Mid-Atlantic U.S. Offshore Carbon Storage Resource Assessment
International Workshop on Offshore Geologic CO_2 Storage, 2016

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PROJECT SCOPE

Goals and Objectives

Mid-Atlantic U.S. Project Objectives

DOE Program Goals	Mid-Atlantic U.S. Project Objectives
Support Industry's ability to predict CO_2 storage capacity	• Define geologic characteristics of candidate storage sites • Use seismic data to better define continuity of reservoirs • Catalog hydrologic properties of mid-Atlantic offshore storage sites • Determine appropriate efficiency parameters specific to offshore lithologies
Develop Best Practices	• Examine risk factors • Engage stakeholders to guide future projects

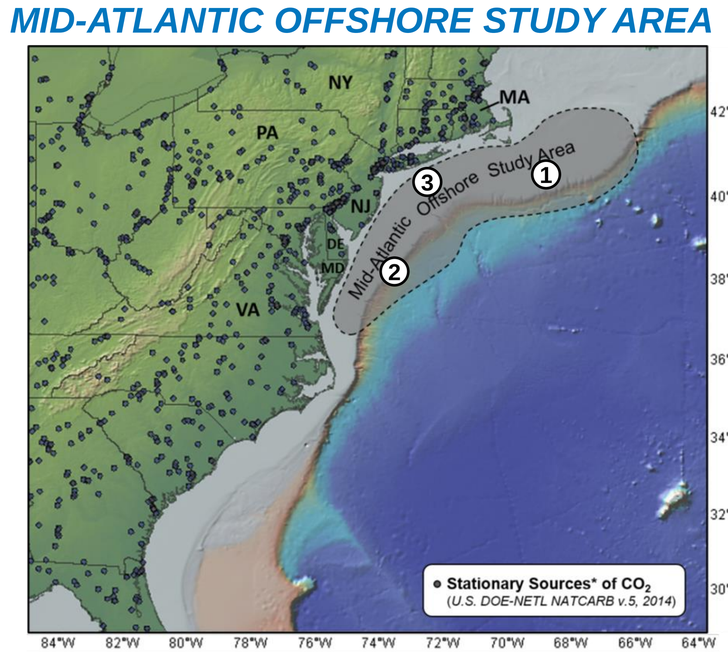
Study area

The study area consists of three major sub regions:

1. Georges Bank Basin
2. The Baltimore Canyon Trough
3. The Long Island Platform

Potential storage within the mid- and north-Atlantic Planning Areas could provide options for heavily populated states along the east coast.

MID-ATLANTIC OFFSHORE STUDY AREA



A map showing the regional study area, and its proximity to point sources of CO_2

