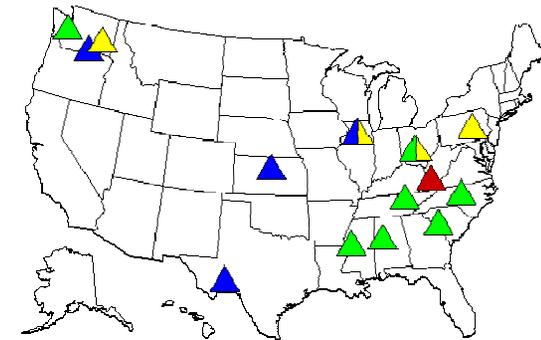


DOE Consortium for Research on *Enhancing*



Carbon Sequestration in Terrestrial Ecosystems

Scientific Program Panel Review 8-9 December 2004 Washington, D.C.



- ▲ Forest
- ▲ Agriculture
- ▲ Grassland/Shrubland
- ▲ Degraded Mine

National Laboratories

- Argonne National Laboratory
- Oak Ridge National Laboratory
- Pacific Northwest National Laboratory

DOE Sponsors

- Office of Science - OBER
- National Energy Technology Laboratory

Universities

- Colorado State University
- University of California - Davis
- Cornell University
- North Carolina State University
- Ohio State University
- Rice University
- Texas A&M University
- University of Washington

Research Institutions

- Joanneum Inst for Energy Res, Austria
- USDA Center for Forested Wetlands Res, SC
- USDA Land Mgmt & Water Cons Unit, WA
- USDA Coshocton Watershed





Introduction and Program Overview

F. Blaine Metting (PNNL) & Robin Graham (ORNL)
CSiTE national co-Coordiators

***Chief Scientists: R. Cesar Izaurrealde (PNNL),
Julie Jastrow (ANL), and Mac Post (ORNL)***



CSiTE Timeline & Context

Dec 1998 – St. Michaels I Workshop

1999 - DOE SC-FE Carbon Sequestration R&D Roadmap

Jan 1999 – Lab 99-12 solicitation from DOE-OBER

Mar 1999 – CSiTE proposal submitted

Aug 1999 – Award made. All hands meeting at Argonne

Jul 2000 – DOE-FE project awarded to CSiTE by NETL

Nov 2000 – 1st CSiTE Program Review at Oak Ridge

**Mar 2003 – Public Briefing in Washington, D.C. with EPA,
USDA, NASA, DOE-FE**

Apr 2003 – St Michaels II Workshop

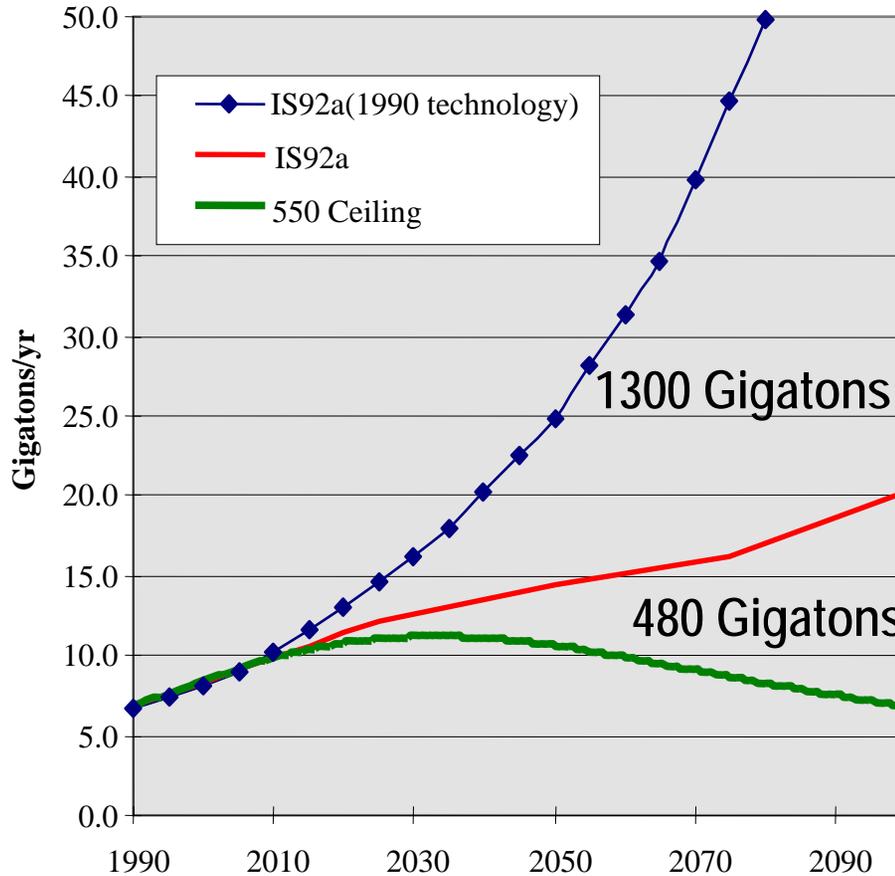
**May 2004 – Joint CSiTE-CASMGS symposium at annual
DOE Carbon Sequestration Conference**

