PINEMAP Scenario Development

PINEMAP 2014 Annual Meeting

Scenarios

Scenarios are an organized set of future conditions and situations that can be used to focus and organize model simulations.

PINEMAP scientists need to develop a limited number of plausible scenarios to use in regional simulations.

The four components of the scenarios are:

Land Use – Productivity – Environment - Disturbance

Each component has multiple facets that need to be considered.

Models, research results and expert opinion will provide the information needed to define the levels of the four components.

Land Use: Change in the amount of land in loblolly pine plantations can be informed by FIA data, the Sub-Regional Timber Supply (SRTS) Model and other models (examples below from Abt et al. (2012) For. Sci. 58:523-539).

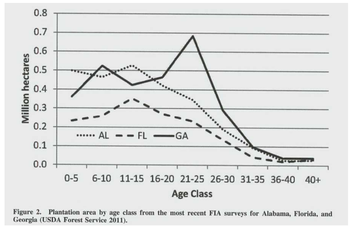
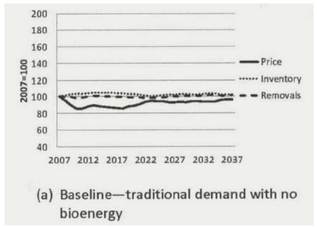
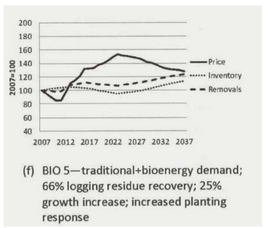


Figure 2. Plantation area by age class from the most recent FIA surveys for Alabama, Florida, and Georgia (USDA Forest Service 2011).

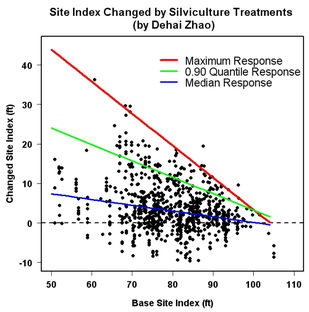


(a) Baseline—traditional demand with no bioenergy



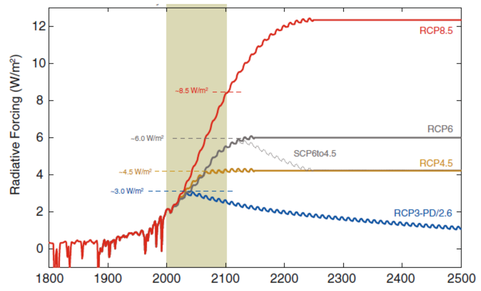
(f) BIO 5—traditional+bioenergy demand; 66% logging residue recovery; 25% growth increase; increased planting response

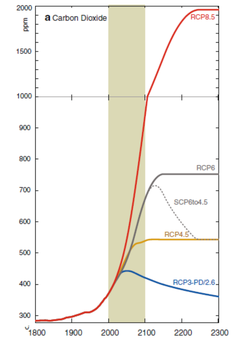
Productivity: Change in loblolly pine productivity will be calculated as a percentage of the base site index. Figure below shows that intensive management has a greater effect on growth on lower site index sites, and the locations of the studies used in the site index response analysis (figure provided by Dehai Zhao).



Stand volume growth is linked to class distributions in 3-PG lob. Products produced and on-site carbon management will determine the amount of sequestered carbon.

Environment will be predicted using downscaled Global Climate Models (GCMs) and projected changes in climate forcing factors, including carbon dioxide (CO2) developed by the IPCC. Representative Concentration Pathway (RCP) 4.5 represents a stabilization scenario in which emissions of greenhouse gasses are capped. RCP 8.5 represents unabated emissions (graphs from Meinshausen et al. 2011 Climatic Change 109:213-241).





Changes in Disturbance will be by estimated by various means, including models that focus on insect outbreaks and widlfire prevalence, the USDA Forest Service Forest Health Protection (FHP) Unit and historical records of productivity losses due to insects, disease, hurricanes and fire. Right figure is the FHP Southern Pine Beetle infestation prediction for 2012. Left is from Williams and Birdsey (2003) USDA FS, GTR NE-308.

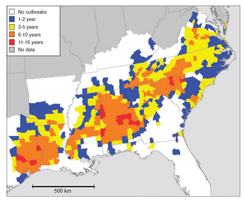
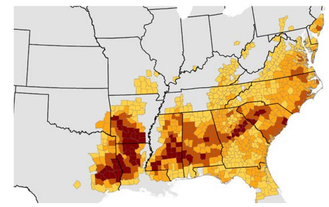


Figure 4.—Frequency of outbreaks by southern pine beetle from 1973 to 1994.



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