West Coast Regional Carbon Sequestration Partnership
westcarb.org

Regional Carbon Sequestration Partnerships Initiative Review Meeting

Forestry and Fire Management in the WESTCARB Region

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Pittsburgh, Pennsylvania
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Phase II Objectives

- Validate and demonstrate the terrestrial carbon sequestration opportunities identified in Phase I, through:
  - pilot projects
  - methodology development
  - reporting
  - market recognition

- Research to inform decisions by policymakers, communities, and businesses

Three pilot activities

Afforestation/reforestation ►

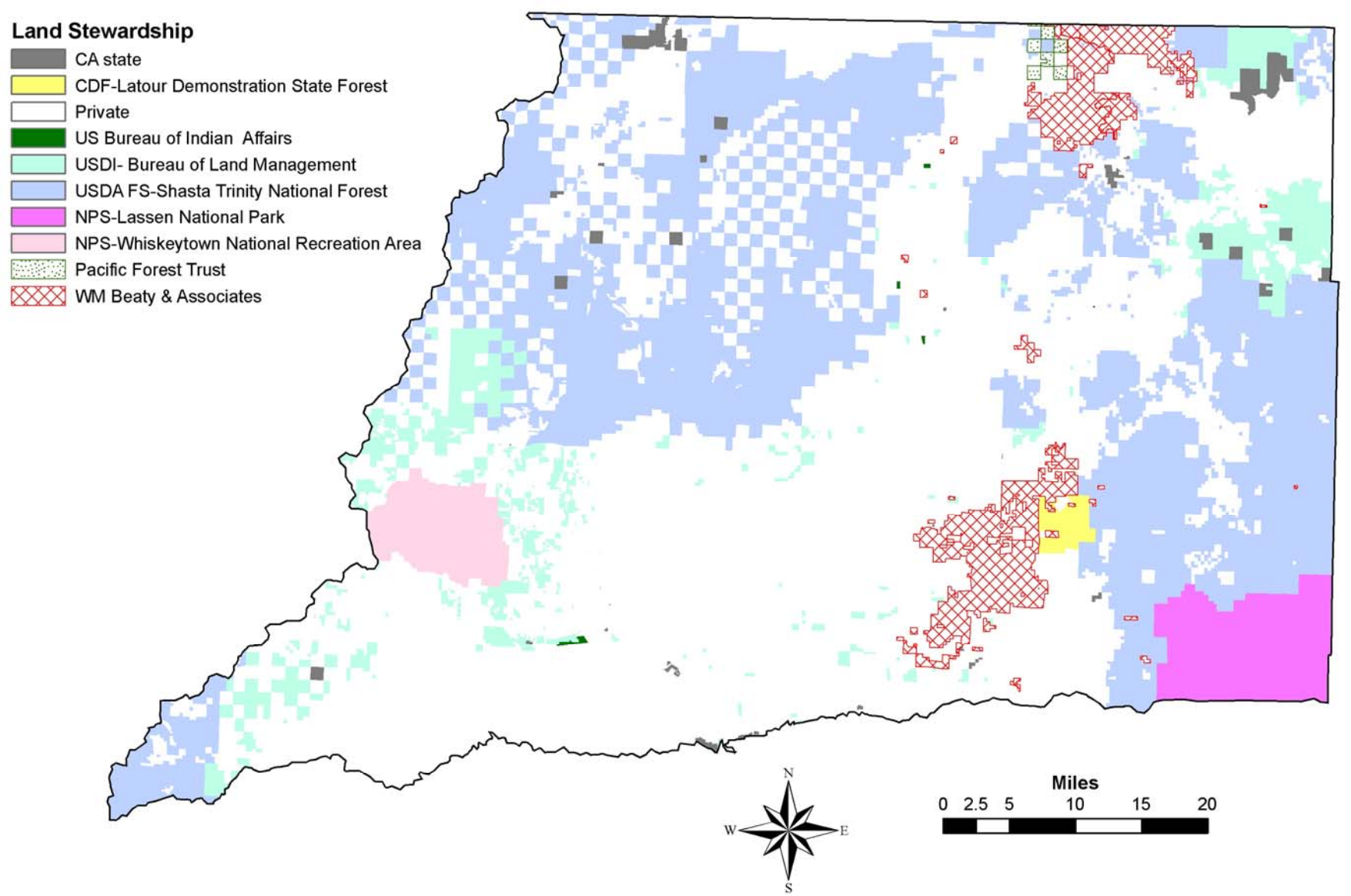
Forest management to increase sequestration ▼

Reducing emissions from catastrophic wildfire (fuel reduction and biomass energy) ▲