Oct 2004 – *BioScience* article by CSiTE team

**2005 – Special issue of *Climatic Change*, “The Science,
Technology and Economics of Soil Carbon Sequestration for the
Mitigation of Greenhouse Gases”**

Carbon Management

Technologies in the Current R&D Pipeline Are Not Enough



← Where today's technology will take us

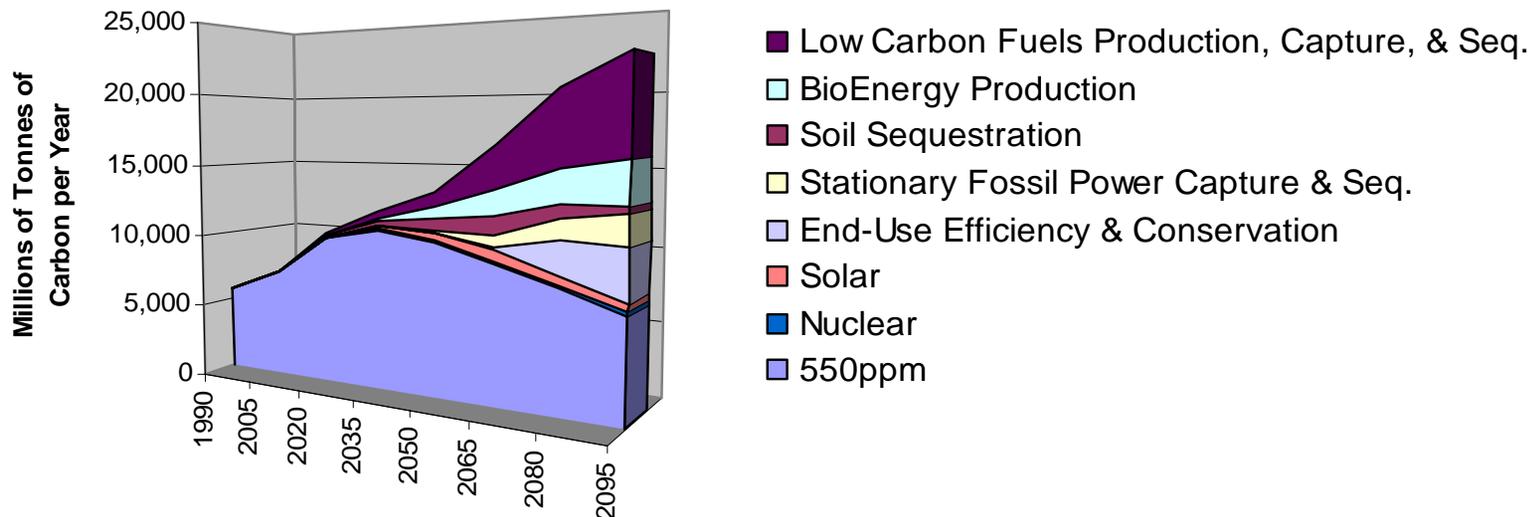
← Where our current aspirations for technology will take us

