



# WESTCARB Regional Partnership

## Phase II: Providing Underpinnings for Deployment

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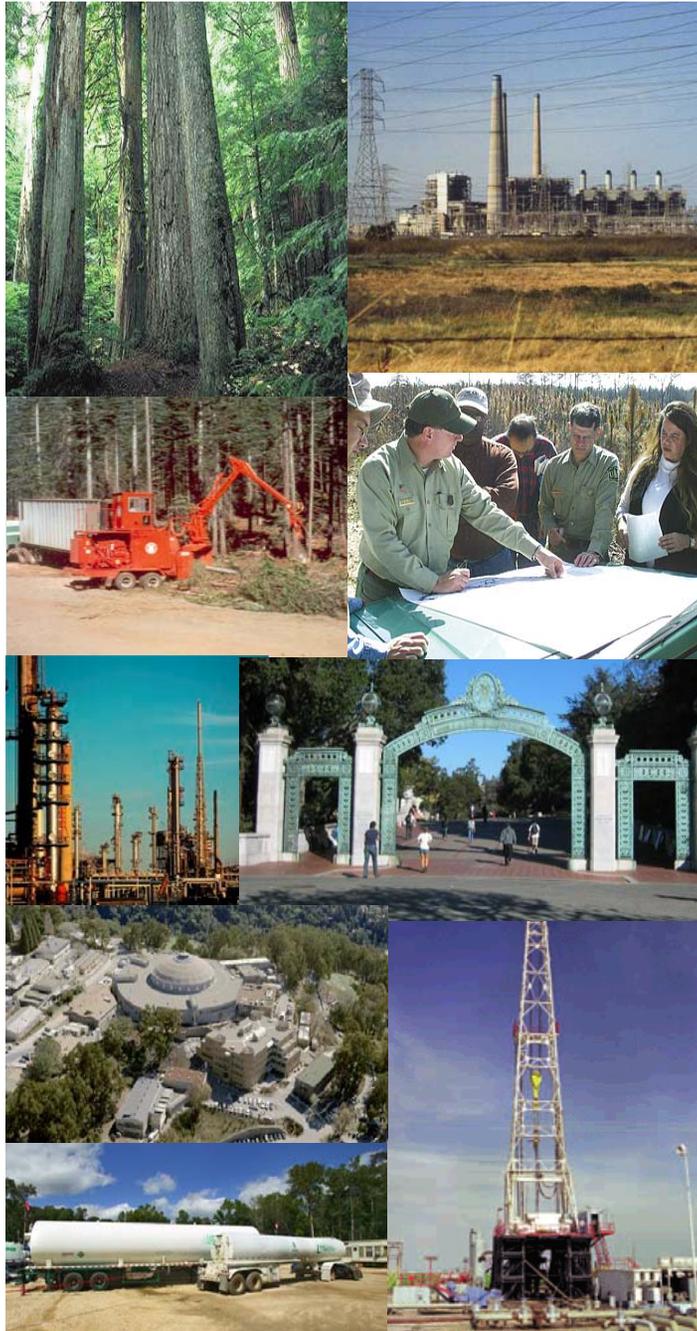
California Energy Commission

