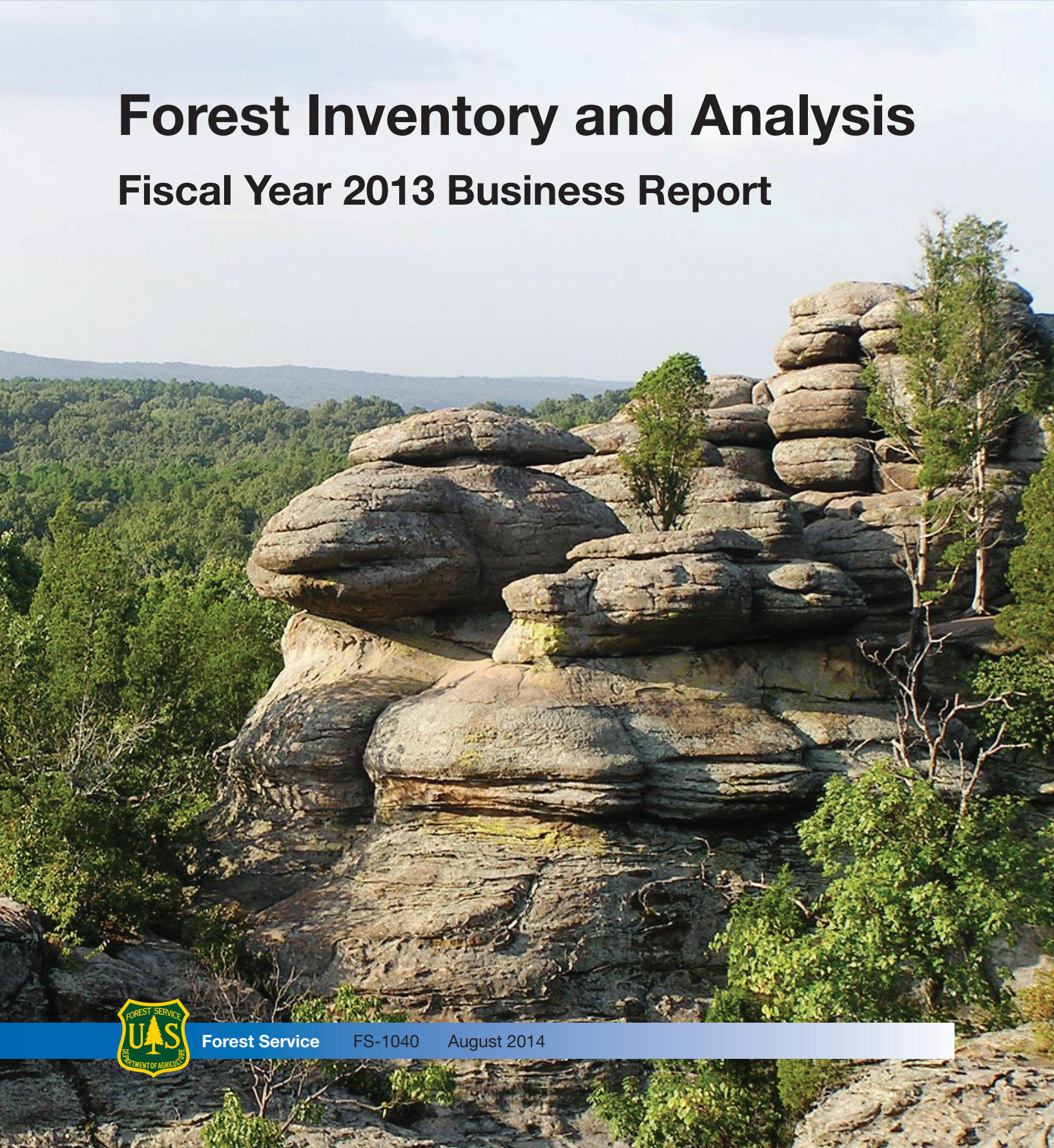
United States Department of Agriculture

Forest Inventory and Analysis

Fiscal Year 2013 Business Report



Forest Service FS-1040 August 2014

United States
Department of
Agriculture

Forest Service

FS-1040

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Executive Summary

For more than 80 years, the Forest Inventory and Analysis (FIA) program has played an integral role in providing the information vital to managing the Nation's forest resources. In recent years, an increased number of major decisions affecting the Nation's forests have been made with reference to and reliance on FIA findings and forest resource evaluations. Contemporary topics include carbon sequestration, forest product sector and employment trends, biomass availability, land cover and land use change, pollutant effects, and fire risk.

In 1999, Congress directed the Forest Service, an agency of the U.S. Department of Agriculture (USDA), to reevaluate its statewide inventory mission and to make the transition from an approach in which each State is surveyed periodically to one in which each State is inventoried annually. FIA developed, in concert with its partners, a strategic plan to carry out the new congressional mandate. FIA's *Strategic Plan for Forest Inventory and Monitoring*, approved by Congress, included a requirement for an annual business report which would outline the status and progress of the national annual inventory program.

This annual business report, our 16th, tells the taxpayers, partners, and clients what the program has accomplished with the financial resources provided and what the program will accomplish in the coming year with budgeted financial resources. This relationship with taxpayers, partners, and clients is integral to FIA's continued success, because accountability is our first priority. Some key findings of this report are—

Annualized progress: In fiscal year (FY) 2013, FIA maintained annualized inventory activity in all 50 States (excluding interior Alaska). In spite of significant travel restrictions, FIA was able to maintain annual plot production with the help of increased contracting and partners' funding. The total area currently sampled represents 86 percent of all U.S. forest land, with interior Alaska representing the remaining 14 percent.

Funding: Total funding from all sources for the FIA program in FY 2013 was $75.9 million, a net decrease of $3.9 million from FY 2012 (appropriated funding decreased $3.6 million). FY 2013 funding consisted of $65.6 million appropriated by Congress plus $2.1 million in net adjustments from the previous fiscal year, special funding of $0.6 million, and $7.7 million in partners' funds. State partners' funds are used to maintain annual measurement and 5-year State report cycles. In FY 2013, total funding from all sources was 15 percent below the amount needed for full program implementation.

Partners' support: Partners contributed $7.7 million to the program in FY 2013. Through cost share, 38 States contributed $2.5 million toward buying down their measurement and reporting cycles to 5 years, and more than 20 States and other partners added $4.4 million for plot intensification and other program enhancements. Overall, partners' contributions decreased by $2.5 million from FY 2012, resulting in lower plot production and program performance.

Grants and agreements: When external cooperators can complete critical FIA work with equal quality for less cost, FIA contracts for these services—a total of $12.1 million was spent in this way in FY 2013. In its annual appropriation, Congress intended for an amount equal to the State and Private Forestry Forest Resource Inventory and Assessment (FRIA) appropriation to be provided to States each year for implementing FIA field plot measurements. Table 2 summarizes FIA funding activity to States from FY 2006 through FY 2013 and demonstrates the program's full compliance with congressional intent of the FRIA appropriation, and appendix table B-5 provides details on all FIA grants.

Data availability: Forty-nine States and coastal Alaska now have access to online data that are less than 2 years old. These data supplied information for 521 spatial data requests and 103,211 online data requests.

Five-year reports: By FY 2013, FIA had completed at least one 5-year report or periodic report for 90 percent of the States and 100 percent of the U.S. islands since annualized inventory began in 1999. In all, FIA had 238 publications, of which 90 were published in peer-reviewed journals in FY 2013.

Quality assurance: FIA quality-checked 13 percent of all field plots measured in FY 2013 to ensure that FIA databases comprise only the highest quality data.

Users groups: FIA relies heavily on periodic meetings with users and clients to ensure that the program is providing the highest quality service and meeting planned objectives. In 2013, FIA held six regional and one national users group meetings to gauge how well it is meeting the goals stated in the strategic plan and the previous year's annual report.

Personnel: FIA, directly and through cooperators, employed 550 people in FY 2013. Cooperators are integral to the efficient delivery of the FIA program, comprising 184 of the 550 employees, or 33 percent of the total workforce. Of the total workforce,

182 were employed in information management, techniques research, or resource analysis, and they provided 824 consultations (8,123 hours) to help users and clients effectively use FIA data.

Other program features: Although plot-based field surveys provide most of the FIA information, additional questionnaires and surveys are conducted to report on timber product output (TPO), logging utilization, fuelwood production, the characteristics and management objectives of the Nation's private woodland owners through the National Woodland Owners Survey (NWOS), and several indicators of forest health. Since FY 2000, FIA has collected such data from more than 62,000 surveys and questionnaires. This information, in concert with FIA plot data, is critical to monitoring the sustainability of the Nation's forest resources.

FIA had a productive year in FY 2013 and looks forward to further progress in FY 2014. Important goals for FY 2014 include—

- Continue annualized inventory of 50 States (including the Tanana Valley in interior Alaska).
- Publish the 2012 update of Resources Planning Act resource statistics for the 2015 assessment.
- Publish the Colorado urban study results.
- Publish the 2013 national pulpwood report.
- Report U.S. forest carbon numbers to the United Nations Intergovernmental Panel on Climate Change.
- Complete edits of the Food and Agriculture Organization of the United Nations Global Forest Resources Assessment for the United States.
- Complete production of the *Forest Atlas of the United States*.
- Complete final FIA *Strategic Plan for Forest Inventory and Monitoring* and submit it to Congress.
- Complete at least 10 State 5-year reports.
- Prepare new NWOS draft report.
- Implement and test the new TPO data-collection system.
- Work with partners to improve land cover and land use classifications.
- Prepare FIA Database 6.0 User Guide and begin planning Field Guide 7.0.
- Maintain and improve the Forest Inventory Data Online system.

Introduction

The Forest Inventory and Analysis (FIA) program of the Forest Service, an agency of the U.S. Department of Agriculture (USDA), provides the information needed to assess the status, trends, and sustainability of America's forests. This business report, which summarizes program activities in fiscal year (FY) 2013 (October 1, 2012, through September 30, 2013), gives our customers and partners a snapshot of past activities, current business practices, and future program direction. It is designed to increase our accountability and foster performance-based management of the FIA program. (Note: This business report does not include statistical information about the forests of the United States. Those who want to obtain such information should contact the appropriate regional or national FIA office listed in appendix A of this report or go to http://www.fia.fs.fed.us.)

The FIA program has been the Nation's continual forest census since 1930. We collect, analyze, and report information on the status and trends of America's forests: how much forest exists, where it exists, who owns it, and how it is changing, and also how the trees and other forest vegetation are growing, how much has died or been removed, and how the harvested trees have been used in recent years. This information can be used in many ways, such as in evaluating wildlife habitat conditions, assessing sustainability of current ecosystem management practices, monitoring forest health, supporting planning and decisionmaking activities undertaken by public and private enterprises, and predicting the effects of climate change. The FIA program combines this information with related data on insects, diseases, and other types of forest damage to assess the current health and potential risks to forests. These data are also used to project how forests are likely to appear in 10 to 50 years under various scenarios to evaluate whether current forest management practices are sustainable in the long run and to assess whether current policies will enable our grandchildren and their grandchildren to enjoy America's forests as we do today.

Changes From Previous Years' Business Reports

The FIA program continues to seek performance measures that accurately reflect the program's progress toward meeting the goal of annualized inventory in all 50 States. This report includes more precise information on whether field plots were part of the base 7- to 10-year Federal program or intensification plots (spatial or temporal).

Because of funding constraints, FIA-funded research of Experimental Forests and Ranges continues to be suspended.

Fiscal Year 2013 Program Overview

In FY 2013, the FIA program completed the 15th year of implementing the annual inventory system as outlined in the *Strategic Plan for Forest Inventory and Monitoring*, written in response to the Agricultural Research, Extension, and Education Reform Act of 1998 (Public Law 105-185). The FIA program includes two basic sample levels: Phase 1 (P1), which consists of remote sensing for stratification to enhance precision and Phase 2 (P2), which is based on the original set of FIA forest measurement plots (approximately one plot per 6,000 acres). A subsample of P2 plots may also be measured for a broader set of forest ecosystem indicators. The number of plots with various ecosystem indicators is noted in appendix table B-9. By the end of FY 2003, our goal was to implement an annual FIA program that measures at least 10 percent of all P2 sample locations per year in the Western United States, and 15 percent of P2 sample locations per year in the Eastern United States. Table 1 shows the overall distribution of P1 and P2 elements of the FIA sample for the United States. The numbers in this table are for illustrative purposes only and do not include possible additional plots that may be required as a result of partially forested sample locations. This process can add 15 to 20 percent more plots that have to be visited to collect data.

The base program includes annual compilations of the most recent year's information, with full State-level reporting at 5-year intervals. All States have the option to contribute the resources necessary to bring the program up to the full sample intensity of 20 percent per year, or to make other value-added contributions, such as funding new measurements or additional sample locations. In FY 2013, the total appropriated funding was $12.0 million below the target level outlined in the FIA Strategic Plan[1] to complete the transition of the base program to full implementation. The following sections highlight current outputs and products, program resources, and partners' contributions.

