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

April 2008 **Volume 3, Number 1**

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A message to our clients...

The previous FIA newsletter covered recommendations from the September 2007 meeting on "Core Variables for the FIA Program" with the SAF-sponsored FIA National Users Group. Just to refresh our memories, the following captures the recommendations from the user group. The three recommendations emerged as ways to focus on core information, save money, and gain efficiency to allow for implementation in all 50 states:

(1) Phase 3 reductions:
- Alternative 1 - Drop Ozone, Soils, Lichens & Crowns
- Alternative 2 - Reduce P3 plots (thin the P3 grid) by 80%

(2) Reduce Wilderness sampling intensity:
- Alternative 1 - Reduce plot intensity by 50%
- Alternative 2 - Cluster plots in Wilderness to reduce access cost

(3) Reduce Phase 2 Annual Costs:
- Alternative 1 - Reduce plot intensity by 10%
- Alternative 2 - Extend cycle length by one year

Recall that I asked for comments on these recommendations, as the final FY 2008 appropriation for FIA was still undecided, and none of these steps had been implemented. Comments regarding impacts to usefulness of the FIA program came immediately. Not surprisingly, none of the recommendations were overly popular, and I had many good letters, in-person meetings, and phone calls from a variety of FIA clients, partners and supporters. As a few examples, EPA communicated that from the Phase 3 samples they are able to address secondary ozone standards. Region 6 in the National Forest System showed how lichen information is used in permitting. Option 3 that proposed reducing the phase 2 intensity was especially unpopular among a great number of partners and users in both the private and public sectors. Fortunately, FIA received a moderate increase in FY 2008 appropriations. This has allowed FIA to maintain current levels of service for this year at least.

In 2008, FIA will be operating annual forest inventories in 47 states, including the initiation of Oklahoma and New Mexico. This leaves Hawaii, Nevada, and Wyoming as the last three states without annual inventories. Last but not least is also the need to initiate

What's going on in the world of research?

Northern Research Station

Woodall, Christopher W.; Monleon, Vicente J. 2008. Sampling protocol, estimation, and analysis procedures for the down woody materials indicator of the FIA program. Gen. Tech. Rep. NRS-22. Newtown Square, PA: U.S. Department of Agriculture Forest Service, Northern Research Station. 68 p.

Woodall, Christopher W.; Perez, Judity A.; Thake, Thomas R. 2007. Forest resources of the Hoosier National Forest, 2005. Resource Bulletin NRS-18. Newtown Square, PA: U.S. Department of Agriculture Forest Service, Northern Research Station. 56 p.

Woodall, C.W.; Liknes, G.C. 2008. Relationships between forest fine and coarse woody debris carbon stocks across latitudinal gradients in the United States as an indicator of climate change effects. Ecological Indicators. 8: 686-690.

Southern Research Station

Bentley, J.W.; Lowe, L. 2007. Kentucky's timber industry—an assessment of timber product output and use, 2005. Resour. Bull. SRS–124. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 32 p.

Bentley, J.W.; Schnabel, D. 2007. Tennessee's timber industry—an assessment of timber product output and use, 2005. Resour. Bull. SRS–126. Asheville, NC: U.S. Department

work in interior Alaska.

Completing the national implementation is becoming paramount as highlighted by this newsletter's section on forest carbon. With increased need to assess the mounting evidence of change in the higher latitudes of the world comes the need to address monitoring the forests of interior Alaska given their vast area and potentially profound effect on carbon storage and flux. In additional to climate change and carbon, FIA's ability to address potential bio-energy supply is quickly becoming a focal topic for clients and users. Send your feedback on these issues to your regional FIA Program Manager and the National Office.

- Greg Reams, National Program Leader

An Update on Forest Service Research and Development, FIA's Forest Carbon Accounting and Research (AKA the Carbon Team)

Rising anthropogenic CO_2 in the atmosphere is now accepted as the cause of climate change. According to estimates based on FIA data, the 635 million acres of managed forests of the United States mitigate this increase by sequestering about 700 teragrams (1 Tg = 1 million metric tons) of CO_2 per year, offsetting about 10% of the gross annual CO_2 emissions in the U.S. Forest carbon estimates based on FIA data have been recognized by the scientific and policy communities as the standard by which all other estimates are judged. They are the basis for (1) the official forest greenhouse gas statistics of the U.S., (2) carbon estimates in the National Report on Sustainable Forests 2003, (3) Heinz Center reports, (4) carbon accumulation values (growth and yield) for the 1605b Voluntary Reporting Program, which are also used by the Chicago Climate Exchange and other registries, and (5) a number of state climate action plans and other reports such as California's recent legislative mandate (Fried and Zhou, PNW-GTR-750).

