



WESTCARB Annual Business Meeting

WESTCARB Vision and Accomplishments Overview

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WESTCARB Features Strong and Diverse Partners; Robust Cost Share

- More than 80 organizations comprising:
 - Resource management and environmental protection agencies
 - National laboratories and research institutions
 - Climate project standards organizations and other nonprofits
 - Oil and gas companies; power companies; pipeline companies
 - Colleges and universities
 - Trade associations and policy coordinating bodies
 - Service firms and consultants
- Led by California Energy Commission (CEC)
- Energy Commission/partner Phase II cost share >\$10 million; Phase III cost share ~\$25 million

WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP

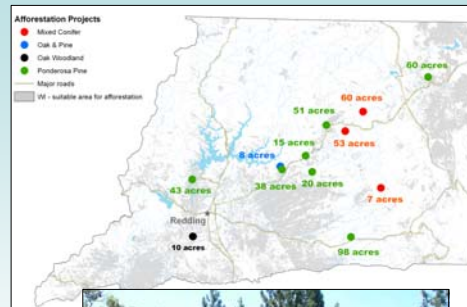


Scope of Terrestrial Sequestration Work Expands to Arizona

- WESTCARB researchers:
 - Established methodologies for quantifying carbon stock baselines for forests and agricultural lands in California, Oregon, and Washington
 - Developed models to estimate carbon sequestration based on changes in land use
 - Identified major opportunities in forest management – specifically afforestation, fuels treatment, and conservation; findings formed the basis for Phase II field pilots
 - Adapted models to reflect Arizona's unique environment and to quantify afforestation potential in riparian zones
- Researchers are examining the carbon sequestration benefits of fire management in Arizona

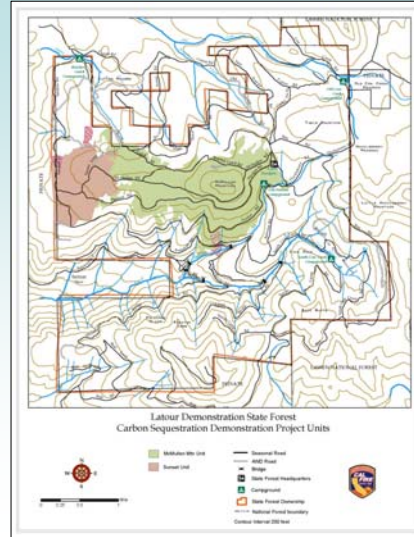
Terrestrial Afforestation Activities

- Shasta County, California
 - Twelve pilots under way, totaling 470 acres for planting of native species (mixed conifers and oak) in 2008 and 2009
- Lake County, Oregon
 - Study of the feasibility, costs, and sequestration benefits of afforestation using hybrid poplar or other fast growing species that can be harvested for bio-power



California Road Testing of Forest Protocols

- Site preparation and planting activities at LaTour were conducted in accordance with California Climate Action Registry (CCAR) protocols for reforestation
- Results from LaTour provided feedback for revisions to CCAR protocols (Version 3 now issued)
- LaTour results informed forestry implementation rules for California's AB 32 – Global Warming Solutions Act



Oregon Fuel Management Pilots

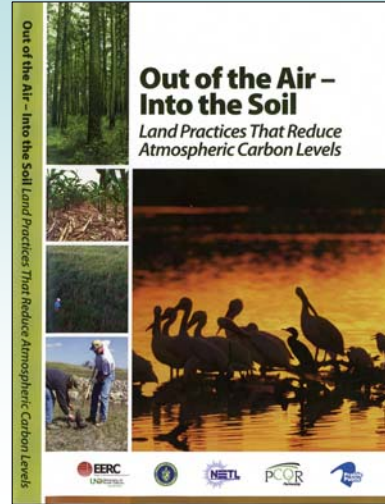
- Post-treatment measurements on two Lake County fuel reduction projects have been completed and data analysis is underway



Source: Dr. Sam Sandberg, USDA Forest Service Pacific
Wildland Fire Sciences Laboratory

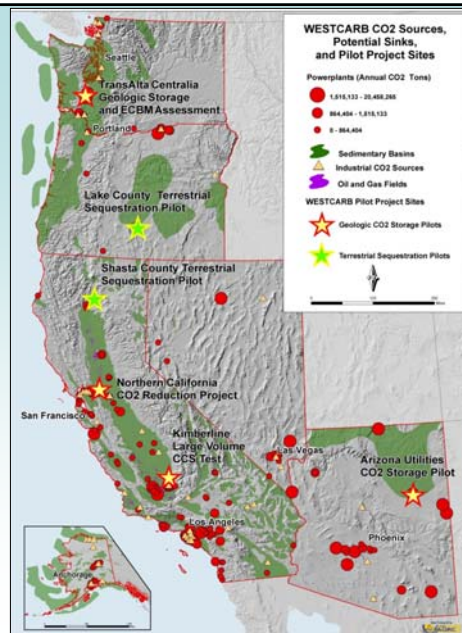
Terrestrial Public Outreach

- WESTCARB's terrestrial projects have seen high levels of participation by landowners and other stakeholders
- Public meetings and presentations at conferences; websites and community events
- Shasta terrestrial pilots were featured in a documentary, which earned a gold award in the Aurora Awards (an international film and video competition)