Project organization

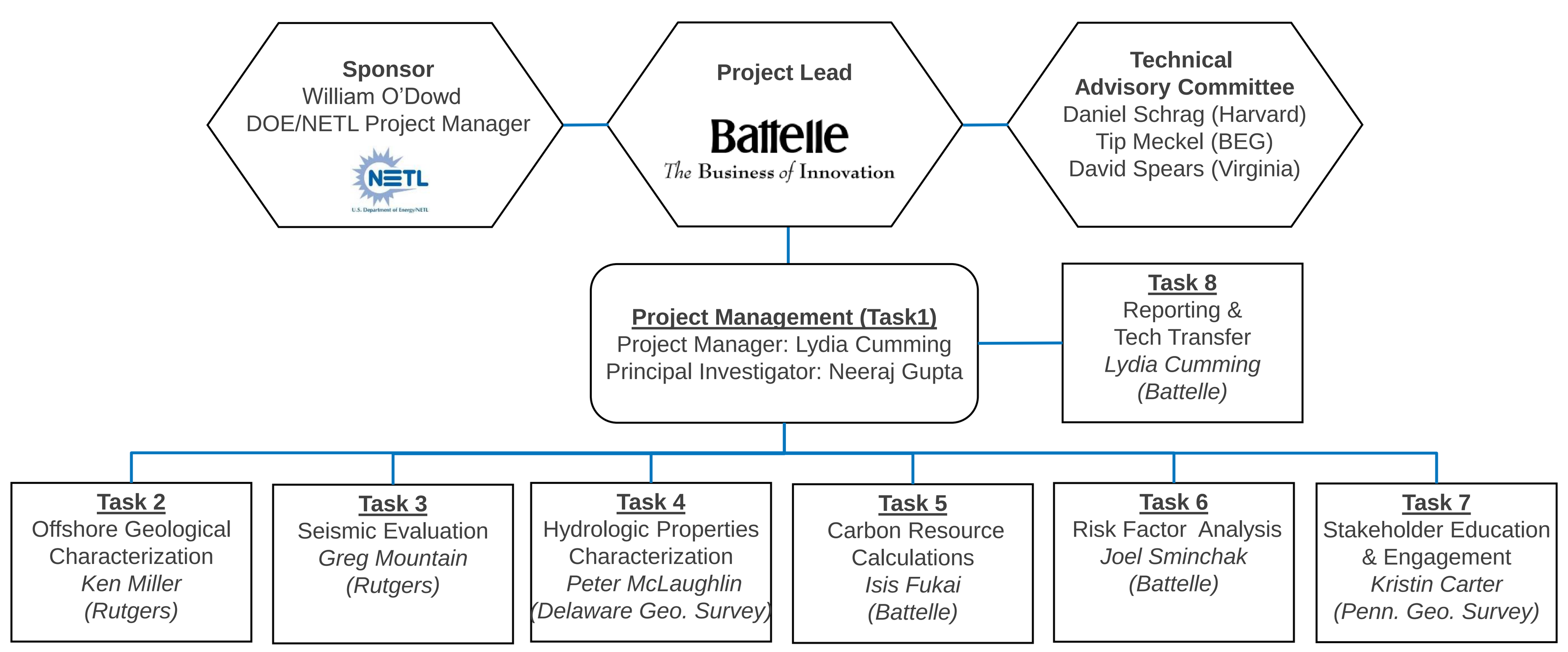
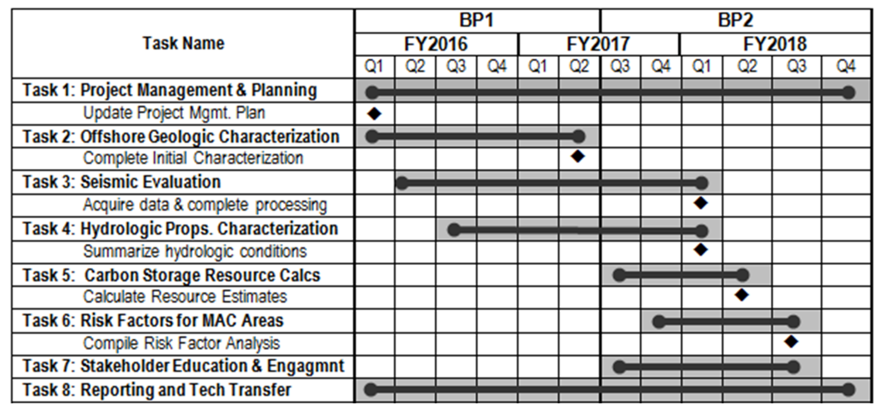


Chart illustrating the project leadership by task

Schedule



Future deliverables include:
- Itemized inventory of existing data
- Regional stratigraphic framework report
- Identification of regional hydrologic boundaries
- Storage Resource Assessments
- Offshore risk factor analysis
- Roadmap for future CCS projects

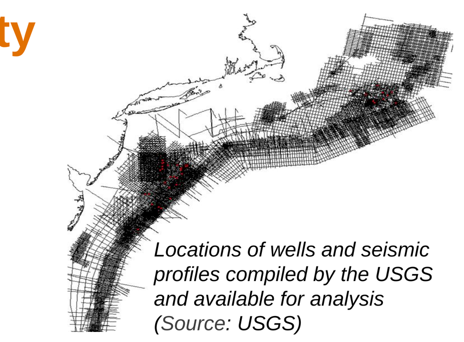
METHODOLOGY

1. Assess the geologic characteristics within the study area

- Compilation and review of all existing data
- Construction of a digital database
- Interpretation of the porosity and mineralogy via well log and core analysis

2. Utilize seismic data to define reservoir continuity

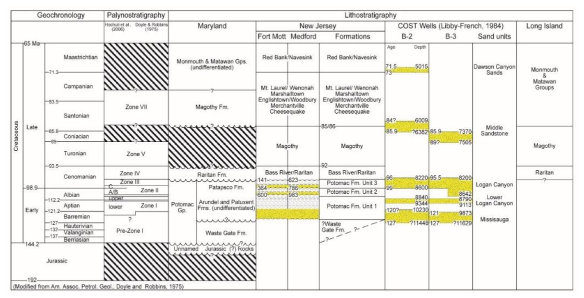
Strategic selection of seismic lines for reprocessing:
- Bureau of Ocean Energy Management (BOEM) newly released multichannel seismic data from 1970's-1980's
- USGS, academic, and other seismic surveys



Locations of wells and seismic profiles compiled by the USGS and available for analysis (Source: USGS)

