Forest Inventory and Analysis (FIA) National *Quarterly* E-Newsletter

April 2006 Volume 1, Number 2

In This Issue

Special News Release Northern Research Station

"Leaders Named for Forest Inventory and Forest Monitoring Programs"

This article is available at: http://www.ncrs.fs.fed.us/news/pressreleases/NR_2006March14_PM.pdf

FIADB is available at http://www.fia.fs.fed.us/tools-data/data/

A message to our clients…

I'm often asked to provide a synopsis of FIA progress, and what can be expected in the near term. Here's my view. Since 1999, FIA has successfully transitioned from implementing five state periodic surveys per year to 45 state surveys per year. State partners continue to play a significant role in the program's field activities in many states. States have also worked with FIA at identifying key issues to be addressed in state reports, and are increasingly involved in co-authoring state reports and related publications. The formula for success in implementing an annual FIA program has included strong state participation through funding, technical assistance, or science and technology development. Working together has strengthened our understanding of database and forest resource assessments needs. FIA intends to build on this strong partnership and strengthen partnerships with NFS and other federal agencies with shared inventory and assessment needs and interests.

FIA has come a long way in implementing nationally-consistent forest inventory methods and procedures across all lands, public and private. For example, FIA has developed a National Information Management System (NIMS) for managing all field-sampled data, and maintains the public database Forest Inventory and Analysis Database (FIADB) that is available via the Web. Phase 3 data, also known as Forest Health Monitoring indicators, became part of the FIA sample in 2001; and these data will be available through FIADB starting June 30, 2006. The use of NIMS nationwide provides for consistent quality control of FIA inventory compilation procedures and inventory estimates across Research Station boundaries. Prior to NIMS, FIA has relied on regional data processing systems to provide inventory estimates.

The future of FIA depends on continued deployment of a nationally-consistent program in all 50 states. A new FIA strategic plan has been completed and is in the publication process. We anticipate the publication will be available in June 2006. Our number one priority continues to be national implementation in all 50 states.

An area of continued emphasis needs to be the development and use of spatial data, models, and tools for applications and products. For example, development of forest fuel maps, small area estimates, and estimates of forest fragmentation dictate the use of spatial models. This newsletter highlights a few advancements of spatial research and applications. The current FIA program is based both on aerial photography and satellite imagery in combination with field visits for data collection. Future activities may include a larger proportion of FIA data being collected via various remote sensing activities. This will not eliminate field

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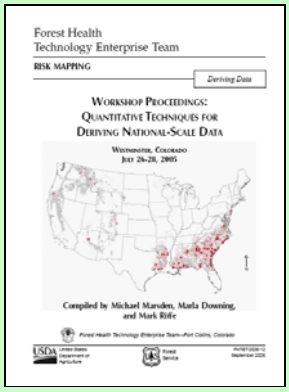
Workshop Proceedings: Quantitative Techniques for Deriving National-Scale Data Workshop



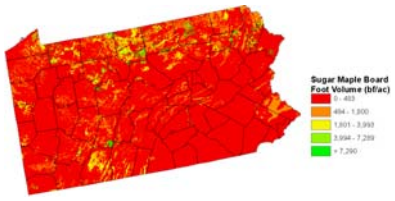
Please click on the following website:
http://www.fs.fed.us/foresthealth/technology/spatialstatistics/docs/QuantitativeTechniques.pdf

visits but will potentially reduce the amount of field visits for data collection. FIA and partners are particularly interested in relying more on this approach in some areas of the interior west and interior Alaska where access costs are high. Finally, I invite everyone to the 8th Annual FIA Science Symposium the week of October 16th, 2006 in Monterrey, CA to see the latest advancements in the delivery and science of FIA. Please visit the FIA web site to register.

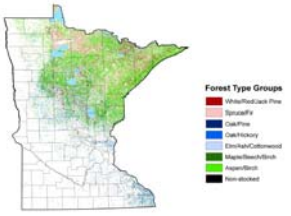
–Greg Reams, National Program Leader

What's new in the world of research?

