1137-92-302 **Adam Erickson*** (adam.erickson@wsu.edu), Department of Mathematics and Statistics, 14204 NE Salmon Creek Ave, Vancouver, WA 98686, **Robert Scheller** (rschell@ncsu.edu), Dept. of Forestry and Environmental Resources, 2820 Faucette Dr., Campus Box 8001, Raleigh, NC 27695, **Nikolay Strigul** (nick.strigul@wsu.edu), Department of Mathematics and Statistics, 14204 NE Salmon Creek Ave, Vancouver, WA 98686, and **Melissa Lucash** (lucash@pdx.edu), Department of Geography, 1721 SW Broadway, Portland, OR 97201. *Toward the efficient approximation of energetic and biogeochemical processes in terrestrial biosphere models: next-generation forest models.* Preliminary report.

Over the past 80 years, forest models have progressed from empirical linear models to physiological process models to hybrids of both. Early empirical models simulated the growth and yield of pure even-aged forest stands. Four decades later, individual-based multi-species physiological gap models emerged with JABOWA and FORET. Despite reasonable fidelity to Moore's Law, efforts to upscale gap models remain limited by algorithmic and parametric complexity, with existing solutions relying on sampling strategies. Following model reduction techniques demonstrated in LANDSIM, a new class of model emerged blending empirical and physiological components. Such hybrid models include the two popular cohort models, LANDIS-II and Sortie-PPA. While the former is based on species life history strategies and the CENTURY model, the latter is based on phototropism and crown plasticity combined with recent biogeochemistry models. Here, we discuss approximations used in LANDIS-II and Sortie-PPA, as well as Bayesian methods for estimating parameters and prediction uncertainties. We also discuss combining the PPA cohort model with a big-leaf biogeochemistry model in the latest version of Sortie-PPA, known as Sortie-PPA-BGC, intended to inform future terrestrial biosphere models. (Received February 06, 2018)