In October 2007, three employees from the Forest Carbon Dynamics and Estimation for Sustainable Management work unit (NRS-4104) and related FIA scientists were integrated into what is now called "the Carbon Team." Members include Mark Hansen, Elizabeth LaPoint, Michael Nichols, Charles (Hobie) Perry, Ron Piva, Jim Smith, Will McWilliams, Pat Miles, Ty Wilson, and Chris Woodall, with Linda Heath as the current team leader. Our immediate focus is to replicate the current estimation system used for the US forest greenhouse gas inventories (NGHGI), but update it to use FIADB 3.0. Estimates for the US EPA's annual inventory of US greenhouse gas emissions and sinks are due every August, and it looks like this will be working in advance of the deadline. Good practice guidance for NGHGI requires documentation, verification, estimates of uncertainty, with internal and external reviews, methods preferably based on peer-reviewed publications, and a follow-up audit process. All these items contribute to credibility, which as we know is important for highly influential datasets.

Meanwhile, carbon variables are already in demand. A carbon change map will be included in the 2007 RPA resource statistics report (see similar map included below). The 2010 National

of Agriculture Forest Service, Southern Research Station. 31 p.

Bentley, J.W.; Cartwright, W.E.; Hendricks, B. 2008. Alabama's timber industry—an assessment of timber product output and use, 2005. Resour. Bull. SRS–128. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 32 p.

Brandeis, T.J.; Oswalt, S.N. 2007. The status of U.S. Virgin Islands' forests, 2004. Resour. Bull. SRS–122. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 61 p.

Coulston, J.; Randolph, K. C.; Rose, A. K.; Bechtold, W. A. 2008. Geographic surveillance of plot-level forest health indicators. Forest Health Monitoring Workgroup Meeting, San Antonio, TX, Feb. 11th – 14th, 2008 [Published Abstract].

Johnson, T.G.; Becker, C.W. 2007. Virginia's timber industry—an assessment of timber product output and use, 2005. Resour. Bull. SRS–125. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 34 p.

Johnson, T.G.; Mann, M.C. 2007. North Carolina's timber industry—an assessment of timber product output and use, 2005. Resour. Bull. SRS–127. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 33 p.

Rose, A. K. 2008. The status of oak and hickory regeneration in forests of Virginia. In: Jacobs, Douglass F.; Michler, Charles H., eds. Proceedings, 16th Central Hardwood Forest Conference;

Sustainability Report will include a carbon criterion along the guidelines provided by the Criterion and Indicators of the Montreal Process. We are also working with Dave Wear of the Southern Research Station to contribute to a Forest Assessment System for the 2010 RPA that projects carbon into the future.

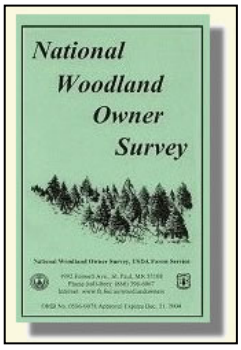
Two P3 indicators fit very well into carbon estimation: soil carbon and down woody material (DWM). Our work with DWM focuses on compiling and vetting the data, developing stratification techniques, and incorporating estimation algorithms into the National Information Management System (NIMS). The soils data are similarly compiled and vetted, but there is more work to be done on stratification and estimation. The 2008 estimates for both DWM and soil carbon will continue to make use of models, but these models will soon be validated with field data. Our goal is to transition to entirely field-based estimates as soon as possible, but one challenge will remain---the scale of the P3 data collection (roughly 1 plot for every 96,000 acres). Techniques are being developed to "fill the gap."

Related research work is being conducted by FIA's National Inventory and Monitoring Applications Center (NIMAC). NIMAC is creating a tool to help develop monitoring plans that result in estimates with sufficient precision for reporting existing carbon stocks and carbon sequestration rates (flux). This research can also be applied to activities such as aggregation of carbon credits among landowners and evaluation of effectiveness of carbon offset projects. Current clients include the Custer National Forest and the Wisconsin DNR.

