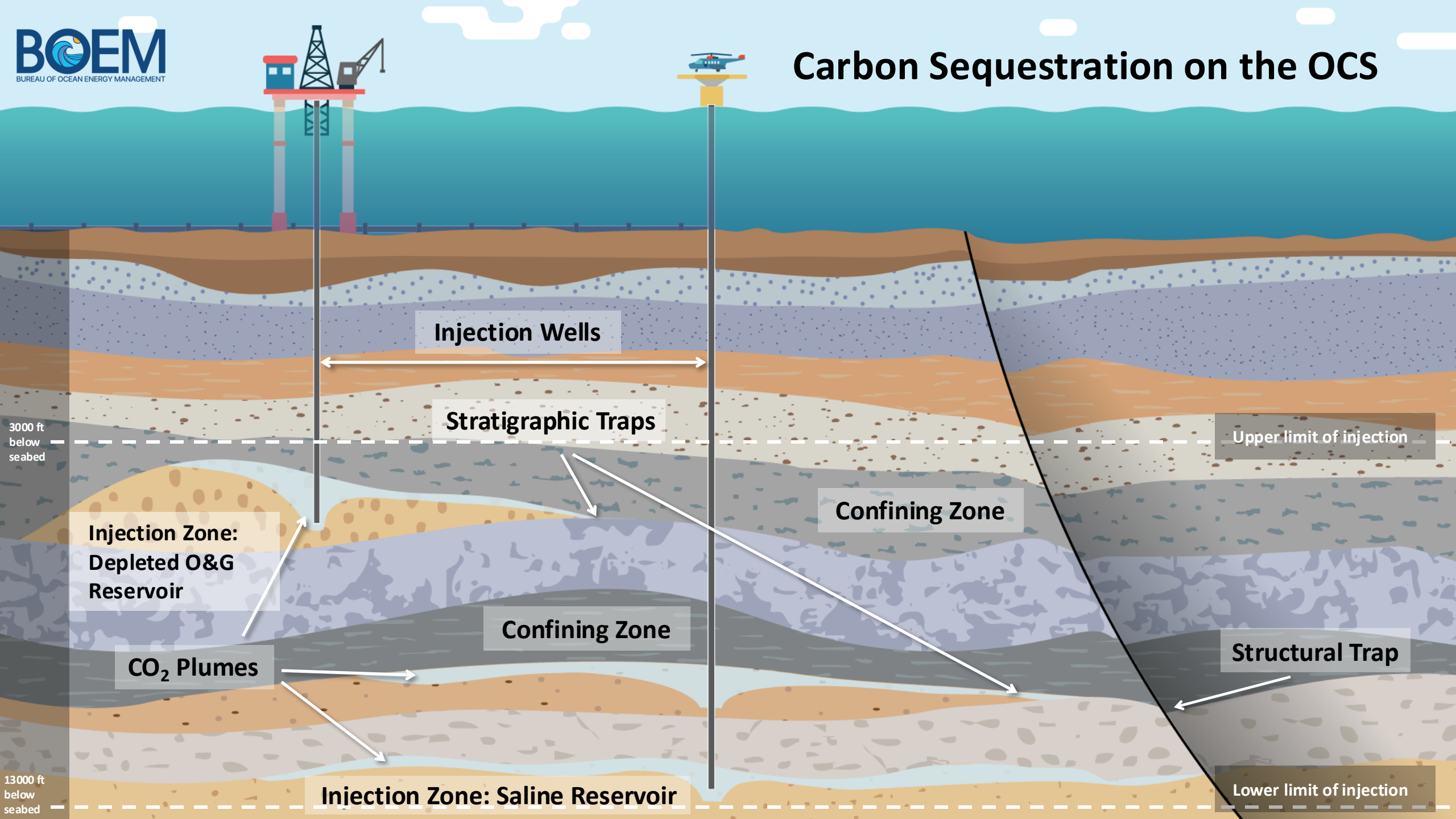
Context for Science Need

- 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**."
- DOI authority delegated to BOEM and BSEE.

