A message to our clients...

The FIA program is a federal and state delivered partnership. Forty nine out of fifty states have fresh and up date to forest data and information available on-line at fia.fs.fed.us. Hawaii and interior Alaska stand as challenges for maintaining current forest resource information.

The last two fiscal years have been challenging due to fiscal austerity measures. As illustrated in the following table the FIA program operated at $7 million (M) less in FY2013 compared to FY2010 and FY2011. This has stretched our ability to fully implement our recent state agreements and has compromised the ability to deliver a 5-year cycle in the eastern U.S. for those states that choose to “buy-down”. At an effective funding level of $64.5M in FY2013, discussions over the past 9 months have focused on moving to a 10-year funded federal base with the ability for participating states to “buy down” to a 7-8 year re-measurement rate. This honors the National FIA user group recommendations to implement “panel creep” that results in a longer plot re-measurement cycle, rather than drop plots or discontinue the survey in any state.

The recently released House language for FY2014 would restore the FIA appropriations to the 2010 level at $71.8M. At that level FIA and participating states can restore the measurement cycle to 5 years by the end of 2014 for those states that choose to “buy-down”. Even at this funding level, the ability to deliver a complete FIA program – basegrid forest inventory information, total carbon/biomass amounts, National Woodland Owner survey, National Timber Products Output assessments, and selected ecosystem indicator measurements – is challenged.

In the interim, we need to consider the effects of the continuing resolution for an unspecified period in FY2014. This will affect the trajectory of how quickly we can fully restore the desired 5 year re-measurement. We look forward to a quick remedy and restoration of the 5 year cycle that recognizes partner support and cooperation.
What's going on in the world of research?

Northern Research Station


Westfall, J.A.; Woodall, C.W.; Hatfield, M.A. 2013. A statistical power analysis of woody carbon flux from forest inventory data. Climatic Change Vol.18 (3-4) 118:919-931 DOI: 10.1007/s10584-012-0686-z

Southern Research Station

Figure 1: Appropriated Federal funds and target funding for the FIA Base Program. The target for full funding contains no cost of living adjustment since 2006. Assuming a 1.25% adjustment puts full implementation of FIA at $82M.

- Greg Reams, National Program Leader

Studies in progress...

Northern Research Station
Study Title: Estimating forest floor carbon content in the United States
Participants: Charles H. Perry, Grant M. Domke, Barry (Ty) Wilson, and Christopher W. Woodall
Status: In Progress
Results: The current method of reporting for C stocks to international parties includes mathematical models of forest floor and mineral soil C. Forest type maps are combined with STATSGO soil survey data to generate soil C storage by forest types, but STATSGO possesses known shortcomings, particularly with respect to forest C estimation. STATSGO data are based largely on agricultural soils, so the data consistently underestimate C storage in forest floors. Here we are combining forest floor measurements with other forest inventory observations to impute forest floor C storage across the United States using nonparametric k-nearest neighbor techniques; resampling methods were used to generate estimates of uncertainty. Other predictors of forest floor formation (e.g., climate, topography, and landscape position) will be used to impute these values to satellite pixels for mapping. The end result
### What's going on in the world of research?

**Southern Research Station**


**Interior West Research Station**


### Results

**Contact:** Hobie Perry, charleshperry@fs.fed.us; (651) 649-5191

**Study Title:** A Novel Approach to Mapping and Quantifying Age Classes of Forest Habitat to Support American Woodcock (*Scolopax minor*) Management in the Upper Great Lakes

**Participants:** Brian Tavernia, Mark D. Nelson, Charles H. Perry, and Francisco Aguilar

**Status:** In Progress

**Results:** This study has produced a novel geospatial dataset representing the area and configuration of early successional forest habitat in 5-year increments across the Upper Great Lakes region. This dataset is the result of using a vegetation change tracker (VCTw) algorithm to detect and date incidence of forest disturbance in a Landsat time series stack. Validation is now underway and will involve (1) comparing VCTw area estimates for age classes to estimates from Forest Inventory and Analysis (FIA) data over various analysis units and (2) comparing site-specific forest age class assignments from VCTw patches to plot-based FIA observations of forest age class. The dataset is being used to create habitat models relating the abundance of regional birds of conservation concern to the area and configuration of young forest age classes.

