

Water management and productivity in planted forests

JAMI E. NETTLES

Weyerhaeuser Company, PO Box 2288, Columbus, Massachusetts 39701, USA
jami.nettles@weyerhaeuser.com

Abstract As climate variability endangers water security in many parts of the world, maximizing the carbon balance of plantation forestry is of global importance. High plant water use efficiency is generally associated with lower plant productivity, so an explicit balance in resources is necessary to optimize water yield and tree growth. This balance requires predicting plant water use under different soil, climate, and planting conditions, as well as a mechanism to account for trade-offs in ecosystem services. Several strategies for reducing the water use of forests have been published but there is little research tying these to operational forestry. Using data from silvicultural and biofuel feedstock research in pine plantation ownership in the southeastern USA, proposed water management tools were evaluated against known treatment responses to estimate water yield, forest productivity, and economic outcomes. Ecosystem impacts were considered qualitatively and related to water use metrics. This work is an attempt to measure and compare important variables to make sound decisions about plantations and water use.

Key words water; forests; sustainability; indicators; plantations; peak flow; base flow