New method implemented for map production in support of FIA state reports



Accomplishment: Map products have taken on increasing importance to customers that use FIA data and analytical products. Not only can effective maps communicate information quickly and clearly, but they also reveal trends and patterns that are not discernable from traditional tabular and graphical displays of FIA data. Researchers at the new Northern FIA Unit have developed a way to operationally map large numbers of FIA attributes to 250 meter pixels. Imagery from the MODIS satellite sensor and other GIS data were combined for the states of Pennsylvania and Minnesota in a multivariate modeling technique that imputes entire plot records to unknown locations on a map. The maps can then be reclassified at will to produce estimates for almost any FIA attribute. Numerous maps were made using this technique for inclusion in the Pennsylvania and Minnesota 5-year reports that are due this year. A quality assurance procedure and software were also developed for standardized assessment of the agreement of the modeled estimates with plot estimates.



Outcome: The suite of maps produced will be incorporated into the Pennsylvania and Minnesota reports, and the technique will be reproduced in other states. This technique produces maps that can be incorporated into other FIA mapping efforts, and could serve as a foundation for future national mapping efforts. The efficiency gained and additional productivity realized by this method benefit FIA's production process.

Lister, A.J. and M. Hoppus. 2002. Small area estimation using FIA plots and satellite imagery. Proceedings of the 2002 IUFRO Seminar on Statistics and Information Technology in Forestry, September 8-12, 2002, Blacksburg, VA.

Lister, A.J. 2005. Creation of an n-Dimensional Spatial Database instead of a Map. FHTET-2005-12, Workshop Proceedings: Quantitative Techniques for Deriving National-Scale Data Workshop, July 26-28, 2005, Westminster, CO.

Wilson, B.T., M.H. Hansen, and R.E. McRoberts. 2005. Validation of geospatial models using equivalence tests. FHTET-2005-12, Workshop Proceedings: Quantitative Techniques for Deriving National-Scale Data Workshop, July 26-28, 2005, Westminster, CO.

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Studies in progress…

Study Title: Close-out Inventory in Mississippi to Quantify Impacts from Hurricane Katrina
Participants: SRS-FIA, Region 8 State and Private Forestry, Mississippi Forestry Commission
Status: Fieldwork is scheduled to be completed in December 2006. Preliminary results should be available spring 2007.
Results: This inventory will be a re-measurement of all phase 2 plots in Mississippi that will be part of the annual inventory system in the future. In addition to national and regional level field procedures, tree-level and plot-level impacts from hurricanes and a measure of down-woody material will be collected in the close-out inventory. Fieldwork began in January 2006. SRS-FIA crews are being assisted with trained inventory staff from Arkansas, Georgia, South Carolina, Texas, and NE-FIA. As of mid-March, more than 25% of the plots have been completed.
Contact: Dale Trenda, dtrenda@fs.fed.us

Study Title: Forest Resources: The Heartbeat of the South
Participants: Alabama A&M University, Auburn University, Clemson University, Mississippi State University, North Carolina State University, Stephen F. Austin State University, Texas A&M University, University of Arkansas – Monticello, University of Florida, University of Georgia, University of Kentucky, University of Tennessee, Virginia Tech, International Paper, MeadWestvaco, Plum Creek, Rayonier, Weyerhaeuser, SRS-FIA, American Forest and Paper Association, National Council for Air and Stream Improvement, Southern Group of State Foresters, The Nature Conservancy, Association of Consulting Foresters, Inc., Southern Group of State Forestry Association Execs., Southern Regional Extension Forestry, U.S. Fish and Wildlife Service – Southeast Region, U.S. Geological Survey
Status: Brochure planned to be published April 2006.
Results: A 26-page brochure in booklet format that examines the values of Southern forests, the threats that may permanently alter the region, and the potential solutions. The brochure demonstrates economic, ecological, and social benefits of forests and communicates potential impacts on quality of life. While it is designed for a variety of audiences, the brochure will initially be used as a reference for congressional, state and local elected and appointed officials during personal visits. It is designed for easy reading with charts, tables, and a variety of pictures that demonstrate the economic and intrinsic importance of forests and associated resources. This is the first of a series of targeted information transfers involving different media formats, and communication modules that are being designed to provide consistent information across Southern states. This brochure and subsequent materials are aimed to increase recognition of the multiple benefits of Southern forests and the threats that must be addressed to ensure sustainability of this resource.
Contact: Richard Harper, raharper@fs.fed.us

