



# WESTCARB Regional Partnership

## Phase II Progress Review

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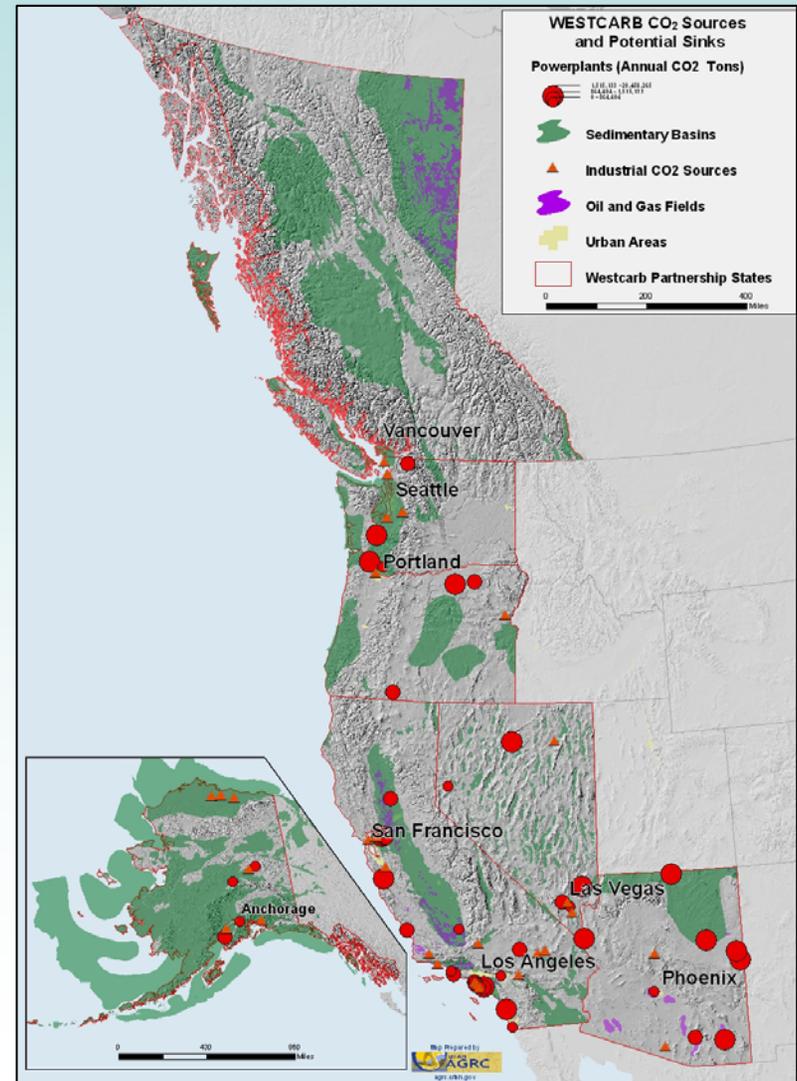