**Contact:** Mark Nelson, mdnelson@fs.fed.us; (651) 649-5104

**Study Title:** Exploring options for the estimation of forest carbon stocks from 1990 to the present using the national forest inventory of the United States

**Participants:** Grant M. Domke, Christopher W. Woodall, Ronald E. McRoberts, Brian F. Walters

**Status:** In progress

**Results:** The procedural transition from periodic to annual inventories in the Forest Inventory and Analysis (FIA) program has led to differences in estimates of forest carbon stocks and stock change over the Intergovernmental Panel on Climate Change monitoring period (1990-present). As an initial step – Phase I – towards rectifying the differences we examined several strategies to compensate for missing observations using the most recent annual inventory data from the Lake States region of the US. The results suggest that most estimates obtained from the compensation approaches were within one standard error of the mean estimates of live tree carbon calculated using observations for all plots. However, some approaches were computationally more efficient than others yielding similar estimates. In Phase II of the study we will be evaluating compensation approaches to update forest carbon estimates throughout the periodic inventories using plots measured previously in the periodic inventories. The precision and uncertainty of annual estimates throughout the periodic inventories will be evaluated for each updating approach and forest carbon stocks and stock changes obtained using current methods will be compared with estimates obtained from approaches proposed in the study.

**Contact:** Grant M. Domke, gmdomke@fs.fed.us; (651) 649-5138
**What's going on in the world of research?**

**Interior West Research Station**


**Pacific Northwest Research Station**

Geiser, Linda H.; Jovan, Sarah E.; Glavich, Doug A. [and others]. 2010. Lichen-based critical loads for atmospheric nitrogen deposition in Western Oregon and Washington forests, USA. Environmental Pollution. 158: 2412-2421


**Southern Research Station**

**Study Title:** Fusiform rust incidence in the southern United States  
**Participants:** KaDonna Randolph (SRS-FIA), Ellis Cowling (NC State Univ.), Dale Starkey (USDA FS Region 8 Forest Health Protection), Tom Byrum (TX A&M Forest Service), John Davis (Univ. of FL), Steve McKeand (NC State Univ.), Dana Nelson (USDA FS SRS Southern Institute of Forest Genetics)  
**Status:** In progress

**Results:** Fusiform rust is the most devastating disease among southern pines, particularly loblolly and slash, in the United States. A 1997 report by the Forest Service detailed the extent of fusiform rust incidence in the southern U.S. based on data collected by FIA from the 1970s through the early 1990s. At that time, there was an estimated 13.4 million acres in the South with > 10% of the slash and/or loblolly pines infected with fusiform rust. Over the last 40 years, rust-resistant planting stock has been developed and deployed throughout the South. This research will use current Southern FIA data to update estimates of fusiform rust incidence in an effort to evaluate the effect of such tree improvement efforts.  
**Contact:** KaDonna Randolph, krandolph@fs.fed.us, (865) 862-2024

**Study title:** Statistical advances for inventory and monitoring  
**Participants:** Francis A. Roesch (SRS-FIA), Paul Van Deusen (National Council for Air and Stream Improvement)  
**Status:** Wrapping up

