



## WESTCARB Phase I Results Review

### ***Additional Terrestrial Characterization***


**John Kadyszewski**  
WESTCARB Lead for Terrestrial  
Pilots and Characterization  
Winrock International  
(703) 525-9430 ext 618  
jkadyszewski@winrock.org

*Berkeley, CA  
November 9, 2005*





## Summary

- Enhanced fire analysis
  - Which forests will see increased carbon stocks from better fire management?
  - What impact do different treatment options have on emissions?
  - What baseline should be used for different forest types?
- Regional sequestration potential of fast-growing species
  - Which trees are best suited for available lands?
  - What productivity can be expected across potential sites?
- Improved baseline methodologies for conservation
  - How does development affect carbon storage in forests?
- Afforestation/restoration of riparian zone
- Identification of additional pilot projects



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 2



## Potential Sequestration Benefits from Improved Fire Management



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

- Reduce net GHG emissions from combustion
- Reduce loss of carbon stocks from large trees
- Reduce loss of carbon stocks from duff
- Maintain carbon accumulation rates during recovery
- Avoid ecosystem-changing fires



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 3



## Forest Classification

- How does fire affect different forest types?
- What are existing site conditions?
  - Age
  - Ecological succession
  - History
- What treatment options exist?
  - Site conditions
  - Cost
  - Access to infrastructure



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 4





### Example from Cone Fire -- 2002

- Treatments affect changes in carbon stocks attributable to fire



Area treated with thinning and prescribed burn prior to fire.



Area untreated prior to fire.

Source: "Cone Fire Tests Fuel Reduction Treatment Effectiveness," Gary Nakamura, UC Cooperative Extension, 2002. Photos: USFS PWS Research Station, Redding, CA.



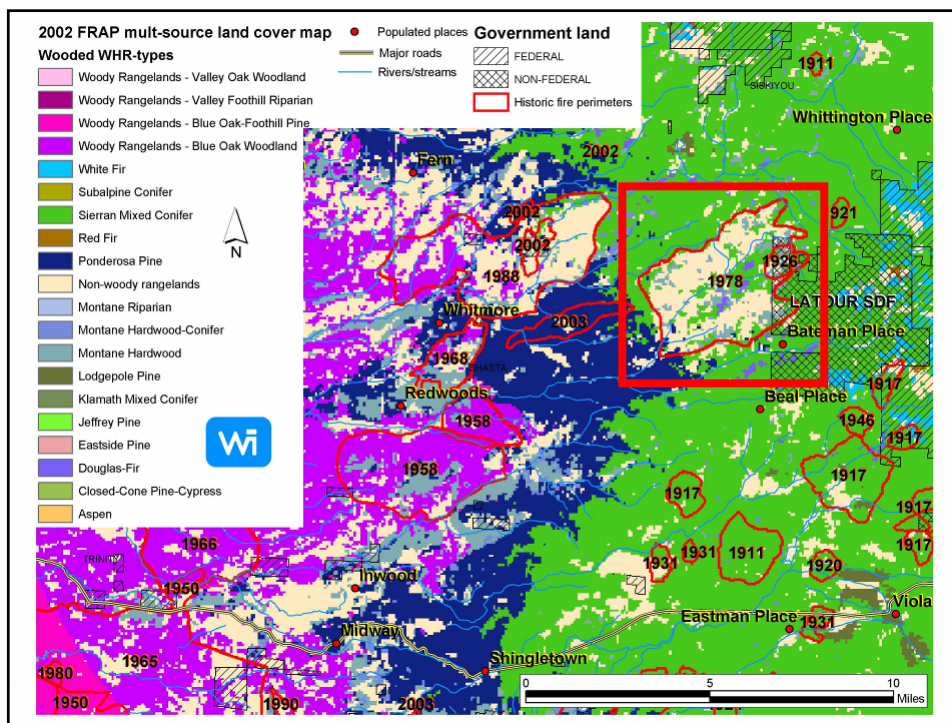
## What Happens to Forest Growth After Fire?



