

Supporting the National Fire Plan with Maps and Digital Data Layers Derived From FIA and FHM Plot Observations

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Due to the late arrival and diminished level of 1st year funding (2003) resulting from circumstances beyond the control of the FHM program, the principle investigators would like to appeal to the FHM program for an extension of funding of this grant to a 3rd and final year. It is felt that with the additional year of phase 3 down woody plots, together with progress made to date, significant conclusion can be made to the initial objectives of this study. Therefore, we respectfully request a final year funding of \$37,125.

INTRODUCTION: The initial purpose of this study remains the same, to use currently existing FIA inventory data to develop new fuel map products and techniques. Because a national-scale inventory of down woody fuels has never existed before, maps based on these data can greatly aid the efforts of the National Fire Plan in addition to users ranging from National Forests to State land management entities. Secondly, the techniques developed in this study may be used to map not only fuels, but also other forest attributes measured on phase three plots such as invasive species on understory vegetation plots (*Schulz, B. and C. Olson. 2003. Monitoring Introduced Plant Species. The Joint Meeting of the Fifth Annual FIA Symposium and the Southern Forest Mensurationists. New Orleans, LA. Nov. 18-20, 2003*). Therefore, this study seeks to utilize interpolation, phase two modeling, and remotely sensed imagery to create needed fuel maps and methodologies that benefit numerous constituents of the forest health monitoring community.

OBJECTIVES: The proposal objectives are threefold: (1) to construct maps and digital data layers of forest fuel loadings for the 11-state North Central FIA region with accuracies suitable for use by projects such as LandFire and the National Fire Plan; (2) to construct similar maps and digital data layers portraying the suitability of forested areas for treatments to reduce forest wildfire risks; and (3) to extend the mapping techniques for national use with other FIA and FHM observed plot variables.

PROGRESS: Research-to-date has been applied in two directions: exploration of kriging as a fuel map interpolation technique and development of phase two fuel models. Kriging is a data interpolation technique that creates a smooth surface from discrete, geographically disparate data points. One disadvantage of kriging is that, for example, data from adjacent forest and non-forest plots are smoothly interpolated geographically between the plots without regard to the fragmented patterns of land cover between the plots. Thus, even though the forest land cover, and hence forest fuels, may abruptly end in much closer proximity to the forest plot than to the non-forest plot, the interpolation only gradually reduces the fuel estimates as the distance from the forest plot increases. Our investigations to compensate for this phenomenon has focused primarily on using a forest/non-forest map or mask to "zero out" the forest fuel estimates on lands with no forest cover and using all phase two plots (including non-forest) in interpolation efforts.

Finally, because of the sparse population of FIA Phase 3 plots (i.e., one plot per approximately 96,000 acres), we have also been investigating construction of models to be used to predict the Phase 3 fuel components from the suite of Phase 2 measurements that are also obtained on every Phase 3 plots. If successful, we would then be able to predict Phase 3 fuel components for every Phase 2 plot, this increasing the density of fuel component information by factor of 16 to one plot per approximately 6,000 acres. Our preliminary analyses indicate that these models reduce the residual error interpolation predictions by a sufficient amount to now move this effort into the production phase.

OUPUTS: Some or all of the work of this been presented both in posters, talks, and published papers over the past year (see below). Additionally, techniques developed in this study feed the data requirements of another EM grant, "Fire Season "Real Time" Estimation of Fuel Moisture Fluctuations in Regional Down Woody Material Inventories during a Fire Season." It is hoped that with a third and final year of funding closure may be brought to this study and a "keystone" publication may be created detailing the results of this study and outlining the knowledge-to-date concerning large-scale fuel mapping.

McRoberts, R.E., C.W. Woodall, and M.H. Hansen. 2004. Mapping FIA phase 3 fuel components. Forest Health Monitoring National Workshop. Sedona, AZ. Feb. 10-12, 2004.

Woodall, C.W., and G.R. Holden. 2003. Assessing forest fuels. The Joint Meeting of the Fifth Annual FIA Symposium and the Southern Forest Mensurationists. New Orleans, LA. Nov. 18-20, 2003.

Woodall, C.W., G.R. Holden, and J. Vissage. 2004. Large scale maps of forest fuels. Fire Mgmt. Today. 64(2): 19-21.

Woodall, C.W., and M.S. Williams. In Press. Sampling protocols, estimation procedures, and analytical guidelines for down woody materials indicator of the Forest Inventory and Analysis Program. USDA Forest Service, Gen. Tech. Rep., North Central Research Station. 97 p.

We respectfully request that second year's funding in the amount of \$37,125 be made available (please see original funding request on the preceding page with a third year of funding equivalent to year 2 requested).

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TIMELINES AND BUDGETS

The table below provides a completion schedule for the primary tasks and cost estimates.

Task	Completion date	FTE	Grade	Salary (\$)
Year 1				
Data Acquisition and Management	March 2003	0.05	GS-9/11	3,350
Analyses				
Construct forest/non-forest map	March 2003	0.10	GS-14	14,000
		0.05	GS-9/11	3,350
Construct ancillary data sets	March 2003	0.05	GS-9/11	3,350
Construct fuel loading models	June 2003	0.10	GS-14	14,000
		0.10	GS-12	9,000
Construct and compare maps	July 2003	0.15	GS-14	21,000
		0.10	GS-12	9,000
		0.15	GS-9/11	10,050
Sub-total		0.85		87,100
Overhead (20%)				21,775
Year 1 totals		0.85		108,875
Year 2				
Extend methodology	September 2004	0.10	GS-14	14,000
		0.10	GS-12	9,000
		0.10	GS-9/11	6,700
Sub-total		0.30		29,700
Overhead (20%)				7,425
Year 2 totals				37,125
Project totals		1.15		146,000