Our shared goal is for FIA to provide scientifically credible, verifiable, transparent carbon estimates in our public databases, reports, and publications. Many scientists in FIA are working with aspects of carbon estimates, and as we bring together our body of work on carbon, we expect the current "hum" to become a loud "buzz" as the results resonate! Agencies, non-governmental organizations, and businesses are looking at measuring and monitoring carbon across the landscape and many eyes are turning to FIA as the foundation. Working together, we can be ready!

Contact: Linda Heath, lheath@fs.fed.us, (603) 868-7612.

Just released...National Woodland Owner Survey Table Maker!



In March, FIA's National Woodland Owner Survey program launched a new, on-line data access tool: the NWOS Table Maker. This tool allows users to generate custom tables based on the 2002-2006 National Woodland Owner Survey data. Users can select their state(s) of interest, the variable(s) of interest, and apply an optional size of forest holdings filter. There are over 50 variables that can be summarized including landowners' concerns, demographics, forest holding characteristics, future intentions, leasing, forest management

2008 April 8-9; West Lafayette, IN. Gen. Tech. Rep. NRS-P-24. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 70-79.

Rosson, J. F., Jr. 2008. Current forest conditions of older stands of the mixed mesophytic forest region on the Appalachian plateaus province of eastern Kentucky. In: Jacobs, Douglass F.; Michler, Charles H., eds. Proceedings, 16th Central Hardwood Forest Conference; 2008 April 8-9; West Lafayette, IN. Gen. Tech. Rep. NRS-P-24. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 213-222.

Oswalt, S.N.; Oswalt, C.M. 2007. Relationships between common forest metrics and realized impacts of Hurricane Katrina on forest resources in Mississippi. Forest Ecology and Management. 9 p.

Turner, J. A.; Oswalt, C. M.; Chamberlin, J.L.; Conner, R.C.; Johnson, T.G.; Oswalt, S.N; Randolph, K.C. 2008. Kentucky's Forests, 2004. Resour. Bull. SRS–129. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 101 p.

Interior West Research Station

Blackard, J., M. Finco, E. Helmer, G. Holden, M. Hoppus, D. Jacobs, A. Lister, G. G. Moisen, M. Nelson, R. Riemann, B. Ruefenacht, D. Salajanu, D. Weyermann, K. Winterberger, T. Brandeis, R. Czaplewski, R. McRoberts, P. Patterson, and R. Tymcio. 2008. Mapping U.S. forest biomass using nationwide forest

practices, collection of nontimber forest products, owner type, program participation, ownership objectives, and timber harvesting. This tool can be accessed through the NWOS website www.fia.fs.fed.us/nwos, the FIA tools page http://www.fia.fs.fed.us/tools-data/, or by going directly to: http://fiatools.fs.fed.us/NWOS/tablemaker.jsp.

Contact: Brett Butler, bbutler01@fs.fed.us, (413) 545-1387.

Studies in progress…

Study title: Canopy Cover Thresholds for Big Sagebrush in Pinyon-Juniper Woodlands: Using FIA Data to Identify and Quantify Potential Mule Deer Transitional Range
Participants: Chris Witt and Paul Patterson, IW-FIA
Status: In progress
Results: The habitats mule deer utilize for food, cover, and security as they travel from summer to winter ranges can be critical for survival, especially if winter and/or summer ranges have been degraded by anthropogenic activities, fragmentation, inaccessibility due to severe weather, or natural disturbance such as fire. We use Interior FIA data to identify conditions where pinyon-juniper woodlands provide security cover, thermal cover, and suitable amounts of big sagebrush (*Artemisia tridentata* spp.) forage to mule deer. We estimate the number of acres that meet or exceed the assumed minimum canopy cover requirements of pinyon-juniper for security and thermal cover and explore the relationship between sagebrush and pinyon-juniper cover ratios over a range of physical attributes (latitudes, longitudes, elevations, and aspects). The utility of FIA data for analysis at varying scales is demonstrated by exploring these cover relationships at the state, section, and management unit level using Utah as a case study.
Contact: Chris Witt, chriswitt@fs.fed.us

Study title: Analysis of Conifer Mortality in Colorado Using FIA's Annual Forest Inventory
Participants: Michael T. Thompson, IW-FIA
Status: On-going/In review
Results: This study compares two analysis options for analyzing conifer mortality from the annual inventory in Colorado that began in 2002. The first option, the traditional periodic design, ignores the fact that some panels are several years older when compared to periodic inventories. The second option, the independent panel design, considers the fact that the annual inventory is an interpenetrating design. Results are presented for the two methods and statistical procedures for validating the results are discussed.
Contact: Michael T. Thompson, mtthompson@fs.fed.us

Study Title: North American Forest Dynamics (NAFD) Project
Participants: Collaborators from FIA, NASA, University of Maryland, the Pacific Northwest Research Station, Canadian Forest Service, Comisión Nacional Forestal (CONAFOR) in Mexico, and others
Status: On-going, with a project description recently published in: Goward, S. N., J. G. Masek, W. B. Cohen, G. G. Moisen, G. J. Collatz,

inventory data and moderate resolution information. Remote Sensing of Environment 112:1658-1677.

