

## ABSTRACT

While there have been numerous studies on climate change impacts on forests, interactions of management with changing climate and natural disturbance are poorly studied.

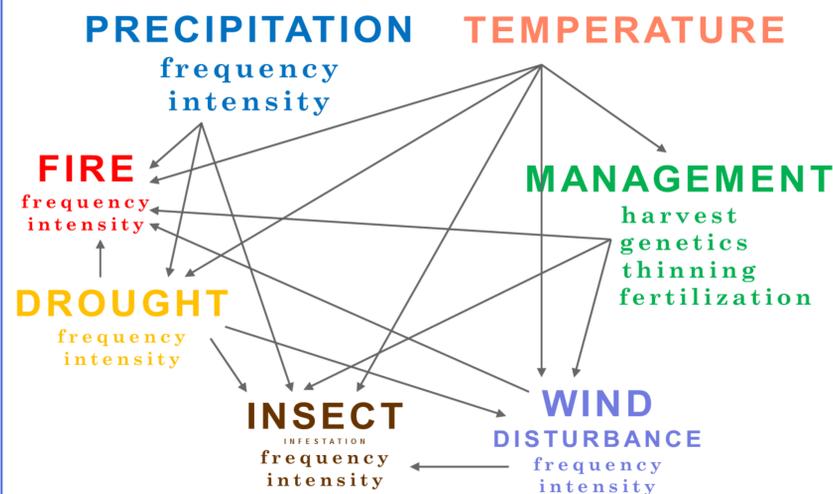
Terrestrial biosphere models (TBMs) provide an excellent opportunity to investigate and assess simultaneous responses of terrestrial ecosystems to climatic perturbations and management across multiple spatio-temporal scales, but currently do not represent a wide array of management activities known to impact carbon, water, surface energy fluxes, and biodiversity.

The Ecosystem Demography model 2 (ED2) incorporates non-linear impacts of fine-scale (~10<sup>-1</sup> km) heterogeneity in ecosystem structure both horizontally and vertically at a plant level.

The management practices that we implemented are: clear-cut, partial harvest and planting. The results are for 2 different sites in the U.S. Southeast (Duke Forest) and Pacific Northwest (Metolius Research Natural Area). These sites differ in regards to climate, vegetation, soil, and historical land disturbance as well as management approaches.