# WESTCARB Features Strong and Diverse Set of Partners; Robust Cost Share

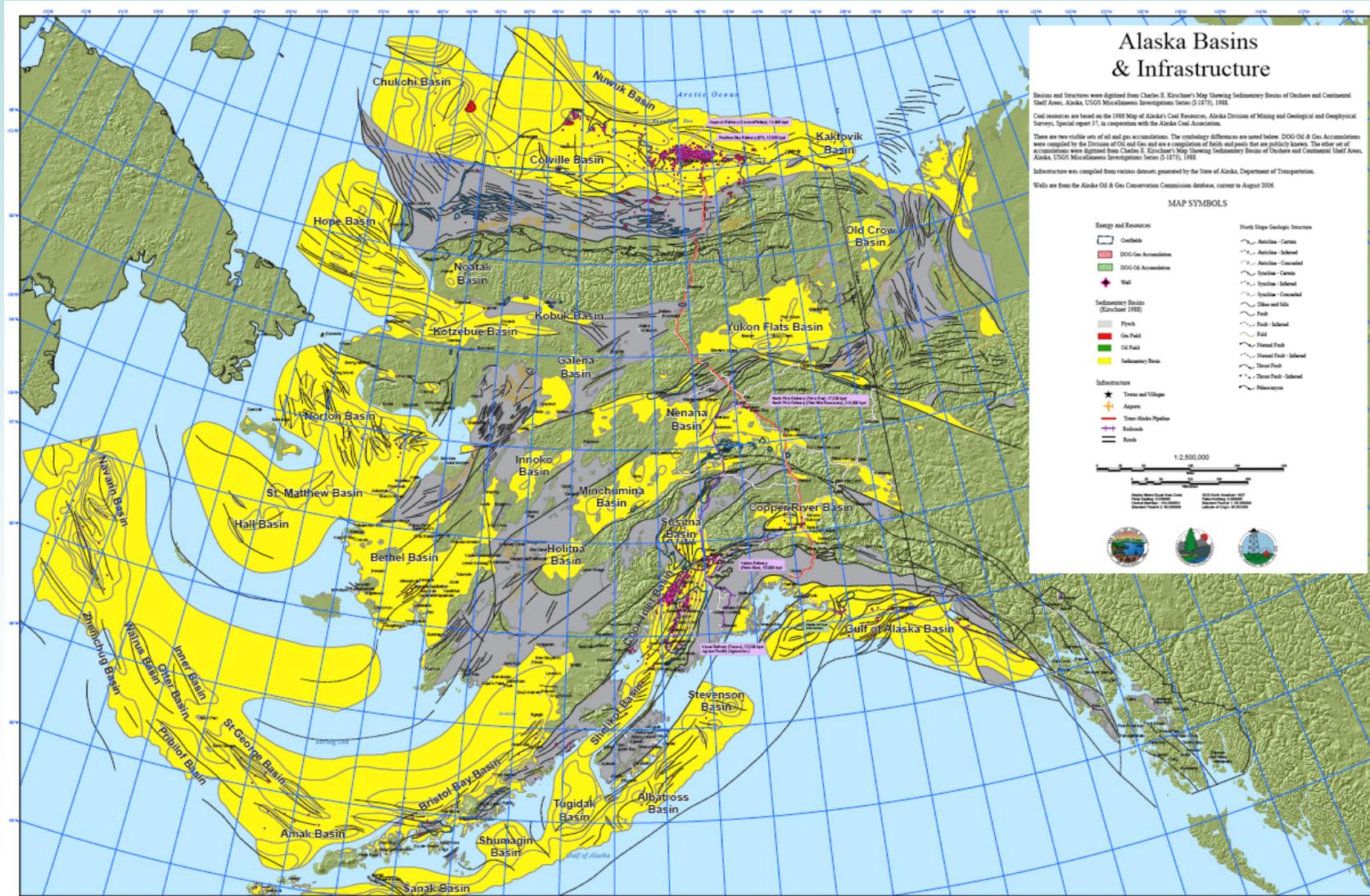
- More than 70 organizations comprising:
  - Resource management and environmental protection agencies
  - National laboratories and research institutions
  - Conservation nonprofits
  - Climate project standards organizations
  - Energy and pipeline companies
  - Colleges and universities
  - Trade associations and policy coordinating bodies
  - Consultants
- Led by California Energy Commission (CEC)
- CEC/partner cost share >\$11.7 million

# Continued Regional Geologic Characterization

- Phase II emphases
  - Improving characterization of states studied on a limited basis in Phase I (e.g., Alaska)
  - Improving characterization of high-potential formations and refining capacity estimates
  - Studying new storage types (e.g., mafic rock in Nevada)
- New data added to publicly accessible sets via WESTCARB and NATCARB databases
- Outreach to partners assures awareness of data by potential commercial project developers