Chopping, M.; Moisen, G.G.; Su, Lihong; Laliberte, A.; Rango, A.; Martonchik, J.V.; Peters, D.P.C. 2008. Large area mapping of southwestern forest crown cover, canopy height, and biomass using the NASA Multiangle Imaging Spectro-Radiometer. Remote Sensing of Environment 112: 2051-2063.

Freeman, E. A., Moisen, G.G. 2008. PresenceAbsence R Library. Journal of Statistical Software, Volume 23, Issue 11.

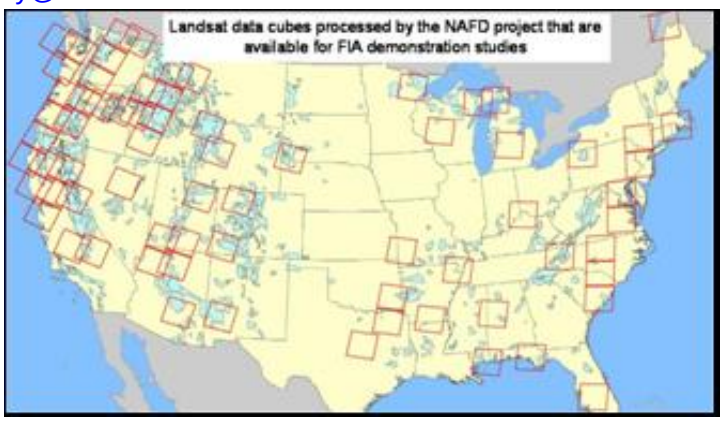
Goward, S. N., J. G. Masek, W. B. Cohen, G. G. Moisen, G. J. Collatz, S. Healey, R. Houghton, C. Huang, R. Kennedy, B. Law, D. Turner, S. Powell, and M. Wulder. 2008. Forest disturbance and North American carbon flux. EOS Transactions 89(11), 11 March, 2008.

Spoelma, Timothy P.; Morgan, Todd A.; Dillon, Thale; Chase, Alfred L.; Keegan, Charles E. III; DeBlander, Larry T. 2008. Montana's Forest Products Industry and Timber Harvest, 2004. Res. Bull. RMRS-RB-8. Fort Collins CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 36 p.

S. Healey, R. Houghton, C. Huang, R. Kennedy, B. Law, D. Turner, S. Powell, and M. Wulder. 2008. Forest disturbance and North American carbon flux. EOS Transactions 89(11), 11 March, 2008.

Results: April 1 - 3, the Interior West FIA unit hosted the "Phase 2 Kick-off Meeting" for the North American Forest Dynamics Project (NAFD). Funded under the North American Carbon Program, this multi-faceted project involves numerous collabotators. NAFD will result in the development of nationwide estimates of forest disturbance and regrowth over the last 30 years using FIA plot data and a time series of Landsat images. Models will extend this information to nationwide maps of forest dynamics over the U.S. Collaborative work with Canada and Mexico is underway to derive estimates over all of North America to provide historic carbon information at the continental scale. The use of historic stacks of Landsat imagery is also being extended to numerous applications of interest to the FIA community.

Contact: Gretchen Moisen, gmoisen@fs.fed.us and Sean Healey, seanhealey@fs.fed.us



Study Title: To provide basic facts about the extent, inventory, and ownership of the cypress resource in the Southern United States.

