Outer Continental Shelf Sub-Seabed Geologic Storage of Carbon Dioxide

BOEM | Bureau of Ocean Energy Management

Melissa Batum, P.G.
Senior Program Analyst
Office of Renewable Energy Programs
Melissa.Batum@boem.gov

Mid-Atlantic U.S.
Offshore Carbon Storage Workshop:

November 14, 2018 | www.boem.gov

CCS ON THE OUTER CONTINENTAL SHELF: REGULATORY FRAMEWORK

In 2010, the Presidential Interagency Task Force on CCS examined the existing U.S. regulatory framework and recommended the development of a comprehensive U.S. framework for leasing and regulating sub-seabed CO_2 storage operations on the Outer Continental Shelf (OCS) that addresses the broad range of relevant issues and applies appropriate environmental protections.

However, this comprehensive framework has yet to be established; therefore, the existing regulatory framework is shared across multiple Federal agencies, including DOI and the EPA, and may have jurisdictional gaps, such as the transition from CO_2 EOR to sub-seabed geological storage of CO_2, as well as potential redundancies.




THE OUTER CONTINENTAL SHELF LANDS ACT

Under the Outer Continental Shelf Lands Act (OCSLA), the Department of the Interior (DOI), Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE) have authority to regulate the development of mineral resources and certain energy and marine related uses on the OCS

THE OUTER CONTINENTAL SHELF

The OCS consists of 1.7 billion acres of submerged lands, subsoil, and seabed, lying between the seaward extent of the States' submerged lands and the seaward extent of Federal jurisdiction.

- For most areas, Federal jurisdiction begins 3 nautical miles from the shore baseline. However, for the State of Texas and the Gulf coast of Florida, Federal jurisdiction begins 9 nautical miles from the baseline and for the State of Louisiana Federal jurisdiction begins 3 imperial nautical miles from the baseline.

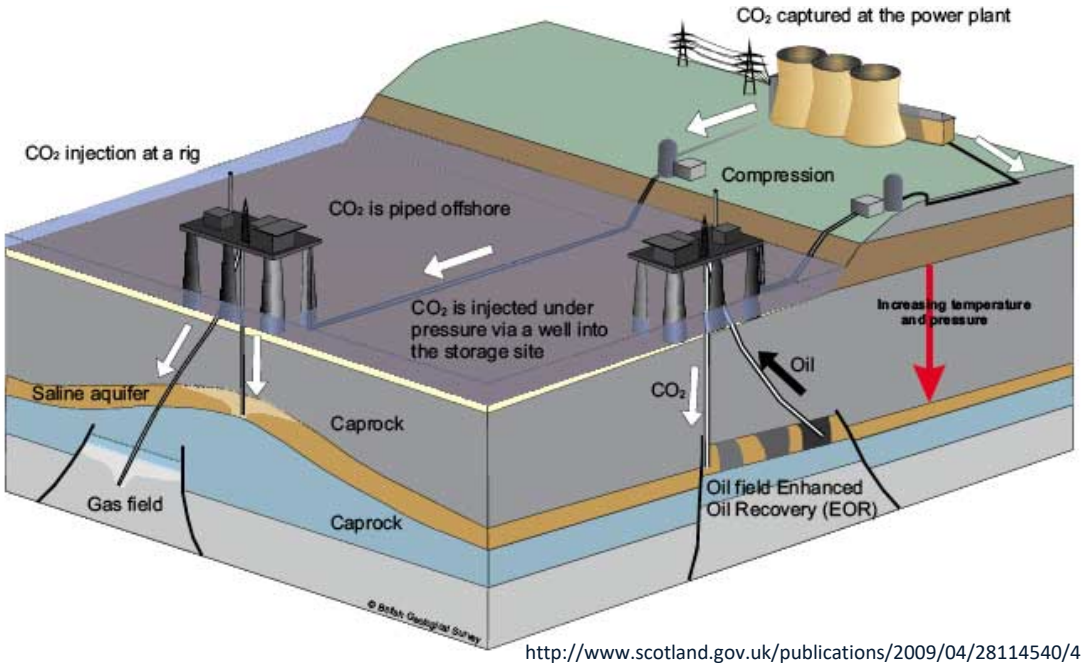
OCS Planning Areas

BOEM
Bureau of Ocean Energy Management

OCSLA AND CO_2

DOI has statutory authority under the OCSLA to permit the use and storage of CO_2 for EOR activities on existing oil and gas leases on the OCS.