# Assessment of Alaska Basins Underway

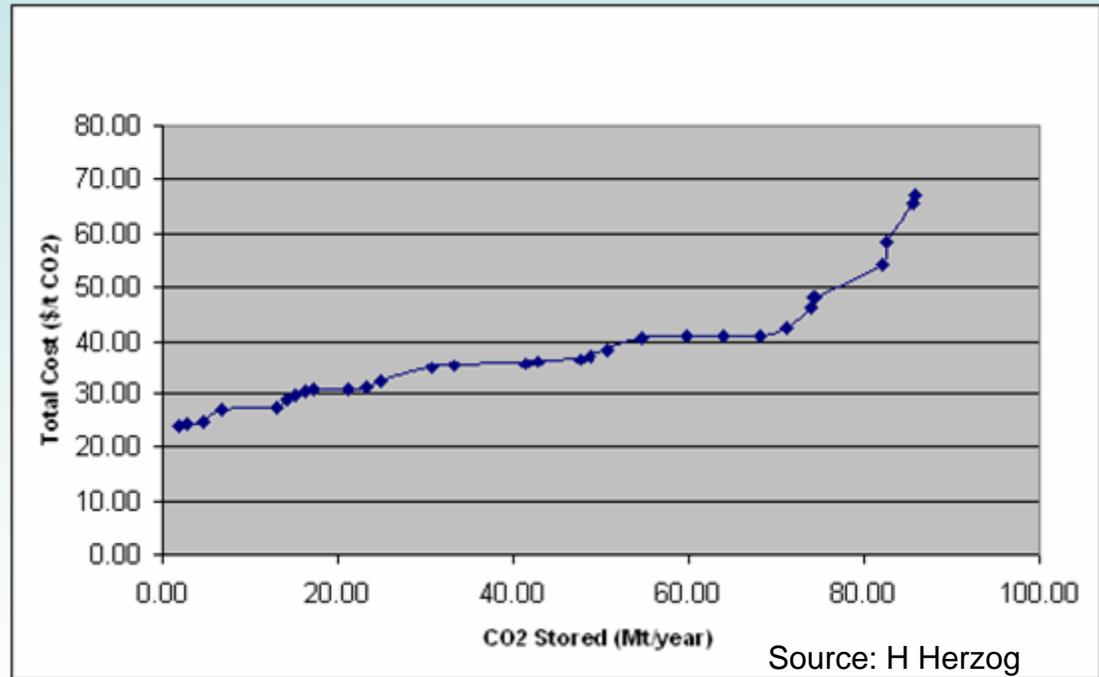




# Continued Refinement of CO<sub>2</sub> Capture and Transportation Costs

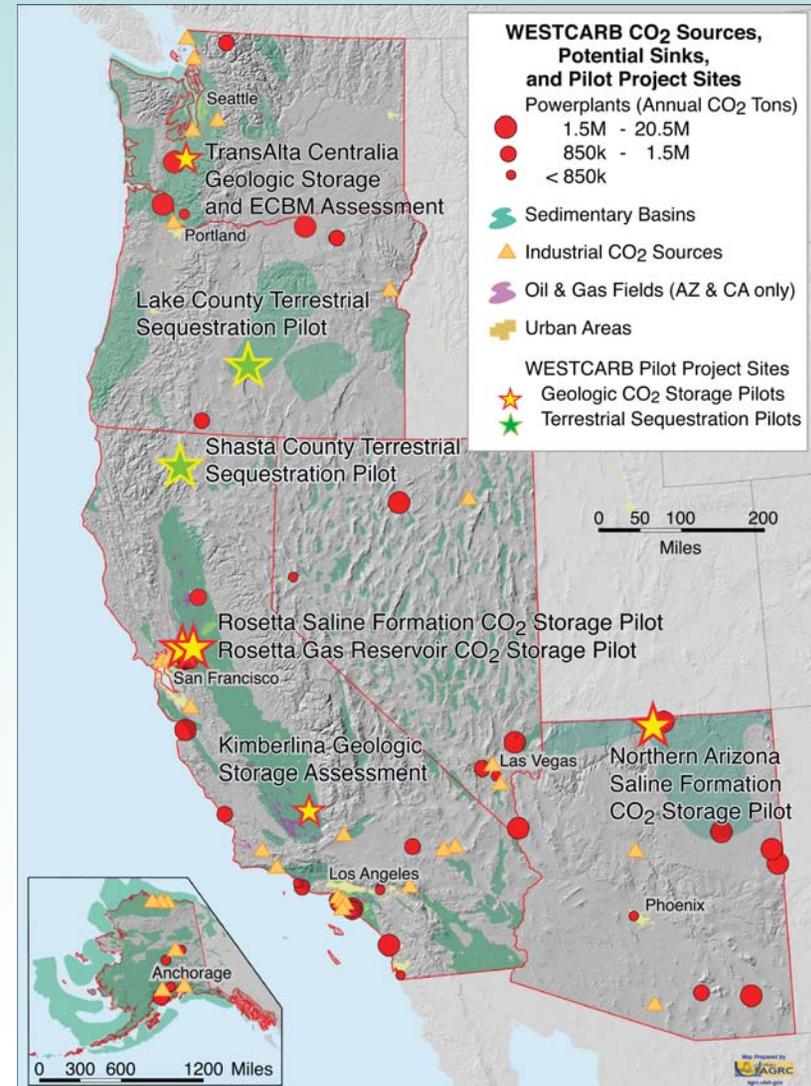
- MIT has improved algorithm for routing pipeline(s) and estimating costs as part of source-sink matching (jointly funded with SECARB)
- EPRI updating costs for CO<sub>2</sub> capture process units and integration with power plants
- EPRI hosted 3/06 Capture Working Group meeting