Outputs and Products

Appendix table B-1 shows some comparisons across FIA regional units in the rates, costs, and performance of implementing the FIA program. In FY 2013, we were active in 49 States plus coastal Alaska (fig. 1), measuring 41,913 base P2 sample locations (17,072 forest and 24,841 nonforest) from the base grid, or 15 percent of the total. At the end of FY 2013, all States were covered by some level of annual FIA program activity, but only 49 States (98 percent) were fully implemented, with interior Alaska awaiting funding. An appropriated funding loss of $3.6 million in FY 2013 was further exacerbated by a decrease in partners' support of $2.5 million. FIA's congressional mandate, under the Renewable Resources Research Act of 1978 (PL 95-307), states that the Nation's Trust Territories and Freely Associated States are to be treated as States for research purposes. Since 2001, in compliance with this mandate, periodic inventories

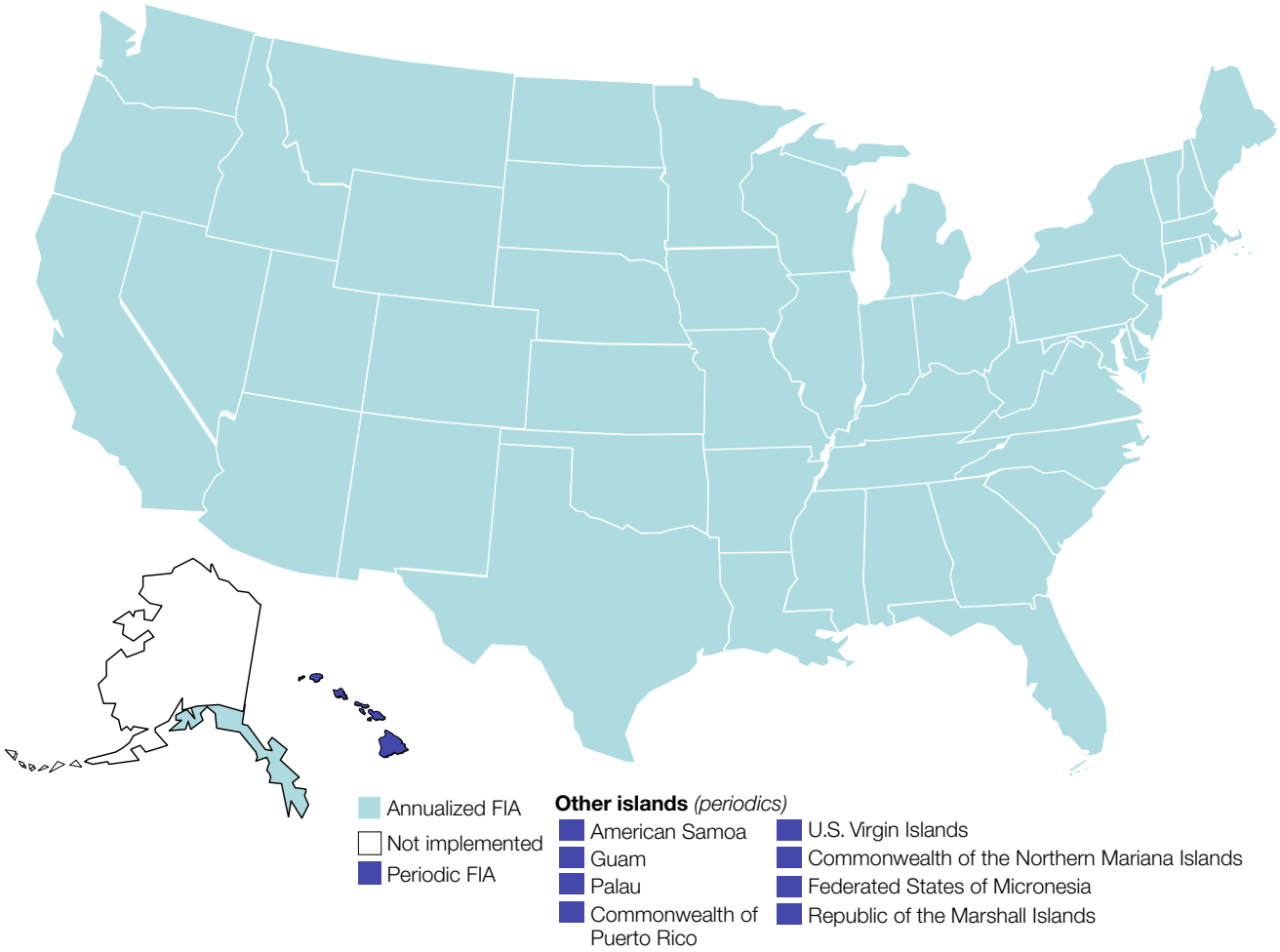
Table 1. Overview of land area, FIADB forest area, RPA forest area, estimated P1 pixels, and estimated P2 plots by region in FY 2013.

Region	Land area	Forest area (FIADB)	Forest area (RPA)	Forest	All P1*	All P2
	Mil. acres	*Mil. acres*		*Percent*	*Mil. pixels*	*Plots*
North	607	182	182	30	39.5	101,140
South	533	267	245	50	34.8	88,839
Interior West	548	154	125	27	35.6	91,282
Pacific Coast (California, Oregon, Washington)	204	85	84	42	13.2	33,944
Coastal Alaska	39	14	14	35	2.7	6,507
Interior Alaska	327	114	114	35	21.0	3,373
Islands (including HI)	7	4	4	53	0.5	1,163
Total	2,264	821	768	33	147.2	326,247

FIADB = Forest Inventory and Analysis DataBase. FY = fiscal year. P1 = Phase 1. P2 = Phase 2. RPA = Resources Planning Act.
* MODIS 250m pixels at 15.4 acres each.

[1] U.S. Department of Agriculture, Forest Service. 2007. Forest Inventory and Analysis strategic plan: a history of success, a dynamic future. FS-865. Washington, DC: U.S. Department of Agriculture, Forest Service, Research and Development. 17p.

Figure 1. FIA implementation status, FY 2013.



FIA = Forest Inventory and Analysis. FY = fiscal year.

have been completed in the Commonwealth of Puerto Rico, U.S. Virgin Islands, Federated States of Micronesia, American Samoa, Guam, the Republic of Palau, the Republic of the Marshall Islands, and the Commonwealth of the Northern Mariana Islands, all of which are exempt from the annualized system and have periodic inventories. Reinventory of the islands continue with American Samoa and Guam in 2013.

The FIA program produced 238 reports and publications in FY 2013, nearly 34 fewer than in FY 2012. Of these publications, 57 were core publications consisting of reports specific to a complete survey unit, complete State, national forest, or national report. Core reports include 5-year State reports required by legislation. FIA also published 90 articles in peer-reviewed journals and 73 articles in proceedings from scientific meetings and conferences. FIA staff participated in 824 significant consultations with FIA customers, requiring 8,124 hours of staff time—equivalent to more than four full-time staff positions. The FIA technical staff met on several occasions to further refine the national core FIA program, resulting in continued improvement of the national core field guide and enhancement of Internet tools for accessing and analyzing FIA data, including the National Information Management System (NIMS), which provides a single national platform for processing FIA data and posting it on the Web. Our Internet resources processed more than 103,211 data retrievals in which FIA customers obtained user-defined tables, data downloads, and maps of interest. This number was nearly 20,000 more retrievals than in the previous year as the program adjusted to moving computer operations to centralized Forest Service servers in Kansas City, MO. It is expected that online retrievals will continue on their upward track in 2014 and beyond.

Program Resources

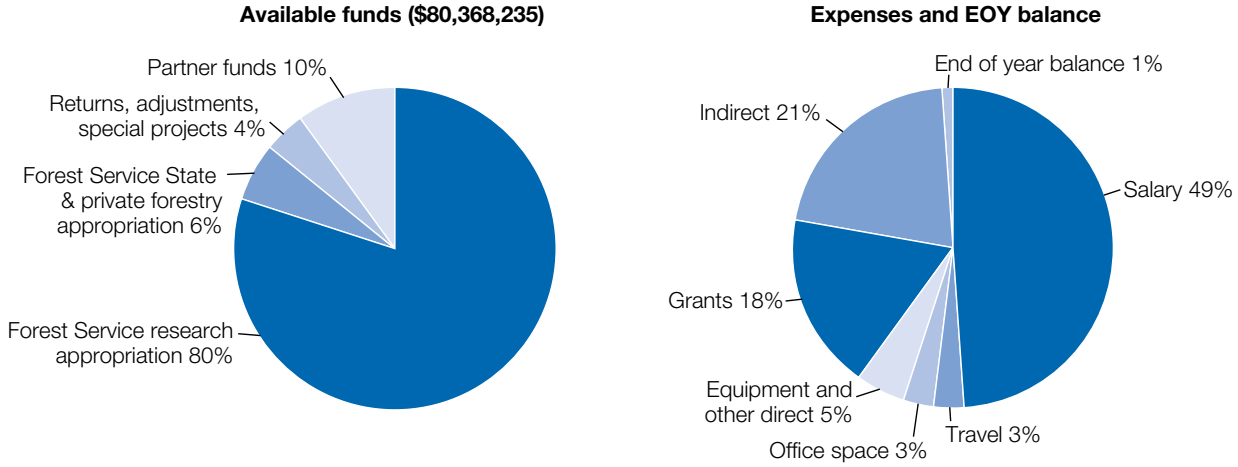
Congress appropriates funds annually for the FIA program in two different Forest Service deputy areas: (1) Research and Development (R&D), which had $60,907,000 in appropriated funds in FY 2013, and (2) State and Private Forestry (S&PF), which had $4,660,000 in appropriated funds in FY 2013, for a total appropriated funding level for the FIA program of

$65,567,000, a reduction of $3,619,000 from the FY 2012 level of $69,186,000 (appendix table B-12). The S&PF Forest Resource Inventory and Assessment (FRIA) budget line is provided to support the FIA program in States that provide cost-share contributions. States providing inventory cost-share funds contributed $3,266,334 toward supporting the base 5-year cycle program. And, States and other partners provided an additional $4,401,151 for plot intensification and other program enhancements. Total available program funding, including $2,098,947 in preyear adjustments and $569,000 in special funding from National Aeronautics and Space Administration (NASA), was $75,092,531 in FY 2013 (fig. 2).

In its annual appropriation, Congress intended for an amount equal to the S&PF FRIA appropriation to be made available to cost-sharing States each year to help implement the FIA program. During budget allocation, FIA treats funds from all sources as a single pool and then allocates funds from the various inflow accounts to maximize efficiency. Each year, however, FIA ensures that congressional intent is met for the S&PF appropriation. Table 2 summarizes FIA funding activity to States from FY 2006 through FY 2012 and demonstrates that the FIA program has consistently complied with congressional intent, typically exceeding the cost-share target by more than 30 percent.

Across FIA regions, cost and productivity figures differ because of the cyclical nature of the current inventory system and because of differences among field units in operational methods and ease of access to property. Rates of effective indirect expenses in FIA field units in 2013 ranged from 9 to 14 percent across the country (appendix table B-2), reflecting differences in both sources of funding and in research station indirect expense assessment practices. The National FIA Office has an 84-percent rate of indirect cost because that budget item includes the USDA overhead and programwide charges to the Albuquerque Service Center, which were $6,234,000 from R&D and $996,000 from S&PF in FY 2013. Overall, program indirect expenses totaled 21.5 percent. Figure 3 shows the total appropriated funding for FIA from FY 2001 through FY 2013 and the FY 2014 target. Refer to appendix table B-12 to view the trend data in FIA performance measures for FY 2007 through FY 2013.

Figure 2. FIA program available funds and expenses by category, FY 2013.



FIA = Forest Inventory and Analysis. FY = fiscal year.

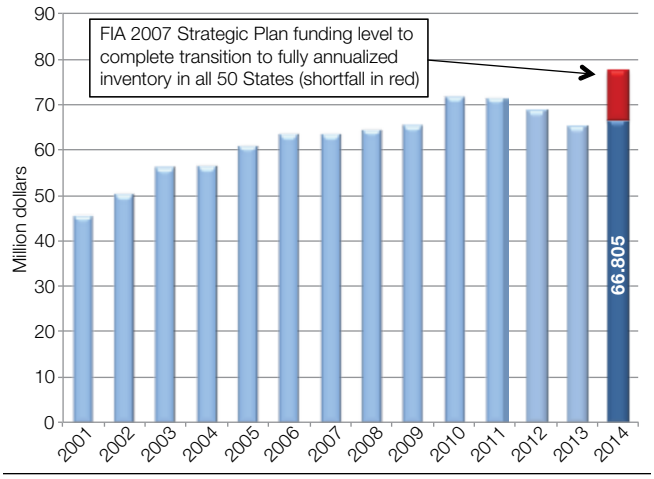
Table 2. Annual FIA appropriations and allocation of S&PF-appropriated funds in thousands of dollars for FIA to meet congressional intent, FYs 2006–13.