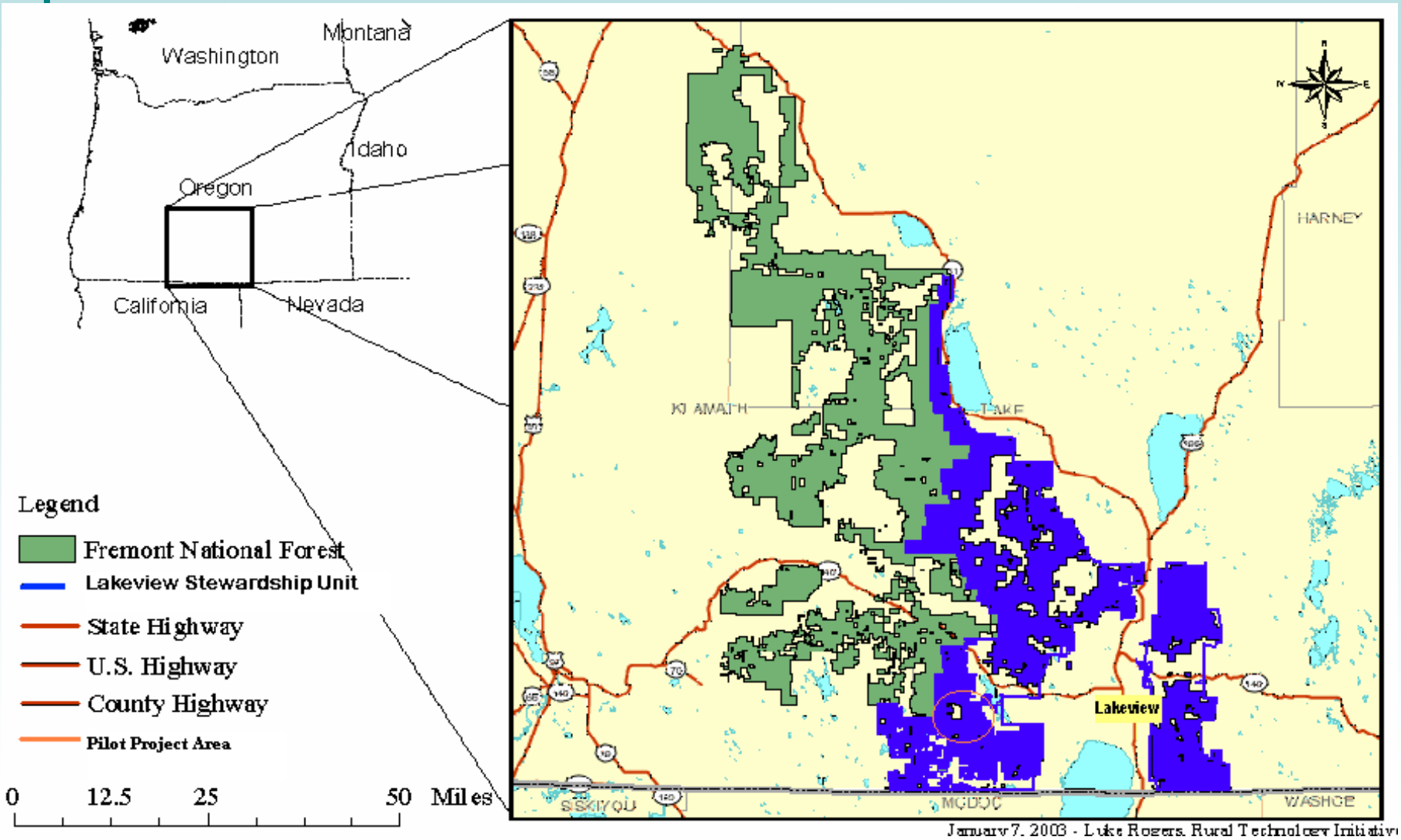
WESTCARB terrestrial partners

- Western Shasta RCD
- WM Beaty & Associates
- Pacific Forest Trust
- California Department of Forestry and Fire Protection (CAL FIRE)
- Oregon Department of Forestry
- California Climate Action Registry
- The Climate Trust
- USDA Forest Service
  - Shasta Trinity National Forest
  - Lassen National Forest
  - Fremont-Winema National Forest
  - Pacific Southwest Research Station
  - Pacific Northwest Research Station
- National Park Service
  - Whiskeytown National Recreation Area
  - Lassen Volcanic National Park
- USDI Bureau of Land Management
- Wheelabrator Shasta Energy Company
- California Forest Products Commission
- Pacific Gas & Electric Company
- Lake County Resources Initiative
- Oregon Forest Resources Institute
- GreenWood Resources LLC
- The Collins Companies
- University of California at Berkeley
- TSS Consultants
- Washington Department of Natural Resources
- Individual ranchers and landowners

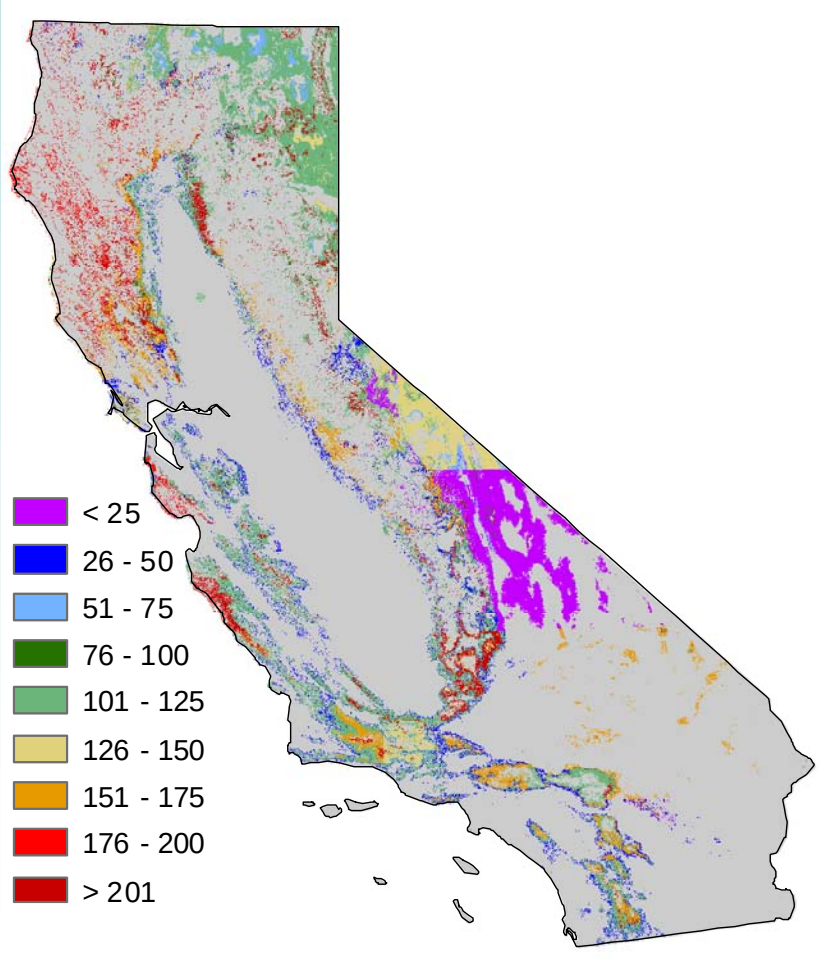
Shasta County, California



Lake County, Oregon



Phase I Analysis for Afforestation



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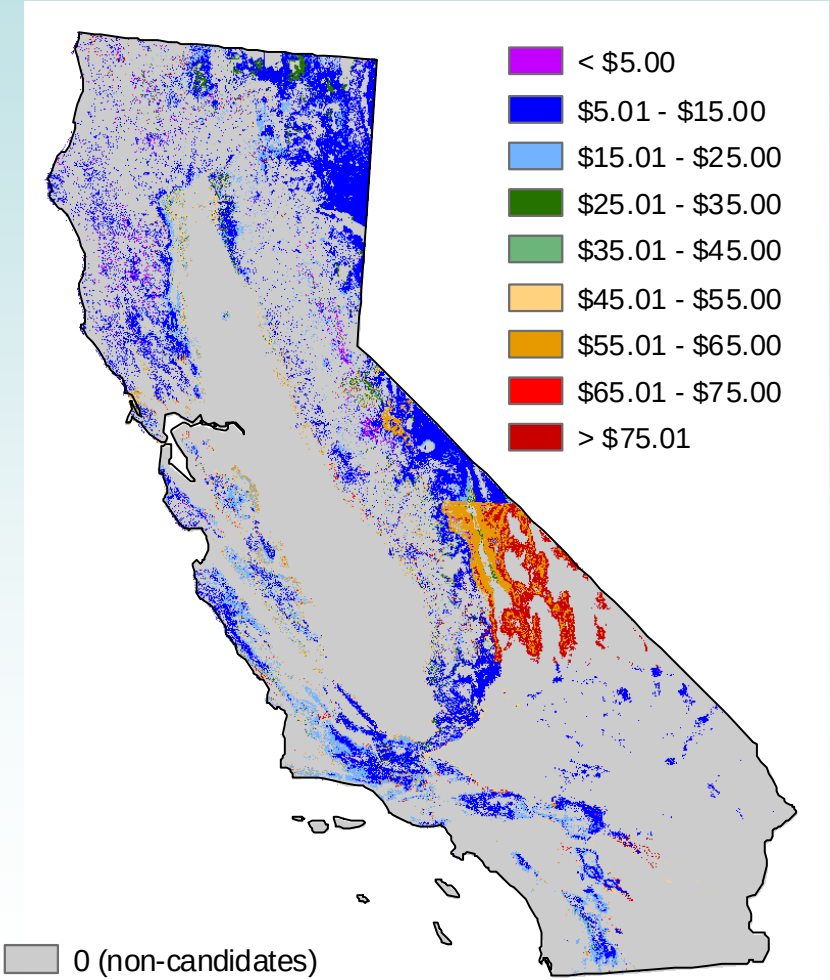