Marginal Cost Curve for California, Current Conditions

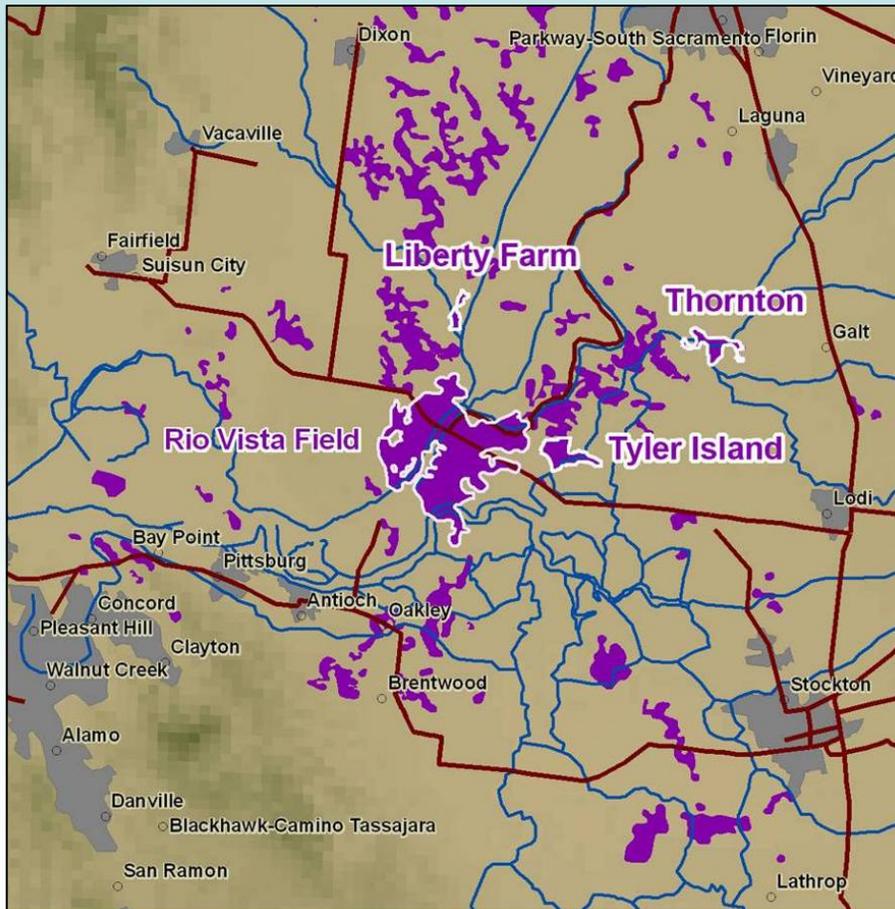


# Pilots Planned in Arizona, California, Oregon, and Washington

- Three geologic pilots (two sites)
  - EGR and saline formation injections in Thornton, CA
  - Saline formation injection in northeast AZ
- Two terrestrial pilots (multiple sites)
  - Forest treatment/fire risk reduction and fast-growth afforestation assessment in Lake County, OR
  - Forest treatment/fire risk reduction, native-species afforestation, and forest conservation management in Shasta County, CA
- Two “site characterization” pilots
  - ECBM/saline in Centralia, WA
  - EOR/saline in Kimberlina, CA



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

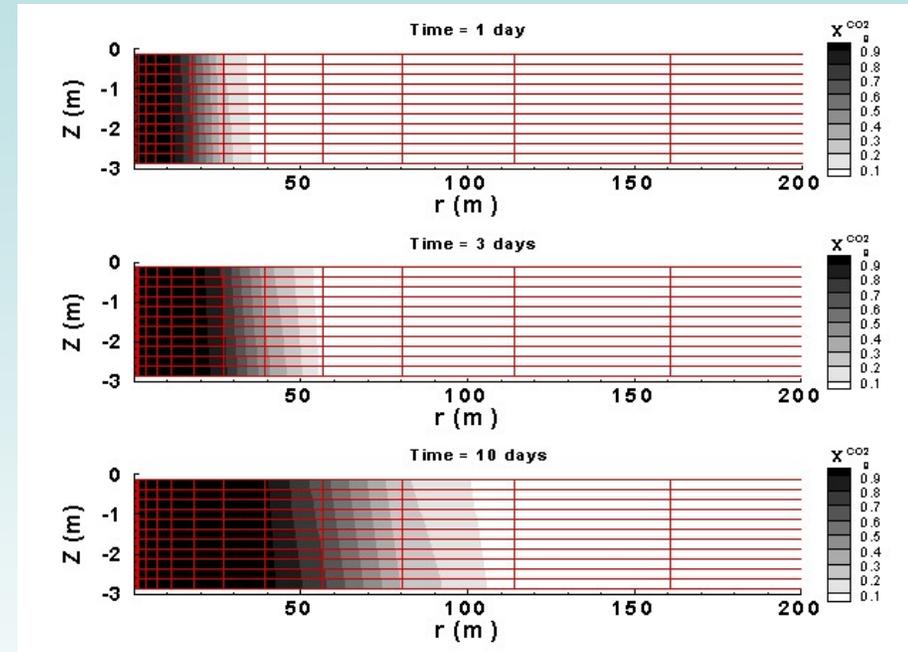


Major Sacramento–San Joaquin River Delta natural gas fields shown in purple

- Two-well, “stacked” saline and depleted gas zone injections
- First field test to collect data to assess CO<sub>2</sub>-based EGR
- Reservoir structure, consisting of a well defined dome, will safely store injected CO<sub>2</sub>
- Selection of narrow, confined zones minimizes risk of potential contamination of gas resources by CO<sub>2</sub>
- One surface and one mineral rights owner. In contrast, large fields like Rio Vista are unitized and securing approval from ~900 owners was impractical.
- Rural site with few neighbors and little risk to cultural or environmental resources

