TITLE: Estimating Biomass of Down Woody Materials in the Eastern U.S. by Linking Two Phases of FIA Data

PRINCIPLE INVESTIGATOR: David C. Chojnacky, Adjunct Faculty, Virginia Tech Department of Forestry, Falls Church, VA **dchoj@cox.net** 703-237-8620

COOPERATOR: Stephen P. Prisley, Associate Professor, Virginia Tech Department of Forestry, Blacksburg, VA **prisley@vt.edu** 540-231-7674

DURATION: Year 2 of 2

FUNDING SOURCE: Base (regional)

PROJECT OBJECTIVES:
(1) Estimate forest-floor down woody material (DWM) mass for the eastern U.S. by updating previously developed models with newly available FIA data (from FIADB 3.0); the models link FIA's phase 3 (P3) DWM data to phase 2 (P2) plot data for greater inference.

(2) Publish model results in a journal.

JUSTIFICATION: This project was partially funded by USDA Forest Service Forest Health Monitoring (FHM) program in 2007 but not completed. An additional $22,000 is requested for principal investigator to complete work. Virginia Tech was allocated $10,000 in 2007 for cooperative help and this work is in progress.

This study seeks to improve a significant linkage between P3 DWM data (sampled on only 1/16th of P2 plots) and the P2 plots for estimating DWM mass. Down woody materials include soil organic layers of duff and litter; dead and down fine and coarse woody detritus (FWD and CWD); and all live and dead understory vegetation. In addition to being a key component of fire fuels, DWM is also important for monitoring healthy forests in terms of carbon storage in the forest floor, habitat for many organisms, and decomposing materials critical for nutrient cycling. The study affords much opportunity to improve our initial models (which generally explained less than 22 percent of the observed variation [$R^2 \leq 0.22$]) to incorporate the newly available P3 data in FIADB 3.0.

PPROJECT DESCRIPTION:
Background: From previous Forest Health Monitoring grants and other funding, we have linked P2 to P3 data for duff, litter, and down woody materials through regression models for estimates of mass and carbon at the P2 scale (fig. 1). These results were submitted to *Forest Ecology and Management* by principle investigator and coauthors but are pending revision. With the 2007 release of FIADB 3.0 these models can be updated with newer, more complete data (objective 1). The additional funding will also support revision of our manuscript and publication of more complete and reliable results (objective 2).

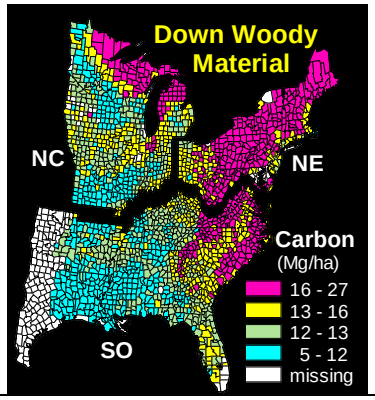

Figure 1. Down woody material (DWM) carbon (which is 50% of mass) shown at county-scale and derived from previous model between P3 and P2 plots for 2001 and 2002 DWM data.

Methods: Objective 1 entails modeling for estimating DWM mass from P2 variables and/or

auxiliary topographic and climate data. Virginia Tech is collaborating to provide input on climate and topographic data by doing an intensive GIS analysis for Alabama DWM data, in concert with another study. The CWD, FWD, duff, litter, and understory vegetation will be modeled separately using regression techniques.

DWM data for most of the eastern states have already been downloaded in 2007 from DIADB 3.0 but this will be updated with more data posted in 2008.

Objective 2 will entail updating a previous manuscript with the new model results and revising it with the assistance of a technical editor, for submission to a professional journal.

Products: (1) Regression or similar models for the eastern U.S. for estimating mass from P2 plots variables and auxiliary information (most likely climate variables). Models will include estimates for duff, litter, FWD, CWD , and understory vegetation. **(2) Publication** of results in a journal **and presentation** at least one outlet as time permits.

Schedule of Activities:

Complete acquisition of all data from FIADB 3.0; compile DWM from raw data measurements.	April 2008
Construct models for linking P3 and P2 data.	May 2008
Draft manuscript(s).	July 2008

The project can be completed within this timeframe assuming that funding is secured in March 2008 or earlier....

BUDGET:

	Item	**Requested FHM Funding**	**Other-Source Funding***	**Source**
CALENDAR YEAR 2008				
Administration	Salary	14,000	TBD	VA Tech Univ.
	Overhead	3,300	TBD	VA Tech Univ.
	Travel	1,200		
Procurements	Virginia Tech collaboration			
	Writer/Editor	3,000		
	Supplies/Misc	500		
TOTAL		**22,000**	TBD	VA Tech Univ.