



CarbonSAFE Phase II: CTV III CO₂ Storage Project

*Demonstrate safe, reliable CO₂ transport and storage in
California's Sacramento Delta*

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Carbon TerraVault

➤ Acknowledgment

Funding for this project will be provided by the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL).



Project Overview

CarbonSafe Phase II: CTV III CO₂ Storage Project

Timeline: Two-year timeframe – Selected - in Negotiations

Funding: Federal \$8.9 MM / Cost-share \$2.2 MM

Objective: Investigate the feasibility of developing a commercial-scale carbon storage hub in the Sacramento Delta, California. CO₂ captured from greenfield and existing sources in the East-Bay.

Project Team:

- Lead - Colorado School of Mines
- California Resources / Carbon TerraVault
- Blade Energy Partners
- Providence Strategic Consulting

Organizations	Personnel	Position
Colorado School of Mines	Dr. Yanrui Daisy Ning	Research Associate of Geophysics
	Dr. Ali Tura	Professor of Geophysics
California Resources Corporation / Carbon TerraVault	Joe Ashley	CRC/CTV Team Leader of Community Benefits
	Travis Hurst	CRC/CTV Team Leader of Technical
Providence Strategic Consulting	Tracy Leach	Government and Public Relations Strategist
Blade Energy Partners	Suri Suryanarayana	Drilling Engineer



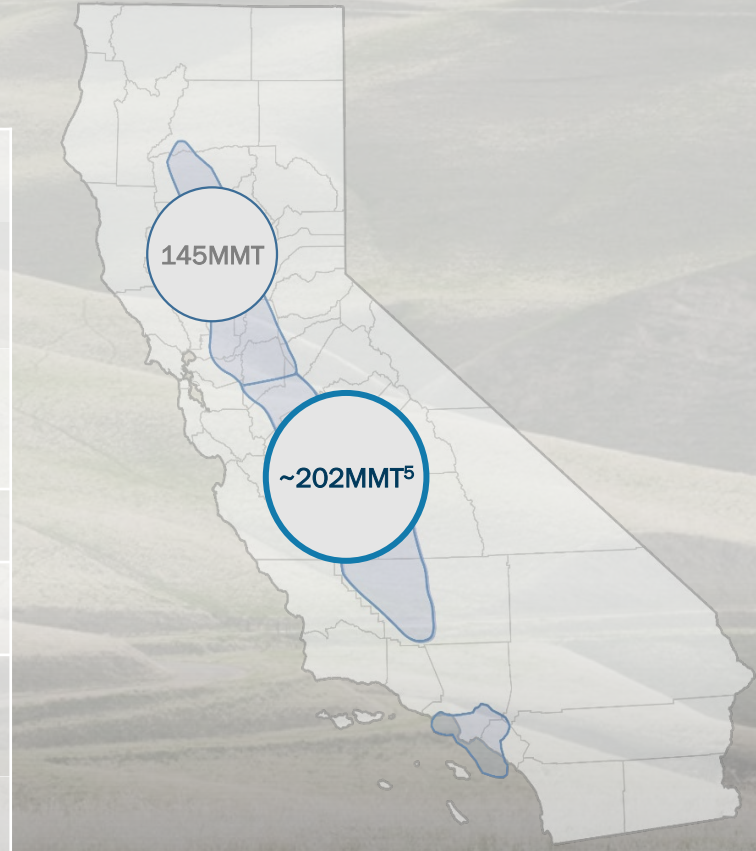
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Vault	CTV I		CTV II	CTV III	CTV IV	CTV V	Carbon Frontier	CTV VI	Coles Levee
EPA Permit Application Administratively Complete	Yes (26R)	Yes (A1-A2)	Yes	Yes	Yes	Yes	Yes	TBD	TBA
Targeting Class VI Draft EPA Permits Receipt	Public Comment Period Complete	~2024	~2024	~2025	~2025	~2025	~2025	~2027	TBA
Location	Central California			Northern California				Central California	
Annual Regional CO ₂ Emissions ¹ (MMTPA)	~30			~60				~30	
Est. Average Annual Injection Capacity ² (MMTPA)	~1.5 ³	0.2	~0.6	~1.8	~0.9	~0.4	~0.7	~2.5	TBA
Potential Total Storage Capacity (MMT)	38	8	23	71	34	17	27	102	TBA