DOI has the statutory authority to permit the storage of CO_2 for certain types of projects.



http://www.scotland.gov.uk/publications/2009/04/28114540/4

BOEM
Bureau of Ocean Energy Management

OCSLA AND CO_2

Under Section 8(p)(1)(C) of the OCSLA (43 U.S.C. 1337)(p)(1)(C)), BOEM may issue leases, easements, and rights-of-way for activities that:

> "**produce or support production, transportation, or transmission of energy from sources other than oil and gas"**

In certain circumstances, Section 8(p)(1)(C) allows BOEM to issue leases for sub-seabed CO_2 storage…

- Such as for the purpose of sub-seabed storage of CO_2 generated as a by-product of electricity production from an onshore coal-fired power plant.

Numerous statutes, regulations, executive orders, and policies are integral to ensuring access to and appropriate development of OCS resources in a manner that is safe and environmentally sound, prevents waste, and provides fair return for public resources.

These include, but are not limited to:

OCS LEGAL REQUIREMENTS

BOEM's **Implementing Statute**, and associated regulations and policies

- **Outer Continental Shelf Lands Act of 1953 with amendments in 2005** (implementing regulations under 30 CFR) *(BOEM and BSEE)*
- **Code of Federal Regulations (CFR), 30 CFR Chapter II** *(BSEE)* **and Chapter V** *(BOEM)*
- **Department of the Interior Manual, Part 516**

Lead Federal Agency

- **National Environmental Policy Act of 1969**
- **Oil Pollution Act of 1990**
- **National Historic Preservation Act of 1966**
- **Executive Order 11990 (1977): Protection of Wetland**
- **Executive Order 12114 (1979): Environmental Effects Abroad**
- **Executive Order 13007 (1996): Indian Sacred Sites**
- **Executive Order 12898 (1998): Environmental Justice**
- **Executive Order 13089 (1998): Coral Reef Protection**
- **DOI Secretarial Order 3317: Tribal Consultation Policy**

Federal, State, Tribal Collaboration

- **Magnuson-Stevens Fishery Conservation and Management Act of 1976** *(BOEM consults NOAA)*
- **Endangered Species Act of 1973** *(BOEM consults NOAA/FWS)*
- **Migratory Bird Treaty Act of 1918** *(BOEM consults FWS)*
- **Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds** *(BOEM MOU with FWS)*
- **Coastal Zone Management Act of 1972, as amended in 1996** *(BOEM consults affected coastal states)*