Study Title: Fusion of LiDAR and High Resolution Multispectral Imagery for Forest Inventory
Participants: Gary Lettman from Oregon Department of Forestry, PNW-FIA
Status: In progress, completion date is fall 2007. First results expected by fall 2006.
Results: Either LiDAR or imagery can be used to delineate individual tree crowns; delineation accuracy improves when the two data sources are merged. LiDAR data enables creation of orthorectified image products of exceptional fidelity. Fusion data supports efforts to automate spatial registration of FIA plots. Accuracy of heights estimated using LiDAR data is often greater that what can be achieved in the field. Leaf-on and leaf-off LiDAR data are equally useful for assessing the heights of individual trees. Techniques for deriving ground and canopy surfaces reported in other studies cannot handle the vegetation and terrain complexities present at the study area.
Contact: Demetrios Gatziolis, dgatziolis@fs.fed.us

Study Title: A Novel Approach to Regional Fuel Mapping: Linking Inventory Plots with Satellite Imagery and GIS Databases Using the Gradient Nearest-Neighbor Method
Participants: Janet Ohmann, Kenneth Pierce, and Jeremy Fried from PNW-FIA, Michael Wimberly from South Dakota State University, Matthew Gregory from Oregon State University.
Status: Funded by grant from Joint Fire Sciences Program. Research 90% complete; project data, maps, posters, proceedings articles, and reports posted on website at http://www.fsl.orst.edu/lemma/gnnfire; follow-on funding from NFS in support of eastern Washington forest planning, USGS GAP, ODF, and WWETAC for extension of mapping work in Oregon; publications pending.
Results: We used the GNN method, which relies on multivariate direct gradient analysis, to link field plot data, satellite imagery, and maps of environmental variables (climate, topography, historical disturbance) in a raster GIS database. Multiple GNN models were built for each of three study areas in contrasting landscapes: eastern Washington, coastal Oregon, and the Sierra Nevada in California. We developed four models for each study area, each with advantages for certain applications that illustrate major variations in model form: (1) species model, (2) species-size model, (3) structure model of fine grain, (4) structure model of coarse grain. The GNN method is very effective at maintaining the range of variability of individual variables at regional scale, as well as the covariance structure of multiple variables at local scale. As an imputation method, GNN does not truncate the range of variability in the response variables like multiple regression and other parametric methods. Furthermore, within

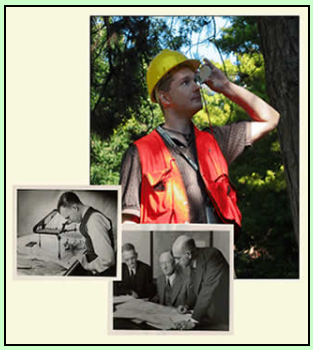
Studies in progress (continued)…

stand covariance structure is maintained when a single nearest-neighbor plot is imputed to each pixel. Therefore, GNN maps are well suited to applications like fuels characterization where it is important to identify sites with extreme values of multiple variables. We have begun to "exercise" the GNN fire vegetation and fuels maps we produced to carry out regional fire risk assessment, and initial results have been promising.
Contact: Jeremy Fried, jsfried@fs.fed.us