# Rosetta Pilots Progress to October 2006

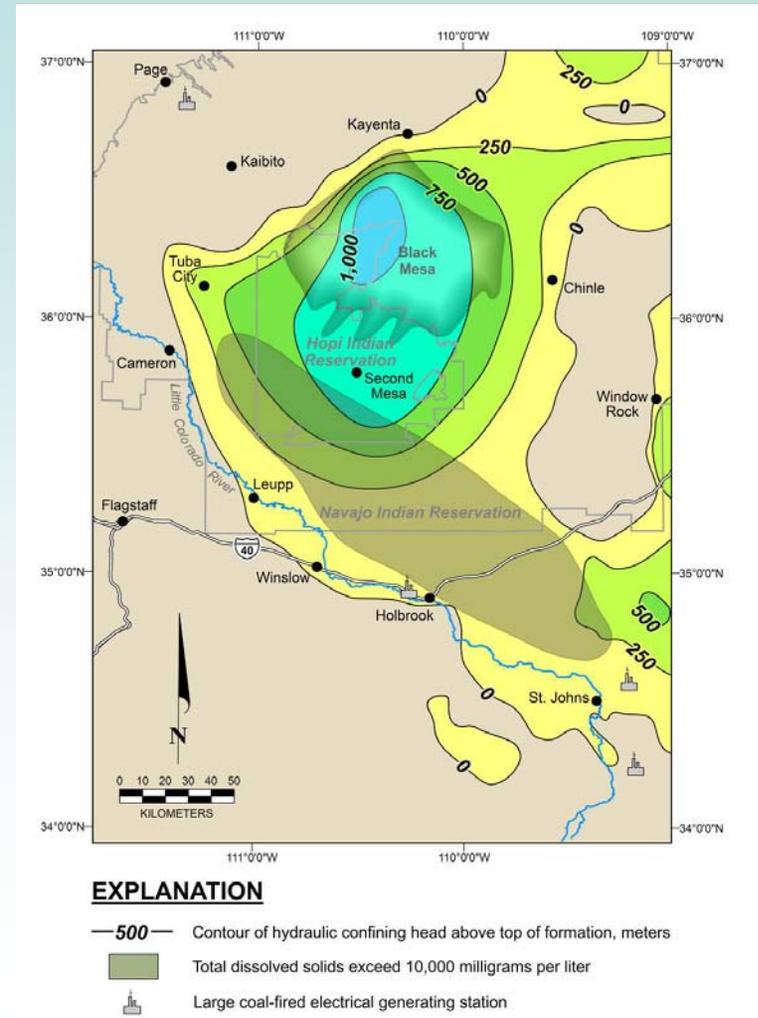
- Face-to-face meetings held with mineral rights and surface landowners; access agreements developed—approval pending
- Received NEPA categorical exemption from DOE
- Driller identified; contract for site management in negotiation
- Discussions with regulators ongoing
- Detailed field test plans being finalized - informed by reservoir simulations
- Meetings with community leaders have begun