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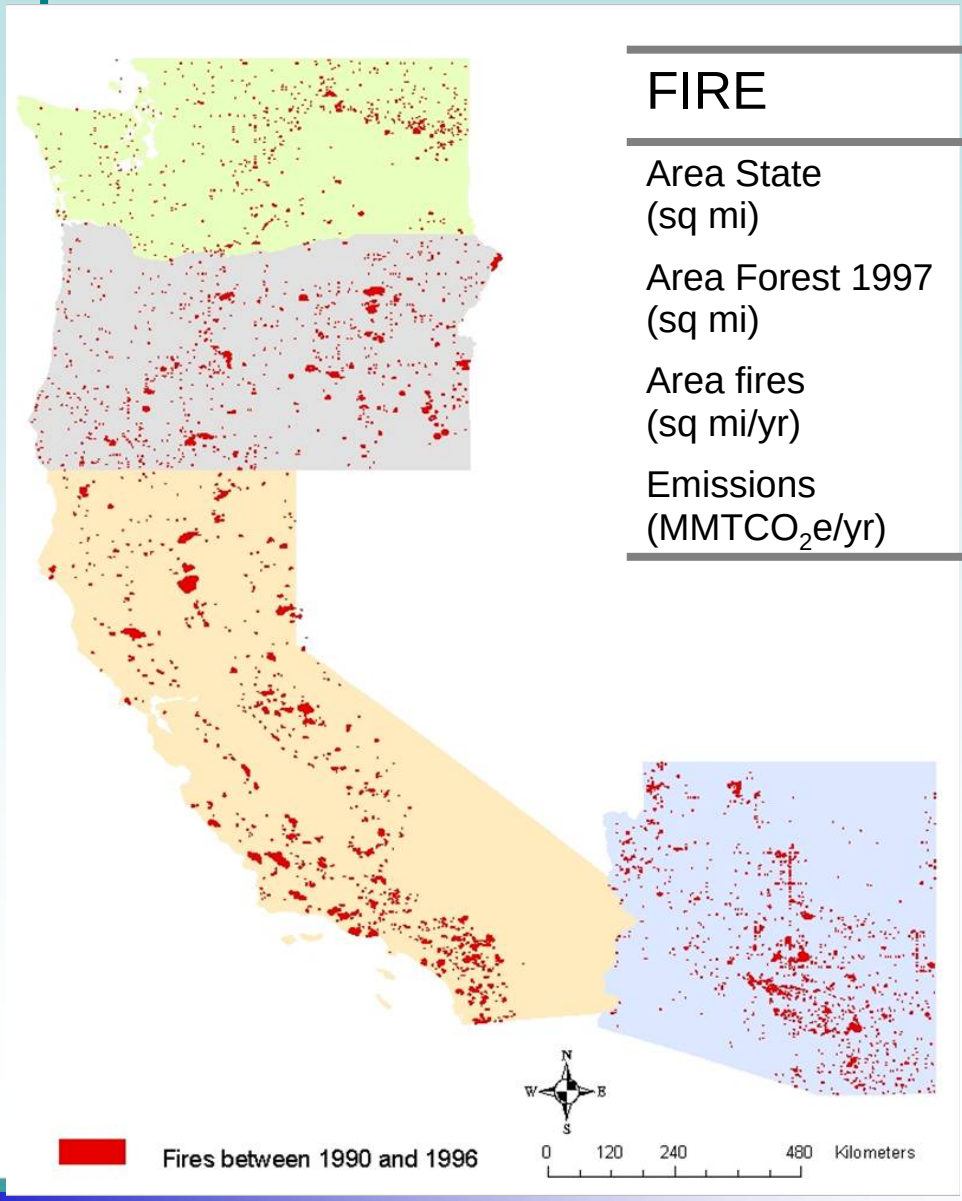
Phase I Analysis for Fire/Fuels



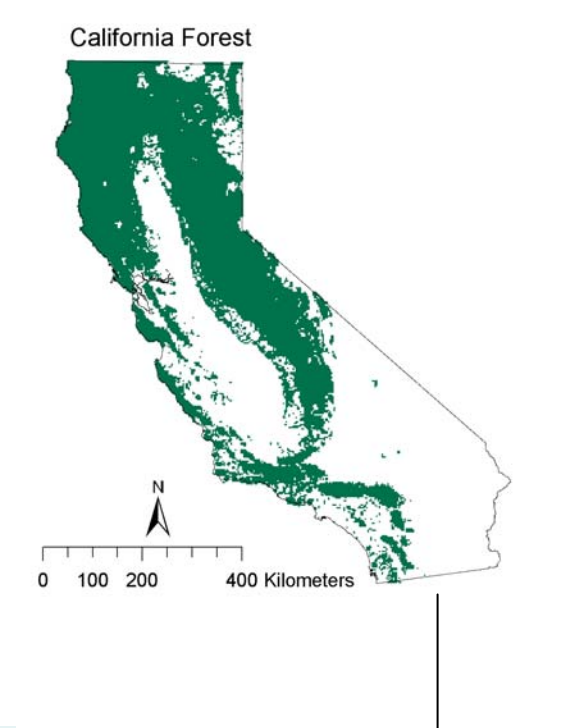
(1990 – 1996)

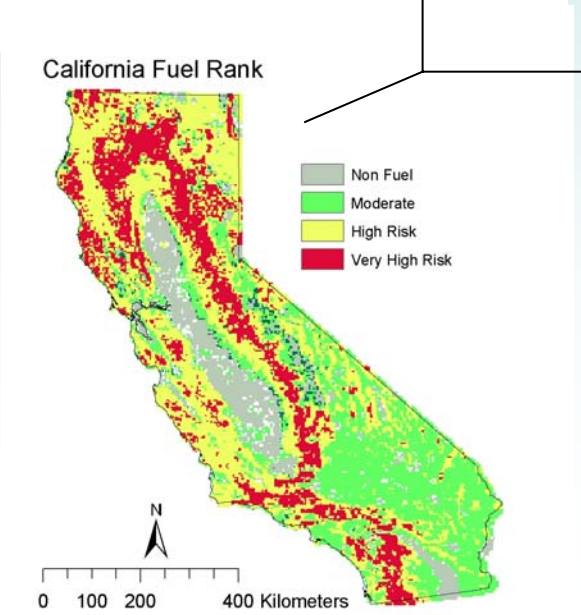
FIRE	CA	OR	WA	AZ
Area State (sq mi)	163,707	98,386	71,303	114,006
Area Forest 1997 (sq mi)	60,228	46,438	34,208	31,134
Area fires (sq mi/yr)	484	21*	4.6*	24
Emissions ($MMTCO_2e/yr$)	1.46**	1.03	0.18	0.47

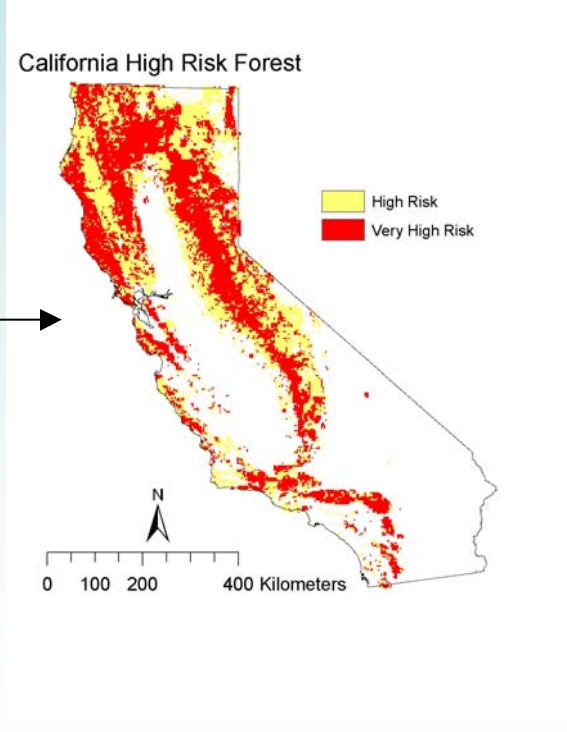
* Fire data is missing for 1994 in Oregon and Washington due to satellite failure.