Study Title: Characterizing Trends in Forest Disturbance and Recovery
Participants: IW-FIA, N-FIA, SRS-FIA, PNW-FIA, NASA, PNW Research Station, University of Maryland
Status: Pre-processing of biennial Landsat satellite imagery for 30 sites across the country is underway. Research into efficient change detection algorithms is also ongoing.
Results: FIA personnel at each region will use resulting change maps to study patterns of harvest, fire, storm damage, and forest recovery. Research will support FIA's ability to process and analyze large sets of Landsat imagery.
Contact: Sean Healey, seanhealey@fs.fed.us

Study Title: Status and Trends of Pinyon-juniper Woodland in Response to Drought
Participants: IW-FIA, Intermountain Region Forest Health Protection
Status: Annual inventory data have revealed spatial and temporal patterns of mortality in pinyon-juniper woodlands. Monitoring continues with the addition of new annual data and adjunct inventory by FHP staff.
Results: Mortality of pinions increased dramatically between 2002 and 2003 in most affected areas. Little additional mortality was recorded in Colorado and Utah in 2004, probably due to cooler and wetter weather (see September 2005 *Journal of Forestry*). However, drought has persisted in Arizona and a leveling-off of mortality has not yet been documented. Annual data collected in 2005 should reveal current trends in mortality rates.
Contact: John Shaw, jdshaw@fs.fed.us

Study Title: Range Prediction Models for Trees of the Southwest
Participants: IW-FIA, USGS (lead), Northern Arizona University
Status: Presence-absence data from FIA plots have proven to be more valuable than polygon-based species range maps when modeling climatic envelopes for western tree species. USGS scientists are refining their modeling process with the help of FIA data.
Results: Climate-range models completed to date have produced promising results. Modeled species ranges do a good job of capturing species occurrences that are in FIA data but are outside polygons of published range maps. Areas where models predict species occurrence, but where species are absent, may reveal disequilibrium with current climate or other ecological processes. Climate envelopes will be used by investigators to predict potential species ranges in response to future climate change.
Contact: John Shaw, jdshaw@fs.fed.us



Category of Links

National Program
http://fia.fs.fed.us
Pacific Northwest
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Interior West
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North Central
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Northeast
http://www.fs.fed.us/ne/fia/
Southern
http://srsfia1.fia.srs.fs.fed.us/

Spring Quarterly Newsletter from PNW-FIA

This newsletter is available at http://www.fs.fed.us/pnw/fia/local-resources/pdf/nl/spring06.pdf

Upcoming events…

Event	Location	Date
SRS Coordinators Meeting	Charleston, SC	May 3-4, 2006
PNW Client Meeting	Anchorage, AK	June 1, 2006
PNW Regional Strategy Committee Meeting	Portland Forestry Sciences Lab, Portland, Oregon	September 2006
Annual FIA Symposium	Portola Plaza Hotel, Monterey, CA	October 16-19, 2006

Register for the Annual FIA Symposium Here!
http://fia.fs.fed.us/symposium/

Spring safety tips…

Fact Sheet: Driving in the Rain
Losing control of your car on wet pavement is a frightening experience. Unfortunately, it can happen unless you take preventive measures. This Fact Sheet is available at: www.nsc.org/library/facts/autorain.htm

Fact Sheet: Hurricanes and Coastal Storms
Hurricanes are among the most violent storms people suffer in the U.S. Gulf and Atlantic states. They are news before they happen, while they are happening, and sometimes for years after they happen. This Fact Sheet is available at: www.nsc.org/library/facts/hurrican.htm

Fact Sheet: Lawn and Garden Safety Tips
The U.S. Consumer Product Safety Commission data show that each year about 400,000 people are treated in hospital emergency rooms for injuries from lawn and garden tools. This Fact Sheet is available at: www.cpsc.gov/CPSCPUB/PREREL/PRHTML96/96127.html