Simulated injection into the gas reservoir

# Northern Arizona Saline Formation CO<sub>2</sub> Storage Pilot

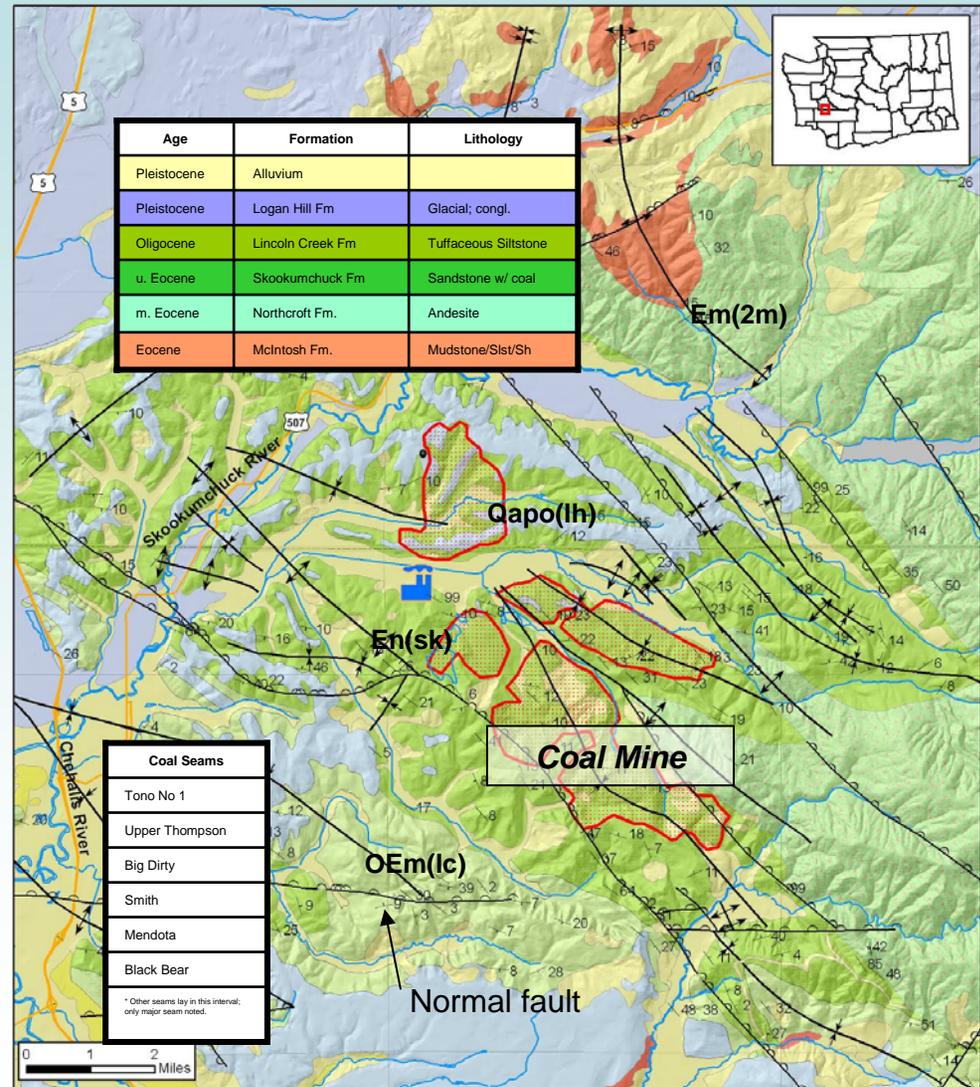
- Single well test
- Target formation screening complete; low water table makes supercritical depth greater than normal
- Pilot host, Salt River Project, has convened advisory committee of key stakeholders