Operator

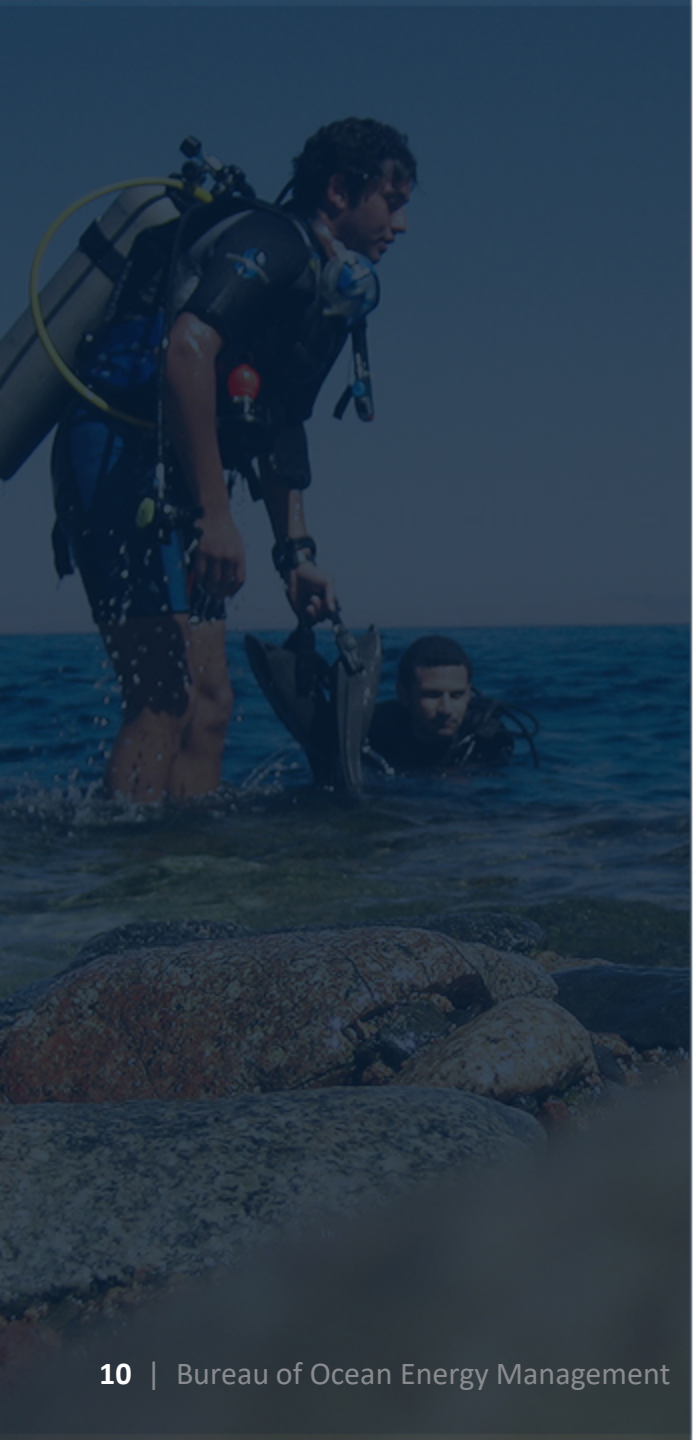
- **Marine Mammal Protection Act of 1972** *(Operator obtains permit from NOAA)*
- **Clean Air Act of 1970, as amended 2012** *(BOEM operator plan approval or Operator obtains EPA air permit)*
- **Clean Water Act of 1972, as amended in 1990** *(Operator obtains NPDES permit form EPA)*
- **Rivers and Harbors Act of 1899, Section 10** *(Operator obtains permit from ACOE)*
- **Code of Federal Regulations (CFR), 30 CFR Chapter II** *(BSEE)* **and Chapter V** *(BOEM)*

Additional Information: www.boem.gov/Environmental-Assessment-Division

Best Management Practices for Offshore Transportation and Sub-Seabed Geologic Storage of Carbon Dioxide