**Results:** How you look at data can serve to expand or limit the knowledge that you can glean from it. The depiction of the sampled population and sampling frame in the FIA Program’s monitoring efforts as three-dimensional cubes, with time as the third dimension, has led to a diversity of new and insightful analysis techniques. Scientists in the USDA FS FIA Program, their partners at the National Council for Air and Stream Improvement, and end-users of FIA data are concerned with evaluating changes in the nation’s forests. Sampling schemes for inventories of this scale have historically been areal-based. For monitoring, the view is often of an area sample selected at fixed points in time, and change is determined by estimating differences between successive areal samples. This two-dimensional model ignores variation in the time of observation for an individual sample as well as variation in remeasurement period lengths between individual plots. For example, an average annual value would be calculated for each remeasured plot, and the values for all plots would be combined, regardless of the distribution of individual temporal interval lengths. The impact of ignoring time increases as the length of time for a single sample increases, the time between successive samples decreases, and the diversity of measurement interval lengths increases. This research is developing ways to improve statistical inferences through the adoption of a three-dimensional sampling paradigm, with time as the third dimension. This maximizes what FIA data can tell us about the forests and how they are changing.  
**Contact:** Francis A. Roesch, froesch@fs.fed.us, (828) 257-4871

**Study title:** Tree planting in the United States reporting reinstated  
**Participants:** George Hernández (USDA FS, Region 8 S&PF Regional Regeneration Specialist), Richard Harper (SRS-FIA), Ronald Overton (USDA FS, Northeastern Area S&PF Area Regeneration Specialist),
What’s going on in the world of research?

Pacific Northwest Research Station
Schulz, B.K.; Gray, A.N. 2013. The new flora of northeastern USA: quantifying introduced plant species occupancy in forest ecosystems. Environmental Monitoring and Assessment 185, 3931-3957.


Scott Enebak (Auburn University), Justin Arseneault (Purdue University), Michelle Bryntesen (University of Idaho), 220 forest tree nursery operators throughout the U.S.

Status: In press

Results: Reliable tree planting data are critical for informed decisions regarding forest sustainability and future wood supply. Such data help nurseries plan for production needs, and provide policy makers with information regarding realistic forest conditions and future impacts. After 12 years of limited reporting and confusion, a nationwide survey of commercial tree planting has been reinstated for annual reporting. Led by the USDA, Forest Service’s Forest Inventory and Analysis and State and Private Forestry programs, a survey questionnaire was distributed to tree nurseries by cooperators at Auburn University, Purdue University, and the University of Idaho. Collaboration with nursery managers and assurance of confidentiality resulted in the collection of >95 percent of the production from initial and follow-up contacts of more than 220 commercial tree nurseries across the U.S. and Canada during the 2011-2012 planting season. Results indicate that 75 percent of tree planting occurred in the South, 19 percent in the Pacific West, 5 percent in the North, and 1 percent in the Rocky Mountain region (Figure 1). Data gaps from 2000 to 2012 were determined for the South and showed the recent low was in 2010 with a 15 percent rebound by 2012 with 1.7 million acres planted (Figure 2). These data help the forestry community, researchers, and policy makers assess and maintain sustainability of the working forests, where in the South, planted stands supply 39 percent of total removals from just 23 percent of the forested acres.

Contact: Richard Harper, raharper@fs.fed.us, (864) 656-5153

Figure 2: Acres and percent of tree planting by region and sub-region in the U.S., 2012.
Figure 3: Tree planting in the South, 1928–2012.

**Interior West Research Station**

**Study Title:** Colorado wildfires: Small area estimation of forest attributes within fire boundaries.

**Participants:** Tracey S. Frescino, Gretchen G. Moisen, Kristen K. Adachi, and Jay Breidt

**Status:** On-going

**Results:** Colorado was just struck by the most destructive wildfire in its history. While the fire season continues and media attention is still on this topic, we’d like to be able to produce estimates of forest resources affected in a timely matter. This past June, the West Fork Complex fire, on the San Juan and Rio Grande National Forests near Pagosa Springs, Colorado grew to over 109,000 acres in size. In the summer of 2012, two major fires were reported in Colorado: The Waldo Canyon fire near Colorado Springs and the High Park Fire, just 15 miles west of Ft Collins. These fires were estimated at over 18,000 and 87,000 acres, respectively (www.inciweb.org). Although the majority of fires are significantly smaller in size, data are showing that, on average, wildfires are burning twice as much land each year as they did 40 years ago, with twice as many fires reaching over 1,000 acres in size each year (Climate Central 2012). The rise of summer and spring temperatures along with a decrease in winter snowpack have strongly contributed to the changes in wildfire risk in the West, and with a continued change in climate, the increased risk may be even higher.