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*Alexandria, Virginia*

*May 11, 2006*



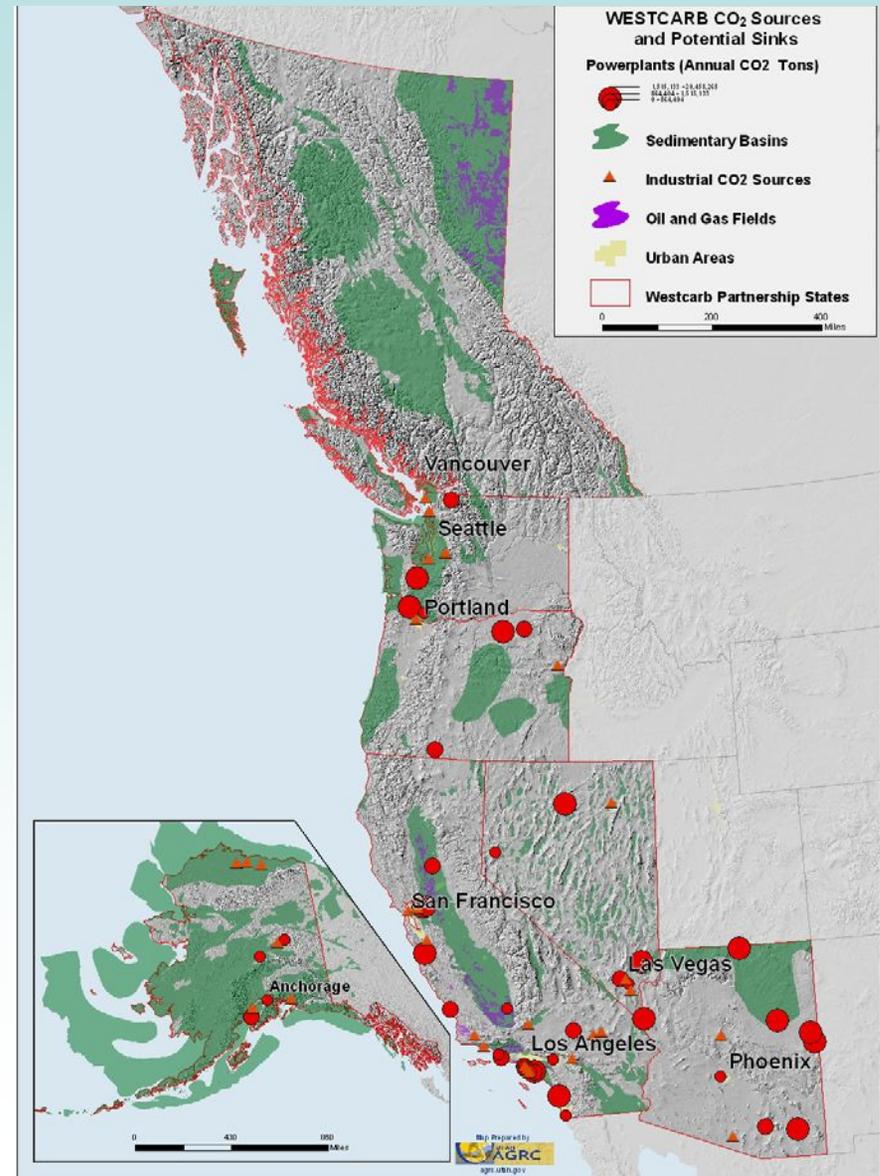


## Who Is WESTCARB?

- Researchers from more than 70 organizations comprising:
  - Resource management and environmental protection agencies
  - National laboratories and research institutions
  - Conservation nonprofits and climate registries
  - Oil and gas companies
  - Power companies
  - Pipeline companies
  - Colleges and universities
  - Trade associations and policy coordinating bodies
  - Vendors and service firms
  - Consultants
- Led by California Energy Commission

