

FACTSHEET FOR PARTNERSHIP FIELD VALIDATION TEST

Partnership Name	West Coast Regional Carbon Sequestration Partnership (WESTCARB)		
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Field Test Information: Field Test Name	WESTCARB Lake County terrestrial sequestration pilot		
Test Location	Lake County, Oregon		
Amount and Source of CO ₂	Tons	Source	
	TBD. Includes fuel management/biomass energy and afforestation.		
Field Test Partners (Primary Sponsors)	Lake County Resources Initiative, GreenWood Resources, The Collins Companies, Jeld-Wen Timber & Ranch, Oregon Forest Resources Institute, Oregon Department of Forestry, USDA Forest Service – Pacific Southwest Research Station, Oregon State University, USDA Forest Service – Pacific Northwest Research Station, The Climate Trust, USDA Forest Service – Fremont National Forest, USDI Bureau of Land Management, Winrock International.		
<p>Summary of Field Test Site and Operations: Terrestrial pilot activities will take place on federal and private ownerships throughout Lake County. Lake County includes a broad spectrum of elevation, topography, forest, range, and agricultural land types, and land ownerships, making it an excellent site for field validation of afforestation and improved fire management/biomass energy opportunities identified in WESTCARB Phase I. Results demonstrated in Lake County can be replicated on similar land types elsewhere in the WESTCARB region.</p> <p>Terrestrial activities in Lake County will include:</p> <ul style="list-style-type: none"> • Pilot activities exploring feasibility, costs, and sequestration benefits of afforestation using hybrid poplar and other fast-growing species. • Development of a new methodology to quantify GHG emissions from wildfires and determine potential carbon credits from improved management of forest fuels, including reduced emissions from wildfires, enhanced carbon sequestration, and displaced fossil-fuel emissions when fuel removed from the forest is burned in a biomass energy facility. • Pilot activities for improved fire management and biomass energy generation. • Outreach to decision-makers and the public through web-accessible, GIS-based carbon project reporting. • Efforts to secure market recognition and validation for all terrestrial pilot activities. 			
<p>Research Objectives: The overall objectives of WESTCARB Phase II terrestrial activities are to:</p> <ul style="list-style-type: none"> • Validate and demonstrate the terrestrial carbon sequestration opportunities identified in Phase I through pilot projects, methodology development, reporting, and market recognition. • Conduct research to help policymakers, communities, and businesses to make informed decisions on how to invest in CCS technology development and deployment to achieve climate change mitigation objectives. 			

Research objectives for improved fire management/biomass energy include:

- Develop methodologies, reflecting the consensus of the scientific and policy communities, for quantifying GHG emissions from wildfires and net sequestration/emissions reductions attributable to improved fuels management combined with biomass energy.
- Compile field data and/or imagery to assist in validating the methodology.
- Design measurement, monitoring, and verification (MMV) protocols for fuel treatments.
- Collect data on treatment costs and potential revenues.
- Analyze carbon benefits from biomass energy production.
- Work with California Climate Action Registry and The Climate Trust to evaluate potential for new accounting and reporting protocols for this activity type.
- Conduct outreach to potential carbon credit purchasers and market makers to ascertain validation and documentation requirements for marketability.

Research objectives for hybrid poplar afforestation and biomass feedstock include:

- Refine the Phase I economic analysis for afforestation using hybrid poplar and other fast-growing species, including feasibility, site selection criteria, costs and benefits, net sequestration potential.
- Explore potential of hybrid poplar as a biomass energy crop.
- Identify and rank candidate sites for hybrid poplar planting.
- Collect field data to validate assumptions on growth potential of hybrid poplar.
- Evaluate soil and water requirements, site preparation, planting methods, treatments for competition.
- Develop MMV methods.