**Analysis from LCMMP dataset in California, 3 regions represent 84 % of total forests in State, 42 % of rangelands.

Phase I:
Forests and fire risk







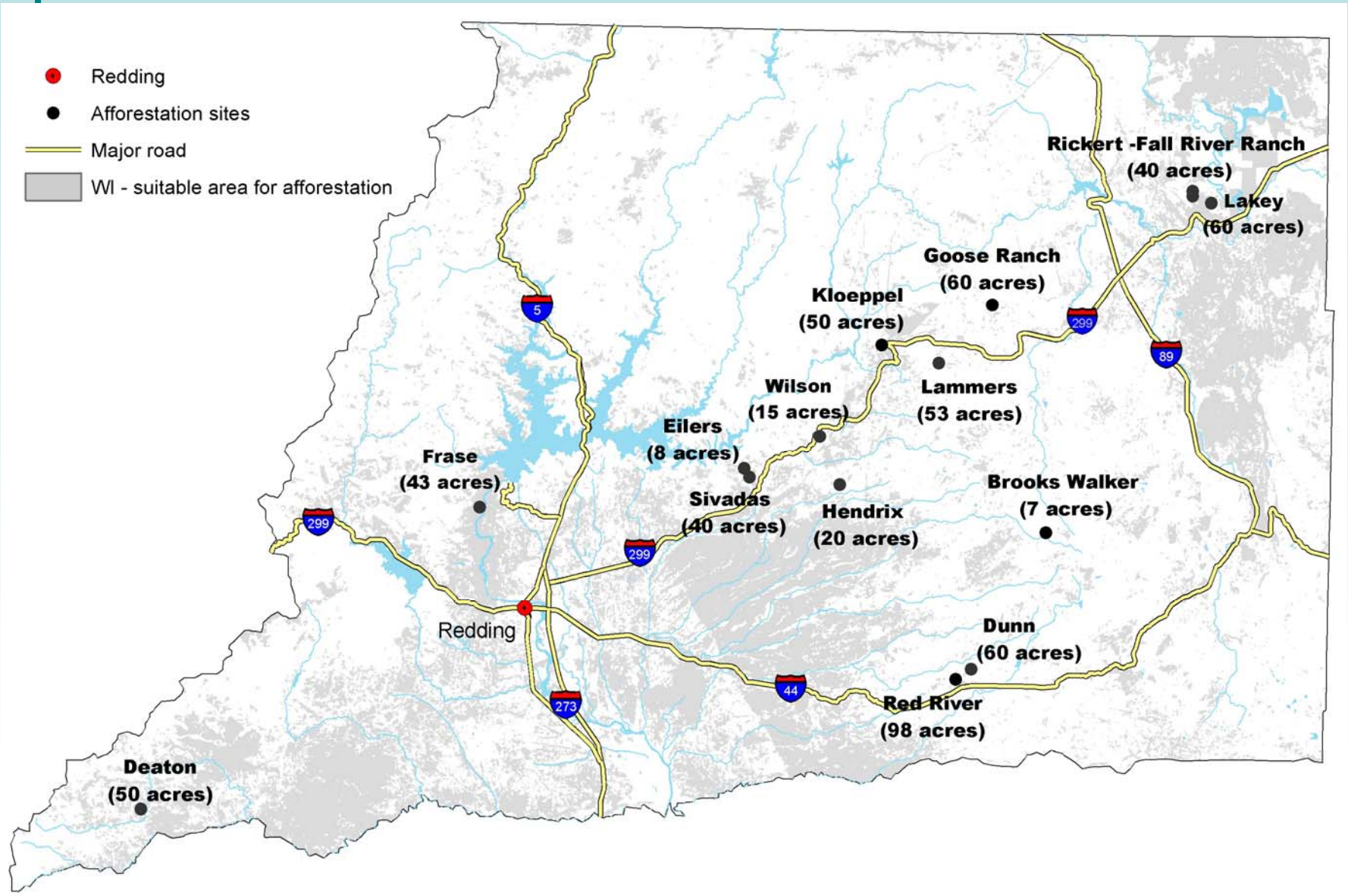
Afforestation: objectives

- Validate Phase I potential through actual pilots
  - Baseline carbon stocks
  - Carbon accumulation potential
  - Costs (site prep, planting, maintenance, MMV, registration and reporting)
- Explore conditions of landowner participation
  - Are the project designs assumed in Phase I those of most interest to landowners? What type of landowners? Under what conditions?
- Gain on-the-ground experience in site prep requirements, planting, maintenance, carbon registries/markets for expansion/replication
- "Road-test" Registry protocols and inform protocol development

Afforestation: current status

- ~400 landowners contacted, through mailings and watershed groups
- 48 interviewed in formal survey on willingness, cost-sharing, site conditions, acres, species preferences, etc.
- Subset chosen, based on analysis and field visits, suitable for WESTCARB afforestation pilots
- 15 site-specific planting plans developed
  - Acres, soils, seed zone, site class, precipitation, current vegetation; step-by-step plan for site prep, planting, chemical and mechanical treatments; estimated costs including WESTCARB and landowner portions
  - Planting in 2008 and 2009
- 9 pilots underway, with landowner agreements signed (344 acres)
  - One or more additional in development or negotiation with landowners
- Site preparation complete on four projects for 2008 planting

Afforestation pilot locations



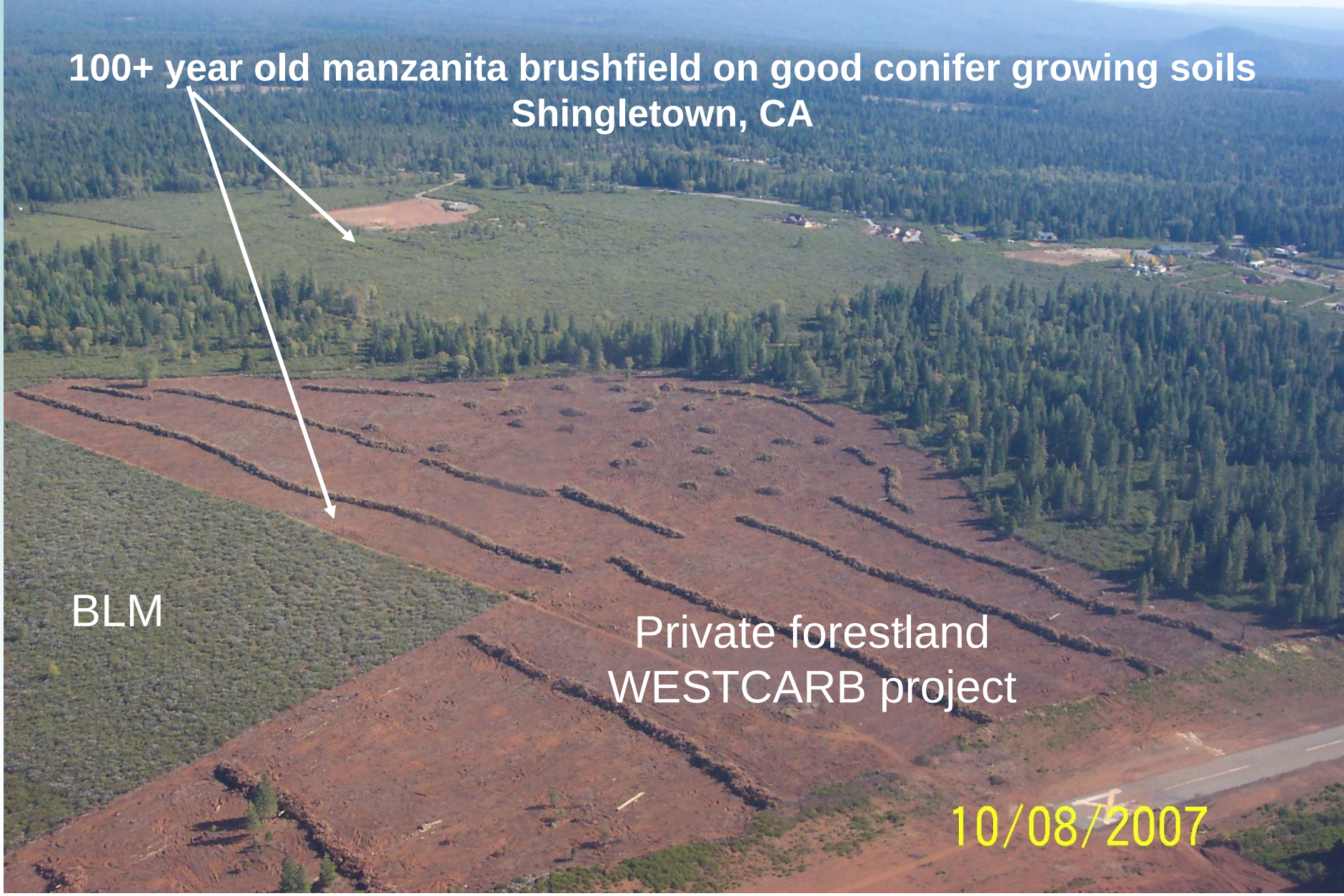
Preliminary findings

- High level of landowner interest in conducting afforestation for carbon
- Projects from 8 to 98 acres, average 40
- Operational costs range from $500 to over $1,000/acre, average $750
- Landowners are willing to share costs (~25%)
- Afforestation process and costs are well understood; however –
  - Lot of landowner uncertainty about carbon markets
  - Low opportunity-cost, flexible projects providing multiple future revenue streams
  - Not all landowners appear able/willing to meet current forest protocol requirements for reforestation

