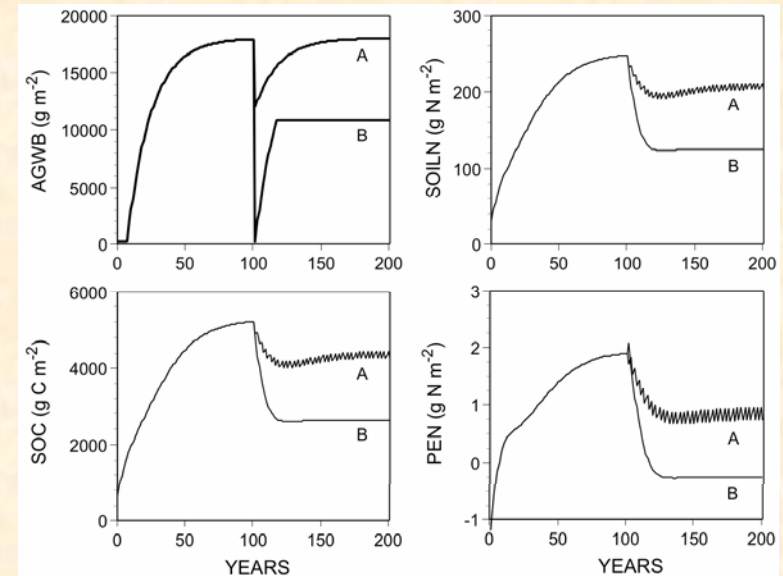# Ecosystem Models May Help Forecast Coastal Forest Recovery Following Hurricanes

## Contact: C.T. Garten, Jr., *gartenctjr@ornl.gov*, 865-574-7355

↬ Hurricanes have widespread impacts on upland forest resources of coastal regions in the southeastern U.S., often leaving forest stands in need of restoration and/or rehabilitation.

↬ Mathematical models to predict soil quality thresholds to ecosystem recovery following disturbance and the effect of common land management practices (like controlled burning) on forest sustainability were recently developed at ORNL.

↬ Results indicate that soil organic matter and nitrogen (N) can be used to define thresholds to ecosystem recovery and that N-limitation can be a key constraint on the recovery and sustainability of desired future ecosystem conditions following disturbance on the coastal plain.



*Predicted tree wood biomass (AGWB), soil N (SOILN), soil C (SOC), and potential excess soil N (PEN) under different regimes of prescribed burning. Sustainable ecosystem recovery after forest thinning is illustrated by line "A" and unsustainable recovery after clear-cutting is illustrated by line "B".*

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Hurricanes can have widespread impacts on upland forest resources of coastal regions in the southeastern US, leaving forest stands in need of restoration and/or rehabilitation. However, little is currently known about how various measures of soil quality affect the potential for post-disturbance forest recovery and how various post-disturbance management practices affect the sustainability of recovering ecosystems on sandy, nutrient-poor soils. Recent research on military installations, by the Environmental Sciences Division (ORNL), has addressed ways of forecasting soil quality thresholds to ecosystem recovery following disturbance and predicting the effect of common land management practices (like prescribed burning and harvesting) on forest sustainability. The research suggests that measurements of soil carbon and nitrogen can be used to define thresholds to ecosystem recovery and that nutrient limitation can be a key constraint on the recovery and sustainability of desired future ecosystem conditions following forest disturbance on the southeastern coastal plain.

References:

Garten, C.T., Jr., Ashwood, T.L., 2004. Modeling soil quality thresholds to ecosystem recovery at Fort Benning, GA, USA. Ecological Engineering 23: 351-369.

Garten, C.T., Jr., 2006. Predicted effects of prescribed burning and harvesting on forest recovery and sustainability in southwest Georgia, USA. Journal of Environmental Management (in press).

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