BOEM BMPS FOR OCS TRANSPORTATION AND SUB-SEABED STORAGE OF CO2

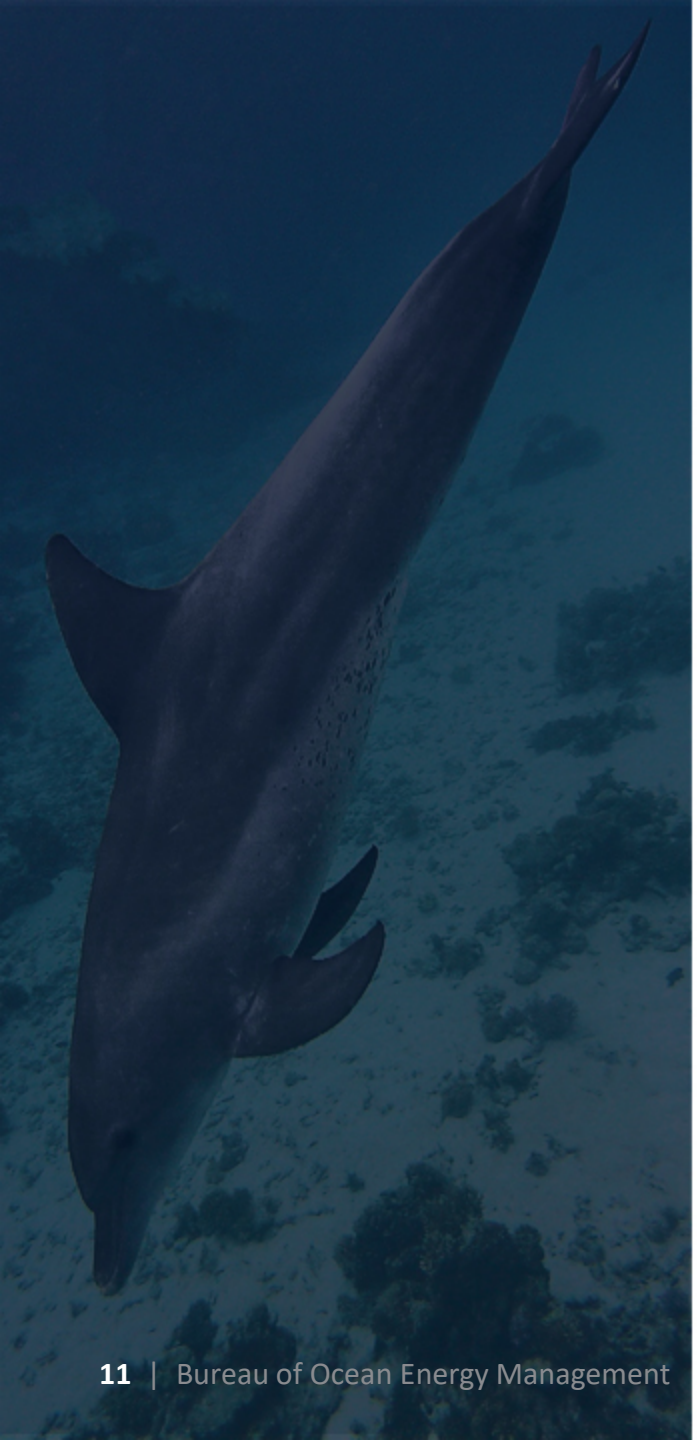
- BOEM published research in April 2018 for Best Management Practices (BMPs) for CO_2 offshore transportation and sub-seabed storage on the OCS
- The BMPs address project lifecycle from site characterization through site closure



BOEM OCS CO_2 BMPS STUDY

- **The BMPs apply to the lifecycle of offshore CO_2 transport and storage, including:**

1. Site Selection and Characterization (data collection, capacity/injectivity assessments, and modeling)
2. Risk Analysis
3. Project Planning and Execution (design, construction, operation, and maintenance)
4. Monitoring
5. Mitigation
6. Inspection and Performance Auditing
7. Reporting Requirements
8. Emergency Response and Contingency
9. Decommissioning and Site Closure



