Removing a key barrier to the use of a critical climate change mitigation tool: Economic modeling of longleaf pine market value and ecosystem services

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Abstract

Forests will play a major role in society's response to climate change, largely because they inexpensively sequester carbon. In Florida, officials are planning to heavily rely on forests to meet mandatory emission targets set under EPA's Clean Power Plant rule. One forest type – longleaf pine (*Pinus palustris* Mill; LLP) – is more resilient to climate change and more effective at sequestering carbon than other commercially viable species. LLP is also appealing for its superior production of other important ecosystem services (e.g., biodiversity). Unfortunately, landowners have expressed little interest in planting LLP despite coordinated state and federal efforts. Florida's LLP forests – mostly privately owned – are in decline due to mismanagement, land use change, and disturbances (e.g., invasive pests). A major barrier to LLP expansion is landowner uncertainty about associated economic impacts. Unlike other major pine species, researchers have not developed the analytic tools to understand the economics of LLP in terms of timber and non-timber benefits, climate change, and disturbance risks. We also have a limited understanding of landowners' preferences for managing fire-dependent LLP forests and the role of incentives. To fill this gap, we will develop a dynamic LLP forest stand-level economic simulation model including key ecosystem services, assess landowner preferences for LLP incentives, and predict changes in LLP planting given incentive program features. We will determine tradeoffs and efficiency in the provision of LLP outputs, and determine optimal policy interventions under changing climatic conditions. Findings will reduce landowners' uncertainty and guide policy decisions involving LLP as a climate change mitigation tool.