# Sedimentary Basins Broadly Distributed

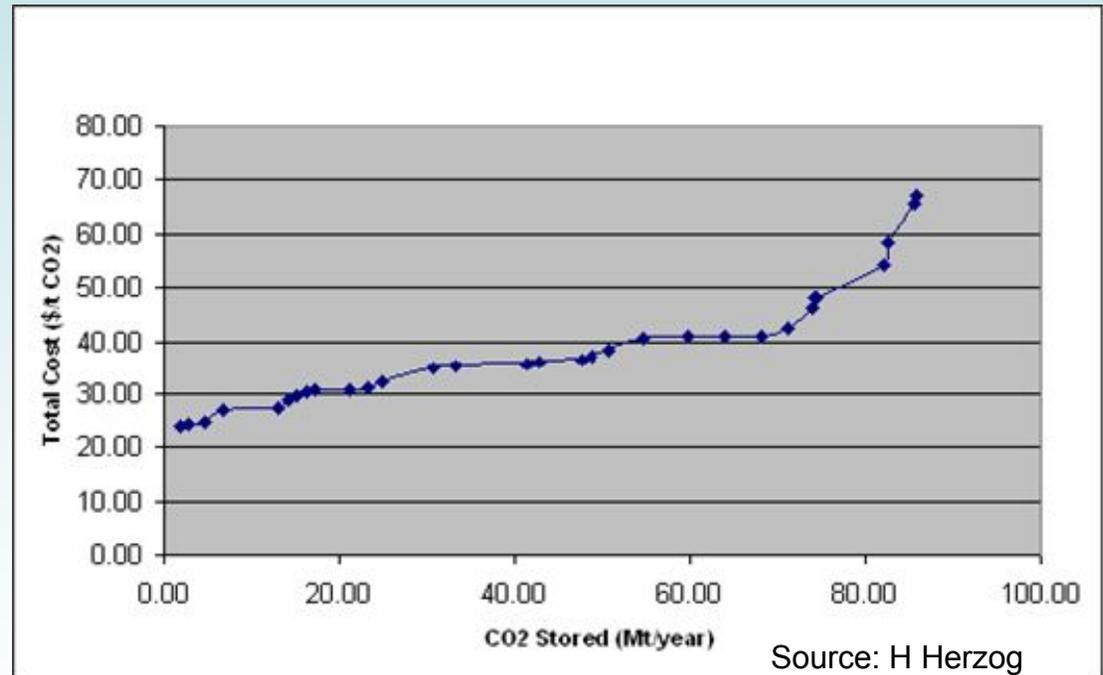
- Storage potential is large – in California, 100 to 500 Gt in saline formations, 3.4 Gt in oil reservoirs, 1.8 Gt in gas reservoirs
- Data reside at Utah AGRC, publicly accessible, part of NATCARB database
- Regional data being used as starting point for commercial project development



# Work Continues on Capture Technology and Costs

- Complete source-sink matching and capacity-cost analyses; perform plant siting study
- Updated review of capture options, integration with power plants
- Site-specific studies of capture options