The sampling design of the Forest Inventory and Analysis (FIA) program consists of a network of sampling locations systematically established at an intensity of approximately 6,000 acres. This means a fire approximately 18,000 acres in size would have about three FIA sample plots within its perimeter, likewise a fire of size 90,000 would have about fifteen FIA plots. Because the FIA inventory was designed for analyses over broad geographic areas, new techniques are needed for constructing meaningful estimates of forest attributes within smaller areas.

Small area estimation methods were recently developed (and applied to previous wildfires in CO) by Kristen Adachi under the direction of Jay Breidt at Colorado State University (Adachi 2013). Work is underway in the Interior-West to quickly assimilate these methods into an automated R-based programming environment,
FIESTA, to produce estimates of forest resources affected by a specified fire perimeter. This small-area estimation approach uses a modified composite estimator (Rao, 2003), which is a weighted average of two estimators; a synthetic estimator built from model-based predictions and a direct estimator built from the FIA plot data that fall within the small area (Adachi 2013). The synthetic estimator is generated from FIA sample data and LANDSAT geo-spatial layers (www.landfire.gov) that fall within a larger area encompassing the small area, delineated by the USDA Forest Service EcoMap Subsections (McNab et al. 2005).

Generating timely estimates within fire perimeters is important for land managers to quickly determine the impact of fires on our nation's forests. Our tool will provide an opportunity for a rapid assessment of the amount of forest resources affected by a fire, while allowing for future analyses with more detailed burn severity data.

Adachi, Kristen K. 2013. Composite estimation for small areas that do not partition the universe with application to forest attributes on fire areas. Master's Project. Department of Statistics, Colorado State University, Fort Collins, Colorado.


Contact: Tracey S. Frescino, tfrescino@fs.fed.us, (801) 625-5402

Figure 4: Photo provided by the U.S. Forest Service taken on May 10, 2013, showing a forest burned by the High Park Fire (AP Photo/U.S. Forest Service, found on news.yahoo.com).
Figure 5: Photo taken by the Pike Interagency Hotshot Crew, found on cnn.com, showing the West Fork Fire Complex made up of the West Fork Fire and Windy Pass Fire, burning 15 miles north of Pagosa Springs, Colorado, on Thursday, June 20.

Study Title: Compensating for nonresponse in the New Mexico Inventory
Participants: Sara Goeking and Paul Patterson
Status: In Progress
Results: From 2008-2011 in New Mexico nine of ten panels (nearly 12,000 plots) were sampled under an accelerated inventory. Due to a number of factors, there is a large amount of nonresponse in New Mexico (slightly more than 1,000 plots), where nonresponse can occur due to denial of access, logistical constraints, or hazardous conditions (figure 1). Traditionally FIA uses post-stratified estimation for variance reduction and assumes that nonresponse occurs at random within each stratum. If nonresponse does not occur at random, then estimates may be biased. There are two potential stratification criteria for addressing nonrandom nonresponse by creating strata where the assumption of random nonresponse is reasonable. The first is ownership class; denied access is higher among private owners. The second is the FIA pre-field designation, where each plot is classified as either an “office plot” or a “field plot” using high-resolution photos in conjunction with old field notes. The office plots are designated as non-forested and have a zero percent probability of nonresponse, while for most field plots the probability of nonresponse is greater than zero. In the case that all plots are either entirely forested or entirely nonforested the bias due to nonresponse can be quantified. To attempt to compensate for nonresponse, a stratification key was developed using ownership and, when necessary, pre-field designation. In New Mexico, the traditional FIA stratification produced an estimated forest land area that was over one million acres less than the stratification that compensates for nonresponse. Figure 2 shows the difference in estimates of forestland by owner group, based on traditional stratification versus stratification to address nonresponse. One unexpected consequence of accounting for high nonresponse is that strata with very low levels of nonresponse, e.g., those with a majority of plots on National Forest lands, were assigned disproportionately high weights under the traditional stratification. Thus failure to address high nonresponse may lead to
underestimation of forest attributes statewide, as well as overestimation of those attributes for specific domains with low nonresponse. Investigation of the impact of stratifying to compensate for nonresponse on tree level attributes is ongoing.