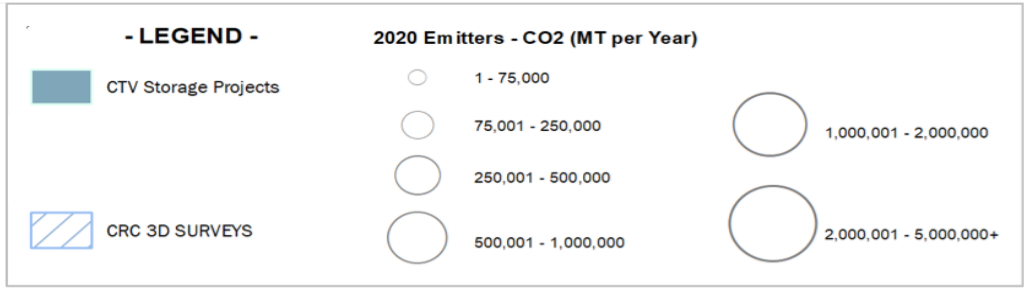
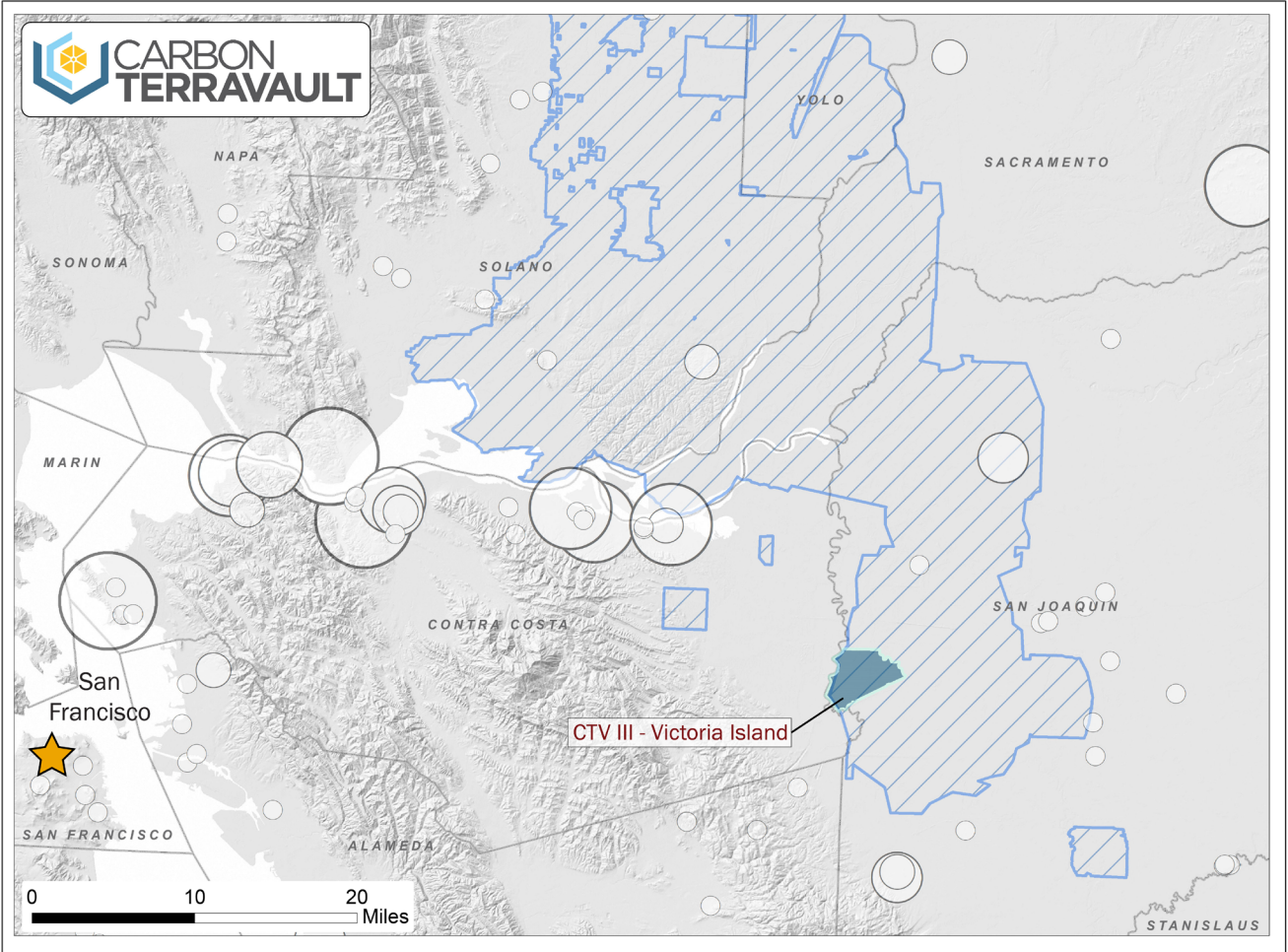
Numbers might not add up due to rounding. See Slide 8 "Assumptions, Estimates and Endnotes"

Project Location

The CTV III project area lies within the Sacramento Basin in northern California

More than 20 million metric tons per annum (MMTPA) of CO₂ emissions from natural gas-fired power plants, refineries and other industrial sources are in the San Francisco Bay Area, approximately 20-50 miles west of the project site.