Category	Fiscal year							
	2006	2007	2008	2009	2010	2011	2012	2013
	Thousand dollars							
R&D appropriation	59,329	59,380	60,372	60,770	66,939	66,805	64,269	60,907
S&PF appropriation[a]	4,312	4,225	4,269	4,766	4,878	4,647	4,917	4,660
Total appropriated	63,641	63,605	64,641	65,536	71,817	71,452	69,186	65,567
FIA data collection grants to States	**7,364**	**7,209**	**6,924**	**7,907**	**8,289**	**7,952**	**7,475**	**8,008**
Number of States	**24**	**26**	**24**	**28**	**26**	**17**	**17**	**31**
Average support	**307**	**277**	**289**	**282**	**319**	**468**	**440**	**258**
Additional FIA allocation to States above congressional minimum for the S&PF appropriation	**3,052**	**2,984**	**2,655**	**3,141**	**3,411**	**2,952**	**2,475**	**3,008**

FIA = Forest Inventory and Analysis. FY = fiscal year. R&D = Research and Development. S&PF = State and Private Forestry.

[a] Congressional funding each year was approximately $5 million less S&PF overhead charges assessed before distribution to FIA; net funds to FIA shown.

Figure 3. FIA-appropriated funding level, FYs 2002–14 (projected).



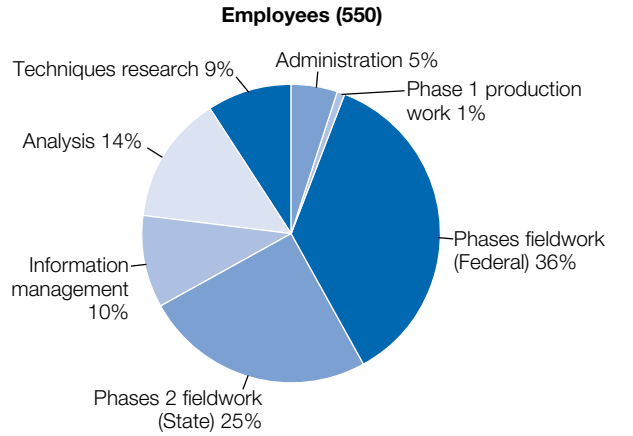
FIA = Forest Inventory and Analysis. FY = fiscal year.

* Dark blue bar (plus red shortfall bar) is estimated total funding ($77.7 million) required to deliver the full base FIA program in FY 2014.

In FY 2013, FIA Federal program staffing consisted of 366 Federal person-years of effort (appendix table B-3a) down from 372 Federal person-years in FY 2012. Cooperators, especially State forestry organizations, through grants and agreements, accomplish much of the work done by FIA, and they added 184 employees for a total workforce of 550. The additional cooperator employees included 138 State field employees, 13 information management specialists, 14 analysts, 18 researchers, and 1 administrative specialist. Cooperator employees constitute 33 percent of the total FIA workforce.

Of all FIA employees, both Federal and cooperator, approximately 61 percent were involved in data collection and field support, 24 percent in analysis and information management, 5 percent in program management and administration, 9 percent in techniques research, and 1 percent in P1 production work (fig. 4).

Figure 4. FIA program employees by job group, FY 2013.



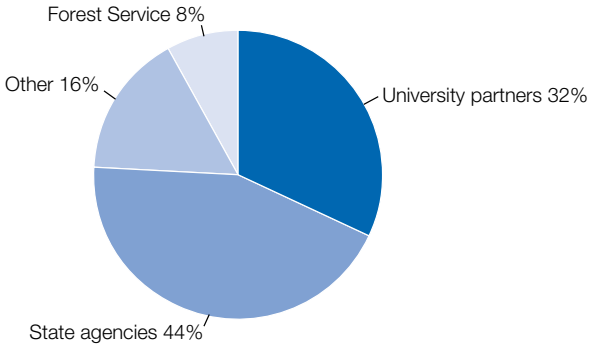
FIA = Forest Inventory and Analysis. FY = fiscal year.

FIA Grants and Partners' Contributions

The complete FIA program envisioned by Congress was to be a Federal-State partnership, with both Federal and State partners contributing resources to accomplish the work. Congressional guidance indicated that the base Federal commitment is an inventory program that collects data from 10 percent of the sample locations in the Western United States (10-year cycle) and 15 percent of the sample locations in the Eastern United States (7-year cycle) on an annual basis, with comprehensive, analytical reports for all States produced at 5-year intervals. The following discussion summarizes program grants and partners' contributions.

Grants and Agreements: Each year, FIA units enter into various grants and cooperative agreements with partners to accomplish specialized work in support of the FIA mission. In some cases, partners provide expertise that is not available within FIA; in other cases, they share the workload. Appendix table B-5 lists 67 grants and for FY 2013, comprising $12,109,274. This number fluctuates from year to year, but it demonstrates the reliance of the FIA program on collaborating with external partners to get work done efficiently. Most of these grants and agreements were with State agencies (44 percent) and university partners (32 percent) (fig. 5).

Figure 5. Grants and agreements by recipient group, FY 2013.



FY = fiscal year.

Additional cooperators included other Federal and Forest Service offices (8 percent) and other non-Federal partners (16 percent) supporting grant collaboration in data collection, information management, and research in techniques development. We expect to continue to make significant use of grants and agreements to augment FIA staff capacity in the analysis and reporting of annual FIA data for individual States.

Partners' Contributions: At their discretion, partners may choose to contribute the resources that are needed to bring the FIA program up to the full 20-percent measurement per year (5-year cycle) that is described in the authorizing legislation. In addition to that choice, or as an alternative, partners may choose to contribute resources for other purposes that add value

to the FIA program from their perspective, such as intensifying the base FIA sample location grid to support analysis at finer spatial resolution, funding additional types of measurements on FIA sample locations, or providing analyses or reporting beyond that provided by FIA. The willingness of partners to contribute resources demonstrates the inherent value of the FIA program as a flexible framework on which to address other issues of interest.

Appendix table B-4 lists 66 partners that have contributed resources to the FIA program in FY 2013, either to achieve the 20-percent cost-share program envisioned by Congress or to add value to FIA in other ways. These resources include staff time, vehicle use, office space, equipment, travel costs, and other noncash items that support or add value to the FIA program. Contributions are valued for reporting purposes in terms of what it would have cost the Federal FIA staff to provide the same service, which may not necessarily be the same as the actual cost to the partner making the contribution. Overall, partners contributed $3.3 million toward the full 20-percent FIA program that was envisioned by Congress and another $4.4 million in contributions that add value to the FIA program, for a total of $7.7 million in partners' contributions. These contributions amount to $2.5 million less than partners contributed in FY 2012. Experience has shown that as Federal funds decline, partners' contributions tend to follow. The source of partners' contributions depends on the region of the country and the ability of States and partners to contribute. In the West, where forest land ownership is primarily Federal, the major cost-sharing partners tend to be Federal land managers. The decrease in State support, which is a hallmark of the FIA program, in FY 2013 is a clear indicator of tough economic times.

Since 2000, FIA has provided grants in excess of $153 million to efficiently carry out annualized inventory and partners have contributed more than $108 million to leverage Federal dollars to reduce inventory cycles and provide for other annual inventory enhancements. Table 3 summarizes FIA grants and partners' contributions by organization.

Adjunct Projects

Experimental Forests and Ranges

Due to budget constraints, FIA-funded research on Experimental Forests and Ranges continues to be suspended, with the exception of individual projects.

American Recovery and Reinvestment Act

FIA and partners have completed two projects continued under the American Recovery and Reinvestment Act (ARRA) that will have a direct effect on the FIA program. A brief summary of these projects follows.

ARRA Project: Forests Adapting to and Mitigating Climate Change Effects: An Inventory of Urban Forests in the Pacific Coast States

In 2010, the Pacific Northwest Research Station (PNW) partnered with the Oregon Department of Forestry and California Polytechnic State University (San Luis Obispo) to conduct an FIA inventory in the urban areas of Alaska, Washington, Oregon, California, and Hawaii. PNW-FIA provided technical oversight with training assistance from the Southern Research Station (SRS) and Colorado Department of Forestry. Funding for training and data collection was provided by a grant from the America Recovery and Reinvestment Act of 2009. In 2010 and 2011, private contractors installed roughly 1,000 on-grid plots in urbanized areas of the 5-State region. In 2012, remaining funding was directed to sampling plots previously missed due to initial difficulty contacting property owners. In 2013, we began working with our cooperators to produce State-level reports. This ongoing effort includes linking the inventory data with the iTree model to calculate the quantity and value of urban forest ecosystem services. Oregon State University joined this analysis phase and will continue collaborating during the reporting phase. The data provide information about the species composition, condition, and extent of the urban canopy cover. Final analysis should be available in FY 2014.

Table 3. FIA grants and partners' contributions, FYs 2000–13.

Group	Total FIA grants	Average annual grants	Percent of grants	Total partner contibutions	Average annual contributions	Percent of contributions
	Dollars			*Dollars*		
States/islands	86,849,037	6,203,503	57	79,566,731	5,683,338	73
Universities	40,825,296	2,916,093	27	5,461,549	390,111	5
Forest Service	12,845,951	917,568	8	19,481,680	1,391,549	18
Other partners	11,338,178	809,870	7	252,936	18,067	0
Other Federal	1,267,370	90,526	1	3,742,777	267,341	3
Total	**153,125,833**	**10,937,559**	**100**	**108,505,674**	**7,750,405**	**100**

FIA = Forest Inventory and Analysis. FY = fiscal year.

ARRA Project: Inventory of New Mexico's Forest Resources

In FY 2012, the Rocky Mountain Research Station, Interior West (IW) FIA program continued its support of the State of New Mexico ARRA forest inventory project, which spanned 3 years. FIA provided historical files and an electronic field data entry program, plot packets with aerial photos and other materials, training for contract crews, and inspections of completed fieldwork.

Analysis of New Mexico forest inventory data will be completed and published in FY 2014. Early analysis revealed two important findings: (1) a low rate of access to private lands required adjustments to standard analysis methods, and (2) the area of forest is higher than reported in the previous (2000) inventory.

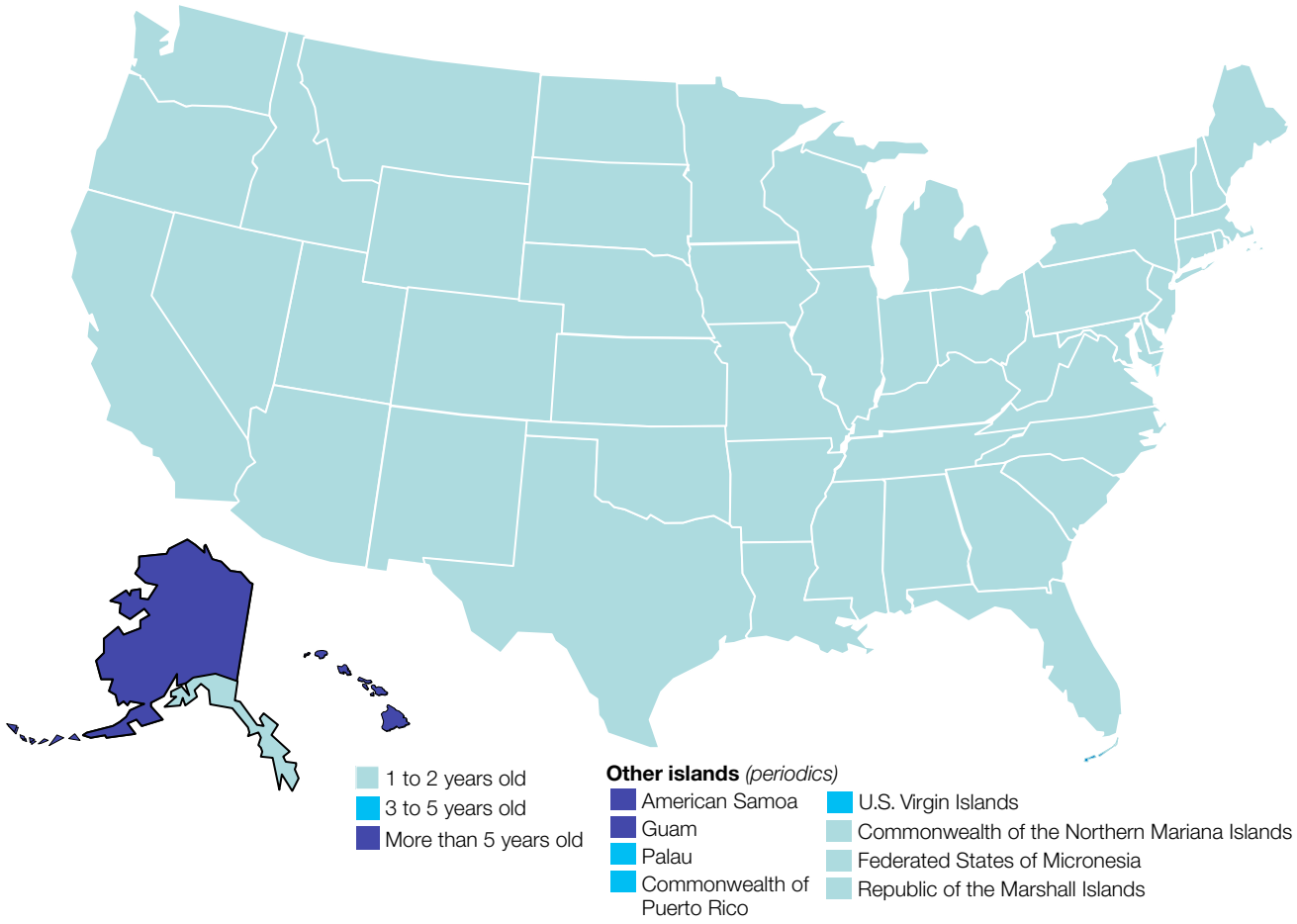
FIA Data Availability

In 2013, FIA completed migrating its data and data-processing procedures to the new Forest Service corporate servers in Kansas City, MO. The overall goal of this migration was to move the Forest Service to a more reliable and modern infrastructure with improved platform tools, better response times, better documentation and, of course, lower total life cycle cost. Through optimized scheduling, the FIA units were able to complete the initial migration with only minor data loading and access delays. Many significant applications development challenges remain in the new corporate server environment, but the first major hurdle is behind us. FIA has overcome the initial hurdles of the migration, and online data access has begun to return to normal levels that are commensurate with FIA's high customer service standards (appendix B-7).