Marginal Cost Curve for California, Current Conditions

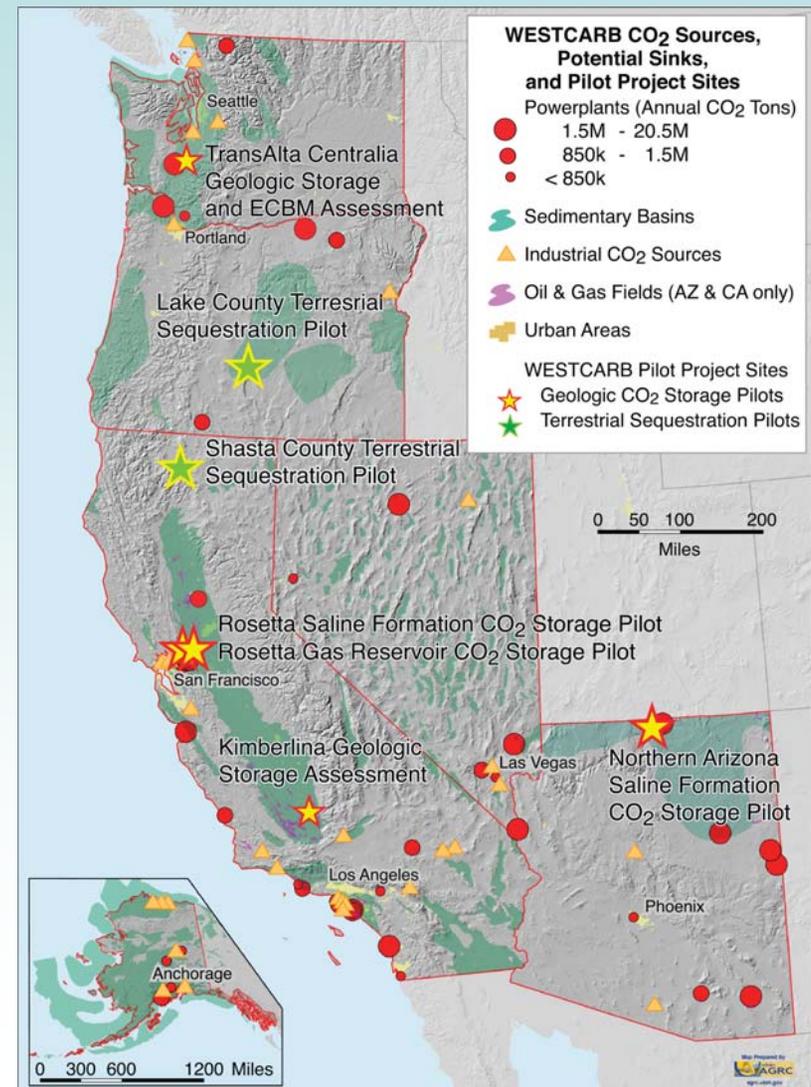


# West Coast Terrestrial Opportunities Are Large: 40-Year Analysis Shows Much Capacity <\$10/ton

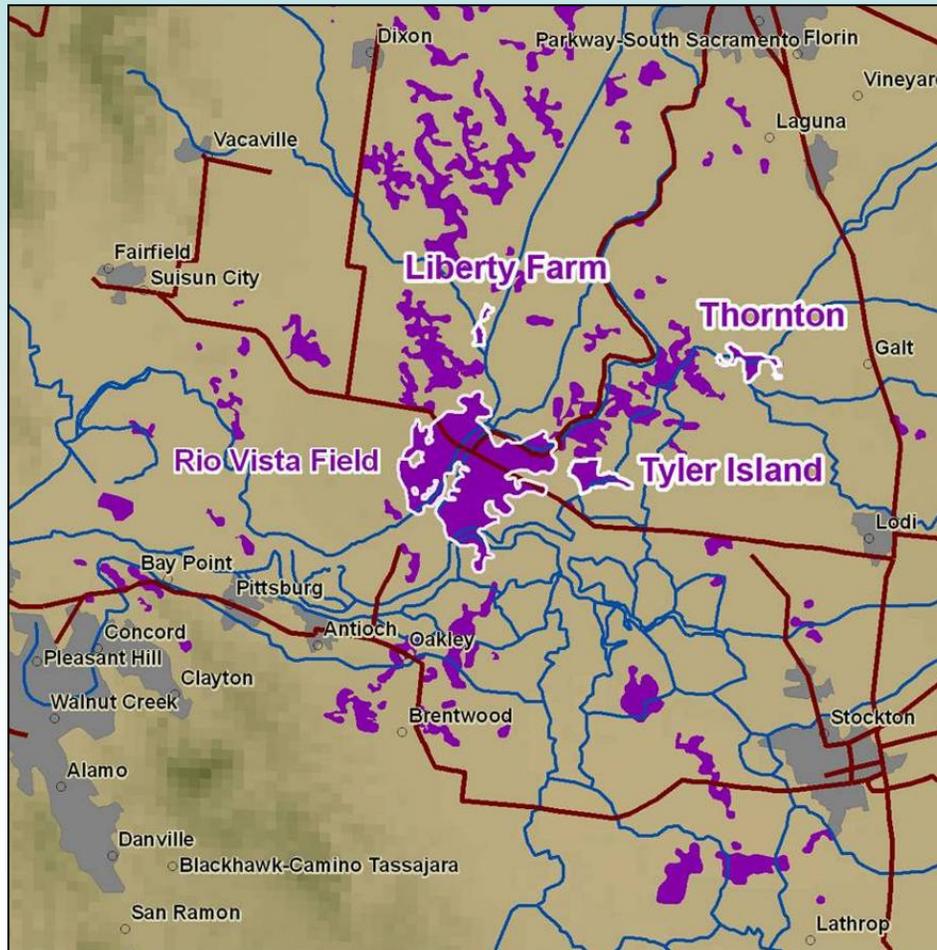
	California		Oregon		Washington	
	Area	Quantity	Area	Quantity	Area	Quantity
<b>Grazing Lands—Afforestation</b>	million acres	MMT CO <sub>2</sub>	million acres	MMT CO <sub>2</sub>	million acres	MMT CO <sub>2</sub>
< \$2.40/metric ton CO <sub>2</sub>	3.61	1138	0.16	37.5	0.06	14.8
< \$10/metric ton CO <sub>2</sub>	17.1	3228	10.5	1007	6.17	1031
< \$20/metric ton CO <sub>2</sub>	20.1	3347	17.4	1420	9.07	1219
<b>Crop Lands—Afforestation</b>						
< \$2.40/metric ton CO <sub>2</sub>			0	0	0	0
< \$10/metric ton CO <sub>2</sub>			1.91	458	0.26	57.2
< \$20/metric ton CO <sub>2</sub>			3.33	560	3.32	271
<b>Forests—Rotation Extension 5 yr extension, 20 yr contract</b>						
< \$2.40/metric ton CO <sub>2</sub>		0		0		6.08
< \$10/metric ton CO <sub>2</sub>		0		0.37		7.17
< \$20/metric ton CO <sub>2</sub>		7.25		1.80		13.55