← Where we need to go to stabilize carbon

Carbon Management

Gigaton Carbon Impact of GHG Mitigation Approaches

	Global	United States
Low-Carbon Fuels Production, Capture, & Sequestration	186	27
BioEnergy	90	15
Soil Sequestration	51	6
Stationary Fossil Power Capture & Sequestration	51	5
Energy Efficiency	42	14
Solar	34	0
Conservation ("Doing with Less")	17	12
Nuclear	13	0





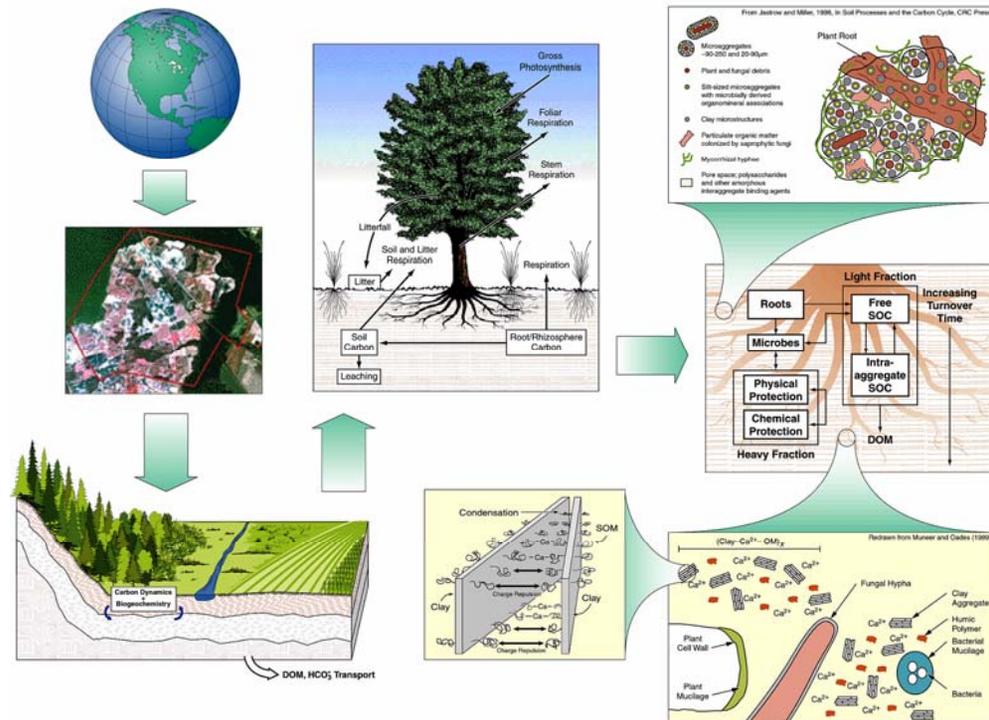
CSiTE Mission

To provide the fundamental knowledge required to develop approaches for enhanced terrestrial carbon sequestration