The FIA program is designed to provide continually updated, accurate, and reliable information on status and trends in the Nation's forested resources. Obtaining current information is one chief interest of FIA customers. Our program objectives include (1) providing annual access to current data for all forested lands sampled as part of the annual inventory system, and (2) producing analytical reports for all States on a 5-year cycle.

As we move through the transition to full program implementation, one key performance measure is how well we are satisfying program objectives. Figure 6 shows, for each State, the age of FIA data accessible in our public database as of September 30, 2013—the end of FY 2013. Virtually all States now have data that are less than 2 years old available in the database. Interior Alaska remains an outlier due to continued lack of

Figure 6. Availability of online FIA data, FY 2013.



FIA = Forest Inventory and Analysis. FY = fiscal year.

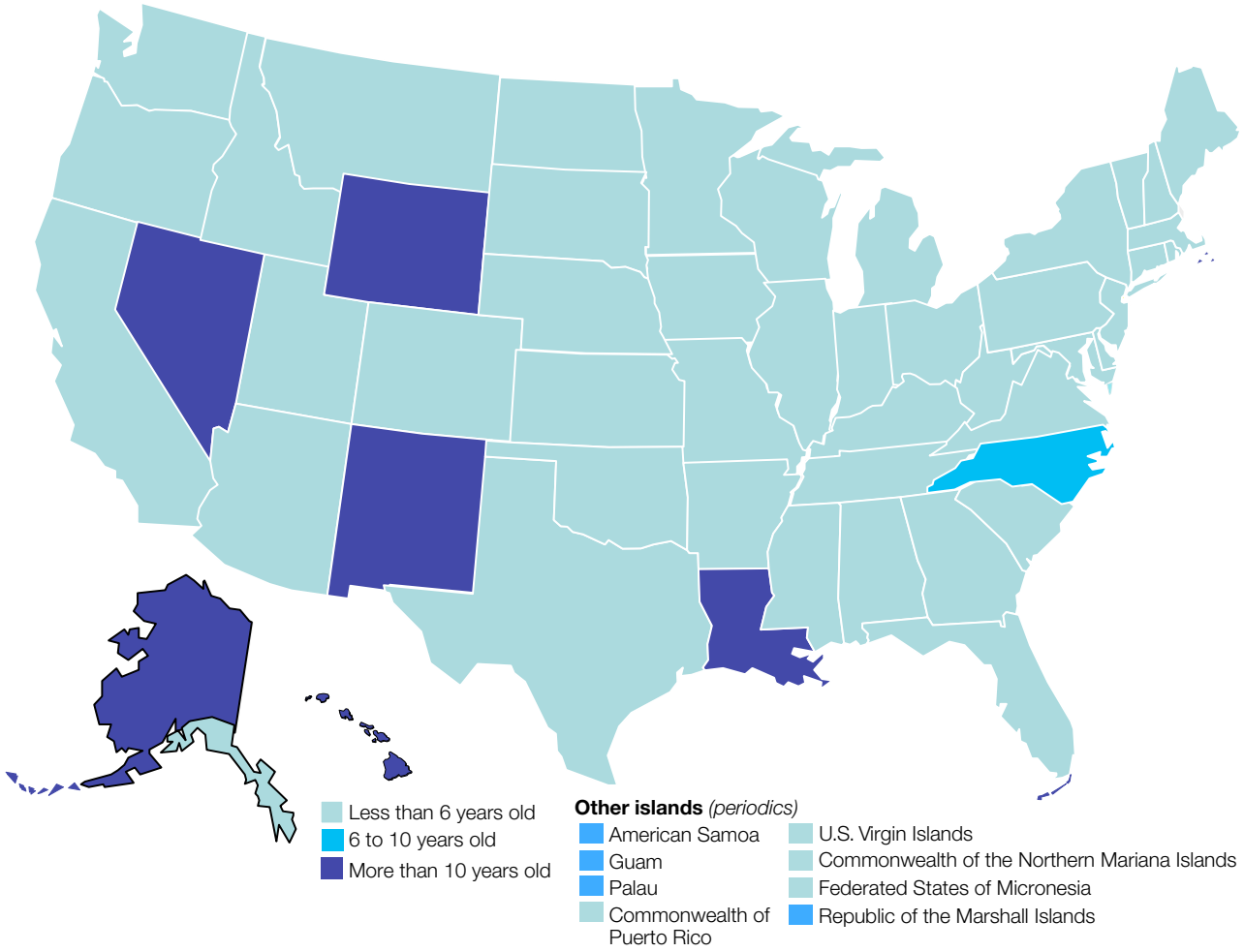
funding to initiate the field inventory. FIA will experiment with opportunities there with a project in the Tanana Valley in FY 2014. Some island data will be older because they are on predominantly 10-year periodic inventory cycles. Continued improvements in data processing and the NIMS are now paying dividends by enabling us to establish a more routine loading schedule.

Figure 7 shows the age of the most recently published statewide FIA report for each State. States with publications based on data less than 6 years old—the program objective—are shaded light blue. States with publications 6 to 10 years old are shaded medium blue, and States where the most recent publication reports are based on data more than 10 years old are shaded dark blue. Only six States now have State reports more than 6 years old (fig. 7). FIA made significant strides in catching up with the backlog of 5-year reports in recent years and should complete the process of full compliance with its legislative mandate and the establishment of a permanent cycle for State analytical reports by the end of FY 2014. As noted earlier, some islands will have reports older than 6 years due to periodic inventory cycles there. The goal, however, is not to exceed 10 years.

Quality Assurance

FIA is committed to producing and delivering complete, accurate, and unbiased information with known precision, completeness, representativeness, comparability, and accuracy. The Quality Assurance (QA) program supports this goal using a framework that promotes consistency during all stages of the national core FIA inventory process. A national core field guide documents the protocols, ensuring consistent field collection of core program data items. FIA's national field data entry program, the Mobile Integrated Data Acquisition System (MIDAS), is incorporated into the overall FIA information management structure and provides consistent logic and error checking in the field. The NIMS database and compilation system provides additional error checks and consistently calculates a variety of derived variables using estimation equations as described in general technical reports. The National Quality Assurance Coordinator works with the Washington Office and the regional and national indicator advisors to provide direction and coordination for the FIA QA program.

Figure 7. Publication status of State reports, FY 2013.



FIA = Forest Inventory and Analysis. FY = fiscal year.

The FIA program promotes process transparency and consistency by extensively documenting methods and procedures, including—

- A national prefield guide, training module, and rigorous QA protocols define a nationally consistent process for collecting information about FIA plots before field visits.
- Up-to-date national CORE field guides ensure consistent CORE program data collection.
- The field QA check procedures guide promotes field QA consistency from region to region (a summary of the QA plot checks is provided in appendix table B-1).
- The FIA database description and users guide provides detailed information to users about published FIA data.
- The Forest Inventory and Analysis DataBase (FIADB) displays standardized output tables and is accompanied by detailed documentation in a database description and user's manual.
- The analytical QA guide outlines steps for checking compiled data for accuracy and completeness before releasing them to the public.
- A national FIA QA plan describes the overall QA process.

New and ongoing FIA QA tasks in FY 2014 aimed at identifying errors and increasing consistency in the national inventory include—

- Distributing regionally developed analytical QA error-checking applications to FIA State analysts nationally.
- Developing systematic edit checks of periodic and annual FIADB data.
- Defining rigorous national cold-check field and scoring procedures to enable equivalent field-crew assessment across regions and crew types.
- Documenting and implementing national data-collection staff training standards.
- Developing well-defined prefield canopy-cover measurement training procedures and training material.
- Developing and documenting NIMS-CS, a consolidated FIA data-processing system.
- Developing a catalog of unpublished FIA procedures.

Fiscal Year 2013 Regional Accomplishments

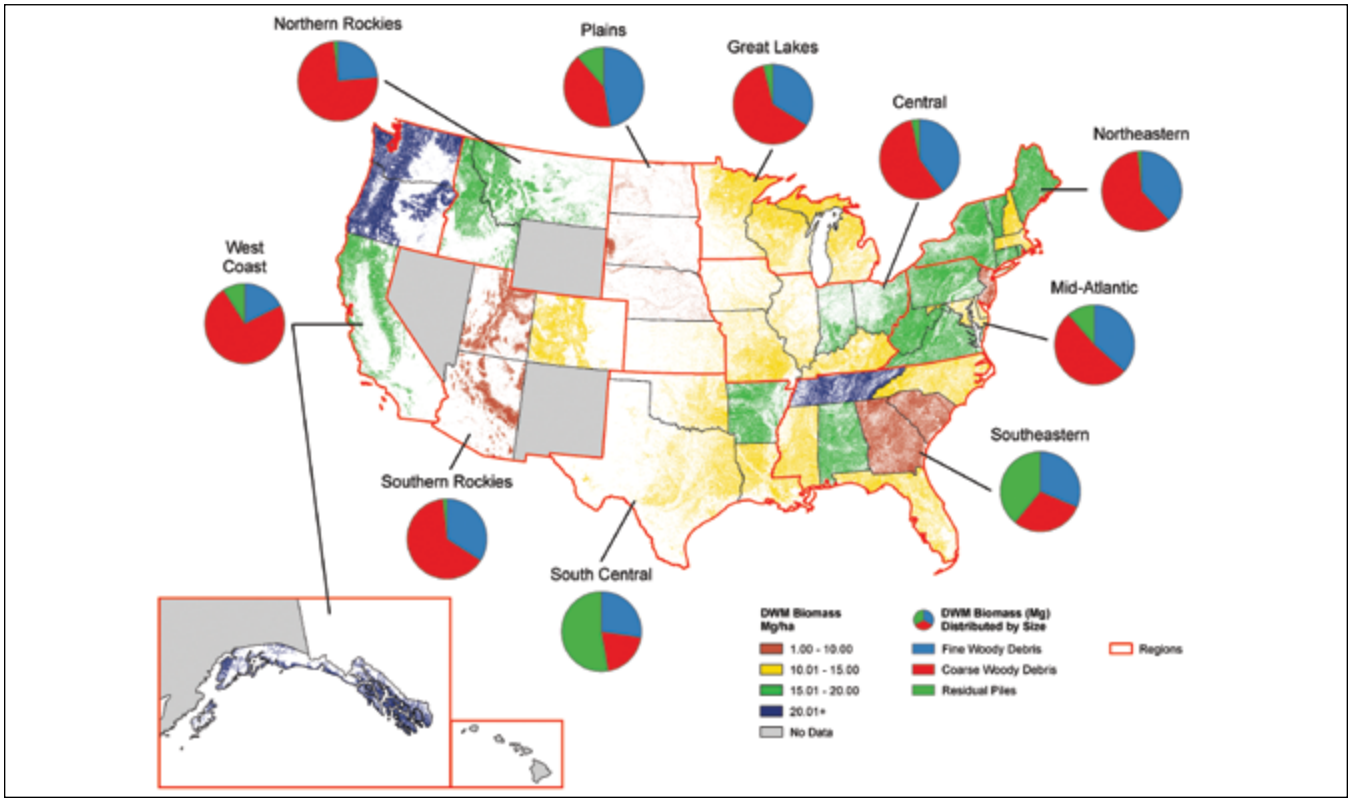
This section provides information on FIA results, accomplishments, and outcomes throughout the country by FIA unit. Those wanting more detailed information may either go to provided links or contact the respective FIA unit. (Contact information for each FIA unit appears on the inside back cover of this report.)