# Pilots Planned in Arizona, California, Oregon, and Washington

- Pilots are representative of best sequestration options, unique technologies and approaches, in region
- Pilots involve site-specific focus for
  - Testing technologies
  - Assessing capacity
  - Defining costs
  - Assessing leakage risks
  - Gauging public acceptance
  - Testing regulatory requirements
  - Validating monitoring methods



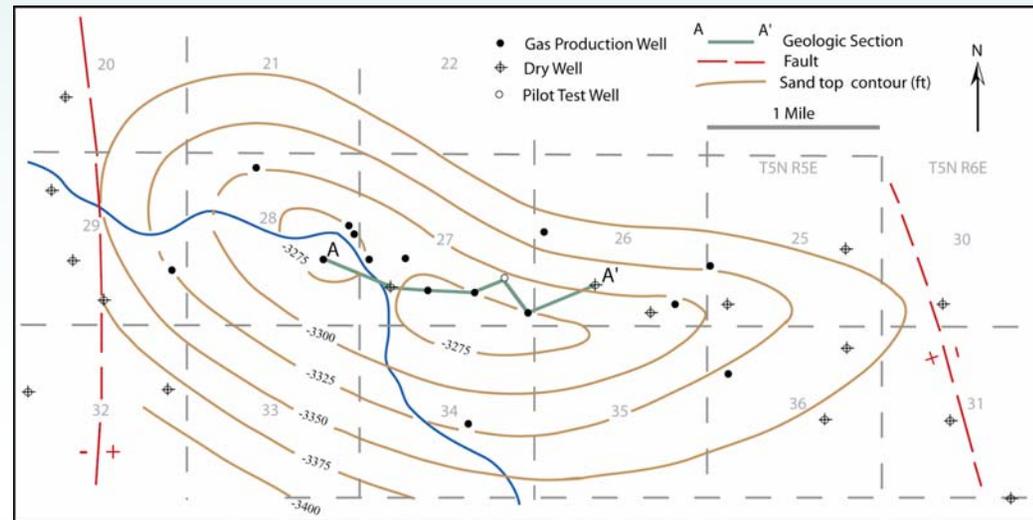
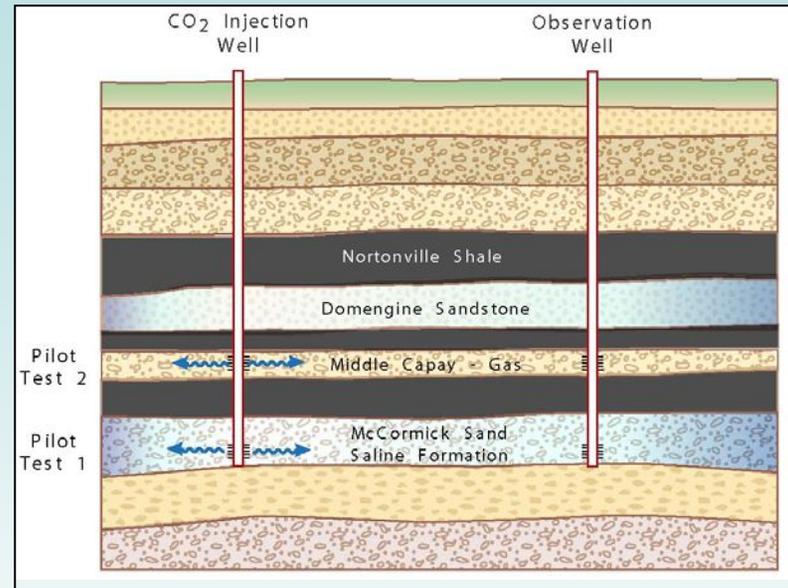
# Rosetta Resources CO<sub>2</sub> Storage Pilot