The estimated variance does not specifically account for the additional variability introduced by nonresponse. An estimated variance which does take the additional variability into account has been derived, and initial results show only a slight increase in the estimated variance.

Contact: Sara Goeking, sgoeking@fs.fed.us, 801-625-5193

Figure 6: Map showing the amount and distribution of forested, nonforested, and not sampled (nonresponse) plots in 9 of 10 panels of New Mexico’s forest inventory.
Study Title: Dendroecological Studies in the Interior West States
Participants: Justin DeRose, John D. Shaw, various partners
Status: Ongoing

Results: In 2009, the Interior West FIA program started a project to inventory and archive approximately 11,000 increment cores collected in most of the Interior West states during the periodic inventories of the 1980s and 1990s. About 90% of the cores found in storage were salvageable (i.e., complete, with verifiable plot and species data attached). The IW-FIA program contracted with the dendroecology lab at Utah State University (USU) to process all salvageable samples to current dendrochronological standards and produce the tree ring data in digital format. There were two primary goals for use of the resulting data: 1) to provide a plot-linked database of radial growth that could be used for growth model development, model validation, and other biometric analyses, and 2) to develop a gridded dendroecological database that could be used to analyze regional patterns of climate, disturbance, and other ecosystem-scale processes. While goal (1) can be accomplished using well-known, traditional modeling methods, goal (2) is more exploratory in nature and requires novel analysis methods. In addition, the analyses anticipated for goal (2) would also require extensive cross-dating of core dates and development of ancillary data.

In the first exploratory study, we analyzed Douglas fir and pinyon pine chronologies as potential climate proxies. When compared to the spatial distribution of traditional tree-ring chronologies, the FIA-based tree-ring dataset has unparalleled spatial density for use as a climate proxy. This study delivered several promising results. First, temporal coherence between the FIA data and previously published tree-ring chronologies was found to be significant. Second, spatial and temporal coherence between the FIA data and water year precipitation was strong. Third, the FIA data captured the El Nino-Southern Oscillation (ENSO) dipole and revealed considerable latitudinal fluctuation over the past three centuries. Finally, the FIA data confirmed the quadrature-phase coupling between wet/dry cycles and Pacific decadal variability known to exist for the
Intermountain West. The results highlight the possibility of further developing high-spatial-resolution climate proxy datasets for the western United States. Results of this study can be found in DeRose et al. (2012; http://www.treesearch.fs.fed.us/pubs/42679) and DeRose et al. (2013; http://www.treesearch.fs.fed.us/pubs/43201).

The project is entering a new phase, which includes the addition of tree-ring measurement capabilities at the Ogden Forestry Sciences Lab. This capability allows more flexibility and complements the capability of the USU lab. In addition to supporting the main IW-FIA archiving project, we have provided support to forest growth modelers at the Texas Forest Service and the University of Alaska, and climate, geography, and hydrology scientists at Utah State University and the University of Utah. In addition to expansion of lab capabilities, FIA crews have started to collect new cores in areas that were not covered or were sparsely sampled during the periodic inventories. Over 1500 new cores have been collected in Nevada and Wyoming so far, and supplemental sampling will begin in Colorado and Idaho during the 2014 field season. After complete coverage of the Interior West has been achieved, a further goal of the project is to partner with the other FIA programs in order to expand database development to all states. One example of a potential cross-region analysis could come from addition of the Pacific Coast states, which would permit mapping and analysis of ENSO climate patterns from Pacific Coast to the edge of the Great Plains. Such a comprehensive analysis could help explain regional patterns of forest establishment and growth, insect outbreaks, and wildland fire.