Northern Research Station FIA Program

Finding: Because most States now have a complete cycle of down woody material (DWM) data, for the first time, field measurements were used to obtain estimates of DWM biomass and carbon stocks in the FIA program and to inform DWM carbon estimates in the National Greenhouse Gas Inventory report.

Accomplishment: The ecological importance of trees in forest ecosystems extends well beyond their biological life in both space and time. When trees fall or shed components (e.g., branches), dead and DWM is created, providing critical substrate for establishing vegetation, habitat for wildlife species, and nutrients for a variety of forest ecosystem functions. The benefits of DWM in forests and, indirectly, to society can be at odds with the fact that DWM may also hinder forest management activities, provide habitat for forest pests, and increase wildfire risk. FIA has been sampling DWM since 2002. Most States in the United States now have a complete cycle of these measurements. Thus, for the first time, field measurements were used to obtain estimates of DWM biomass and carbon stocks in the FIA program and used to inform DWM carbon estimates in the National Greenhouse Gas Inventory report including spatially explicit estimates of DWM (fig. 8). Until recently, DWM data were not sufficient to obtain consistent national estimates that meet the precision standards established by the FIA program, so DWM estimates were modeled using geographic area, forest type, and live tree carbon density. A comparison

Figure 8. Estimates of DWM biomass density (Mg/ha) on forest land by State, with the proportion (pie charts) of total DWM represented by fine woody debris, coarse woody debris, and piles by region of the United States (outlined in red), FYs 2002–10. (Note: Coastal Alaska is included in the West Coast region)



DWM = down woody material. FY = fiscal year. ha = hectare. Mg = megagram.

between the previously used dead wood models with FIA's national inventory revealed where past National Greenhouse Gas Inventories may have differed greatly from actual empirical estimates of the dead wood carbon resource. It is also hoped that the transition from purely model-based estimates of DWM to estimates obtained from field measurements will reduce uncertainty within the greenhouse gas inventory and increase sensitivity to human-induced disturbances and events resulting from a changing climate.

Outcome: The official 2014 National Greenhouse Gas Inventory will include downed dead wood carbon estimates derived from FIA's phase three (P3) inventory of dead wood. The summary of this dataset and associated estimates have been published in Forest Ecology and Management with a thorough evaluation of the differences between former greenhouse gas inventory estimates of downed dead wood and the P3 field-based estimates published in PLoS ONE.

Contact: Chistopher Woodall, cwoodall@fs.fed.us

Domke, G.M.; Woodall, C.W.; Walters, B.F.; Smith, J.E. 2013. From models to measurements: comparing downed dead wood carbon stock estimates in the U.S. forest inventory. PLoS ONE 8(3): e59949. doi:10.1371/journal.pone.0059949.

http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0059949.

Smith, J.E.; Woodall, C.W.; Domke, G.M. 2013. Forest sections of the land use change and forestry chapter, and annex. In: U.S. Environmental Protection Agency, Inventory of U.S. greenhouse gas emissions and sinks: 1990–2011. EPA 430-R-13-001.

http://www.epa.gov/climatechange/emissions/usinventoryreport.html.

Woodall, C.W.; Walters, B.F.; Oswalt, S.N.; Domke, G.M.; Toney, C.; Gray, A.N. 2013. Biomass and carbon attributes of downed woody materials in forests of the United States. Forest Ecology and Management. 305: 48–59.

http://www.sciencedirect.com/science/article/pii/S0378112713003290.

Finding: An efficient approach has been developed for mapping multiple individual tree species over large spatial domains. The method integrates vegetation phenology derived from MODIS imagery, raster data describing relevant environmental parameters, and extensive field plot data of tree species, basal area to create maps of tree species abundance and distribution at a 250-m pixel size for the entire contiguous United States. The approach uses the modeling techniques of k-nearest neighbors and canonical correspondence analysis. Much of the species covariance found on the forest inventory plots is retained in the species datasets, which means that if the individual species datasets were stacked together, each grid cell in the modeled datasets would contain close to the same mix and proportion of species as could be found on the ground in the field data.

Accomplishment: FIA now has a series of nationally consistent datasets of individual tree species distributions. These datasets provide readily accessible information on the location, relative abundance, and distribution of all tree species across the contiguous United States. A suite of assessment procedures has been applied to each of the modeled datasets, and region-wide and neighborhood accuracy assessment results are available in Wilson et al. (2012) and are associated with each species in the online database. The datasets provide unprecedented access to extensive and relatively detailed information on the relative abundance and distribution of individual tree species that can be analyzed with other spatial datasets to address any number of issues of interest.

Outcome: The methods used to create these datasets have been published as a paper (Wilson et al. 2012); the datasets themselves and their associated assessment information have been published as a Research DataSet (RDS-2013-0013); and maps of the top 12 tree species in each State (by basal area) are currently being published in a series of research-based maps (RMAPs), one for each of the 24 States in the Northern Research Station's (NRS's) region. A sample RMAP is shown in figure 9. The raster datasets are available on line to anyone, from professional researchers to students interested in the distribution of individual tree species, and the RMAP series is designed to be accessible and informative to a wide audience, including teachers and the general public.

Contacts: Ty Wilson, barrywilson@fs.fed.us; Rachel Riemann, rriemann@fs.fed.us

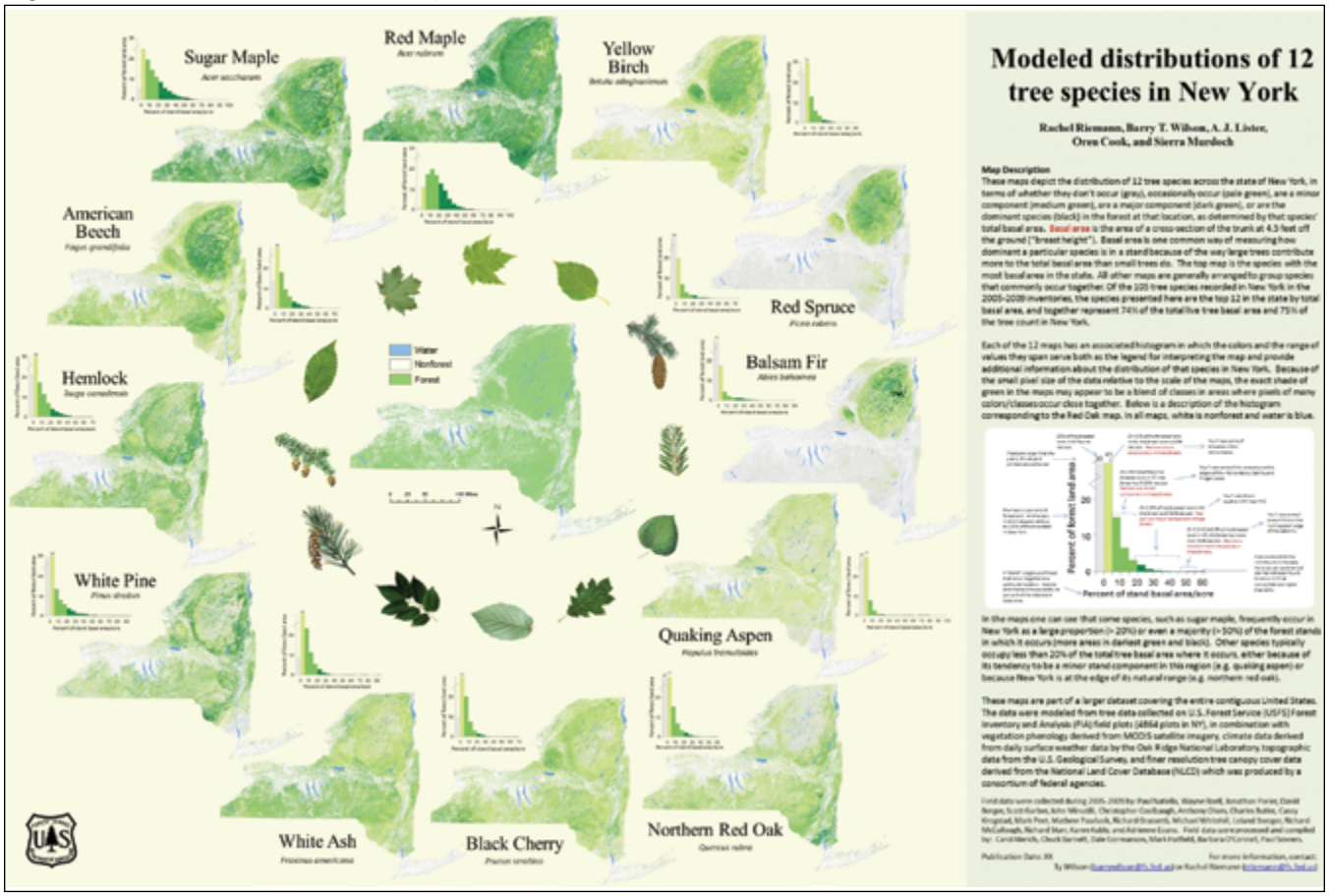
Paper: Wilson, B.T.; Lister, A.J.; Riemann, R.I. 2012. A nearest-neighbor imputation approach to mapping tree species over large areas using forest inventory plots and moderate resolution raster data. Forest Ecology and Management. 271: 182–198.

RDS (Dataset): Wilson, B.T.; Lister, A.J.; Riemann, R.I. 2013. Modeled tree species distributions across the contiguous United States. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. [Dataset]. Available at: http://dx.doi.org/10.2737/RDS-2013-0013.

RMAP: Riemann, R.I.; Wilson, B.T.; Lister, A.J.; Cook, O.; Murdoch, S. 2013. Modeled distributions of 12 tree species in New York. Research Map NRS-X. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. [Map].

Finding: Forest inventory and satellite data documenting forest canopy-cover change were linked by Forest Service scientists to other sources to predict water quality (phosphorus and

Figure 9. Modeled distributions of tree species in New York.



sediment levels) measured in rivers mouths on Lake Superior and Lake Michigan. This information can help with predicting the water quality expected at ungauged river mouths. Managers can use resulting rankings of land and watersheds to prioritize restoration investments.

Accomplishment: Watersheds have an important influence on water quality, and watershed characteristics can be used to predict stream water quality. Forest Service scientists used novel information derived from the Landsat data archive describing forest canopy-cover change, along with forest inventory data and existing land cover data, to predict total phosphorus and turbidity in Great Lakes streams draining into Lakes Superior and Michigan. In the Lake Superior basins, phosphorus output increased with the amount land in agriculture, recent forest disturbance, and persisting forest cover; turbidity measurements increased with recent forest disturbance, the amount of land in agriculture, persisting forest, and urban land. In the basins draining to Lake Michigan, phosphorus output was related to ecoregion, increased with urban land, and decreased with older forest disturbance and watershed storage; turbidity measurements increased in some ecoregions and with recent forest disturbance, and decreased as the amount of conifer forest increased. Forest Service scientists used these relationships to identify and prioritize restoration areas in watersheds without observed in-stream data. This prioritization of watersheds will help effectively manage the Great Lakes Watershed and result in efficient use of restoration funds, leading to improved near-shore water quality.

Outcome: Presentations were made to our funding partners and at relevant professional meetings. An article summarizing the results was published in the Journal of Great Lakes Research, and the resulting data are being released to our partners and the public as research datasets (RDS) and RMAPs.

Contact: Charles H. (Hobie) Perry, charlesperry@fs.fed.us

Seilheimer, T.S.; Zimmerman, P.L.; Stueve, K.M.; Perry. C.H. 2013. Landscape-scale modeling of water quality in Lake Superior and Lake Michigan watersheds: How useful are forest-based indicators? Journal of Great Lakes Research. 39(2): 211–223. doi:10.1016/j.jglr.2013.03.012.

The following is a link to a press release from the journal following publication: http://www.iaglr.org/jglr/release/39/2013.03.012_seilheimer.php

Partners: National Forest System (NFS) Remote Sensing Applications Center, Salt Lake City, UT; NASA, funding source

for Landsat tool development; University of Maryland, Landsat tool development; EPA Great Lakes Restoration Initiative, funding source for tool application and model development.

Pacific Northwest Research Station FIA Program

Finding: The 2008–2010 housing collapse and recession hit Oregon's forest industry hard. Harvests from 2008 through 2010 were the lowest three since the Great Depression, with 2.7 billion board feet in 2009, the lowest harvest since 1934. By the end of 2010, more than a dozen large mills and numerous small mills closed permanently from lack of demand. Timber-processing capacity dropped from 5,142 million board feet of timber (MMBF) Scribner in 2006 to 4,417 MMBF Scribner in 2010. Lumber production dropped by half, falling from 7.4 billion board feet lumber tally in 2005 to 3.8 billion board feet in 2009, with slightly more than 4 billion board feet of lumber produced in 2010.