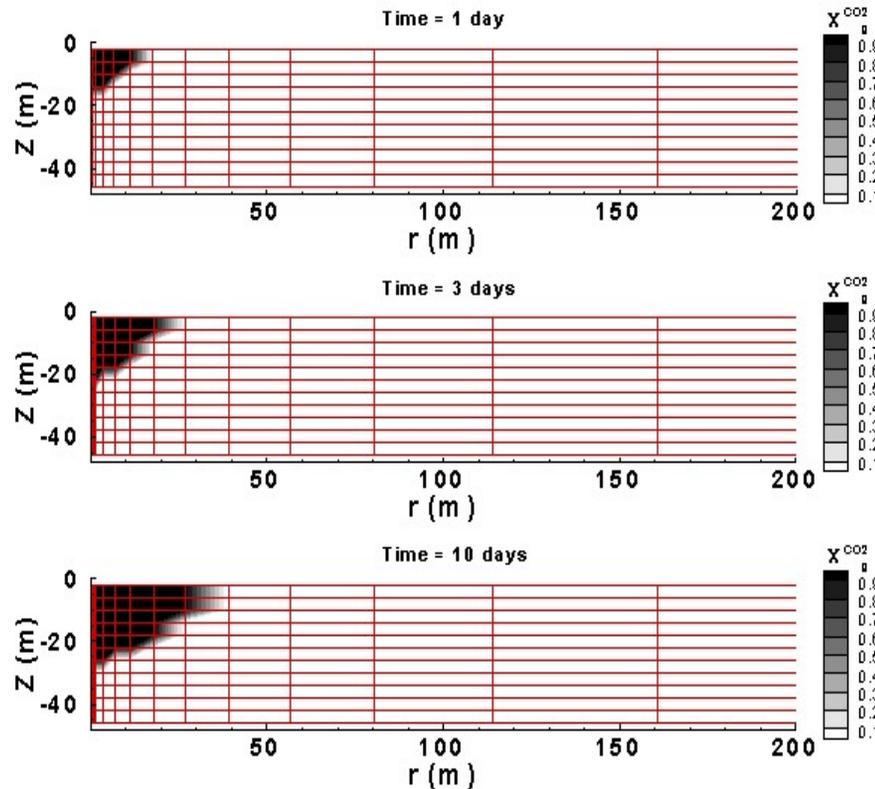
- Lead industrial partner: Rosetta Resources
- Validate sequestration potential of California Central Valley sediments
- Test CO<sub>2</sub> Storage Enhanced Gas Recovery
- Focus on monitoring

# Pilot Test Design

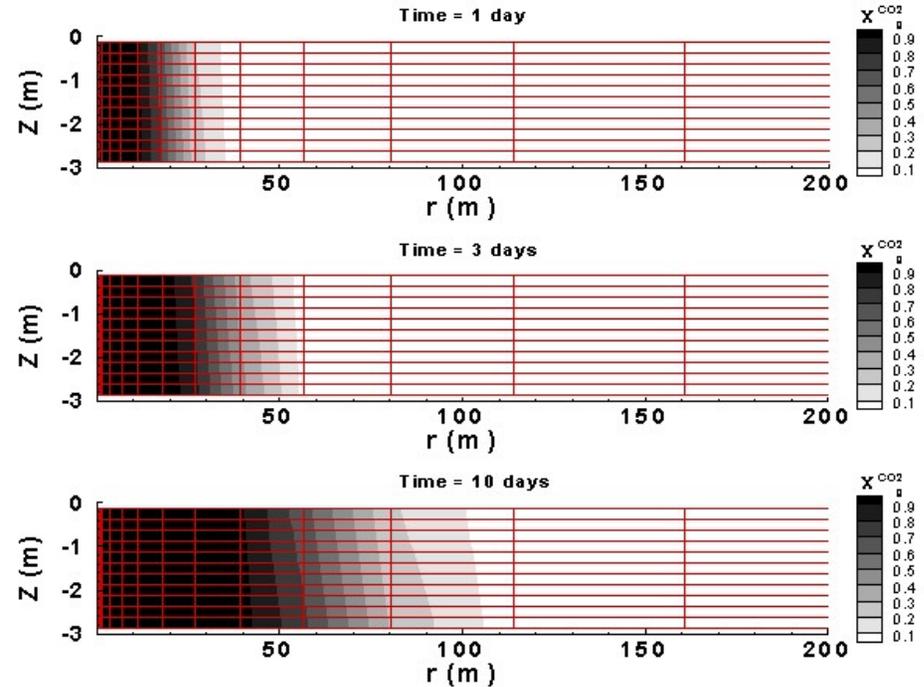
Two separate CO<sub>2</sub> injections of about 2000 tons each