Contact: John Shaw, jdshaw@fs.fed.us; 801-598-5902

Pacific Northwest Research Station
Study Title: A Joint USFS-NASA Pilot Project to Estimate Forest Carbon Stocks in Interior Alaska by Integrating Field, Airborne and Satellite Data
Participants: Ross Nelson (NASA-GSFC), Hans Andersen (PNWRS), Bruce Cook (NASA-GSFC), Andrew Finley (Michigan State Univ.), Doug Morton (NASA-GSFC), Robert Pattison (PNWRS)
Status: In progress
Results: Monitoring U.S. forest carbon stocks is critical for natural resource management and national greenhouse gas reporting activities. The USFS Forest Inventory and Analysis (FIA) program—the largest network of permanent forest inventory plots in the world—covers most U.S. forestlands. However, more than 450,000 km² of forests in interior Alaska (~15% of U.S. forestland) are not included in the FIA program, as these remote regions are difficult and expensive to monitor with standard field methods. Recent and projected future impacts from climate change on forest carbon stocks, composition, and extent have elevated the need to develop new approaches for forest monitoring in Alaska. In particular, airborne remote sensing offers unique advantages for monitoring remote forested regions. The proposed research leverages a sizable investment by the USFS FIA Program in 2014 for new forest inventory plots and airborne data collection with Goddard's LiDAR, Hyperspectral, and Thermal Airborne Imager (G-LiHT; http://gliht.gsfc.nasa.gov). In this project, we will expand the Tanana research activity to 1) collaborate on the experimental design for optimal integration of field and LiDAR data for forest
carbon monitoring; 2) compare several sampling methods for estimating forest carbon stocks using both plot and LiDAR information; 3) enhance the inventory activity using vegetation measurements obtained from the combination of G-LiHT hyperspectral, thermal, and LiDAR sensors; and 4) characterize the impacts of recent fires and risk of future fire-driven carbon losses using the systematic sample of G-LiHT flight lines over ~2.5% of the Tanana region (3800 km²); and 5) develop new, spatially explicit estimates of carbon stocks and uncertainties. The main outcomes from this work will be estimates of forest carbon stocks and associated uncertainties for the Tanana Inventory Unit.

Contact: Hans Andersen, handersen@fs.fed.us, 206-221-9034

Study title: Forest wildfire effects on coarse woody detritus in the Pacific coast states.

Participants: Bianca N.I. Eskelson (Ore. State U.), Vicente J. Monleon, David L. Azuma

Status: In progress

Results: Coarse woody detritus (CWD) represents a large carbon pool in the PNW forests. The impact of wildfire on CWD is controversial, with many studies assuming that most of the carbon stored in CWD remains unconsumed by wildfires. However, the information is often based on a very small sample size of individual fires or professional opinion. We examine the impact of wildfire on CWD at a regional scale, using the Phase 2 FIA data for California, Oregon and Washington, and the Current Vegetation Survey for National Forest Service land in Oregon and Washington. FIA plots that were burned within five years prior to plot measurement were spatially matched with unburned plots, resulting in 441 pairs of plots. The CVS data provided repeated measurements for 8,312 plots, of which 165 had burned between remeasurements. Both analyses showed a significant decrease in CWD biomass in burned areas. From the FIA dataset, we estimated the median CWD biomass on unburned plots was 2.11 times greater than the median biomass on burned plots. From the CVS dataset, we estimated a significant increase in CWD biomass of 2.1 Mg/ha on unburned plots, and a significant decrease of 12.8 Mg/ha in burned plots. While CWD combustion increased with fire severity, neither study showed a statistically significant difference among burn severity classes. Our estimates of combustion factors (proportion of CWD biomass consumed in the fire) for low, moderate and high severity fires were 0.23, 0.28 and 0.31 based on the FIA data, and 0.30, 0.32 and 0.47 based on the CVS data, values much higher than those reported in the literature.

