

9-2014

## How Will Climate Change and Bioenergy Harvest Affect Carbon Storage in the Oregon Coast Range

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### Citation Details

Creutzburg, Megan K.; Scheller, Robert M.; Lucash, Melissa S.; LeDuc, Stephen D.; Evers, Louisa B.; and Johnson, Mark G., "How Will Climate Change and Bioenergy Harvest Affect Carbon Storage in the Oregon Coast Range" (2014). *Environmental Science and Management Faculty Publications and Presentations*. 119.

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# How Will Climate Change and Bioenergy Harvest Affect Carbon Storage in the Oregon Coast Range?

Megan Creutzburg, Robert Scheller, Melissa Lucash, Stephen LeDuc, Louisa Evers, Mark Johnson



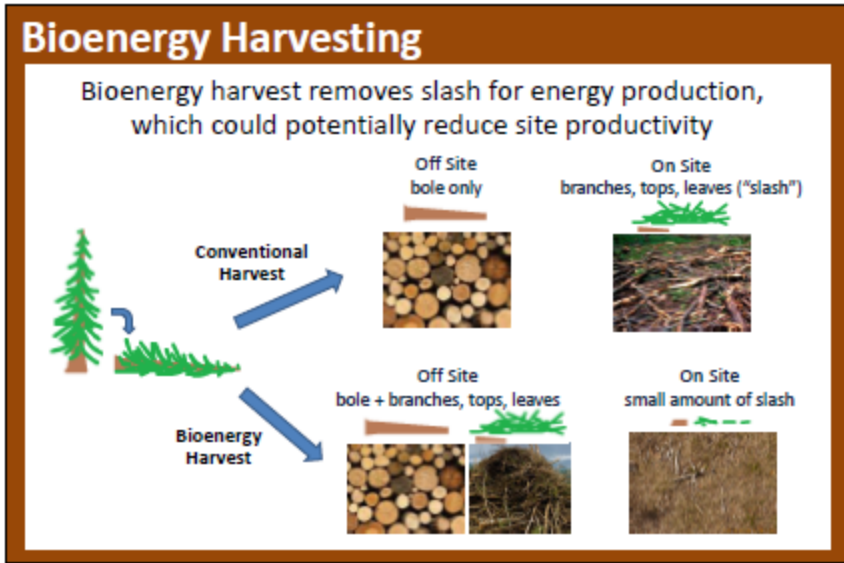
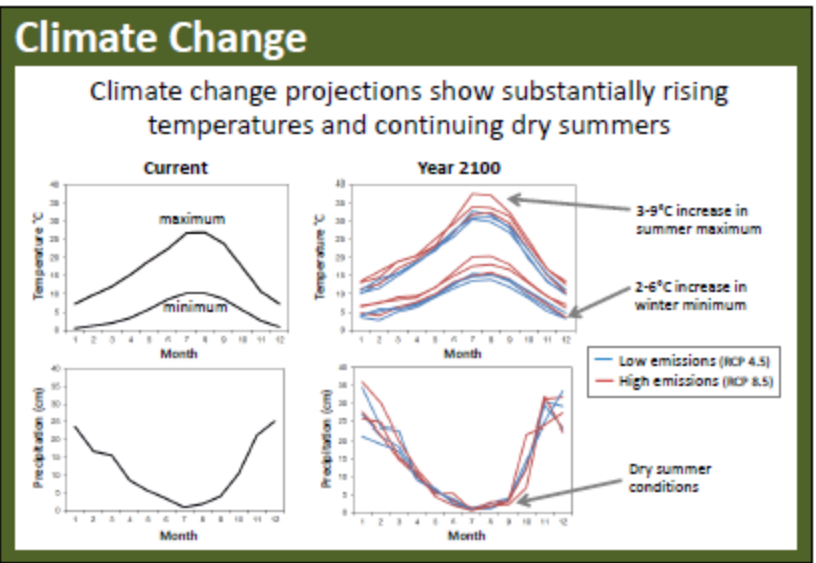
## The Oregon Coast Range

The Oregon Coast Range contains highly productive forests across a diverse range of land ownerships and management regimes

**Land Ownership**

- Bureau of Land Management
- Forest Service
- BLM
- Other
- Private Industrial
- Private Nonindustrial
- Private Nonindustrial (reserve)

Results are presented for the Panther Creek watershed, in the northern Coast Range



## LANDIS-II Forest Simulation Model

We used a simulation model to explore the impacts of varying scenarios of climate change and forest management on ecosystem carbon

### Climate Scenarios

**Current Climate**

**Climate Change Emissions scenarios**

- Low (RCP 4.5)
- High (RCP 8.5)

**Global Circulation Models**

- CCSM4 ← warm
- CanESM ← hot, wet
- HadGEM ← hot, dry

### Management Scenarios

**No Harvest** ← Maximize carbon storage

**Harvest Rotation**

- Current ← Continue current harvest practices
- Accelerated ← Increase harvest but maintain low harvest rates on federal & some private land
- Industrial ← Harvest all lands as private industrial forests (clear-cut forestry across all lands)