# Simulations Provide Basis for Test Design



Injection into saline reservoir



Injection into the gas reservoir

# Northern Arizona Saline Formation Pilot

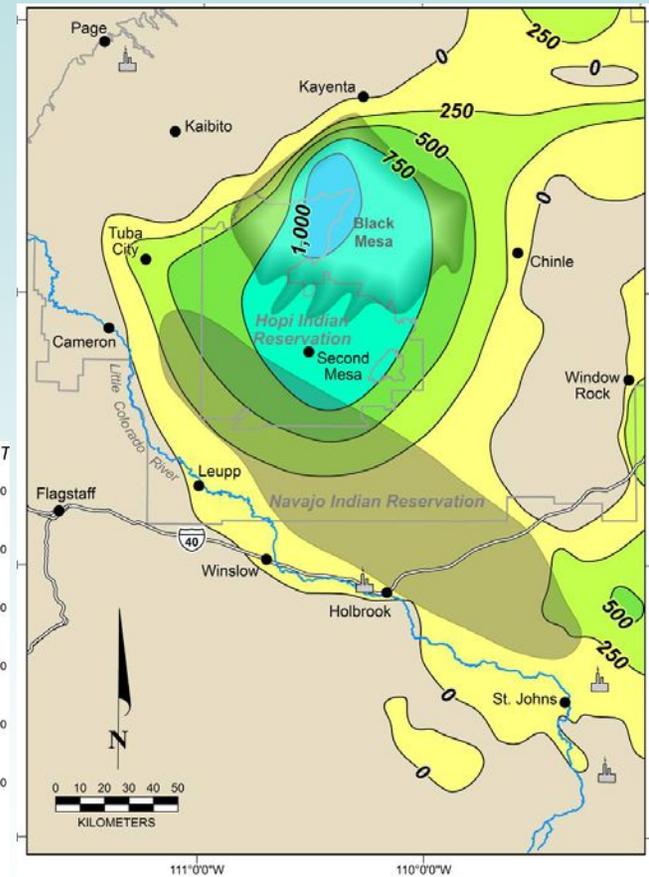
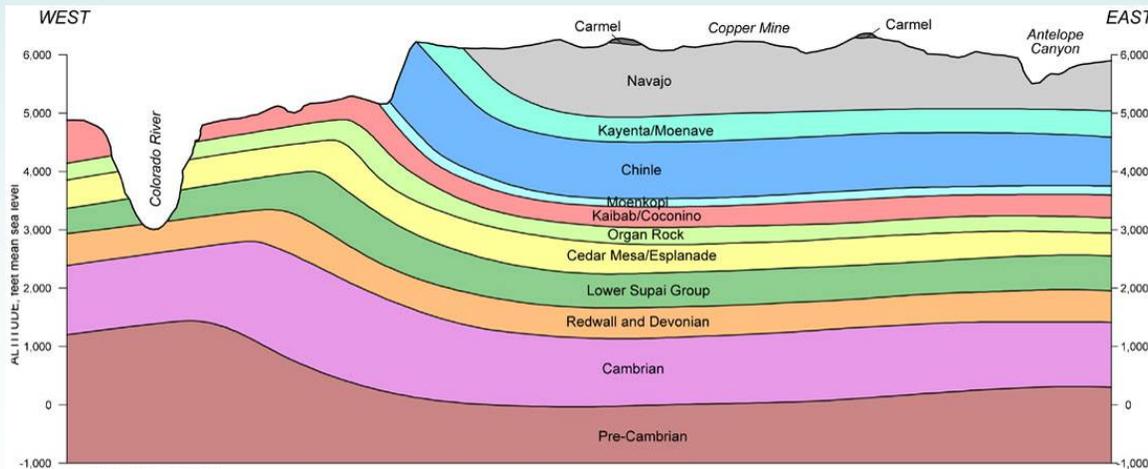
- Lead industrial partner: Salt River Project, through EPRI Tailored Collaboration program
- Coal resources are 54% of annual generation
- Gas/oil resources are 26%