California Resources Corporation / Carbon TerraVault (CTV) has secured rights and support for >50 MMT of carbon storage in a saline aquifer at ~6,000 feet.



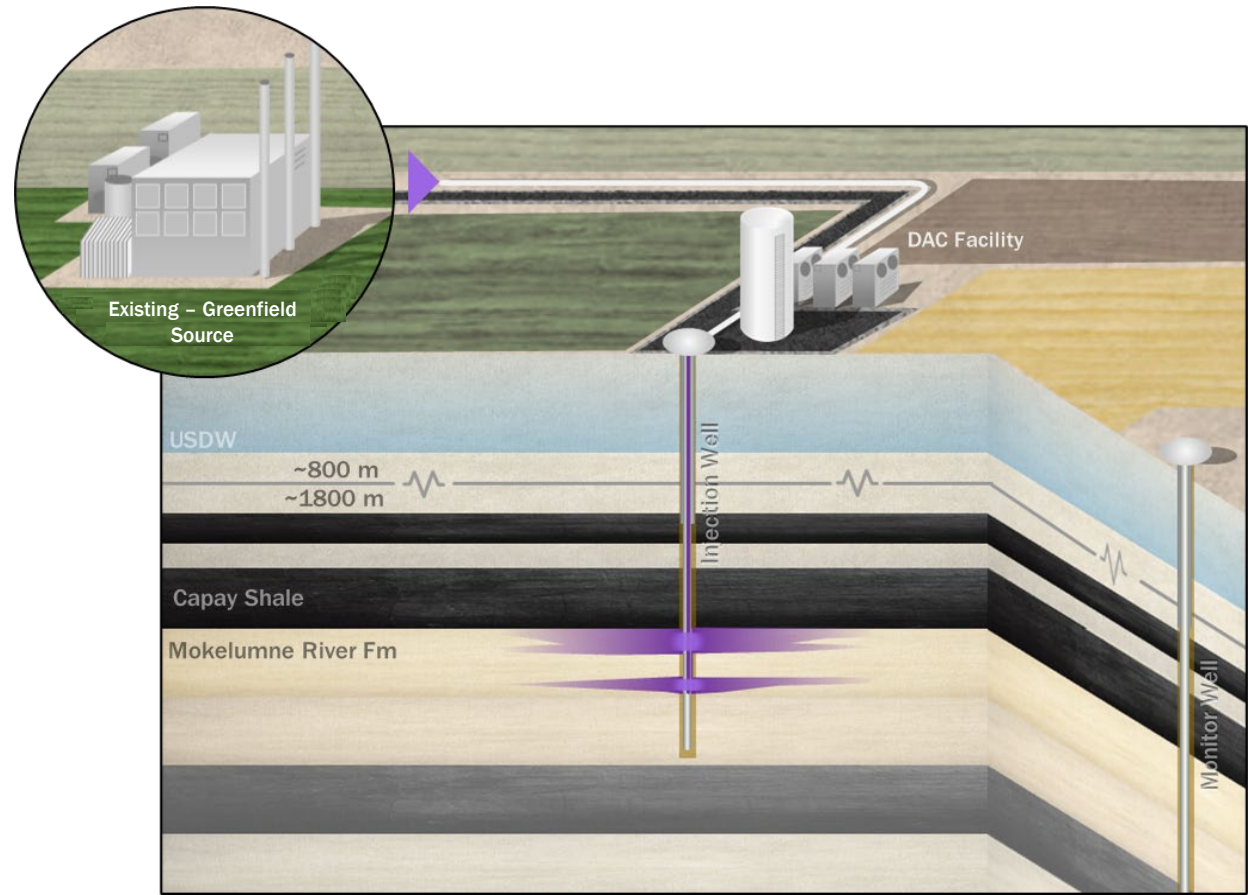
Project Goals

High level project goals:

- De-risk storage in Sacramento Delta
- Confirm storage complex capacity and injectivity to meet or exceed 50 MT-CO₂ over 30 years required for commercial scale deployment
- Complete initial risk assessment for project components
- Develop a CO₂ sequestration pathway:
 - Maintain key natural gas-fired power generating assets
 - Develop Direct Air Capture (DAC) to meet Carbon Dioxide Removal target in California
 - Address future industrial sources of CO₂

At the end of this project, we expect to be prepared for a future CarbonSAFE application, which will help accelerate the implementation of a commercial CCS project.