Summary of Modeling and MMV Efforts: (Use the table provided for MMV)

Activity	Baseline scenario determination	With-project scenario	Techniques used
Hybrid poplar afforestation and biomass feedstock	Review site history; document existing land use and trends in land use using ground-based and remotely sensed data. Quantify baseline carbon stocks through standard field measurements.	Model carbon accumulation in planted forests using standard growth models, for comparison to baseline scenario.	MMV guidance from California Climate Action Registry Forest Project Protocols, Chicago Climate Exchange, and USDOE 1605b Guidelines for Voluntary Reporting of Greenhouse Gases.
Improved fire management/biomass energy	Estimate baseline GHG emissions from wildfires, building on existing fire models, including area and spatial distribution and the corresponding changes in carbon stocks due to fire, emissions of non-CO ₂ greenhouse gases, and forest recovery after fire. Use chronosequence fire data to validate and calibrate models. Estimate baseline GHG emissions from fossil fuel-based energy generation.	Choose fuel reduction prescriptions to be analyzed for net sequestration/emissions reduction benefits. Model net benefits including reduced emissions from wildfire, sequestration benefits post-treatment, differences in GHG emissions from burning biomass on-site vs. at power plants, emissions reductions from fossil fuel substitution or displacement, initial carbon removals from treatments, and direct emissions from treatments. Quantify pre- and post-treatment carbon stocks using standard field measurements.	New baseline and crediting methodology to be developed in cooperation with fire scientists, policymakers, and market validation entities. Will build on existing fire modeling approaches. Landscape modeling of the Drews Creek Watershed using ArcFuels Geographic Information Systems Modeling Platform.

Accomplishments to Date:

Improved fire management/biomass energy:

- Assembled WESTCARB Fire Panel fire scientists and fuels experts to work on fire methodology development. Panel includes California Department of Forestry and Fire Protection, California Air Resources Board, Lake County Resources Initiative, Oregon Department of Forestry, Oregon State University, Spatial Informatics Group, TSS Consultants, University of California at Berkeley – Center for Fire Research and Outreach, USDA Forest Service – Pacific Northwest Research Station – Pacific Wildland Fire Sciences Laboratory, USDA Forest Service – Pacific Southwest Research Station – Redding Silviculture Laboratory, USDA Forest Service – Pacific Southwest Research Station – Sierra Nevada Research Center, USDI National Park Service – Whiskeytown NRA, W.M. Beaty & Associates, Western Shasta Resource Conservation District, and Winrock International. Conducted three Fire Panel meetings, October 2006, May 2007, and March 2008.

- Developed *Protocol for monitoring and estimating greenhouse gas benefits from hazardous fuels management in Western U.S. forests*, a “strawman” methodology to begin discussion.
- UC Berkeley – Center for Fire Research and Outreach developed alternate approaches to quantify baseline fire risk across the regions of northern California where WESTCARB fuel reduction pilot activities are being monitored.
- USDA Forest Service – Pacific Northwest Research Station developed estimates of emissions to be paired with the baseline rate of fire; emissions estimation relies on USFS fire models and in particular the Fuel Characteristic Classification System (FCCS).
- Oregon State University completed literature review and analysis of data on rates of decomposition of woody debris and conducted long-term modeling using STANDCARB.
- Pre-treatment carbon stock measurements were conducted on three fuels projects on National Forest and private industrial forest lands in Lake County, following a Standard Operating Procedures manual developed by Winrock. The purpose of the measurements was to identify, in real as opposed to modeled forests, the carbon stocks available to be burned before and after treatment, the direct impacts of fuel treatments on carbon stocks in different carbon pools (e.g., increases in dead wood, decreases in dense growth), and the fuel removed from the forest for biomass energy during treatment. Measurements will also provide input data for fire models used to simulate fire behavior and emissions in the baseline (without-treatment) and with-treatment scenarios. Post-treatment measurements are in progress on these treatments.
- Submitted *Progress Report on WESTCARB Fuels Management Pilot Activities in Lake County, Oregon*.
- Lake County partners negotiated 20-year Biomass Supply MOU to provide a framework for planning and implementing forest and rangeland restoration and fuels reduction projects that address identified resource needs while being supportive of the Lakeview Biomass Project. The parties to the MOU include Lake County Resources Initiative, Lake County, Town of Lakeview, City of Paisley, DG Energy LLC, DG Investors LLC, The Collins Companies, Oregon Department of Forestry, USDA Forest Service Fremont-Winema National Forest, and Bureau of Land Management- Lakeview District.
- Lake County partners negotiated the first 10-year Stewardship Contract in USFS Region 6, to provide a long-term supply of material necessary for the recent investments in a biomass power plant and small log mill.
- Marubeni Sustainable Energy has begun construction on a 13 MW biomass plant in Lakeview. This represents the culmination of all multi-year effort by all the partners in the Lakeview Stewardship Group to reach agreement on sustainable harvest levels and long-term biomass supply mechanisms necessary for investment in new capacity. Marubeni will invest \$20 million in the facility, which will be sited at Collins’ Fremont Sawmill. The project is designed to use biomass from overstocked forests, helping to reduce wildfires and their associated greenhouse gas emissions, improve forest health, and create jobs.
- Collins has expanded its Fremont Sawmill operation in Lakeview by building a new \$6.6 million dollar small log mill. The small log mill is the direct result of the 20-year Interagency Biomass Supply MOU and 10-year Stewardship Contract effort spearheaded by LCRI, and provides an added tool for improving management of forests and hazardous fuels in Lake County.
- Gathered, reviewed, edited, and loaded the Drews Creek data layers for the ArcFuels Model.
- Conducted the initial applications of the ArcFuels Model to the Drews Creek analysis area to evaluate the carbon losses from various treatment planning scenarios for the Drews Creek watershed.
- Developed carbon loss functions in the ArcFuels modeling platform (for avoided CO₂ emissions from reducing the severity and extent of wildfire as a result of landscape forest wild land fire fuels treatment projects).