OCS Planning Areas

- Study results will aid BOEM's ongoing rulemaking efforts, program development and implementation, and future operational needs including NEPA analyses, lease planning, lease stipulations, consultations, plan and permit approvals, mitigation measures, and risk assessment and monitoring requirements.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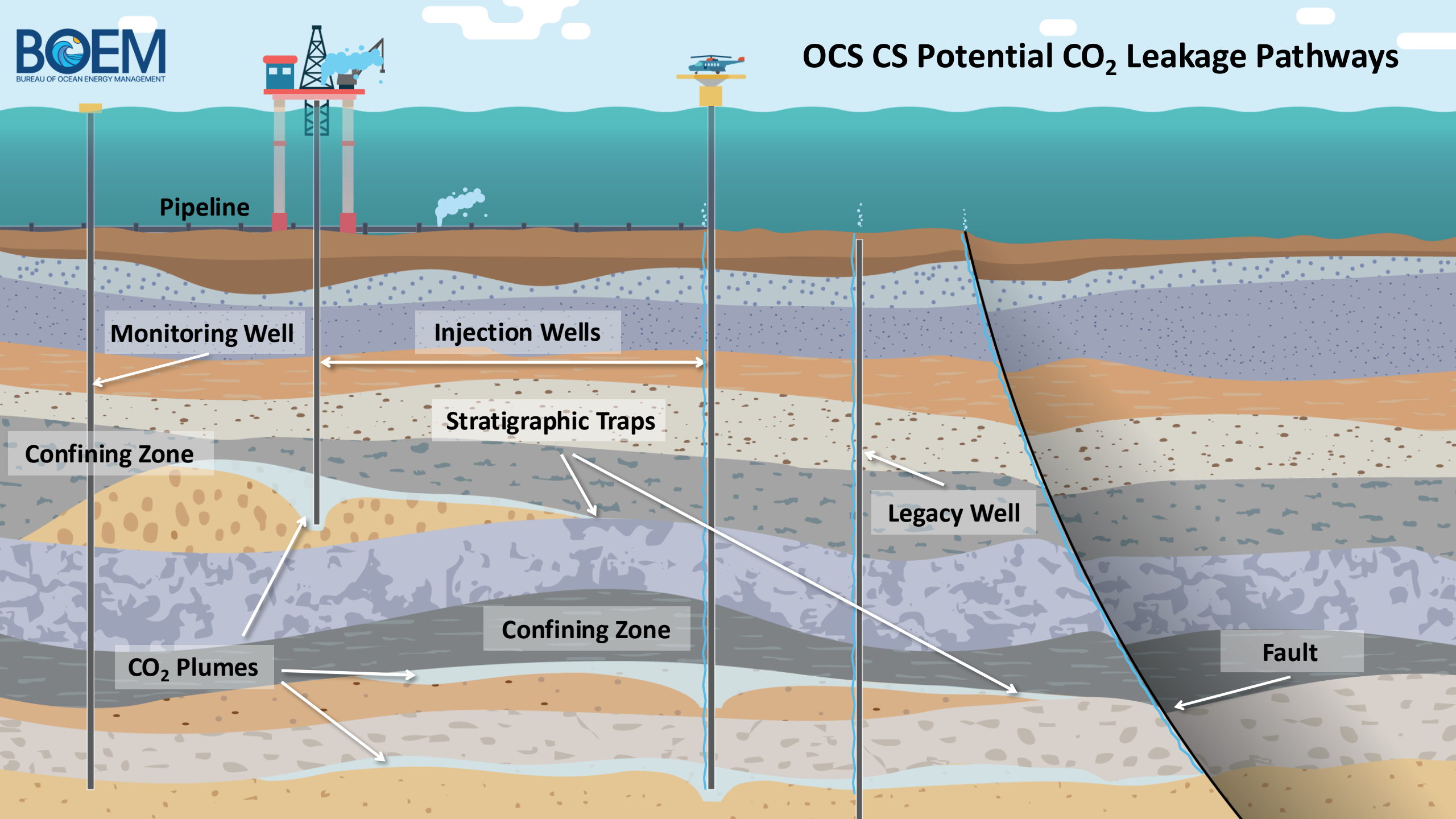
Carbon Sequestration on the OCS
Injection Wells
Stratigraphic Traps
3000 ft below seabed
Upper limit of injection
Confining Zone
Injection Zone: Depleted O&G Reservoir
Confining Zone
CO_2 Plumes
Structural Trap
13000 ft below seabed
Injection Zone: Saline Reservoir
Lower limit of injection

BOEM Science Need

- **Understand potential environmental impacts of CO_2 leakage on the coastal, marine, and human environment**
- **GOM case-study; applicable to all OCS regions**
- **Model CO_2 leakage dynamics, dispersion, fate, transport, and attenuation under varying volumes and pressure scenarios, including worst-case:**
  - Pipeline ruptures
  - Injection well blowouts
  - Other project wells
  - Legacy wells
  - Platform infrastructure
  - Geologic pathways such as seeps, reactivated faults, etc.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OCS CS Potential CO_2 Leakage Pathways
Pipeline
Monitoring Well
Injection Wells
Stratigraphic Traps
Confining Zone
Legacy Well
Confining Zone
CO_2 Plumes
Fault

Study Objectives and Methods

- Compile information on "**background**" levels of CO_2 in the marine environment: seasonal and other variability in naturally occurring CO_2 levels.
- Evaluate **existing CO_2 leakage models and pilot tests** (small-scale field tests) and determine how they can be applied the OCS.
- **Model CO_2 leakage**, dispersion, fate, transport, and attenuation under various volume and pressure scenarios, including worst-case scenarios, from various leakage pathways.
- Model potential **chemical oceanography** and **other environmental impacts** from the various leakage scenarios.
- Recommend methods and protocols for most effectively inform/incorporate study results into CS program implementation:
  - **NEPA analyses, lease planning, lease stipulations, consultations, plan and permit approvals, mitigation measures, risk assessment and monitoring requirements**.

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Contact us: **BOEMEnviroStudies@BOEM.GOV**