## INTRODUCTION

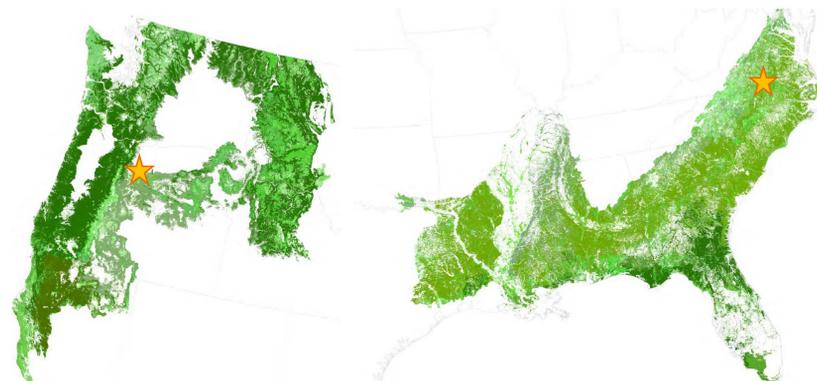
### POTENTIAL INTERACTIONS



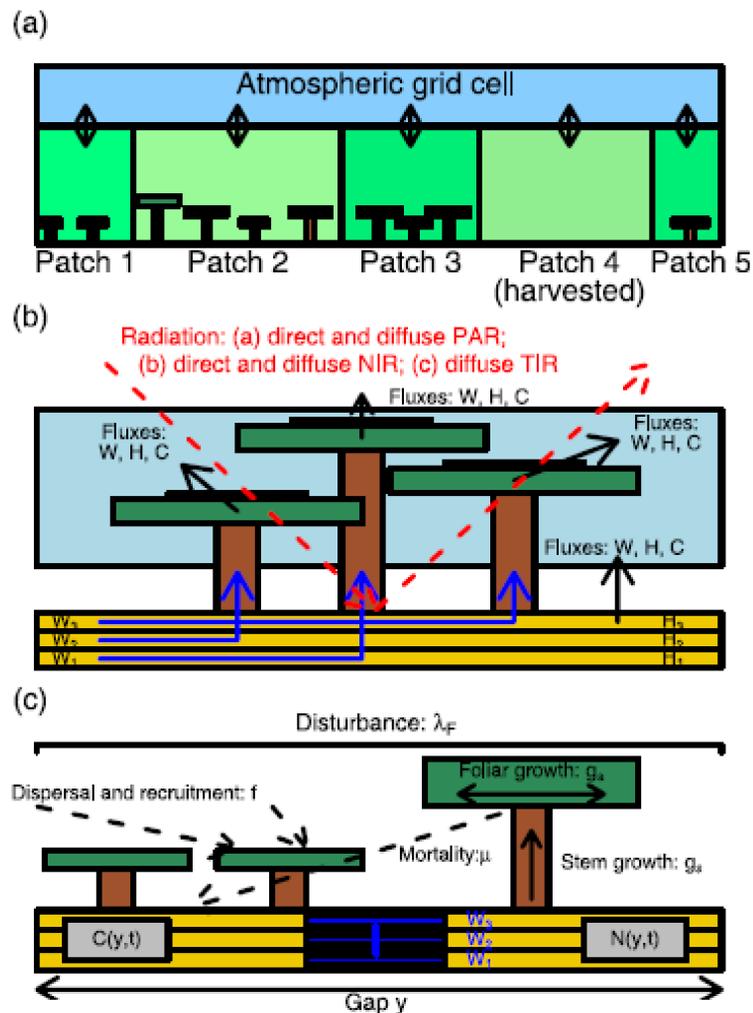
## STUDY REGIONS

Ecoregion-Based Study Area and Forest Type of PNW Forest Lands

Ecoregion-Based Study Area and Forest Type of the SE Coastal Plain and Piedmont

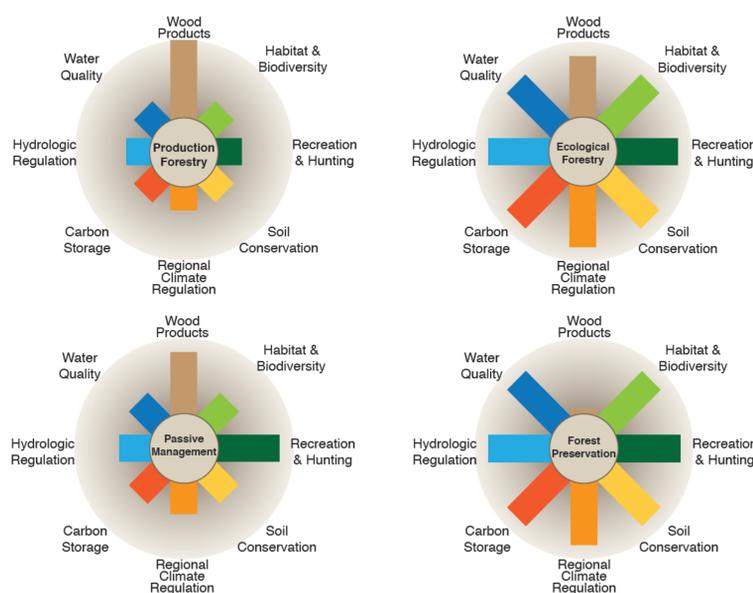


## ED2 MODEL STRUCTURE and PROCESSES



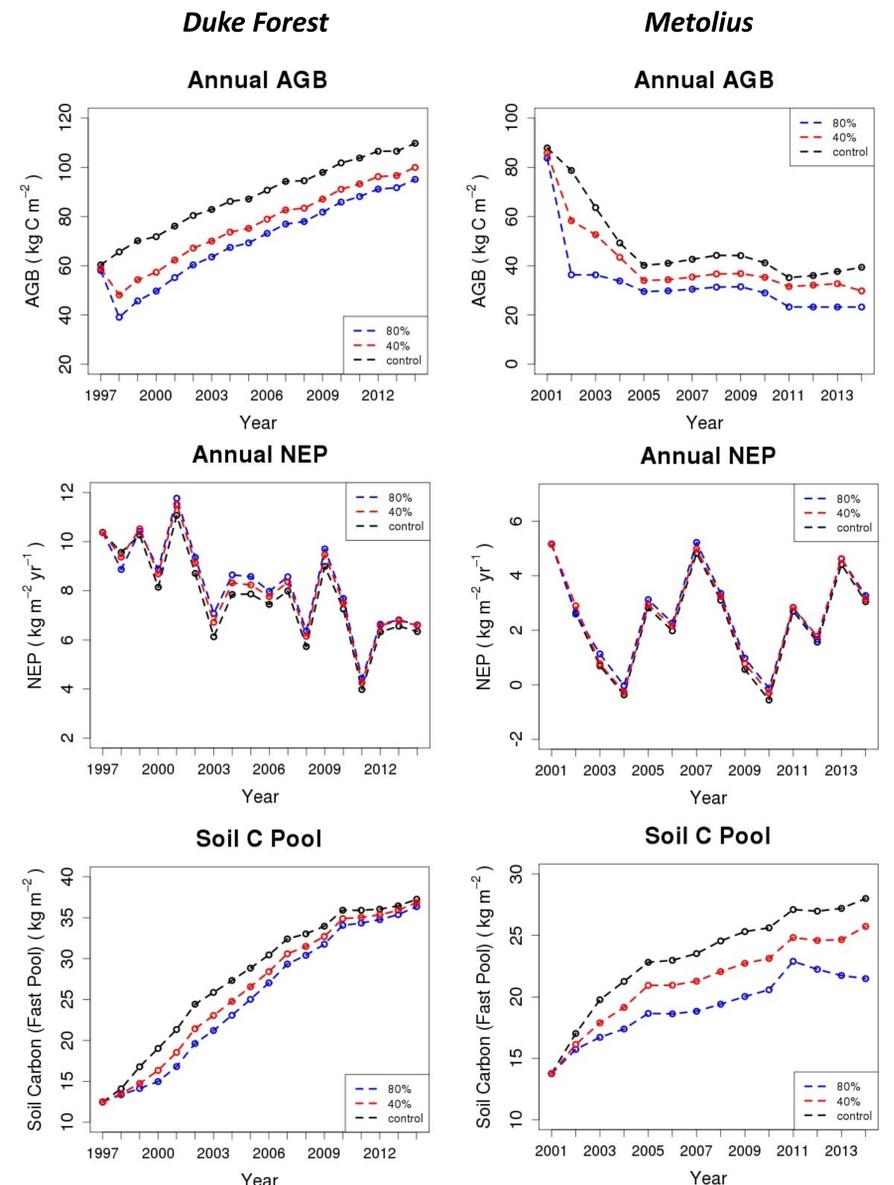
Medvigy et al. 2009

## FOREST MANAGEMENT FUNCTIONAL TYPES



Becknell et al. (2014)

## PRELIMINARY RESULTS



## CONCLUSION

- Responses of forests to partial harvest and planting are different depending on climate, vegetation, soil, and historical land disturbance.
- Preliminary results showed that different management practices could successfully and realistically be implemented in the ED2 model at site level.

## FUTURE WORK

- Modification of ED2 model to allow planting at lower minimum height in order to simulate more realistic recovery after harvest.
- Model application at Joseph Jones Ecological Research Center, North Carolina Loblolly Pine, Ordway-Swisher Biological Station, H.J. Andrews Experimental Forest, Wind River Field Station, and Mount Rainier National Park.
- Implementing low intensity fire, conversion, restoration, salvage, and herbicide/pesticide.
- Scaling up the management and assessment of management impacts at regional scale for Southeast (SE) and Pacific Northwest (PNW).
- Sensitivity analyses to determine the most important processes at different spatial scales.

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