Create a comprehensive community and stakeholder engagement plan that includes diversity, equity, inclusion and accessibility.



Project Tasks

Task 1.0 – Project Management and Planning

Task 2.0 – Site Specific Characterization & Assessment of the CO₂ Storage Complex

Task 3.0 – Preliminary Project Risk Assessment with Mitigation & Management Plans

Task 4.0 – Phase III Characterization Plan and Class VI Application Update

Task 5.0 – Project Technical & Economic Feasibility Assessment, Including Conceptual-Level Design Study for CO₂ Transport

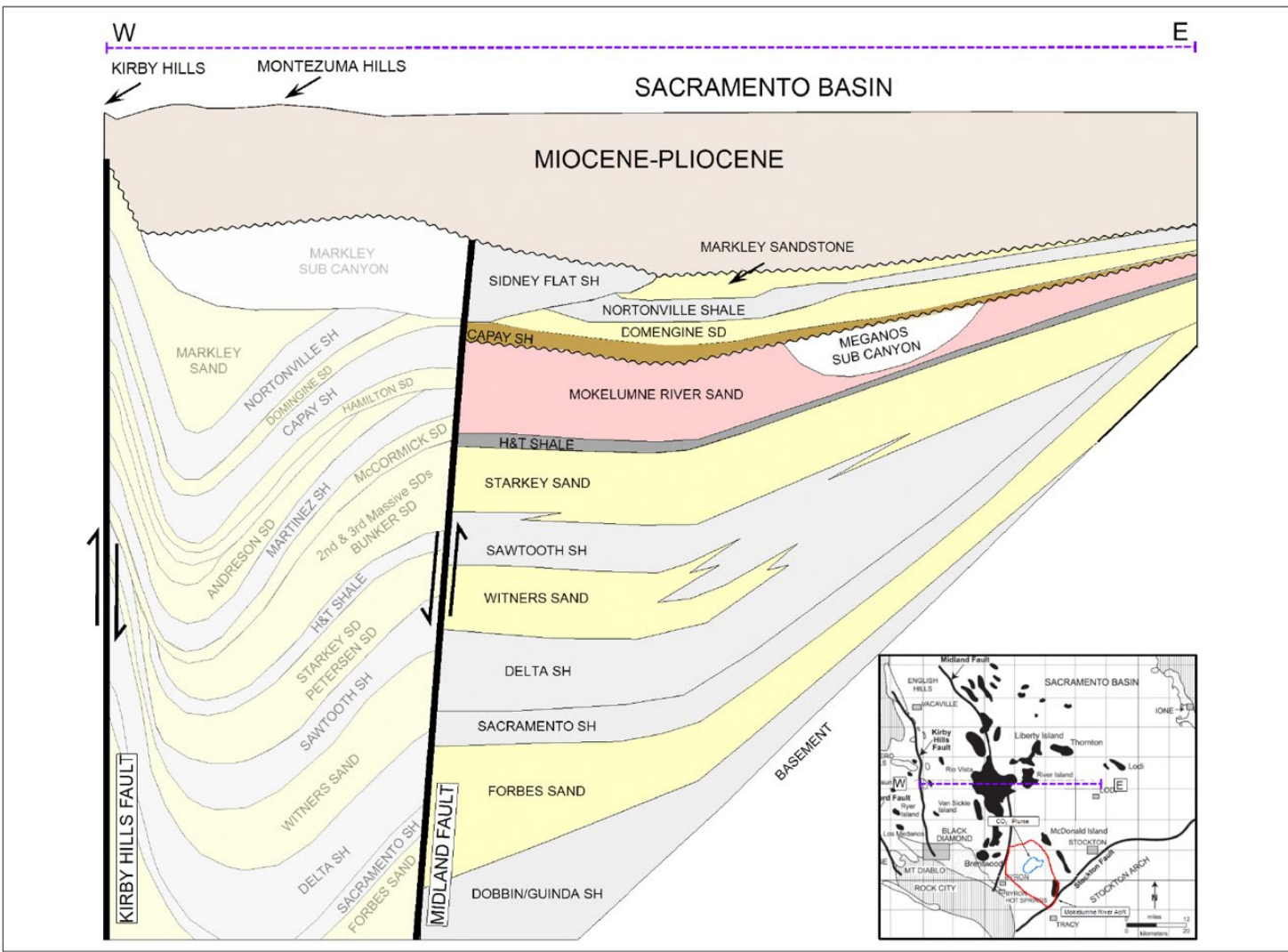
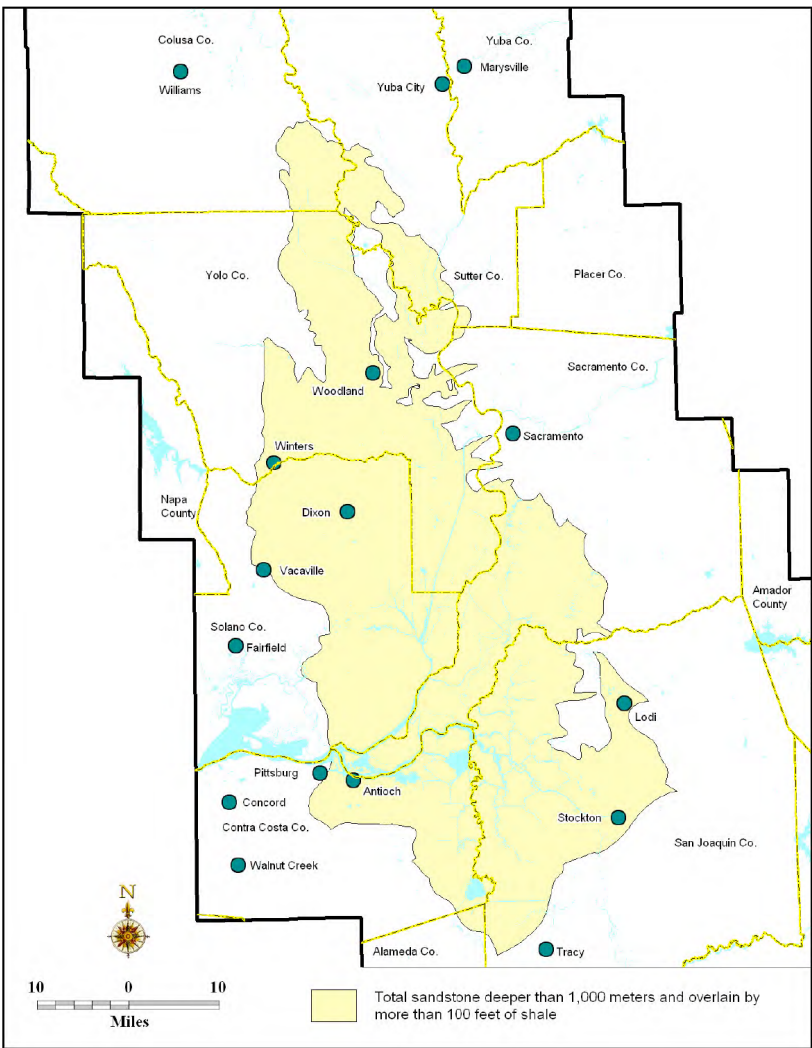
Task 6.0 – Community Benefits Plan