Preliminary findings

- Projects have substantial co-benefits
  - Healthier forest with habitat diversity
  - Timber and biomass fuel values
  - Fire risk reduction (interrupt brush and burn cycle)
- Projects with brush grinding and removal for biopower:
  - Improves overall GHG balance of project (by displacing GHG emissions from fossil-fuel alternative)
  - Added costs
  - Technical challenge in equipment and methods to produce clean fuel cost-effectively

ORBARK

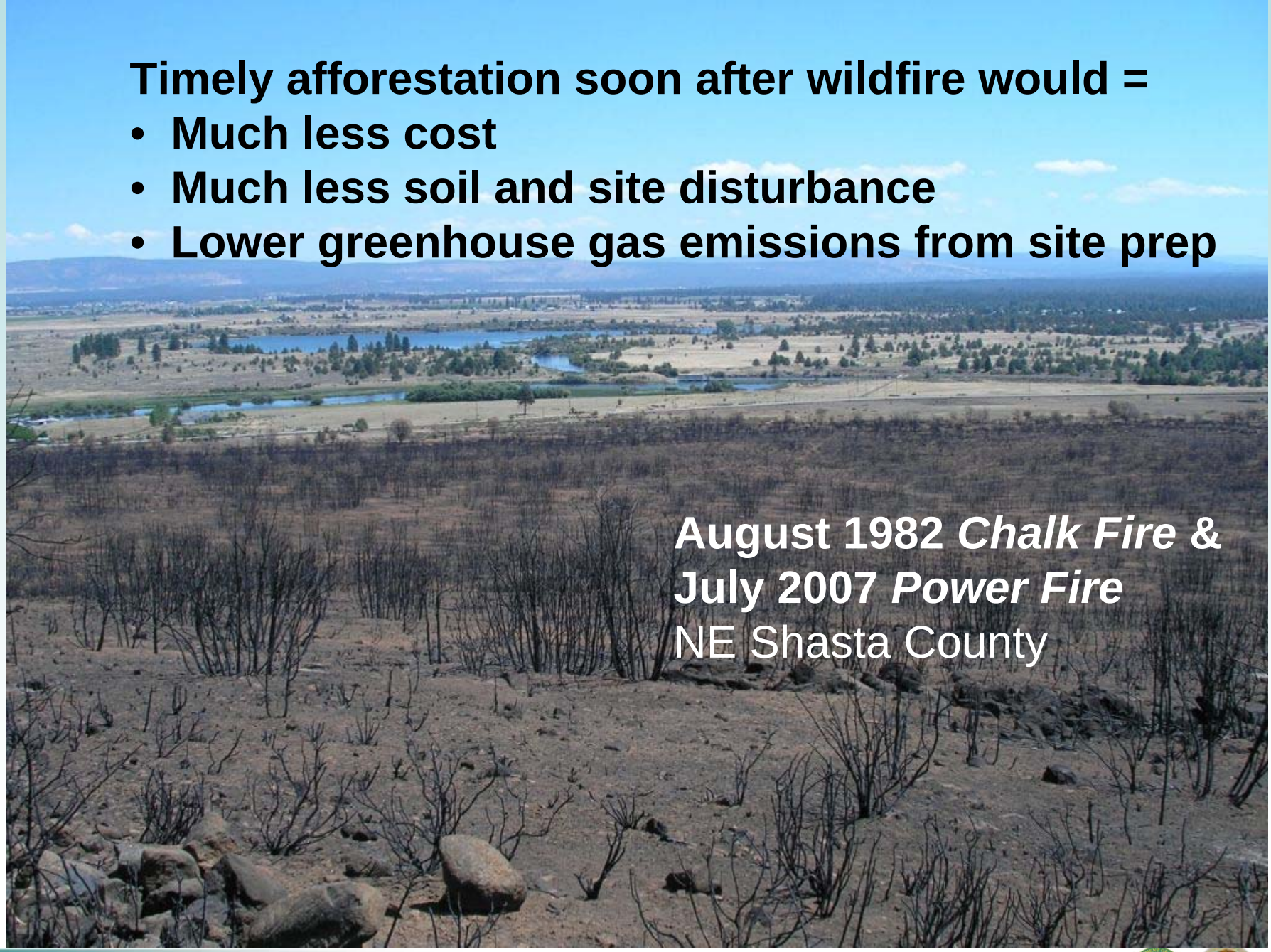

100+ year old manzanita brushfield on good conifer growing soils
Shingletown, CA
BLM
Private forestland
WESTCARB project
10/08/2007

20 years after planting on a NE California wildfire site
Planted + weed control
Planted, no weed control

1992 Fountain Fire
@ 3,900' elev
Conifers Planted mid 1990's
Greenleaf
manzanita

Timely afforestation soon after wildfire would =

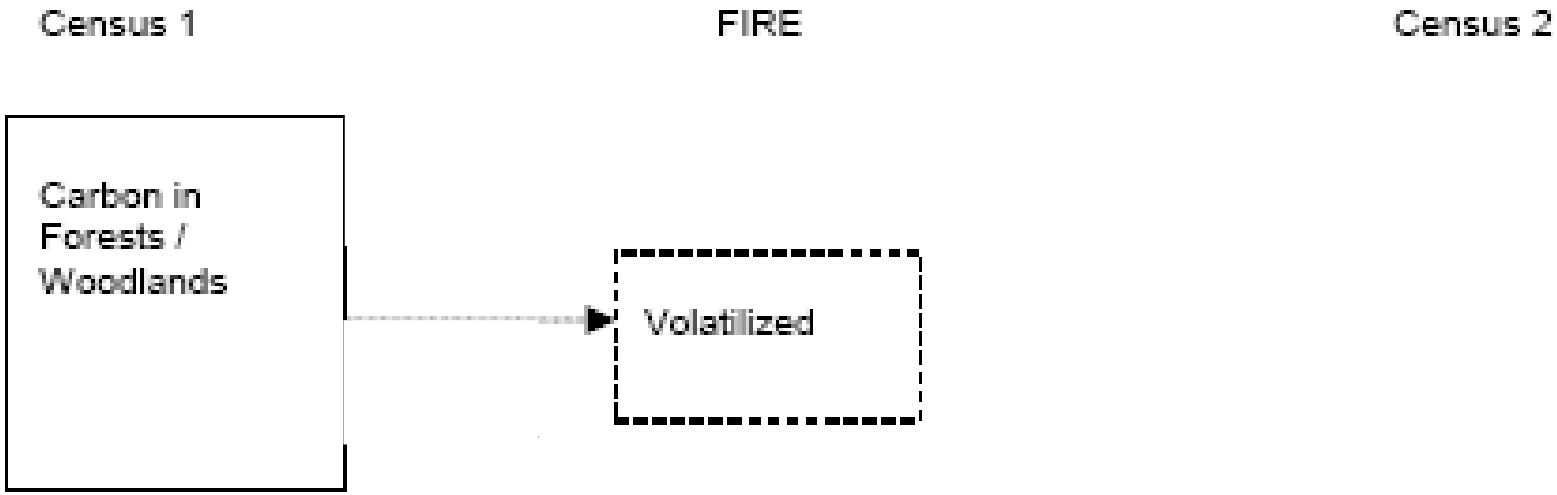
- **Much less cost**
- **Much less soil and site disturbance**
- **Lower greenhouse gas emissions from site prep**