Contact: Vicente Monleon, vjmonleon@fs.fed.us; (541) 750-7299
Figure 8: Estimated CWD biomass by burn severity (BSC, 1 low, 2 moderate, 3 high) and piece decay class (DC, 1 sound, 2 sound heartwood, 3 rotten).

**Study Title:** An Historically Consistent and Broadly Applicable MRV System Based on Lidar Sampling and Landsat Time-series (Tested in the U.S. and applied to the U.S. NGHGI reporting system)

**Participants:** Warren Cohen (PNWRS), Hans Andersen (PNWRS), Sean Healey (RMRS), Gretchen Moisen (RMRS), Todd Schroeder (RMRS), Christopher Woodall (NRS), Grant Domke (NRS), Zhiqiang Yang (Oregon State Univ.), Stephen Stehman (SUNY-ESF)

**Status:** In progress

**Results:** The objective of this study is the development of a Monitoring, Reporting, and Verification (MRV) accounting system that could be used by developing countries within the context of the United Nations (UN) REDD Programme. We consider different biomass estimation frameworks and different components for inclusion in the system, including design-based and model-based inference. Sampling with lidar strips, supported by a smaller set of plots may be an attractive alternative that is highly relevant to many REDD countries, as is the use of Landsat for disturbance monitoring. We will also develop and test estimators that rely primarily on Landsat data within a model-based inference framework. The U.S. while not a REDD country, is a party to the UNFCCC and has a need for similar NGHGI baseline information. The various components of our MRV system will be tested in the U.S. where the best data are available for parsing the uncertainty contributions of the several system components we will test. In doing so, we will develop and test a biomass estimation approach that, if implemented, would provide REDD countries a practical set of workflows for integrated monitoring of current and historic baseline carbon stocks and trends, with an understanding of the uncertainties associated with different components of the alternative workflows. Additionally, with the improvements expected from including Landsat-derived disturbance
history into the methods used for the U.S. NGHGI, this research would provide NASA and Carbon Monitoring System (CMS) with a collaborative role in the process of reporting U.S. forest carbon estimates to the UNFCCC.

**Contact:** Warren Cohen, wcohen@fs.fed.us, 541-750-7322

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**Outcomes from recently held meetings...**

**Southern Research Station**  
**Vietnam Agency Officials visit Forest Inventory and Analysis**  
Ten agency officials from the Vietnam Administration of Forests (VNFOREST), Forest Protection Department, and Forest Inventory and Planning Institute (FIPI) visited the Southern Research Station’s Forest Inventory and Analysis (FIA) unit in Knoxville, Tennessee and USDA FS offices in Washington, D.C., April 29 to May 5. The officials wanted to understand how U.S. national forest inventory objectives are based on resource management information needs, and how this information needs guide inventory design, data collection, information processing, and results dissemination. They also wanted to see how data flows through forest inventory systems, learn about the legislative foundations, funding mechanisms and administrative organization of the U.S. national forest inventory, and discuss how the information gathered is disseminated to stakeholders. The trip included a visit to the University of Tennessee Arboretum for a field plot demonstration. The tour continued in Washington, D.C. with meetings with the National FIA Washington Office staff. The Study Tour concluded with a meeting with USDA FS Chief Thomas Tidwell and the signing of a Letter of Intent between USDA FS and VNFOREST for further cooperation on forestry issues.