Participants: John Greis and Mark Brown, SRS-FIA

Status: Nearing completion

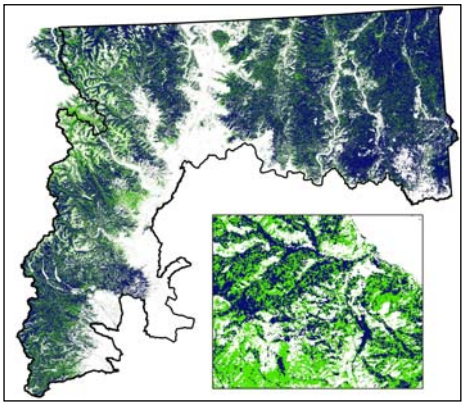
Results: Based upon the latest FIA information, cypress forest types comprised more than 3.3 million acres, or 1.7 percent, of the timberland in the 13 Southern States (AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, and VA). About 2.6 million acres of the cypress forest types were privately owned and accounted for 1.5% of the total privately owned timberland in the South. About 754 thousand acres of the cypress forest types were publicly owned and accounted for 3.0% of the total publicly owned timberland in the South. The all live volume in individual cypress trees across these Southern States totaled 7.4 billion ft^3 or 2.3% of the all live volume of all tree species in the South. Nearly 5.6 billion ft^3 of the cypress volume was privately owned or 2.1% of total privately owned live volume for all tree species in the South. More than 1.8 billion ft^3 of the cypress volume was publicly owned or 3.4% of total publicly owned live volume for all tree species in the South. FL and LA contain the vast share of both acreage and volume of cypress. Any changes in these States will affect southern US totals. Regional and State level totals indicate relative stability of the resource, but can mask countervailing trends at the sub-regional or sub-state level.

Contact: John Greis, jgreis@fs.fed.us and Mark Brown, mbrown03@fs.fed.us

Photo by
Terry Spivey
USFS

Courtesy of
www.scarysquirrel.org

Study Title: Regional patterns of forest wildlife habitat: scaling from plots to landscapes
Participants: Andrew Gray, PNW-FIA; Brenda McComb, University of Massachusetts; Stephanie Hart, Oregon State University; Janet Ohmann, PNW-ECOP
Status: On-going
Results: Applied a recent synthesis of wildlife-habitat-relationships for Oregon and Washington to FIA plot data by calculating habitat types, stand structural conditions, and the abundance and proximity of key habitat elements for 328 vertebrate species. Predictions of available breeding habitat worked best for species with well-defined forest habitat needs (e.g., canopy cover, snag size, down wood abundance, tree species preferences). Predictions were less reliable for poorly-defined habitat types (primarily riparian zones) and species requiring elements not in the FIA data (e.g., talus, soft banks). Species-plot associations are being imputed across the landscape with GNN mapping and filtered using species' home range sizes and other spatial preferences (e.g. proximity to water). Spatial and non-spatial analyses will be compared to evaluate and refine the most reliable estimates. Final product will be consistently-applied predictions of habitat availability across the region that can be reassessed with newly measured or modeled data.



Contact: Andrew Gray, agray01@fs.fed.us

Study Title: Current forest conditions from paneled inventory data: using plot-level imputation in the Pacific Northwest
Participant: Oregon State University and PNW-FIA
Status: Final year of project
Results: In the western United States, one-tenth of inventory plots (a "panel") are measured each year. For estimating current status, the default "moving average" combines the last 10 panels; this can result in bias when there are trends in forest conditions over time. However, using only the latest panel can be imprecise because of the relatively small number of plots. In this study, we looked at a third alternative: combining climate data, Thematic Mapper satellite information, and field information using a variety of imputation methods to improve the ability to provide current estimates. For our case study area of national forests in Oregon and Washington, imputation methods outperformed both the moving average and estimates from only the latest panel.
Contact: Tara Barrett, tbarrett@fs.fed.us

Study Title: Estimating tree-height via LiDAR in mesic, closed-canopy forests of the Pacific Northwest
Participants: PNW-FIA Environmental Analysis and Research team and the Oregon Dept. of Forestry.
Status: Forty-five, fixed-radius, FIA-style inventory plots were installed using survey-grade tools to pinpoint locations and measure attributes of trees, in a portion of the Yaquina watershed in Oregon's

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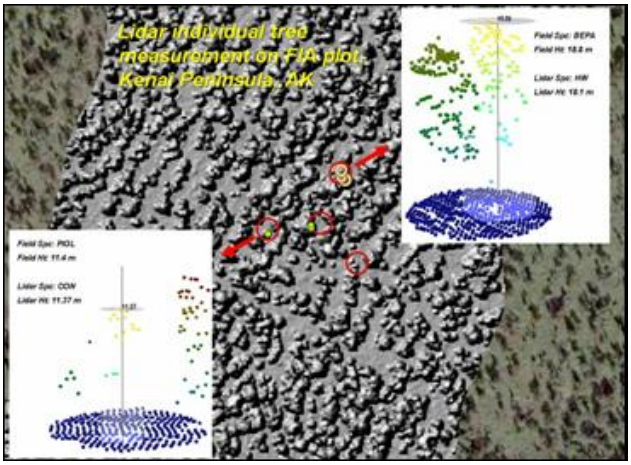
Coast Range in which leaf-on and leaf-off LIDAR and multi-spectral imagery has been acquired. Analysis is concluding as we enter the 4th year of this 4-year project.