Focus is on Soil carbon within a whole ecosystem context

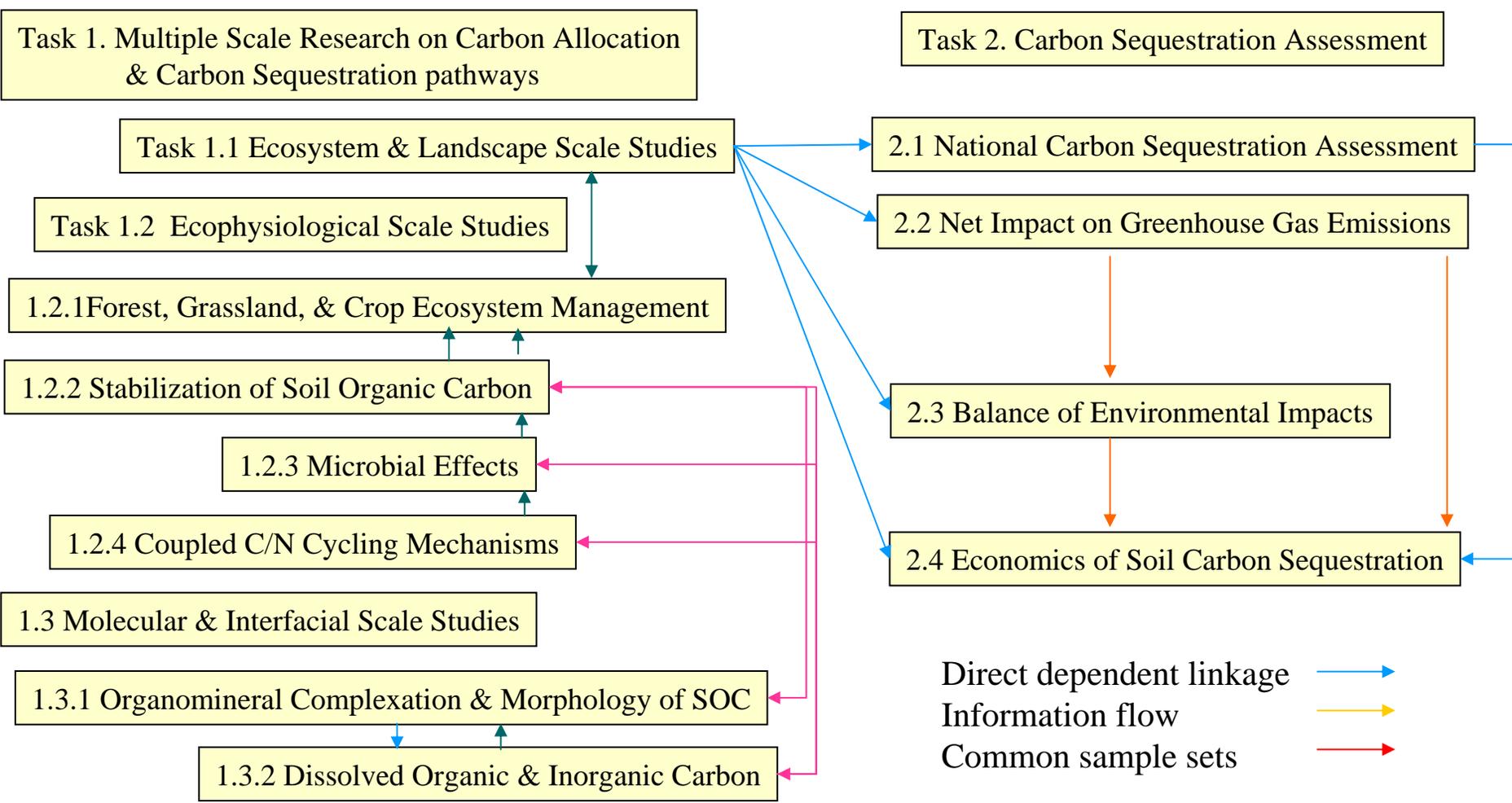
- 1 Discover how to alter carbon capture and sequestration mechanisms from molecular to landscape scales
- 2 Develop conceptual and simulation models for extrapolation across spatial and temporal scales
- 3 Advance science of assessing environmental and economic consequences of sequestration

Multi-scale & multi-disciplinary ORNL 99-0526/abh





CSiTE Tasks and Linkages Among Tasks



CSiTE Research Sites

Douglas fir forest



Tallgrass prairie restoration



Loblolly pine plantation



Arid Land Ecology Reserve





Accomplishments

- ① Elucidation of controls on rates and limits of accumulation of soil organic C
- ① Fractionation methods leading to new insights on soil organic carbon capture and longevity
- ① Emerging manipulation concepts
- ① Microbial microarray technology for exploring soil carbon processes
- ② Advances in modeling tools
- ③ Model analysis of full CO₂ and greenhouse gas accounting
- ③ Analyzing economic implications

Nearly 120 publications and presentation abstracts through 2004 with and additional 22 accepted or submitted for 2005.