Accomplishment: This report traces the flow of Oregon's 2008 timber harvest through the primary timber processing industry and provides a description of the structure, operation, and condition of Oregon's forest products industry as a whole. It is the second in a series of reports that update the status of the industry every 5 years. We provide detailed information (based on a census conducted in 2009 and 2010) about the industry in 2008, discuss historical changes, and address more recent trends in harvest, production, and sales. To convey the severe market and economic conditions that existed in 2008, 2009, and 2010 (fig. 10), we also provide updated information on the industry and its inputs and outputs through 2010.

Outcome: Data and conclusions from this report are being used to guide investments and steps toward recovery of a significant economic industry regionally. Local rural economies that were especially susceptible to the recession are looking for ways to transform and provide increased options to maintain viable communities.

Contacts: Charles Keegan, charles.keegan@business.umt.edu; Glenn Christensen, gchristensen@fs.fed.us

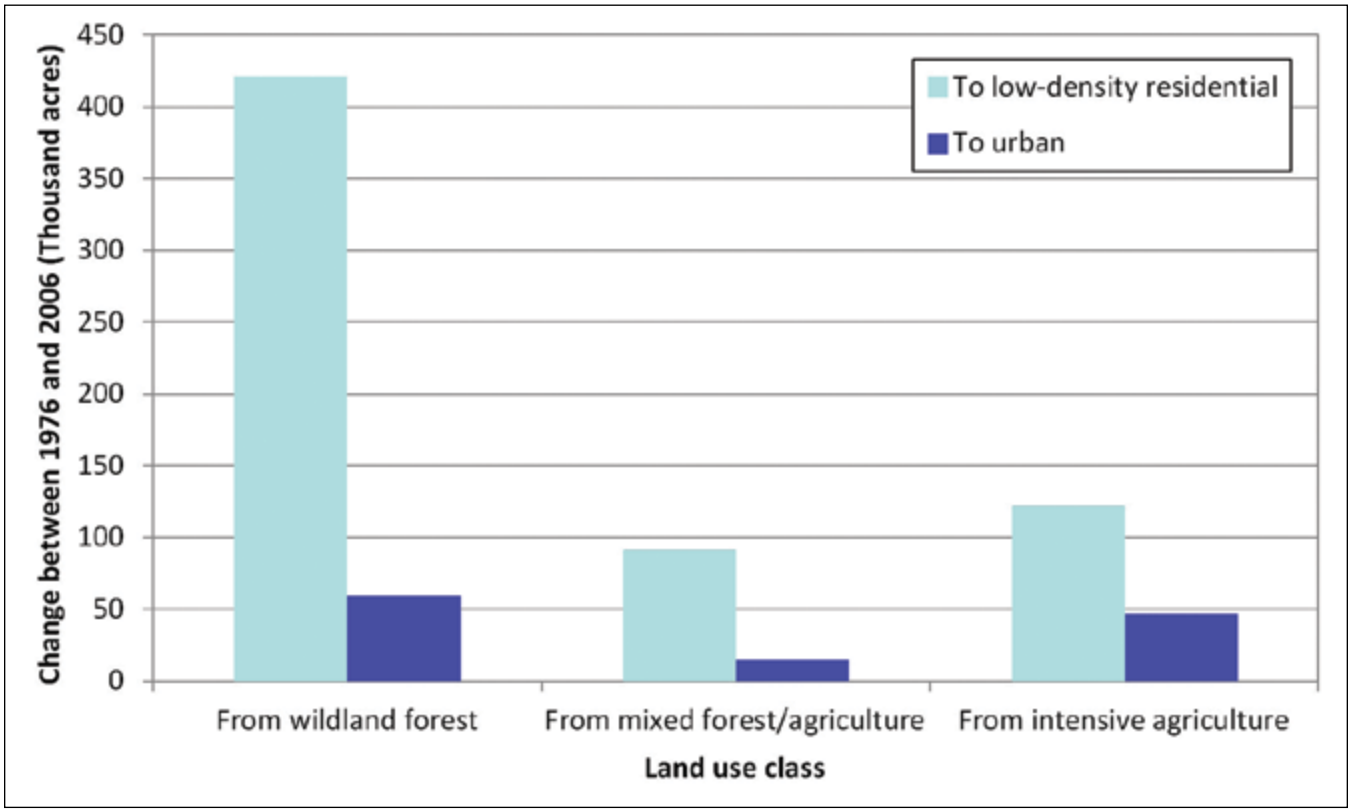
Gale, C.B.; Keegan, C.E., III; Berg, E.C. [and others]. 2012. Oregon's forest products industry and timber harvest, 2008: industry trends and impacts of the Great Recession through 2010. Gen. Tech. Rep. PNW-GTR-868. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 55 p.

Partner: University of Montana, Bureau of Business and Economic Research

Finding: Population in Washington State increased by 2.5 million people (66 percent) during the 30-year period 1976–2006, during which time 1.16 million acres were converted from forest and agriculture land use classes to residential and urban land uses (fig. 11). The greatest changes were in western Washington, where forest lands declined at a rate of 0.2 percent per year and intensive agricultural lands declined at a rate of 0.7 percent per year. Of non-Federal land in western Washington, 20 percent was in developed land uses in 2006. The density of

Figure 10. Harvest operations occur amid a backdrop of different age classes in Oregon.

Figure 11. The greatest losses in forest land occur as conversion to low-density residential land use.



housing structures on lands that remained in forest and agricultural land uses also increased during the period of interest, particularly in areas close to developed land uses. The rate of housing increase on resource lands was greater from 1994 to 2006 than from 1976 to 1994 in eastern Washington, but declined in western Washington. This method of assessing land use change compared favorably with other approaches and had the advantage that it could be applied consistently to a longer period of time and enabled detailed assessment of patterns at local scales.

Accomplishment: The purpose of this study was to apply a robust manual image classification method to assess changes in land use and housing density across Washington State for a 30-year period. Digital imagery from 1976, 1994, and 2006 was classified to land use, classifications were assigned to a systematic-random grid of 44,554 photointerpretation points on non-Federal lands, and houses were identified within 80-acre circles around each nonurban point.

Outcome: Monitoring and reporting on land use and concomitant changes over long-term periods enable municipalities to evaluate the efficacy of land use laws and adjust to reach desired goals. Comparing trends across States with differing land use laws enables individual States to determine whether their laws facilitate their objectives.

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

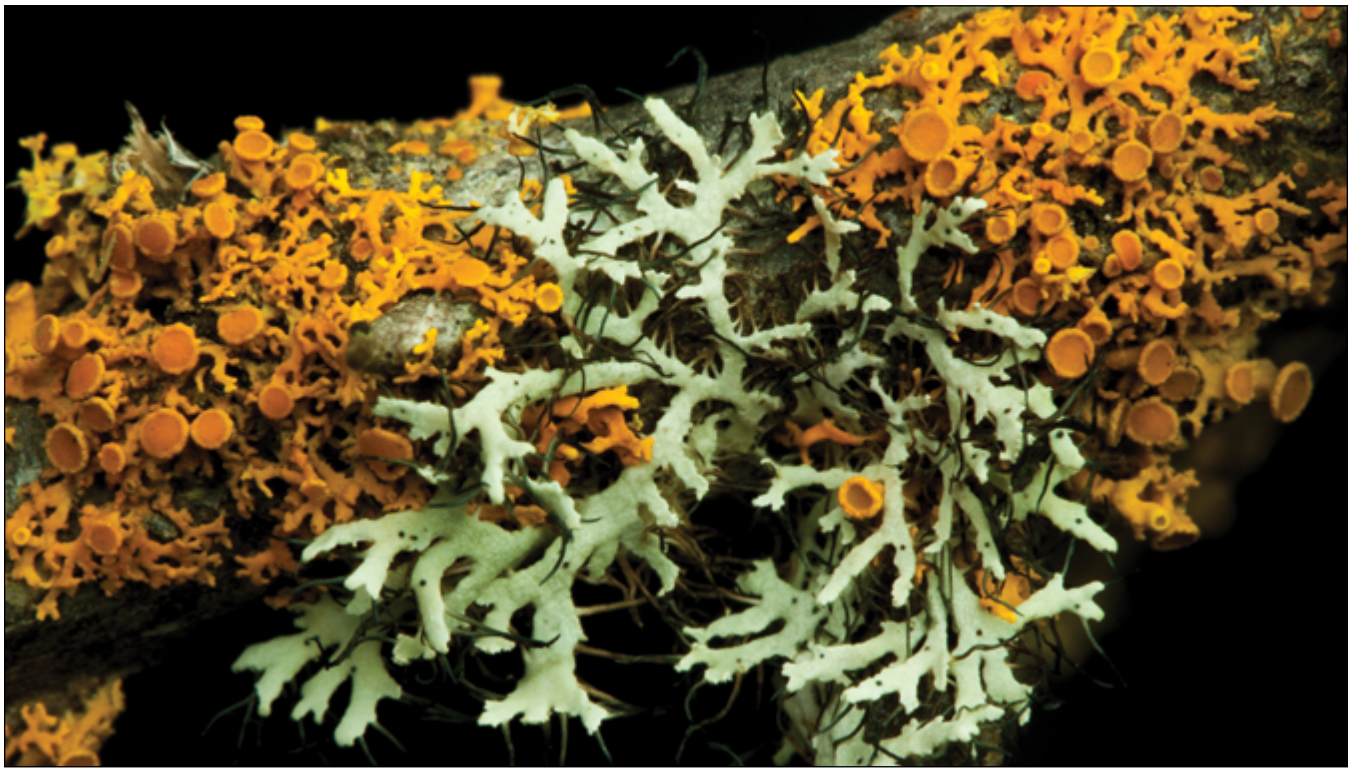
Gray, A.N.; Azuma, D.L.; Lettman, G.J. [and others]. 2013. Changes in land use and housing on resource lands in Washington State, 1976–2006. Gen. Tech. Rep. PNW-GTR-881. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 51 p.

Partners: Forest Service, Forest Health Monitoring Program; Oregon Department of Forestry.

Finding: Researchers use data from the FIA lichen indicator to define critical loads (CLs), thresholds that describe the largest quantity of nitrogen (N) deposition that a forest can handle before early warning, "canary-in-the-coal-mine" organisms are negatively impacted (fig. 12). CLs serve as guidelines for managers and policymakers who must balance environmental impacts against the positive economic outcomes that produce N emissions (transportation, industry, and agriculture). Results showed that the abundance of N-loving lichens has a strong linear correlation with total N deposition and is not a response to any particular N pollutant.

Accomplishment: This study corroborates the utility of N-loving lichens for mapping N deposition, their use as effective bioindicators, and utility for policy-defining tools such as CLs. This calibration work was undertaken because N is part of many gaseous, particulate, and aerosol air pollutants, and it was not known which form(s) most affect lichens. Effective CLs must clearly link impact with specific pollutants. Lichen responses to N were examined against an unprecedented variety of *in situ* measurements of N in the San Bernardino Mountains.

Figure 12. *Physcia tenella* and *Xanthoria polycarpa* lichen species are indicators of nitrogen enrichment and often are found co-occurring on branches and twigs of urban trees.



Situated downwind of the Los Angeles metropolitan area, forests receive heavily polluted air masses. Only pollution-tolerant lichen species remain.

Outcome: This research challenges the use of lichens for developing "critical levels," which are used to set target emissions for N gases in Europe. CLs define a threshold of N deposition whereas critical levels define concentrations of N gases. For the lichen indicators used in this study, response was driven by the contribution of multiple gases and other forms of N to total N deposition.

Contact: Sarah Jovan, sjovan@fs.fed.us

Jovan, S.; Riddell, J.; Padgett, P.E.; Nash, T.H. 2012. Eutrophic lichens respond to multiple forms of N: implications for critical levels and critical loads research. Ecological Applications. 22(7): 1910–1922.

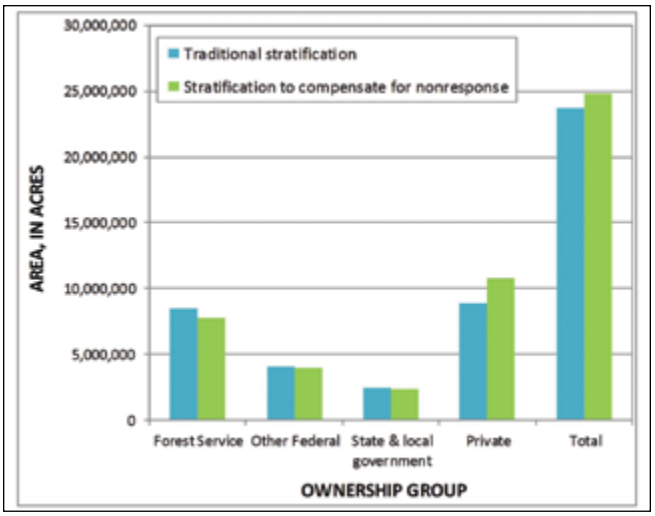
Partner: Pacific Southwest Fire Lab, Arizona State University School of Life Sciences

Rocky Mountain Research Station, Interior West FIA Program

Findings: FIA's estimates are based on a sample design that is unbiased and representative of all lands. When a large proportion of plots in a given area cannot be measured (for example, when private landowners do not grant permission to access plots on their property), the area of forest land may be underestimated. We developed a stratification scheme that accounts for plots that cannot be measured (nonresponse plots).