**Harvest Intensity**

- Conventional ← Remove bole only, leave slash on site
- Bioenergy ← Remove bole and slash

Carbon and nitrogen cycling

- Soil texture
- Soil C and N pools
- N inputs

Soil dynamics

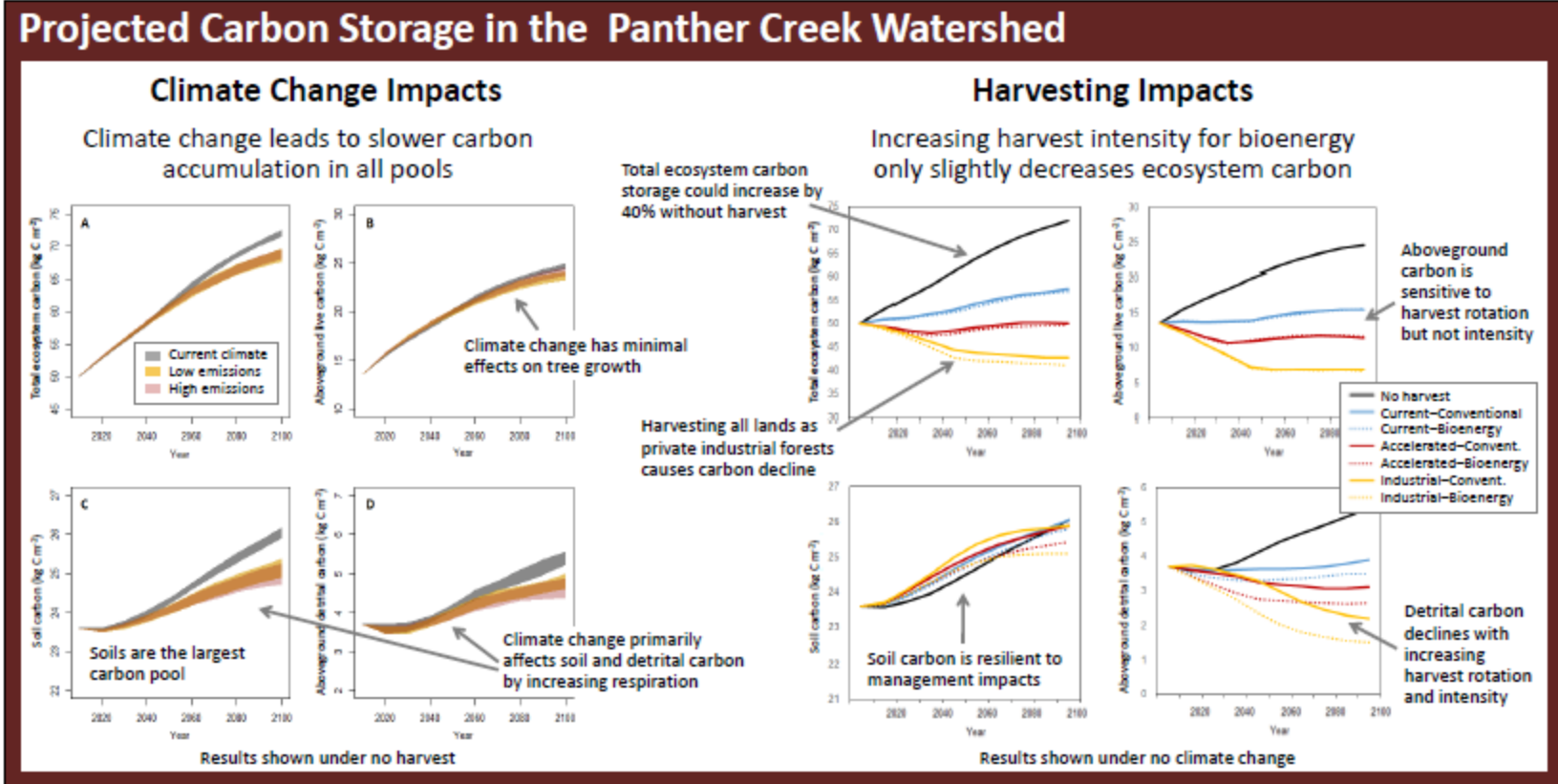
- Modified CENTURY model

Simulates growth and competition among tree species-age cohorts

- Tree species life history traits
- Functional traits
- Tissue nutrient content

Spatially interactive landscape

- Input initial vegetation maps
- Model spatial processes
- Model management heterogeneity



- ## Continuing Work
- Simulate entire Coast Range, including BLM, Forest Service, state, tribal and private lands
  - Include climate change impacts on wildfire
  - Simulate a wider range of management scenarios: current management, climate change adaptation, ecological forestry, economic growth, and watershed protection

## Acknowledgments

Funding for this work came from the Bureau of Land Management and Environmental Protection Agency

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