August 1982 *Chalk Fire* &
July 2007 *Power Fire*
NE Shasta County

Catastrophic Fires

Fire and Greenhouse Gases



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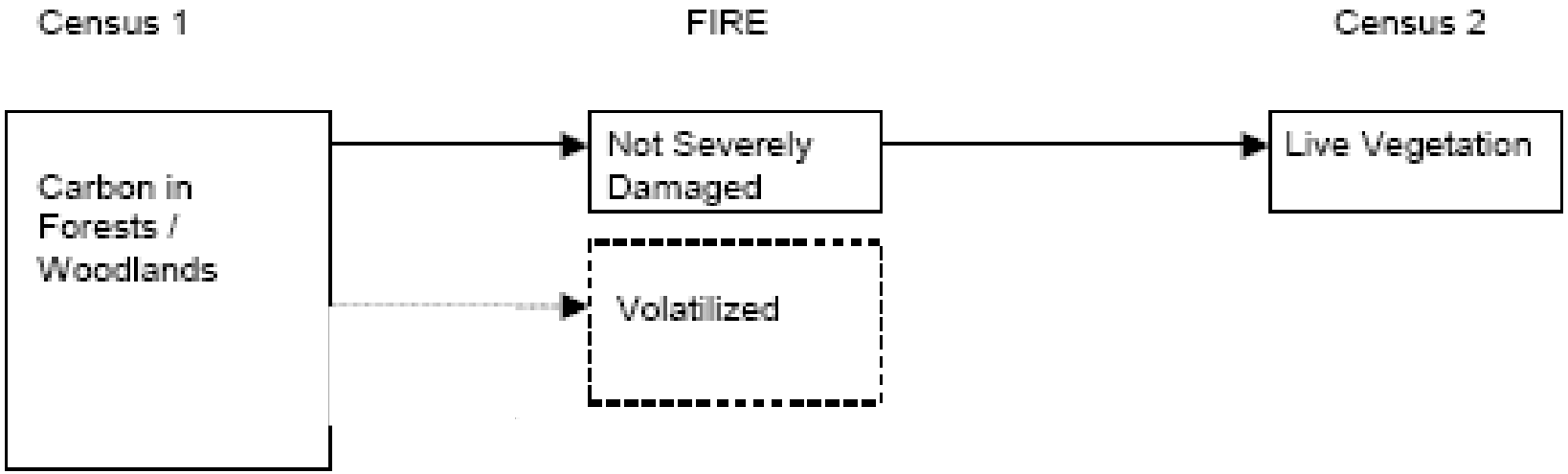

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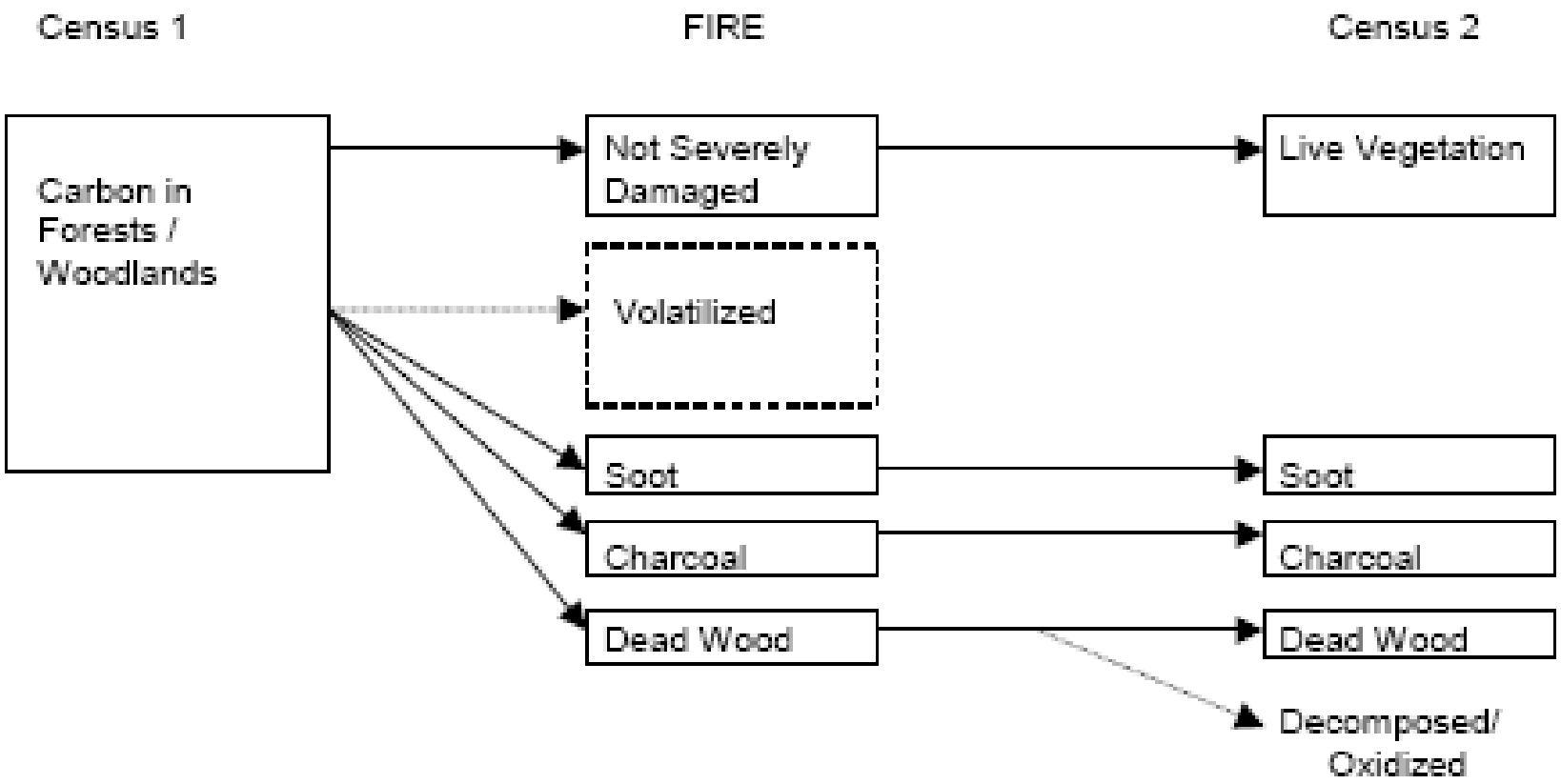
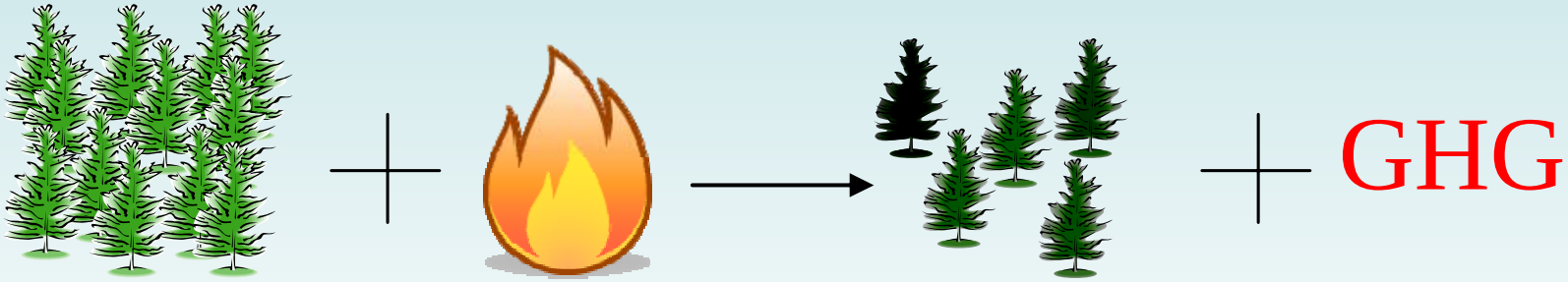
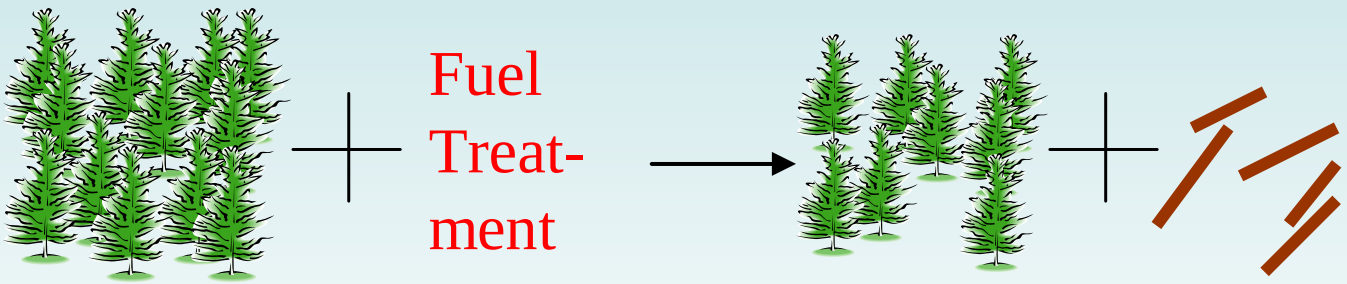