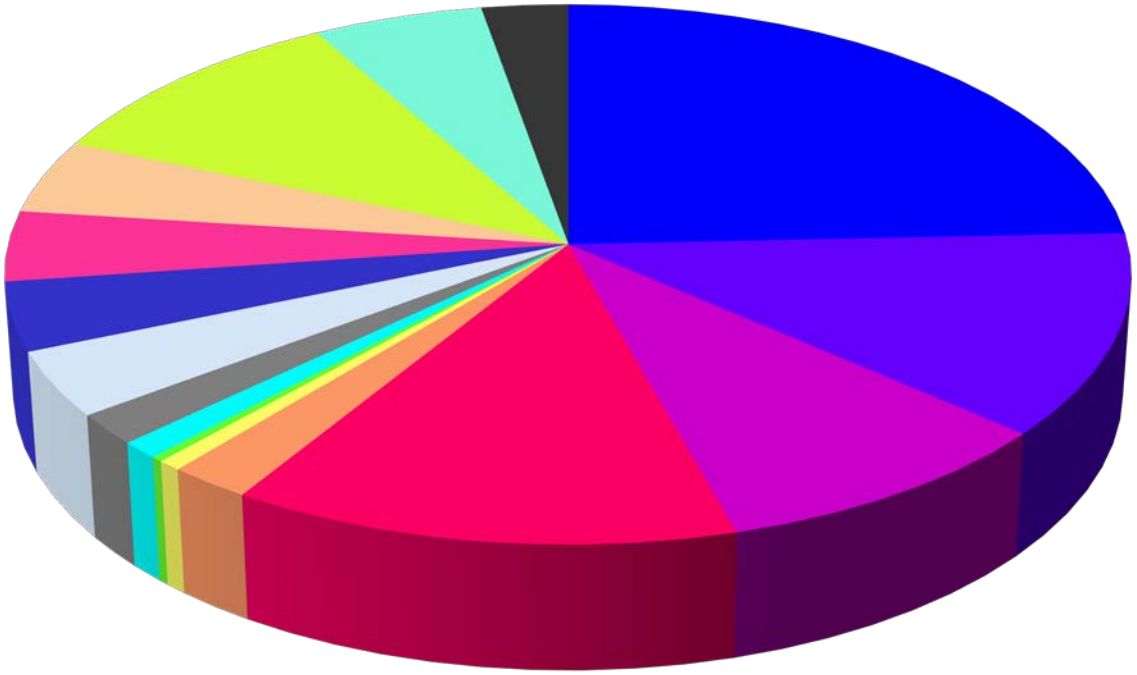
DELIVERABLES

1. **Worldwide Annotated Literature Database:**
   - Database containing literature and other materials complied with annotations

2. **BMPs with Data Gaps Analysis**
   - BMPs, where possible
   - Identify data gaps in the information and practices.