- Permitting issues discussed with key Arizona agencies
- MMV costs estimated
- Navajo Nation outreach planning under way



Source: Errol L. Montgomery & Associates

# Two Site Characterization Pilots

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



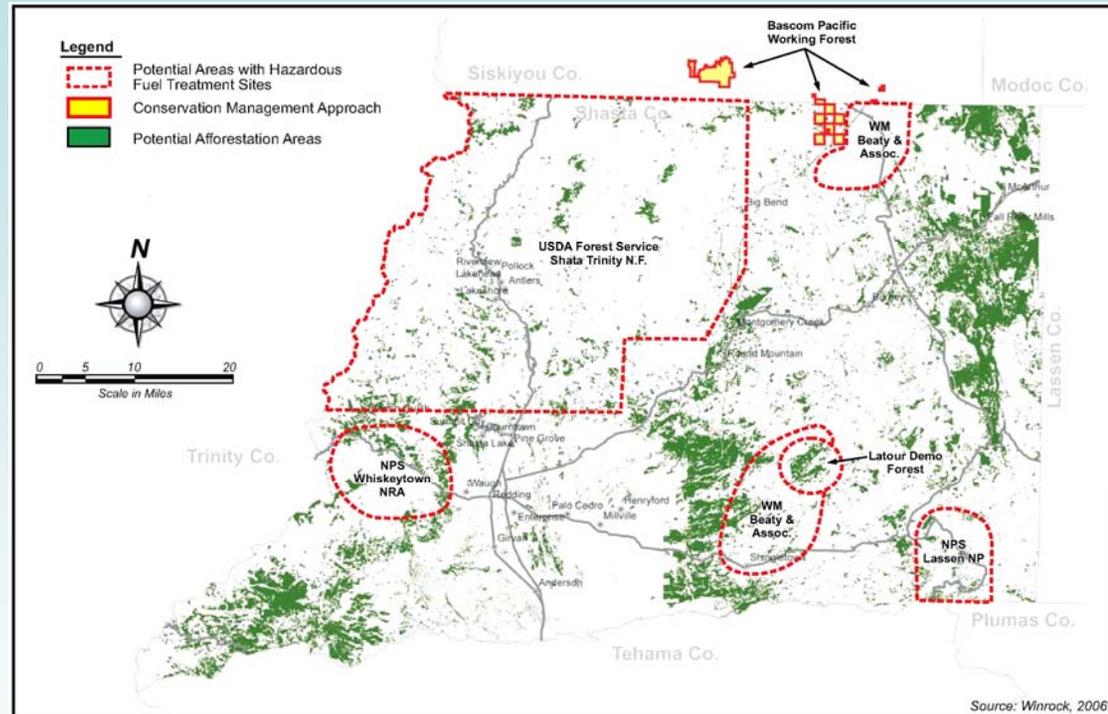
# Lake County (OR) Terrestrial Pilot Progress