Baseline



Fuel Treatment



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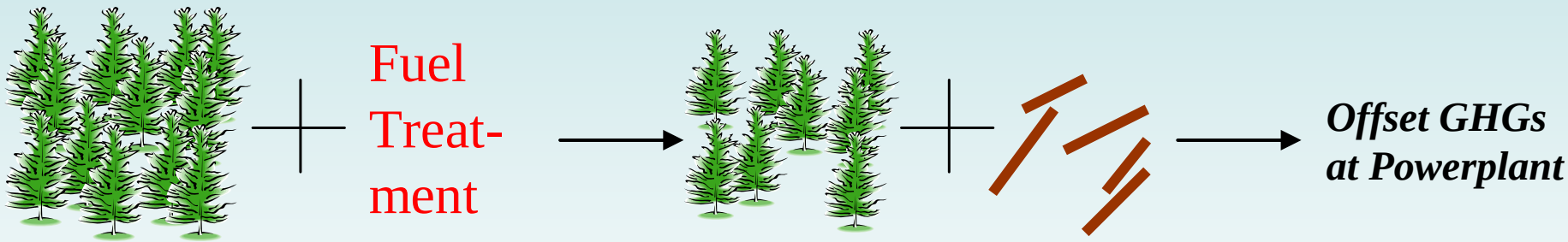

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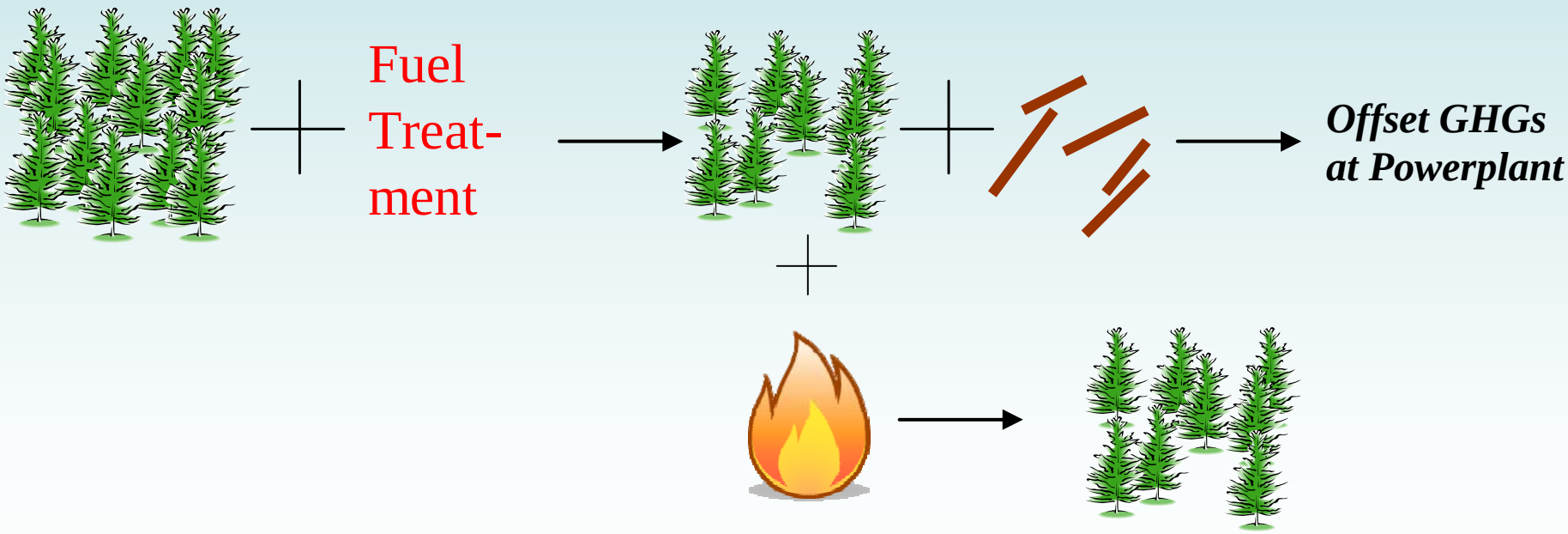
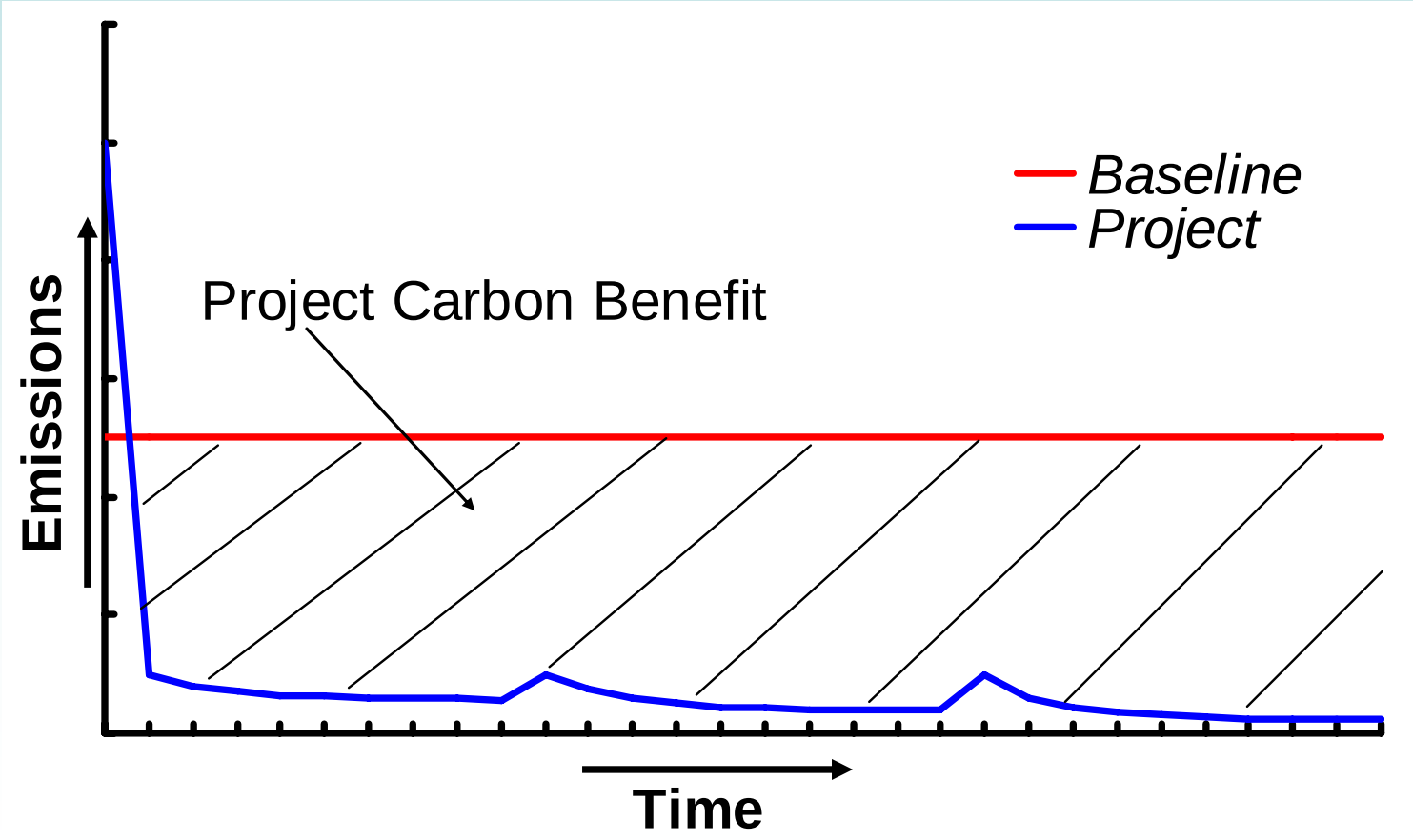


Importance of Baseline



Fire Baseline

- What is a fire baseline?