- Rate of regrowth depends on the severity of the fire
- Fire severity varies across fire area



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 7



## Ecosystem Conversion



Fire can change forest ecosystems to non-forest ecosystems

Site of 1978 Whitmore fire in Latour State Forest, Shasta County



## Emissions Reductions by Changing Fire Management

|  | California | Oregon | Washington |
|--|------------|--------|------------|
| Treatable Area (million acres)                               | 1.51       | 6.47   | 5.76       |
| Biomass (millions tons carbon)                               | 54         | 413    | 376        |
| Emissions assuming 10% loss (million tons CO <sub>2</sub> e) | 19.8       | 151.6  | 138.0      |
| Emissions assuming 70% loss (million tons CO <sub>2</sub> e) | 138.7      | 1,061  | 969        |

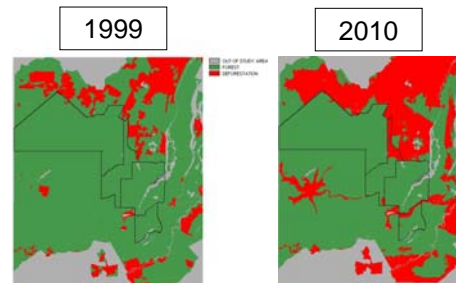
Potential reductions in emissions from fire estimated by looking at forest lands at moderate to severe risk of fire on lands with <40% slope within 400 meters of existing roads and within 50 miles of biomass energy facility



## How Does Land Development Affect Carbon Stocks?



- Develop and test methods for predicting conversion of forest land to non-forest land



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 11

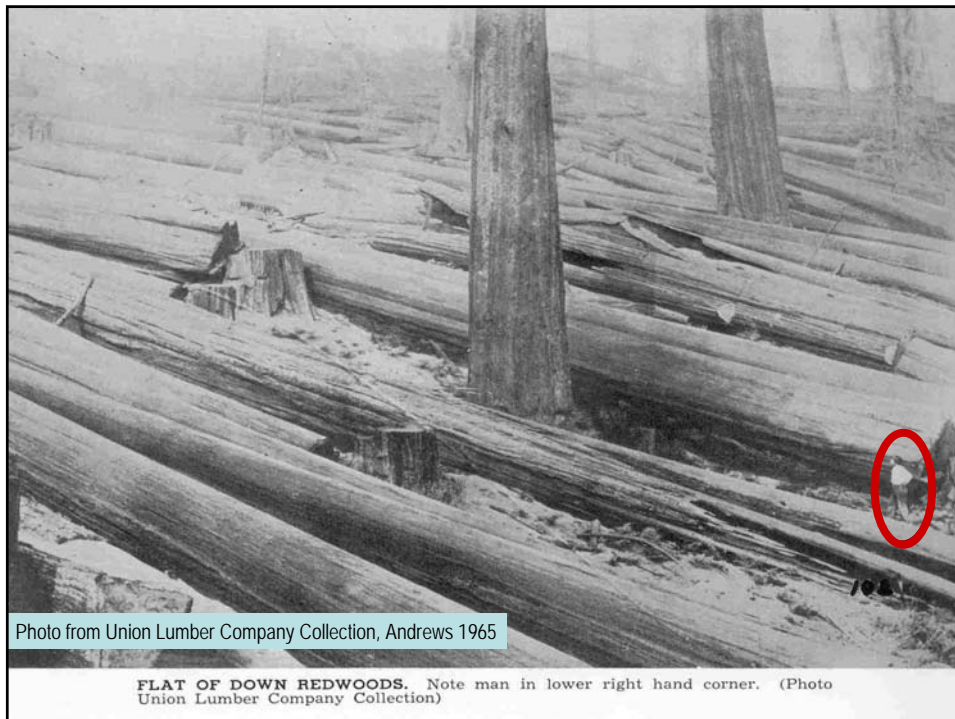


Photo from Union Lumber Company Collection, Andrews 1965

FLAT OF DOWN REDWOODS. Note man in lower right hand corner. (Photo Union Lumber Company Collection)

## Afforestation and Riparian Zone Restoration

- Improve mapping and classification of riparian zones
- Match species to sites and estimate carbon stock change
- Evaluate co-benefits and potential revenue to land owners



## Planning for AZ and WA Pilot Projects

- Criteria for selecting pilot sites
- Project categories
  - Afforestation
  - Hazardous fuel reduction to reduce emissions from fire
  - Forest management and conservation



## Conclusions

- Further characterization needed
  - Fire
  - Fast-growing species
  - Baselines for conservation
  - Riparian zone restoration
  - Identify additional pilots for Washington and Arizona