Hybrid poplar afforestation:

- GreenWood Resources completed a feasibility study to assess use of hybrid poplar for biomass energy in another region of North America.
- GreenWood Resources was a partner on three grant solicitations to U.S. DOE to develop poplar feedstock for cellulosic ethanol conversion.
- GreenWood Resources completed establishing a network of nine varietal test sites in the western states. These test sites will be managed for a minimum of three years and will be assessed for variety performance and suitability for direct combustion and ethanol conversion.
- GreenWood Resources reorganized land management and initiated fund management for a timber investment fund that purchased 30,000 planted acres of hybrid poplar in Oregon and Washington and began construction of a mill to process logs into lumber.

Summarize Target Sink Storage Opportunities and Benefits to the Region:

Afforestation of rangelands:

	California	Oregon	Washington
Area of rangelands (acres)	56.5 million	26.9 million	11.9 million
Rangelands suitable for afforestation (acres)	23.1 million	19.1 million	9.1 million
Estimated sequestration potential at 40 years at <\$5.50/t-CO ₂ (MMT CO ₂)	3,017	403	335

Improved fire management/biomass energy:

Net sequestration/emissions reductions benefits of reducing forest fuels have yet to be quantified. However, the following is a summary of estimated baseline emissions from fire that could be reduced (not eliminated) through improved management of forest fuels and biomass energy generation.

Area	Estimated yearly baseline emissions from fires
California	1.46 MMTCO ₂ e/yr
Oregon	1.03 MMTCO ₂ e/yr
Washington	0.18 MMTCO ₂ e/yr
Arizona	0.47 MMTCO ₂ e/yr

Cost:

Total Field Project Cost: \$1,722,611
DOE Share: \$1,162,5006 (7.5%)
Non-DOE Share: \$560,111 (32.5%)

Field Project Key Dates:

Baseline Completed: 2007
Drilling Operations Begin: n/a
Injection Operations Begin: n/a
MMV Events: ongoing 2007-09

Field Test Schedule and Milestones (Gantt Chart):

CIEE task	DOE task		FY 2006			FY 2007			FY 2008			FY 2009		
			Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul
1	-	Administration	[Gantt bars for Administration task]											
2	1.3	Ongoing regional characterization and pilot site identification	[Gantt bars for Ongoing regional characterization and pilot site identification task]											
3	5.1	Fire methodology development	[Gantt bars for Fire methodology development task]											
4	5.2	Lake County pilot	[Gantt bars for Lake County pilot task]											
5	5.3	Shasta County pilot	[Gantt bars for Shasta County pilot task]											
6	5.4	GIS carbon reporting system	[Gantt bars for GIS carbon reporting system task]											
7	5.5	Market validation and outreach	[Gantt bars for Market validation and outreach task]											

Additional Information

Figure 1. Lake County hazardous fuels projects measured thus far: U.S. Forest Service – Burnt Willow Stewardship Project (yellow), U.S. Forest Service – Bull Stewardship Project (blue), and The Collins Companies fuel treatments (purple and orange).