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- What is a fire baseline?
  - Risk of area burning
  - Emissions per unit area

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  - Risk of area burning
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- Risk of an area burning in a given year only fraction of a %

Project Emissions

- Project is not just avoided emissions!
  - Emissions from fuel treatment
    - Emissions from machinery
    - Emissions from increased dead wood stocks
    - Emissions from transport of materials

Project Benefit

- Avoided fire emissions
  - Inside project boundaries
  - And potentially outside project boundaries
- Stimulated growth in thinned trees
- Growth in trees that might have been killed by fire
- Avoided emissions from displacing fossil fuels in electricity generation

- Initial emissions across all project lands balanced by annual benefit from avoided emissions from catastrophic fire

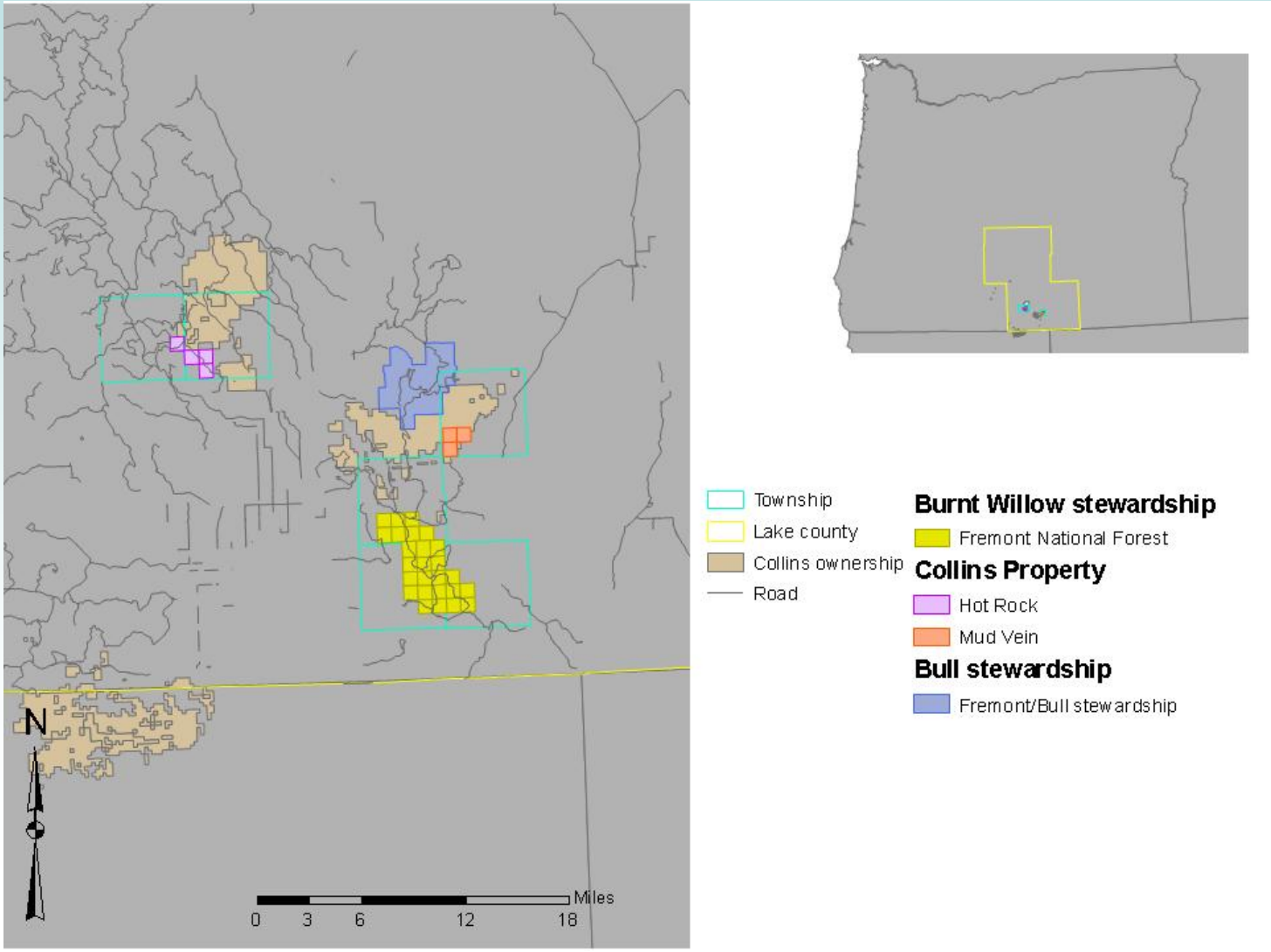
What is happening under WESTCARB

- Process to develop a transparent, conservative and statistically sound carbon project methodology
  - Assessment of baseline rate of fire incidence
  - Assessment of baseline fire emissions
  - Assessment of project emissions
  - Assessment of growth in project and baseline cases
  - Assessment of avoided fire outside project boundary
- Fuel treatments and measurements of fuel treatment
  - To aid in methodology development
  - To road-test methodology

Fire Methodology

- Four overall steps
  - Creation of Winrock ‘straw-man’ methodology
    - ten year moving window of fire probability
  - Fire workshops
    - October 2006 – full panel (22 participants; 15 organizations)
    - May 2007 – fire expert subgroup
  - Consultancies with fire experts
    - UC Berkeley team focused on the baseline fire risk - probability of an area being burned in a given year
    - USFS PNW focused on developing estimates of emissions to be paired with the baseline rate of fire
  - Field measurements before and after fuel treatments

WESTCARB fuel reduction treatments (Lake County, Oregon)



Pre- and post-treatment measurements

- Random measurement plots within fuel treatment units
- All carbon pools potentially affected by treatment or fire
  - Trees, tree heights, canopy density, height to live crown
  - Standing and lying dead wood
  - Understory vegetation, litter/duff
- Fire model inputs

Preliminary results – Lake County

- Bull Stewardship: 46 pre-treatment plots on 8 units; post-treatment measurements underway
  - Total aboveground carbon 220 tC/ha
  - 74% trees, 17% down dead wood, 9% litter/duff
- Collins – Mud Vein and Hot Rocks: 34 pre-treatment measurement plots
  - Total aboveground carbon 115 tC/ha
  - 87% trees, 9% down dead wood, 4% litter/duff
- Post-treatment on these projects, and pre-treatment on Burnt Willow Stewardship, pending for 2008

Preliminary results – Shasta County

- PG&E: 11 pre- and post-treatment plots
  - Total aboveground carbon 175 tC/ha
  - 26% of tree biomass cut and extracted during fuel treatment
- WM Beaty – Davis Mountain: 15 pre-treatment plots
  - Total aboveground carbon 132 tC/ha
- WM Beaty – HH Biomass: 10 pre-treatment plots
  - Total aboveground carbon 159 tC/ha
- CAL FIRE – LaTour Demonstration State Forest
  - Measurements underway

Contact info

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