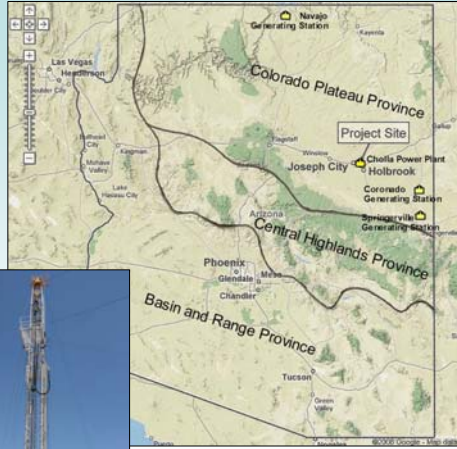
Continued Regional Geologic Characterization

- Adding to existing sink information
 - Analysis of storage potential in priority basins in Alaska
 - Screening-level geological characterization of Tertiary sedimentary basins in Arizona's basin and range province
- WESTCARB GIS database – new point source data added for Alaska



Arizona Utilities CO₂ Storage Pilot

- Significant storage capacity in Colorado Plateau Province, an area with several large CO₂ sources
- Institutional issues successfully resolved
 - Coordination on permits issuance by U.S. EPA Region 9 and Arizona Dept. of Environmental Quality
- Well drilled and logged

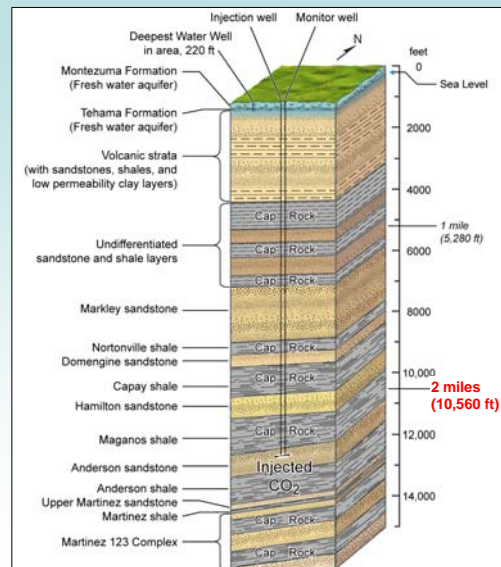


Industry partners: Arizona Public Service Co.; Salt River Project; Tucson Electric Power; Arizona Electric Power Cooperative; Peabody Energy



Northern California CO₂ Reduction Project

- Drill two wells (one for injection, one for monitoring) more than 2 miles deep and 150 feet apart
- Inject 6000 tons of CO₂ into a permeable sandstone layer beneath multiple impermeable shale layers
- Resulting stabilized CO₂ plume is expected to be about 800 feet wide
- Permitting and public outreach underway
- Industry partner: Shell Oil

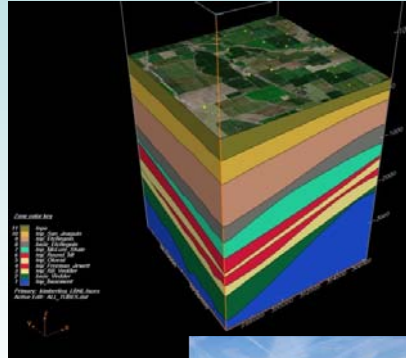


Source: Shell



Site Characterization Work Is an Early Step in Planning a Larger-Volume CO₂ Storage Test

- Demonstrate secure storage of 1 million tons of CO₂ in a California saline formation
- Characterization activities for a potential site near Bakersfield include assessment of local faults and existing seismic survey data
- Risk assessment considered physical, legal, and social site characteristics and conditions
- Industry partners: Clean Energy Systems; Schlumberger Carbon Services



(Source: Wagoner, LLNL)



Outreach and Education

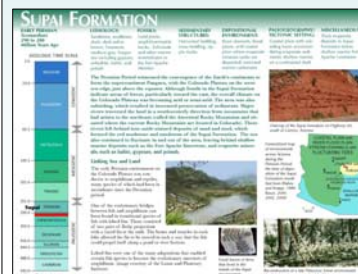
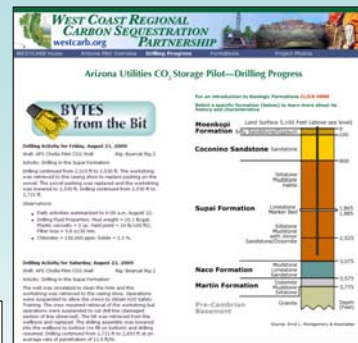
- Public meetings and presentations at conferences
- Project-specific pages and drilling progress on www.westcarb.org
- Scheduled site visits
- RCSPs' Best Practices Manual for outreach (draft)



PUBLIC MEETING
Starting Carbon Dioxide to Fight Global Warming
Arizona Utilities CO₂ Storage Pilot Project
Indio, Indio, August 1, 2009, 4:00-6:00 p.m.

Pages: [unreadable]

MEETING OBJECTIVE: [unreadable]



Integrating CO₂ Sources and Sinks

- Completed engineering analysis and cost estimate for a post-combustion CO₂ capture retrofit at a pulverized coal plant in WESTCARB territory
- A new study will assess natural gas combined cycle plants in northern and central California with respect to their suitability for possible CO₂ capture retrofit, including the logistics of CO₂ transport to storage sites



2009 Policy Developments - CCS

- Support for CCS projects under the American Reinvestment and Recovery Act of 2009
- New policy driver - EPA issues endangerment finding classifying CO₂ as a pollutant
- WESTCARB continues to inform policy by organizing workshops on CCS (geologic and terrestrial) for California's Integrated Energy Policy Report
- EPA issues Notice of Data Availability, containing research by the RCSPs and LBNL, for the UIC Class VI rulemaking and opens a 45-day public comment period (August 24)
- Increased discussion of other policy issues that need resolution:
 - Long-term liability for geologically stored CO₂
 - Property rights (pore space ownership)