3. Catalog hydrologic properties

- Lithologic, porosity, and permeability data generated from core and well logs will be used to determine the amount of pore space available for storage
- Data will be obtained from original reports, public databases, and new analysis of core material located at the Delaware Geological Survey



Stratigraphic column illustrating the stratigraphy and targeted sand intervals (yellow) within the study area (modified from Seker, 2012)

Core from the COST G-2 well currently being inventoried and assessed for additional analysis

4. Calculate Prospective CO_2 Storage Resources

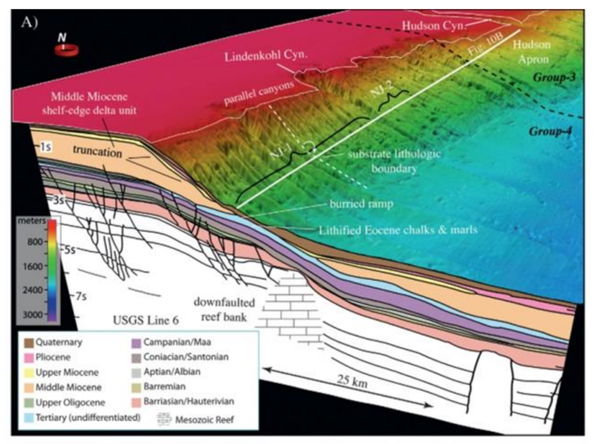
- Development of first approximations of offshore CO_2 storage efficiency
- Examination of differences in storage efficiency between onshore and offshore environments
- Calculation of prospective storage resource assessments following the DOE methodology (US-DOE-NETL, 2012)

$$G_{CO2} = A_t h_g \phi_{tot} \rho_{CO2} E_{saline}$$

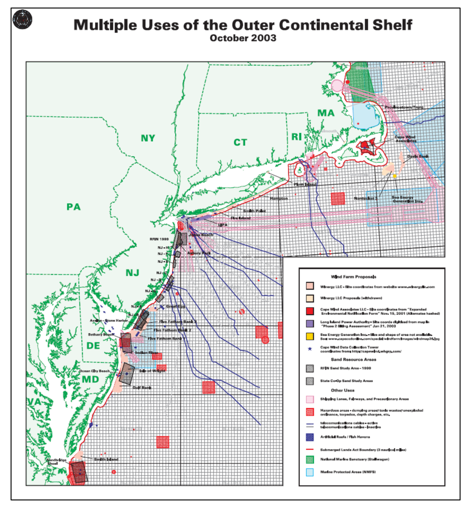
Parameter	Dimension *	Description
G_{CO2}	M	Mass CO_2 storage resource of reservoir
A_t	L^2	Total area of reservoir
h_g	L	Gross thickness of reservoir within the area defined by A_t
ϕ_{tot}	L^3/L^3	Total pore/void space in the volume of rock defined by A_t h_g
ρ_{CO2}	M/L^3	Density of CO_2 at anticipated pressure and temperature conditions of storage
E	L^3/L^3	Storage efficiency factor that represents the fraction of the total volume of the reservoir accessible for CO_2 storage

*M is mass; L is length

5. Examine risk factors that may impact storage resource estimates



Geological and other risk factors impacting operations will be considered. The map to the left displays known behavior of faults, fractures, and dipping strata (source: USGS). The map to the right illustrates environmental risks such as marine protected areas, hazardous waste dumping areas, and shipping lanes (source: BOEM).