SRP's generating assets

# Site Selection Builds on Regional Characterization

Pilot will involve single exploration well; injection of about 2000 tons CO<sub>2</sub>; comprehensive monitoring



## EXPLANATION

- 500 — Contour of hydraulic confining head above top of formation, meters
- █ Total dissolved solids exceed 10,000 milligrams per liter

Source: Errol L. Montgomery & Associates

## Two Site Characterization Pilots

- Lead industrial partner:  
TransAlta Centralia plant
- Evaluate ECBM potential of deep coals near plant in Centralia, Washington; saline formation potential
- Lead industrial partner:  
Clean Energy Systems
- Evaluate EOR and saline sequestration potential near Kimberlina (California) plant



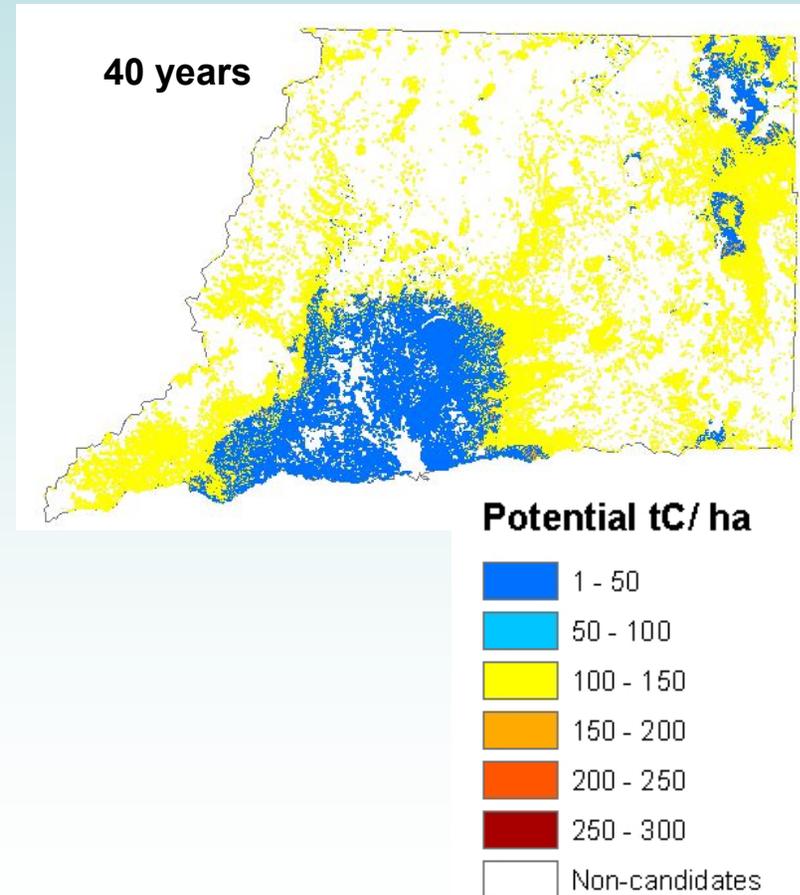
# Lake County (Oregon) Terrestrial Pilot

- Research fire models
- Carry out fuel treatment, measurement and monitoring activities
- Assess potential of hybrid poplar “plantations”



# Shasta County (California) Terrestrial Pilot

- Validation of forest growth type for rangelands
- Develop and test fuel management activities; baselines and measurement and monitoring
- Validate emissions reductions from conservation and sustainable forest management practices



*Any Questions?*