- In New Mexico, the traditional FIA stratification underestimated forest land area by about 1 million acres compared with the stratification that compensates for nonresponse (fig. 13).

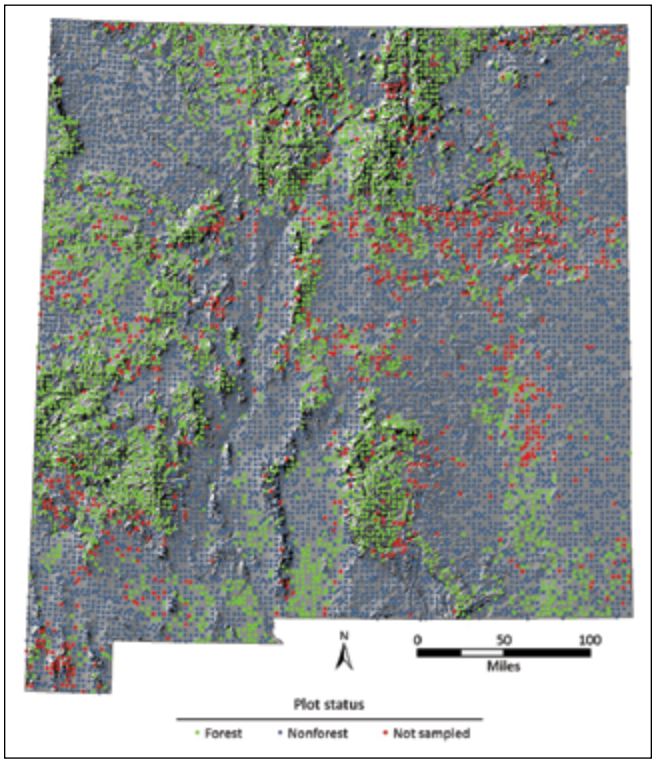
Figure 13. Estimated forest land area by owner group, based on traditional stratification compared with stratification that minimizes nonresponse bias.



- One unexpected consequence of accounting for high nonresponse is that strata with very low percentages of nonresponse, such as those with most plots on NFS lands, were assigned disproportionately high weights under the traditional stratification. Thus, failure to address high nonresponse may lead to underestimation at the State level and also lead to overestimation for specific areas with a low percentage of nonresponse.

Accomplishment: From 2008 through 2012, nearly 12,000 forest inventory plots were sampled in New Mexico, and more than 1,000 of these were nonresponse plots (fig. 14). Two factors were identified that affect each plot's chance of being nonresponse. The first factor is plot ownership status. The second factor is each plot's classification as either an "office plot" or a "field plot," based on visual inspection of high-resolution photos in the office. The office plots are plots designated as nonforest based on the photos. The remaining plots cannot be classified as nonforest based on the photos and are sent to the field to be surveyed by a field crew. The office plots have zero chance of being nonresponse, while field plots have a positive chance of being nonresponse. We then developed a stratification key, based on these two factors, to stratify plots into groups where each plot in the group has an equal chance of nonresponse. We then used the resulting strata to estimate New Mexico's total forest area.

Figure 14. The distribution of forest plots, nonforest plots, and not measured (nonresponse) plots in New Mexico's forest inventory.



Outcome: The stratification process and key were published as a research note. Investigation of the impact of stratifying to compensate for nonresponse on tree-level attributes, such as growth and mortality, is ongoing and will be published as a journal article.

Contacts: Sara Goeking, sgoeking@fs.fed.us; Paul Patterson, plpatterson@fs.fed.us

Goeking, S.A.; Patterson, P.L. 2013. Stratifying to reduce bias caused by high nonresponse rates: a case study from New Mexico's forest inventory. Res. Note RMRS-RN-59. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 22 p. http://www.treesearch.fs.fed.us/pubs/42771.

Partner: New Mexico Energy, Minerals and Natural Resources Department, State Forestry Division.

Findings: The NFS is subject to carbon monitoring requirements under the Climate Change Performance Scorecard and the new Planning Rule. As carbon is stored in forests and forest products, greenhouse gases are kept out of the atmosphere. It is thought that informed forest management might mitigate the harmful effects of greenhouse gases released through human activities. FIA provides comprehensive information about current carbon stocks, but sheds little light on how management and natural disturbance affects the amount of carbon stored in Federal forests. Combined with the Forest Vegetation Simulator (FVS—maintained by the Forest Service Forest Management Service Center) and time series of Landsat satellite imagery, however, FIA is currently supporting assessment of carbon dynamics on every national forest.

Accomplishments: FIA has worked with NASA and university partners for several years to develop ways to use remote sensing to map historical forest disturbances and trends. FIA has recently combined satellite-based maps with FIA plot data, NFS monitoring resources, and the FVS in an application called the Forest Carbon Management Framework (ForCaMF). ForCaMF allows for assessment of the relative impact of either mapped or hypothetical disturbance and management patterns on carbon storage. Uncertainties related to both supporting maps and the underlying FVS model are tracked through innovative analyses of simulated errors.

Outcome: With strong support from the Office of Climate Change and FIA, ForCaMF is being applied to every national forest (fig. 15). Preliminary results are available for the northern part of NFS Region 2, highlighting the important role of fire and root disease in carbon storage in both short and long timeframes. Forest-specific reports for the NFS Regions 5 and 8 will be delivered in 2014. Insight into how the effects of harvests on carbon storage compare with the effects of growth and natural disturbances are expected to provide important context as forest

Figure 15. Fires release large amounts of carbon to the atmosphere through combustion and create even larger amounts of dead material that breaks down and is emitted over longer timeframes. (Public domain photo, courtesy of the U.S. Fish and Wildlife Service.)

plans are revised over the next several years. This processing has been centralized in the Rocky Mountain Research Station Inventory and Monitoring Program, which should reduce redundant and possibly incompatible monitoring efforts as managers across NFS address mandated information needs.

Contact: Sean Healey, 801–625–5770

Partners: NASA, Applied Sciences Program; Forest Service, Office of Climate Change, IW-FIA Unit, NFS Region 1 Resource Information Management Board; and Utah State University.

Finding: FIA tree-ring data show used for a broad range of applications**.**

Accomplishment: In 2009, the IW-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. The program had two primary goals for using 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. With inventory and archiving of the periodic inventory cores nearing completion, the project is entering a new phase. Tree-ring measurement capabilities have been added at the Ogden Forestry Sciences Lab, complementing the capability of the existing lab at Utah State University and allowing for more flexibility. In addition to supporting the main IW-FIA archiving project, we have provided support to forest growth modelers at the Texas A&M 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. More than 1,500 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 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 El Niño-Southern Oscillation (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.

Outcomes: In the first exploratory climate study, we analyzed Douglas fir and pinyon pine chronologies as potential climate proxies. When compared with 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 ENSO dipole and revealed considerable latitudinal fluctuation during 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 Interior West. The results highlight the possibility of further developing high-spatial-resolution climate proxy datasets for the Western United States.

Contacts: John D. Shaw, jdshaw@fs.fed.us, 801–598–5902; R. Justin DeRose, rjderose@fs.fed.us, 801–625–5795

Publications: http://www.treesearch.fs.fed.us/pubs/42679; http://www.treesearch.fs.fed.us/pubs/43201

Partners: Utah State University; University of Utah; Texas A&M Forest Service; and University of Alaska, Fairbanks.

Southern Research Station FIA Program

Finding: Recognizing the ecological and economic importance of nontimber forest products, the SRS has recently partnered with four institutions to advance our understanding of nontimber forest products (NTFPs). In addition to yielding practical tools for managing NTFPs, these partnerships are providing volunteer citizen scientists opportunities to explore all aspects of forest-based research.

Accomplishment: Overharvesting is a major cause of population decline in medicinal forest plants, but managers lack even basic methods to inventory them. In partnership with Radford University, SRS-FIA scientists developed a tool that estimates belowground biomass of black cohosh (*Actaea racemosa*) based on measurements of aboveground vegetation—providing a practical, efficient, and simple approach to inventory black cohosh and a template for inventory plans for other NTFPs (Chamberlain et al. 2013a).

Research by SRS-FIA scientists in partnership with Virginia Polytechnic Institute and State University (Virginia Tech) and the American Herbal Products Association demonstrated that co-managing eastern hardwood forests for timber and American ginseng (*Panax quinquefolius*) (fig. 16) benefits local economies while conserving biodiversity (Chamberlain et al. 2013b). Ginseng has been harvested from temperate hardwood forests for hundreds of years, and more than $27 million each year goes to the harvesters. Annual sales of ginseng could support thousands of full-time harvesters.

Last, SRS-FIA has partnered with Virginia Tech to develop a system to track nontimber forest products. With an initial focus on medicinal plants, the goal is to develop methods to track all nontimber forest products. Already the system is providing insights into harvest volumes of a dozen species in Virginia. These partnership efforts have been highlighted in recent issues of *CompassLive*, the Southern Research Station (SRS) newsletter.

Figure 16. American ginseng (*Panax quinquefolius*). (USDA National Agroforestry Center.)

Outcome: These studies have yielded useful tools that will be instrumental for incorporating inventory of NTFPs with

traditional forest inventory and have laid the groundwork for wiser management of economically important NTFPs such as American ginseng. This work also supports efforts targeting historically underserved populations and rural communities.

Contact: James L. Chamberlain, jchamberlain@fs.fed.us

Chamberlain, J.L.; Ness, G.; Small, C.J. [and others]. 2013a. Modeling below-ground biomass to improve sustainable management of *Actaea racemosa*, a globally important medicinal forest product. Forest Ecology and Management. 293: 1–8.

Chamberlain, J.L.; Prisley, S.; McGuffin, M. 2013b. Understanding the relationships between American ginseng harvest and hardwood forests inventory and timber harvest to improve co-management of the forests of the Eastern United States. Journal of Sustainable Forestry. DOI:10.1080/10549811.2013.798828.

Partners: Radford University; Virginia Tech, Department of Forest Resources and Environmental Conservation; American Herbal Products Association.

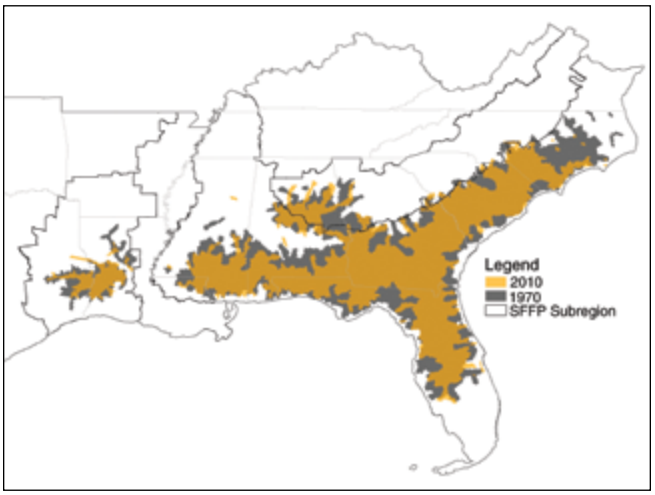
Finding: Longleaf pine (*Pinus palustris* Mill.) acreage in the Southern United States has been reduced by more than 95 percent over the past several decades.

Accomplishment: A new report from the Forest Service, SRS (Oswalt et al. 2012) describes the history and current condition of longleaf pine in the Southern United States. Longleaf pine (*Pinus palustris*) (fig. 17) was once one of the most ecologically important tree species in the Southern United States, with longleaf pine forests spanning an estimated 92 million acres in a range that stretched from southwest Virginia to eastern Texas. Today, even though much interest in longleaf pine forest ecosystems continues, only 4.3 million acres of longleaf pine forests remain, with much of this acreage in poor or degraded condition.

Figure 17. A mature, open stand of longleaf pine in Chesterfield County, SC. (Jack Culpepper, U.S. Fish and Wildlife Service.)

Historical and contemporary FIA data were used to present estimated changes to southern longleaf pine forests, implications for the conservation of the species, and suggestions for future research. Though the data show that the range of longleaf pine in the South has contracted over the past four decades (fig. 18), findings in the report point towards potential improvement. Significant challenges to expanding longleaf-pine-dominated forests in their former range certainly exist. With targeted research and conservation efforts, however, these forests could thrive again across the South.