Task 7.0 – Data Submittal and Final Phase II Report

The project team plans to:

- (1) Acquire and analyze data to advance the existing Class VI application;
- (2) Conduct a risk assessment to improve understanding of project risks and further develop mitigation strategies (NRAP toolset)
- (3) Assess the technical and economic case for transport and storage for the project.

Sacramento Basin Geology



Petroleum basin with good seismic coverage, well data to confirm presence of high-quality reservoir sands. Gas fields confirm presence of confining shales, with hydrocarbon confinement for million of years.



*Downey, Cameron, and John Clinkenbeard. 2010. Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations – Southern Sacramento Basin, California. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

Subsurface Storage Complex

Sacramento Basin has been studied and contemplated for CCS through the WESTCARB initiative.

Target injection zone, Mokelumne River Fm:

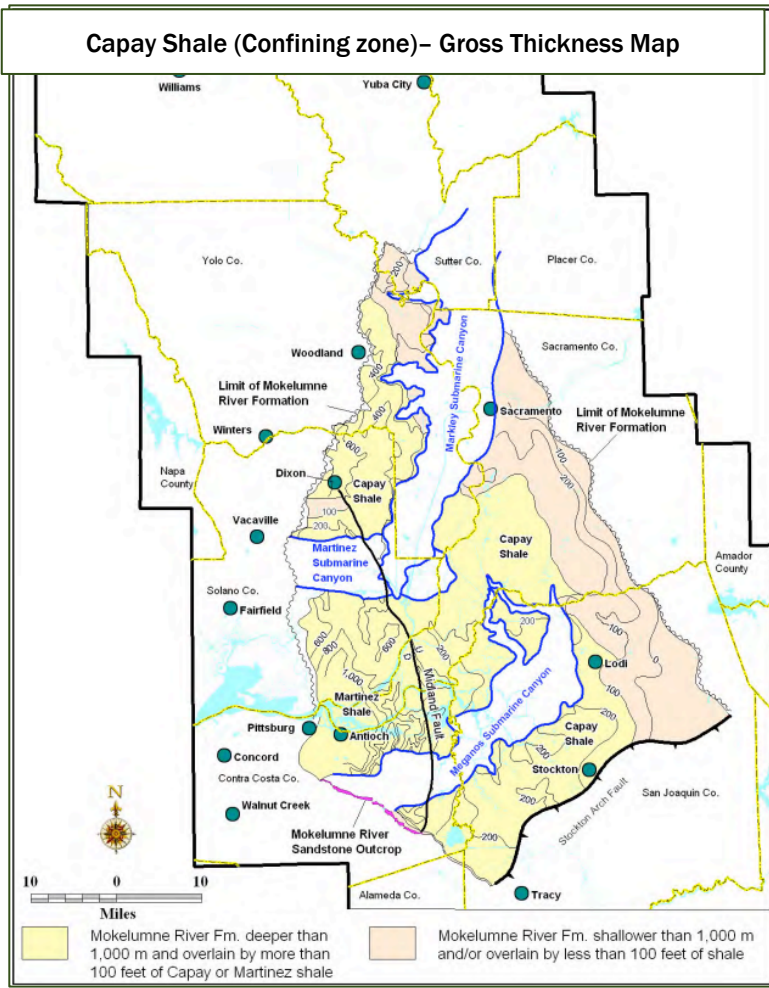
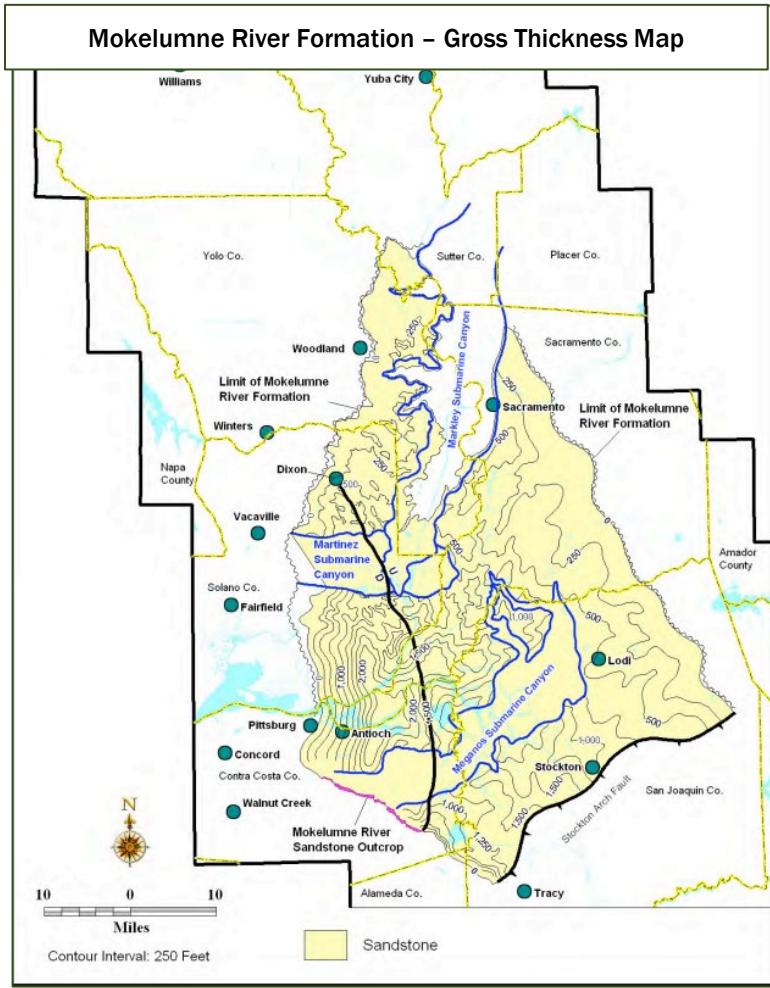
- Fluvio-Deltaic, high quality sandstone