Results: Accurate tree-height estimation depends on the accuracy of the LiDAR representations of both the tree top (which was generally less than 0.5 m, in the Z-dimension, below calibrated values) and the tree base. In dense-canopied forest, particularly in steep terrain, LiDAR representations of tree bases were often problematic (biased high) due to misrepresentation of the ground (in the Z-dimension). Even where ground representation was adequate, heights estimated for trees with even small lean angles on steep slopes had substantial and unpredictable errors due to violation of the implicit assumption that tree bases lie directly below LiDAR detected tree tops.

Contact: Demetrios Gatziolis, dgatziolis@fs.fed.us



Study Title: Using airborne laser scanning and advanced geopositioning technologies as tools in the Alaska resource inventory

Participants: University of Washington and PNW-FIA

Status: Final year of project

Results: The utility of airborne laser scanning (lidar) as a forest measurement tool has been well-established in recent years. Lidar can be used to accurately measure individual overstory tree heights, canopy cover, vertical forest structure, and in some conditions can also be used to determine stem density, mortality and species class (deciduous vs. conifer). The use of high-resolution lidar in combination with accurately georeferenced field plot data could therefore significantly increase the efficiency of the inventory, especially in extensive, remote areas within Alaska where it is very expensive and logistically difficult to establish field plots. In this study, we are investigating: 1) how the use of more sophisticated geopositioning technology can improve the accuracy of FIA plot locations, and 2) how lidar might be used as a tool in the operational inventory program in Alaska, using continuous, N-S strip samples of lidar data collected over 120 field plots on the Kenai Peninsula of Alaska. Results indicate that 1) survey-grade GPS receivers can be used to consistently obtain plot positions with submeter error in coastal and interior Alaska, and 2) lidar strip samples can provide relatively accurate estimates of biomass over the western lowlands of the Kenai, and could be effectively used within a model-assisted sampling design to improve estimates of several important inventory variables (biomass, volume, etc.) in remote areas of Alaska.

Contact: Hans Andersen, handersen@fs.fed.us

Climate Change, Fire, and Other Hot Topics

FIA Symposium 2008
Abstracts are due May 30, 2008
Send abstracts and queries to: Will McWilliams,
wmcwilliams@fs.fed.us

Forest Service Safety Website

Please click on the following link for the Forest Service safety website. It contains lots of safety information, as well as the links to other good safety websites.
http://www.fs.fed.us/safety/

Upcoming events…

Event	Location	Date
PNW-FIA Client Meeting	Residence Inn Anchorage Midtown, Anchorage, AK (907) 563-9844	April 29, 2008
PNW-FIA Client Meeting	Wildland Fire Training and Conference Center, McClellan, CA	May 13, 2008
FIA Science Symposium	The Canyons Grand Summit Hotel, Park City, UT (866) 604-4171 www.fia.fs.fed.us/symposium/default.asp	October 21-23, 2008

Safety at work…

"Acceptable Multitasking?" – Devon Donahue, PNW-IW

A day does not go by without hearing something regarding the risks associated with driving and cell phone use. It seems like reports come out weekly indicating that driver distraction is a major cause of traffic accidents and that mobile telephones are often the culprit. Everything we do tends to subject to our obsession with multitasking. Just last week I was making dinner and talking on my cell phone-speaker phone of course because that is "safer". I found myself putting things in the wrong places more than once. I was so distracted that I even put something in the refrigerator that I intended to put in the dishwasher.

Unfortunately, our cell phones are not the only things holding our attention captive. We use our ipods while running, skiing, hiking etc. Some of us even use them in the office. A recent study observed the pedestrian behavior of mobile phone users, ipod users, and pedestrians with neither at three crosswalks. The electronics users crossed unsafely into oncoming traffic significantly more than the last group. For pedestrians as with drivers, cognitive distraction from mobile phone use reduces situation awareness, increases unsafe behavior, putting pedestrians at greater risk for accidents, and crime victimization (*Accident Analysis & Prevention*, 40:1, Jan. 2008, Pg 69-75).

Acceptable multitasking? Are you pushing it too far?

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