**Northern Research Station**  
**A North American Forest Biomass and Disturbance Mapping Workshop held in August at the Northern Research Station headquarters in Newtown Square, PA.** The workshop was organized by Rich Birdsey, in coordination with SilvaCarbon and other cooperating programs across North America. Participants included representatives from institutions in Canada, Mexico, and the United States. The objectives of the meeting were to further the development of practical and harmonized methods for mapping forest biomass, disturbances, causes of disturbances, and forest age with the purpose of supporting modeling and analysis for climate change adaptation and carbon management. Several presentations from all three countries were given describing methods that generally involve a combination of remote sensing imagery and national forest inventories using a variety of statistical techniques. The main outcomes of the workshop include plans for the development of coordinated North American forest biomass and stand age maps, as well as follow-up workshops on the use of Landsat scene stacks for the attribution of forest disturbance and nearest neighbor imputation mapping.
Employee Profile

Interior West Research Station

Charles (Chuck) Liff
National Information Management Coordinator

Charles (Chuck) Liff passed away on May 26, 2013, from pancreatic cancer at the age of 60. Chuck served as the National Forest Inventory and Analysis Program (FIA) Information Resource Management Coordinator, beginning in 2002 until his retirement in April 2013.

Chuck received his B.S. degree from Cornell University and also studied at the University of Georgia. He worked for a number of years in environmental health, focusing on air and water chemistry.

Chuck began his association with FIA in the early 1990s while he was a contractor for Environmental Protection Agency (EPA) during the early stages of the Forest Health Monitoring program. He lead the development of the P3 data collection system he called The Most Excellent Software System (aka The MESS), also developing many friendships within FIA. He was hired by the Rocky Mountain Research Station (RMRS) FIA unit in 2002 to serve as the National Information Management Coordinator and provided key leadership as FIA’s liaison to the CIO. Chuck also provided leadership in moving the FIA Program to a national database and successfully spearheaded FIA’s migration to the Forest Service National Data Center.

Chuck touched many lives. His positive attitude and outlook not only helped him endure far longer than his doctors expected, but also added an incredible amount of life to those around him. His contagious laughter echoed in the hallways of the Ogden Forestry Sciences Lab; you always knew when Chuck was in! He was always quick to share stories of beautiful experiences like skiing with his two children, Will and Lisa, or travels to the Far East with his wife, Merlise. His unbridled sense of humor brought a beam of light into the Huntsman Cancer Center’s infusion ward that will be remembered for a very long time. His wonderful perspective on life inspired many who knew him.

Chuck’s vision and leadership, quick wit, relentless efforts, contagious laughter, and open love of family and friends will be missed.
Upcoming events...

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<tr>
<th>Event</th>
<th>Location/Objectives</th>
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<td>Future Improvement to FIA’s IM Systems</td>
<td>Location: to be determined</td>
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<td><strong>Objectives:</strong> The Information Management Group Leaders and IM Team Leaders will meet with the FIA Program Managers and National Program Leader to discuss and plan future improvement to FIA’s IM systems. Our IM systems are designed to collect, compile, tabulate, and allow on-line access to FIA data. Not only does this include information gathered from the plot network but information from the National Woodland Landowner survey (NWOS) and our timber Products Output (TPO) studies.</td>
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<td><strong>For more information contact:</strong> John Vissage, <a href="mailto:jvissage@fs.fed.us">jvissage@fs.fed.us</a>, 651-649-5200</td>
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Safety at work...

Interior West Research Station

Function Field Warm Up

Clay Sniteman, Physical Therapist, provided us with an excellent session on preventing common field related injuries during our April training in Ogden. The following is the “Functional Field Warm Up” he suggested that all field employees’ use before beginning hiking for the day to get our muscles warmed up and hopefully prevent injuries.
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/

1) Walking Lunges with Rotation

2) Low Spine Twist

3) Push Up to Walk
4) Scorpion

5) Multidirectional Hip Stretch

Tip: Make sure your toes are pointed straight in front of you.