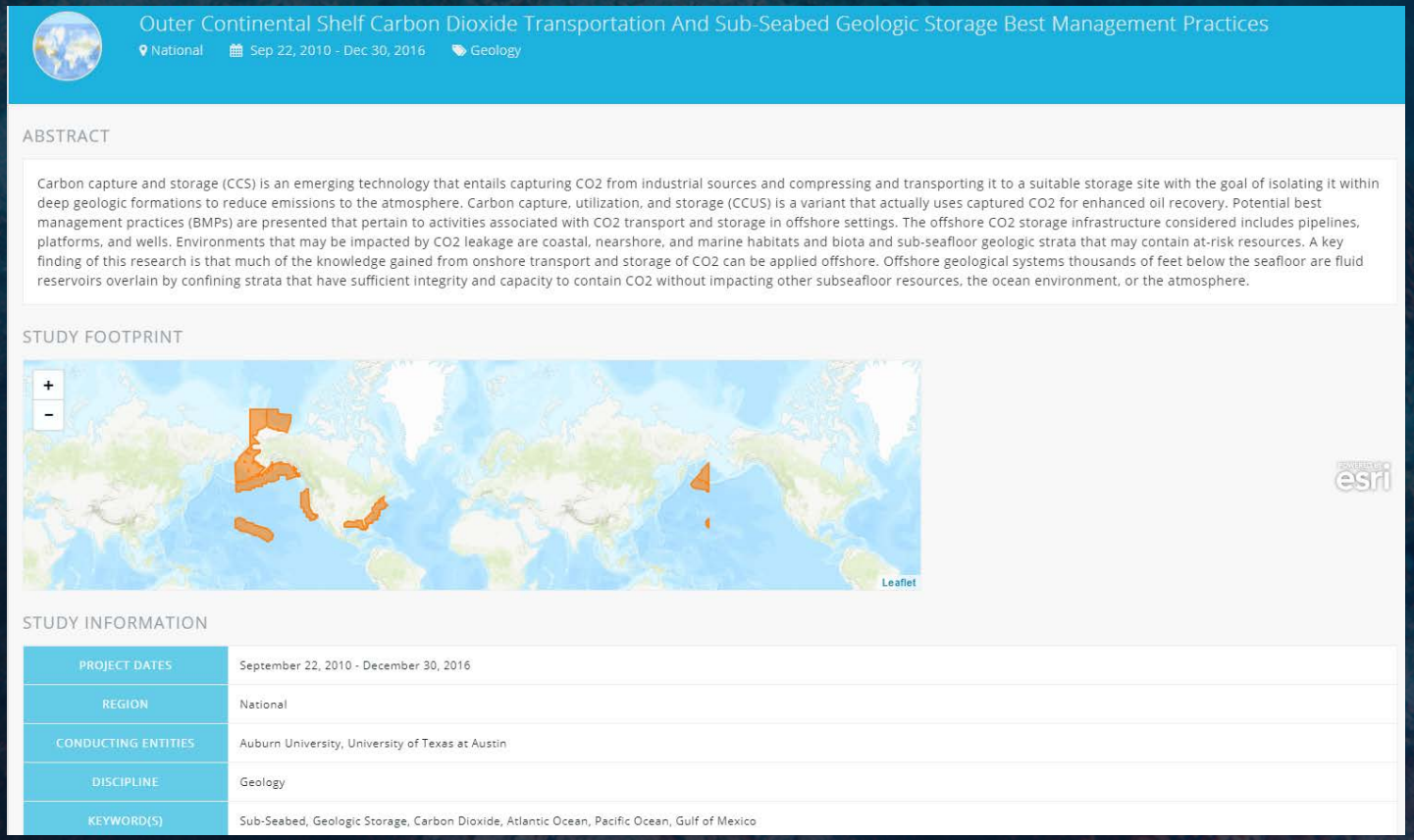
ANNOTATED BIBLIOGRAPHY DATABASE

Number of Literature Sources by Subtopic



- Site Selection & Characterization (237)
- Risk Analysis (118)
- Project Planning and Execution (90)
- Monitoring (128)
- Mitigation (21)
- Inspection & Performance Auditing (6)
- Reporting Requirements (3)
- Emergency Response & Contingency (10)
- Decomissioning & Site Closure (18)
- General CCS (38)
- EOR-GS (40)
- International Policy &Regulations (41)
- U.S. Policy & Regulations (43)
- Manuals & Standards (101)
- Legal (53)
- Economic (27)

Environmental Studies Program Information System (ESPIS)



Outer Continental Shelf Carbon Dioxide Transportation And Sub-Seabed Geologic Storage Best Management Practices

National | Sep 22, 2010 - Dec 30, 2016 | Geology

ABSTRACT

Carbon capture and storage (CCS) is an emerging technology that entails capturing CO2 from industrial sources and compressing and transporting it to a suitable storage site with the goal of isolating it within deep geologic formations to reduce emissions to the atmosphere. Carbon capture, utilization, and storage (CCUS) is a variant that actually uses captured CO2 for enhanced oil recovery. Potential best management practices (BMPs) are presented that pertain to activities associated with CO2 transport and storage in offshore settings. The offshore CO2 storage infrastructure considered includes pipelines, platforms, and wells. Environments that may be impacted by CO2 leakage are coastal, nearshore, and marine habitats and biota and sub-seafloor geologic strata that may contain at-risk resources. A key finding of this research is that much of the knowledge gained from onshore transport and storage of CO2 can be applied offshore. Offshore geological systems thousands of feet below the seafloor are fluid reservoirs overlain by confining strata that have sufficient integrity and capacity to contain CO2 without impacting other subseafloor resources, the ocean environment, or the atmosphere.

STUDY FOOTPRINT

STUDY INFORMATION

PROJECT DATES	September 22, 2010 - December 30, 2016
REGION	National
CONDUCTING ENTITIES	Auburn University, University of Texas at Austin
DISCIPLINE	Geology
KEYWORD(S)	Sub-Seabed, Geologic Storage, Carbon Dioxide, Atlantic Ocean, Pacific Ocean, Gulf of Mexico

https://marinecadastre.webqa.coast.noaa.gov/espis/#/search/study/27007

https://marinecadastre.gov/espis/#/

CCS COLLABORATIONS

- Contributed to CSLF Task Force on Offshore CO_2-EOR Report (November 2017)
- Cascadia CarbonSAFE Workshop: Pre-feasibility study for offshore carbon storage in basalt formations (October, 2017 and April, 2018)
- Presentation at the U.S.-Norway Annual Bilateral Collaboration on CCS/CCUS (August 2017)
- Presentations at the International Workshops on Offshore Geologic CO_2 Storage (April 2016 and June 2017)
- DOE Offshore CO_2 Storage Resource Assessment Studies:
  - BOEM collaborates with DOE to provide needed data
  - SEACarb – BMPs for the SE Offshore Storage Resource Assessment Project
  - GOMCarb – Advisory Committee for GoMCarb

www.boem.gov

Melissa Batum, P.G.
Senior Program Analyst
Office of Renewable Energy Programs
Melissa.Batum@boem.gov

BOEM
Bureau of Ocean Energy Management