Multiple characteristics of a good geologic sequestration target

- >100md on permeability and > 28% porosity
- Low formation dip

Overlain by the Capay Shale (Confining zone)

- Eocene aged formation
- Major flooding surface spanning the basin
- Low permeability seal, overlies gas fields



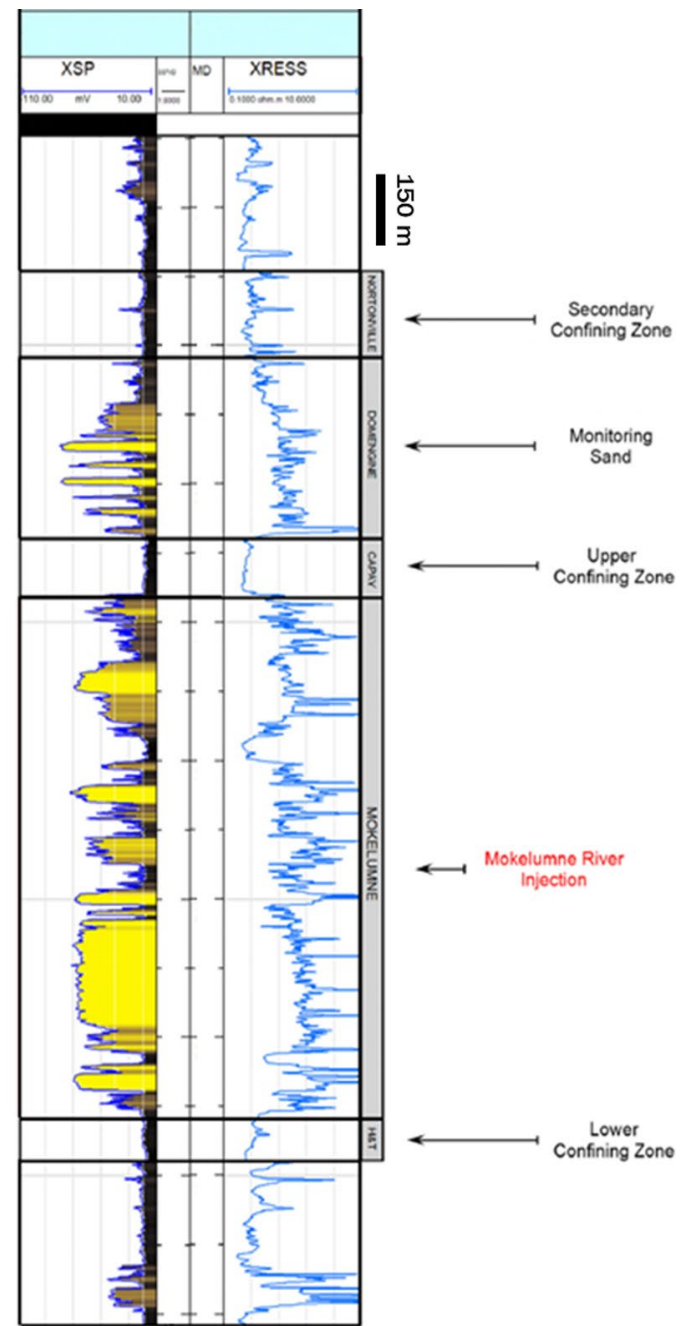
Stratigraphic Well Objectives

Further characterize the storage reservoir and associated confining zones:

- Drill well to ~8,000 ft depth
- Core following intervals
 - Injection zone – Mokelumne River Formation
 - Confining zone – Capay Shale
 - Monitoring / Dissipation zone – Domengine Formation
- Sidewall core additional zones as necessary
- Extensive logging suite
- Fluid sampling
- Well tests, pressure fall off testing

Data will be used to:

- Update static geologic model and dynamic reservoir simulations
- Complete risk assessment
- Class VI update