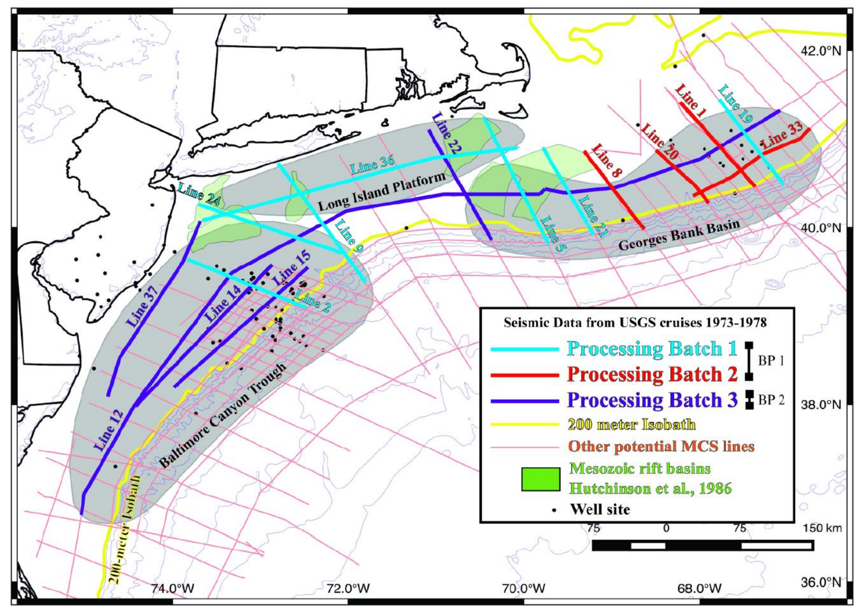


6. Engage stakeholders to guide future projects

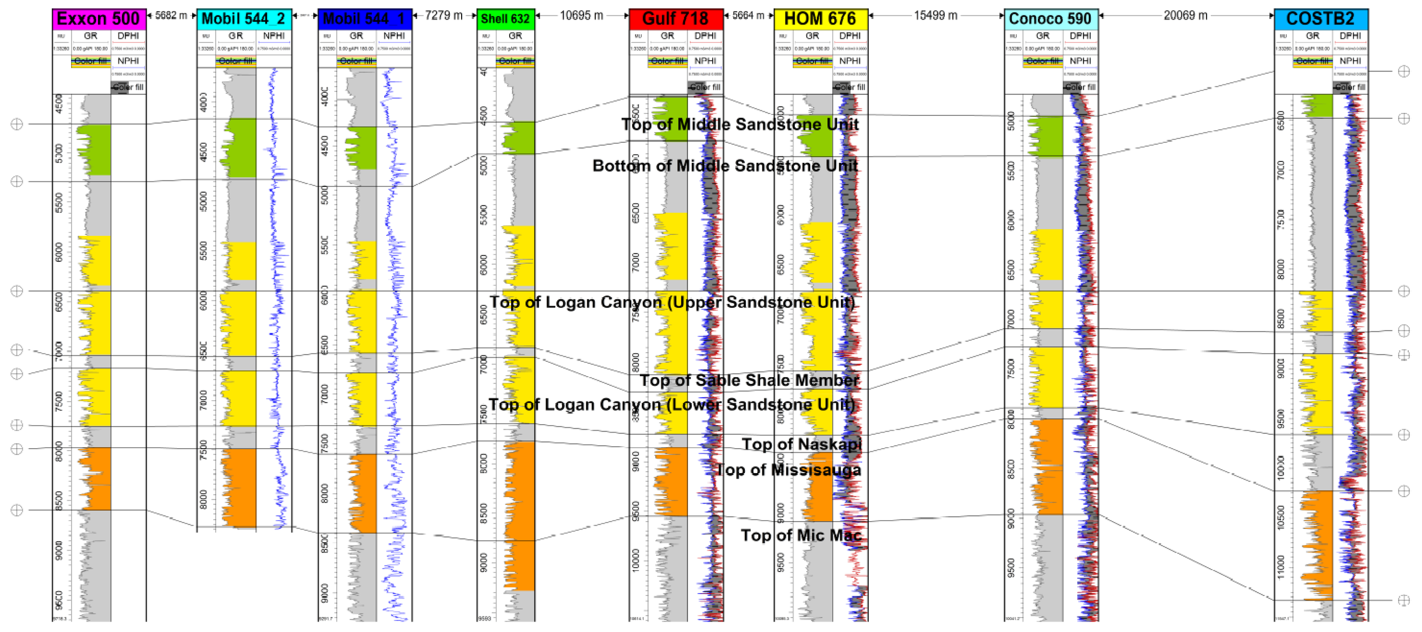
- Several workshops will be held with the objective to seek input for road mapping

DISCUSSION

Attention towards offshore prospects for CCS in the U.S. is required to address numerous large-point sources located along the U.S. Atlantic Coast. Research is underway to develop a reliable method for screening candidate offshore storage formations, producing data-driven, probabilistic estimates of the prospective CO_2 storage resources, and identifying key formations that exist offshore of the Mid-Atlantic U.S. with the greatest potential for effective, permanent storage of CO_2. The anticipated outcomes are high level storage resource assessments of areas of the mid-Atlantic not previously characterized and improved storage resource estimates. The Project Team will also review and update guidance on efficiency factors for offshore resource assessment and best practices for site selection criteria.



The first batch of seismic data selected for reprocessing consists of over 1000 km of seismic lines; ultimately, a total of 4000 km lines will be selected (source: Lamont-Doherty)



Cross section constructed using data from wells located within the Great Stone Dome in the Baltimore Canyon Trough, North (left) to South (right) (source: Rutgers University)

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