- Assembled expert panel to review fire models and carbon stock impacts (also applies to Shasta)
- Developed baseline fire emission methodologies
- Submitted NEPA documentation
- Identified first 8 fuel treatment plots in Fremont Nat'l Forest



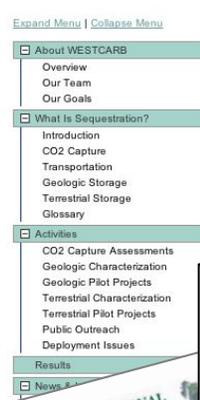
# Shasta County (CA) Terrestrial Pilot Progress

- Classified rangelands for afforestation (see figure); prepared work plan
- Identified candidate seedling species for afforestation
- Hosted tour of site for CDF Board of Foresters (gubernatorial appointees)
- Submitted NEPA documentation
- Developed baseline fire emission methods
- Held workshop at widely attended California Climate Action Registry annual conference



# Public Outreach

- Increasingly important as pilots unfold and given state legislative initiatives and executive orders
- Fundamental strategy has been “bottom up” for pilots (from landowners/community to county/state officials and media) with overall partnership outreach to legislators/regulators, media, and affiliated professionals
- Pilot-related media inquiries can disrupt preferred outreach approach
- Strategy now has “active” and “ready, but responsive” elements
- Steady stream of meetings with state and local leaders under way



CO<sub>2</sub> SEQUESTRATION  
geologic transport  
terrestrial capture

WESTCARB is a collaborative research project bringing together dedicated scientists and engineers at 70 public agencies, private companies, and nonprofits to identify and validate the best regional opportunities for keeping CO<sub>2</sub> out of the atmosphere and thereby reducing mankind's impact on the climate.

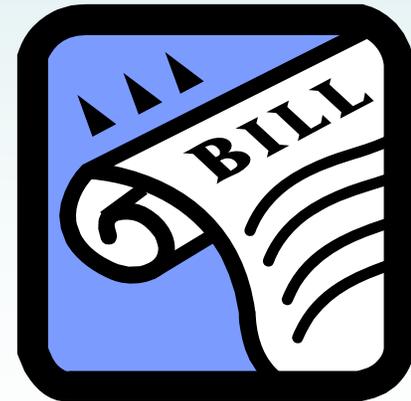


# California Assembly Bill 1925

- Passed unanimously by legislature in August 2006; independent of widely publicized greenhouse gas reduction bill
- Requires Energy Commission to prepare a report to Legislature on “recommendations for how the state can develop parameters to accelerate the adoption of cost-effective geologic sequestration strategies for the long-term management of industrial carbon dioxide”
- Technically astute legislation; awareness of WESTCARB appears to have informed the bill



Sam Blakeslee



# Summary

- Field work expected to commence by year-end for 4 of 5 pilots
- Site access/liability, permitting, and other regulatory issues challenging for geologic pilots, but not expected to be showstoppers
- Public interest and scrutiny on the rise; jury still out in the court of public opinion
- Discussions with potential commercial project developers on the rise