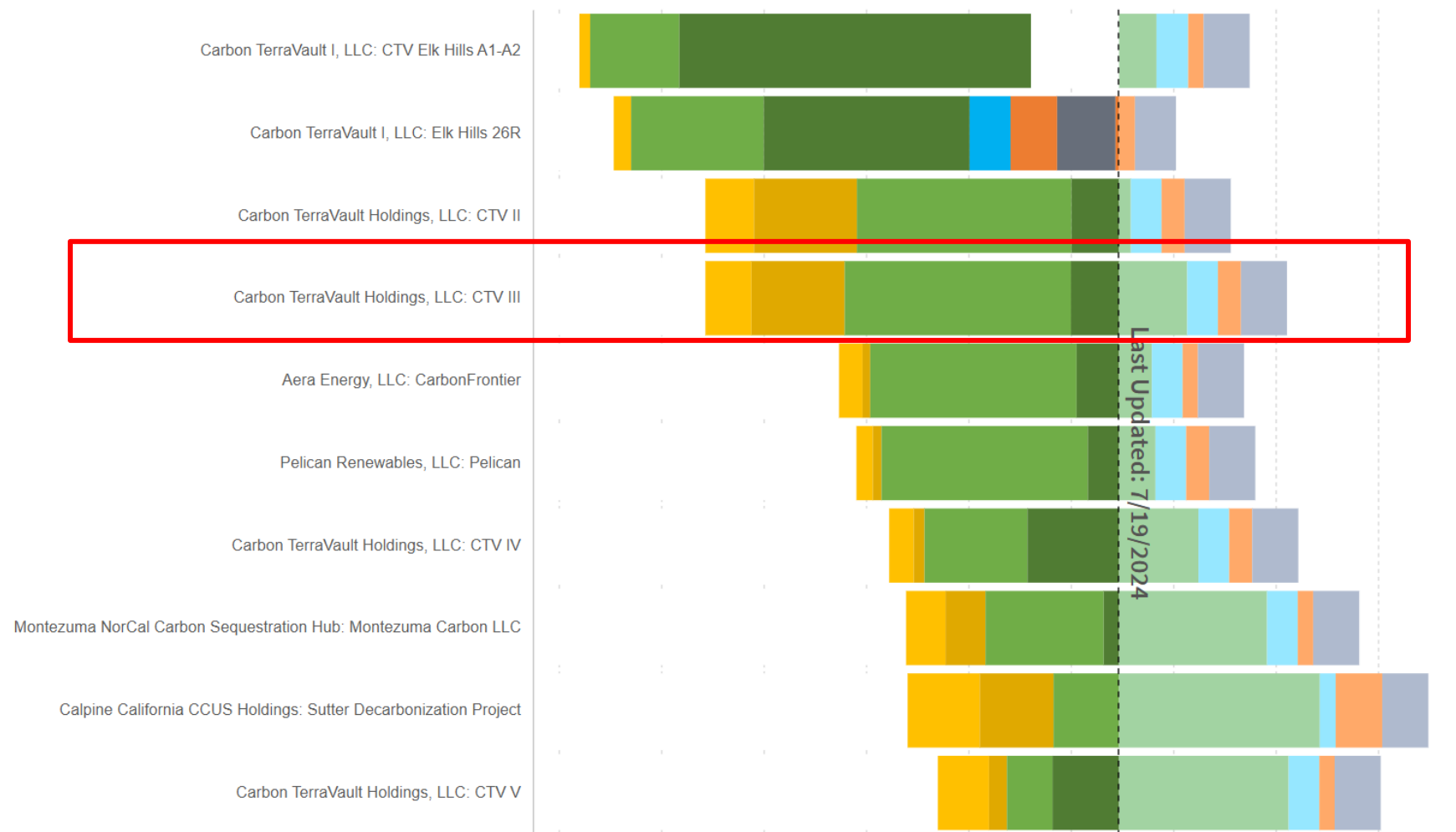


EPA Class VI

EPA Class VI:

- 6 injectors for 2.5 MMTPA
- 71 MMT of storage
- Administratively complete on February 23, 2023
- CarbonSAFE Phase II will provide dynamic data to further understand reservoir performance and support the Class VI.

EPA Region 9: UIC Class VI Permit Tracker



Completeness Review ¹ (est. 30 days)	Technical Review ^{2,3} (est. 18 months)	Prepare Draft Permit (est. 60 days)	Public Comment Period (est. 30-45 days)	Prepare Final Permit Decision ⁴ (est. 90 days)
Cumulative portion of Completeness Review waiting on applicant response ¹	Cumulative portion of Technical Review waiting on applicant response ²	Cumulative portion of Technical Review on applicant requested hold		
Notice of Deficiency (NOD) Sent ¹	Request for Additional Information (RAI) Sent ²	Applicant response time to NODs and RAIs ^{1,2}		



Summary and Next Steps

- Proceeding through contract negotiations with DOE.
- Ensuring critical paths addressed for seamless project execution.
 - Initiating discussions and processes with California agencies for well permitting and testing.