Figure 18. Geographic extent of longleaf pine in the South as sampled by the Forest Inventory and Analysis program, 2010 compared with the 1970s. Southern Forest Futures Project subregions have distinct ecological, social, cultural, and economic characteristics. For more information, see http://www.srs.fs.usda.gov/futures/technical-report/.



Outcome: Findings from the report provide a solid baseline of information that land and natural resource managers can use in the future to assess the impact of ongoing longleaf pine forest restoration activities.

Contact: Christopher M. Oswalt, coswalt@fs.fed.us

Oswalt, C.M.; Cooper, J.A.; Brockway, D.G.; Brooks, H.W.; Walker, J.L.; Connor, K.F.; Oswalt, S.N.; Conner, R.C. 2012. History and current condition of longleaf pine in the Southern United States. Gen. Tech. Rep. SRS–166. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 51 p.

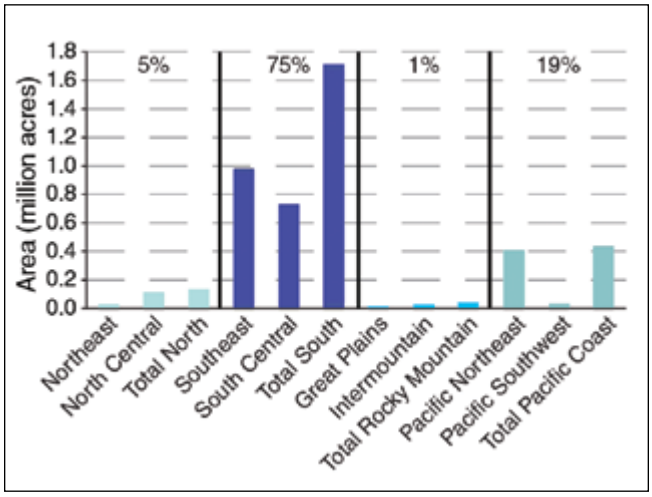
Partner: Forest Service, Longleaf Pine Ecosystems Research Unit

Finding: After 12 years of limited reporting, a nationwide survey of commercial tree planting activity has been reinstated for annual reporting.

Accomplishment: Reliable tree planting data are critical for informed decisions regarding forest sustainability and future wood supply. Such data help nurseries plan for production

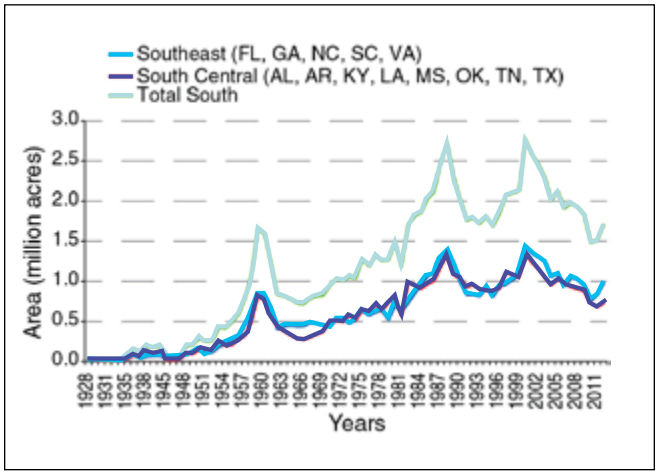
needs, and provide policymakers with information regarding realistic forest conditions and future impacts. The SRS-FIA and NFS Southern Region and Northeastern Area State and Private Forestry programs led a survey effort in which cooperators at Auburn University, Purdue University, and the University of Idaho distributed a questionnaire to tree nurseries. Collaboration with nursery managers and assurance of confidentiality resulted in the collection of more than 95 percent of the production from initial and follow-up contacts of more than 220 commercial tree nurseries across the United States and Canada during the 2011–12 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 (fig. 19). 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 (fig. 20). In the South, planted stands supply 39 percent of total removals from just 23 percent of the forested acres.

Figure 19. Acres and percent of tree planting by region and subregion in the United States, FY 2012.



FY = fiscal year

Figure 20. Tree planting in the South, 1928–2012.



Outcome: These data are critical to help the forestry community, researchers, and policymakers assess and maintain sustainability of the working forests.

Contact: Richard Harper, raharper@fs.fed.us

Partners: Forest Service State and Private Forestry; Auburn University; Purdue University; University of Idaho; 220 nursery industry cooperators throughout the United States.

National Office FIA Staff

The National Office of the FIA program helps to guide and coordinate the FIA field units in implementing the enhanced FIA program. Most of the National Office accomplishments include making presentations, preparing policy white papers and budget justifications, and providing input to reports for national and international organizations.

In FY 2013, the National Office staff, in collaboration with field units—

- Provided budget coordination, briefings, and guidance for FIA field units.
- Facilitated one FIA management team meeting, six conference calls, and dozens of briefings for internal and external partners, customers, collaborators, and supporters.
- Collaborated with the Society of American Foresters and helped organize the ninth national users group meeting for FIA customers, which was held in New Orleans, LA, in March 2013.
- Published the *Forest Inventory and Analysis Fiscal Year 2012 Business Report*.
- Worked with field units and partners to draft a new FIA Strategic Plan in response to the proposed Farm Bill. If the Farm Bill becomes legislation a final plan will be reviewed, prepared and presented to Congress.
- Continued to work with USDA and U.S. Department of the Interior general council on the memorandum of understanding (MOU) with the National Park Service guiding FIA operations on Park Service lands.
- Worked with global resource data strategy team, representing the Forest Service on the Interagency Council on Agricultural and Rural Statistics Land Use Working Group.
- Continued providing support for coding and testing the National Vegetation Classification System algorithm for use with FIA data, in cooperation with FIA by NatureServe.

- Continued to work with the United Nations Food and Agriculture Organization on the global Forest Resources Assessment and oversight of the Global Remote Sensing Project to estimate and monitor area changes of the world's forests.
- Continued to oversee collaborative work with NASA on land cover and land use tracking in the United States.
- Participated in SilvaCarbon, a flagship program under U.S. fast-start financing for Reducing Emissions from Deforestation and Forest Degradation Plus, or REDD+, and is a U.S. contribution to the Forest Carbon Tracking task of the intergovernmental Group on Earth Observations.
- Worked with Mexico with plans to develop a remote field data entry system and proposed a workshop providing an overview of the FIA MIDAS.
- Drafted report on 10-year activities of the North American Forestry Commission Inventory Working Group.
- Participated in Forest Service Safety Journey training engagement sessions.

Contacts: Greg Reams, greams@fs.fed.us; Brad Smith, bsmith12@fs.fed.us

FIA Data Requests and Access

The FIA Spatial Data Services (SDS) Team provides spatial data services to clients and operates as a virtual Spatial Data Services Center (SDSC) with staff located throughout the country. SDSC staff consists of—

Liz LaPoint—Team Lead, NRS, national projects

Rich McCullough—NRS, national projects and northern region projects

Sam Lambert—SRS

Jock Blackard, Chris Toney—RMRS IW

John Chase, Tom Thompson, Joel Thompson—PNW

Partners

MOU agreements continue to be put in place for those clients for whom access to the confidential data is critical for the project and it clearly benefits FIA. Most data requests do not require an MOU and are handled by SDS personnel working with the client to provide the information needed. New partners include the Cary Institute of Exosystem Studies, the University of Maryland, Utah State University, and RTI International. MOUs remain in place with a variety of partners from academia, industry, and government groups.

FY 2013 Spatial Data Requests

In FY 2013, 521 requests were active (fig. 21). National or multiregional data requests accounted for 10 percent of the total number of requests. Of the received requests, 99 percent were completed by the end of the fiscal year and 1 percent remains in progress.

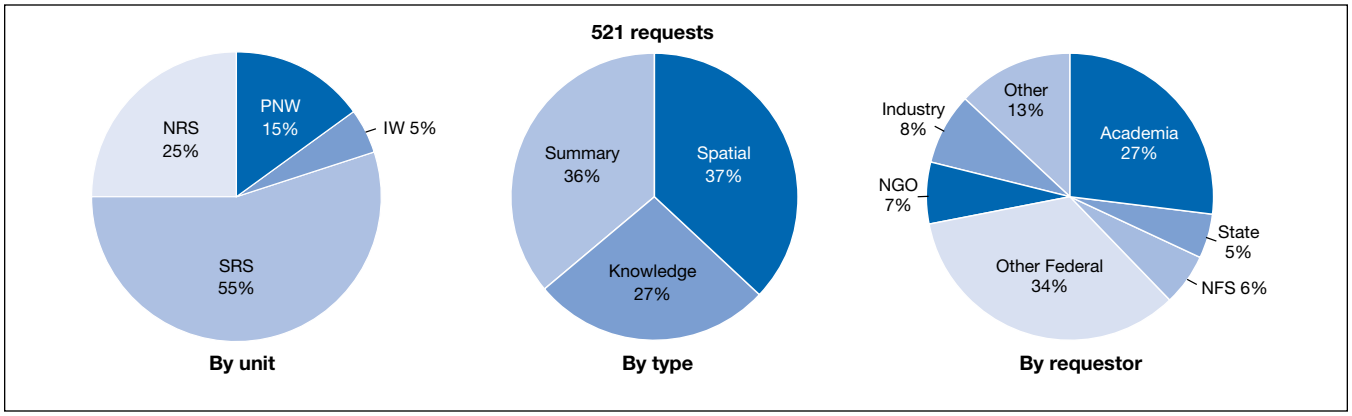
Requests are cataloged by type and are almost evenly divided among knowledge, summary, and spatial types (fig. 21). In FY 2013, Federal agencies were the largest group of spatial data requestors, with 40 percent of all new requests, followed by academia, with 27 percent (fig. 21).

FY 2013 Web Tools

The FIA program has been serving data to the public since 1996 through a variety of Web tools. FY 2013 was particularly challenging because a number of technical issues at the national data center caused the tools to be unreliable and unstable for 47 days; as a result, Web traffic during that time was down about 50 percent.

The first database retrieval program FIA released in 1996 was the FIA Data Base Retrieval System (DBRS). The DBRS enabled the public to query regional FIA datasets in eastwide/westwide format. In 2002, the Forest Inventory Mapmaker program was introduced, enabling the public to generate estimates from national FIA data in the newly created Forest Inventory and Analysis DataBase. The current generation of data retrieval programs produces estimates and their associated sampling errors. Forest Inventory Data Online (FIDO) was introduced in 2008, and the EVALIDator Web application was introduced in 2009.

Figure 21. Requests made to the FIA Spatial Data Services Center in 2013.



FIA = Forest Inventory and Analysis. IW = Interior West. NFS = National Forest System. NGO = nongovernmental organization. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. SRS = Southern Research Station.

Based on analysis of the FY 2013 Internet protocol addresses using FIDO, academia accounted for 26 percent of the users, corporate use 19 percent, Government use (State and Federal combined) 17 percent, nongovernmental organizations (NGOs) accounted for 1 percent, 3 percent of users were from outside the United States, and 34 percent were indeterminate. The total number of FIDO retrievals was 57,567.

The analysis of the FY 2013 Internet protocol addresses using EVALIDator portrays a different breakdown in user categories: academia 17 percent, corporate use 7 percent, State and Federal government combined 49 percent, NGOs <1 percent, external to the United States 2 percent, and 25 percent were indeterminate. The total number of EVALIDator users was 33,759. A larger percentage of EVALIDator users are from Federal and State agencies.

Both FIDO and EVALIDator are being actively "crawled" by various Web search engines—with a significant number of page hits resulting from this activity that are not included in the totals above.

In 2009, a Web application was developed that allowed querying of the National Woodland Owner Survey (NWOS) database. In FY 2013, 4,502 retrievals were completed. The FIA DataMart was revised in FY 2009 to include the ability to download FIADBs by State as Microsoft Access database files. The Access databases contain a reporting tool (the EVALIDator-PC) that enables the user to generate reports. These reports are not included in table 4 but undoubtedly number in the thousands or tens of thousands. These State databases are included on DVDs that are distributed with each NRS State's 5-year report.

In FY 2010, users downloaded 18,026 Zip™ files that contained data from 1 or more FIADB tables. In FY 2011, 24,576 Zip™ files for a single file were downloaded. In FY 2011, users downloaded 2,544 Zip™ files containing the entire set of text files for a given State. In FY 2012, 1,512 Zip™ files were downloaded. In FY 2013, a total of 7,383 files (State and individual files combined) were downloaded from FIA's DataMart.

In 2003, the FIA Mapmaker program added a module that enabled the user to download FIA data in FVS format. This feature was lost with the retirement of the Mapmaker program in 2009. The FVS format is now available through a tool developed by the Forest Management Service Center. The FIA2FVS program is used to extract data fields from the FIADB into an FVS-ready database. The FIA2FVS program can be downloaded from http://www.fs.fed.us/fmsc/fvs/software/data.shtml.

The National Reporting and Data Distribution (NRDD) team has been providing webinars and in-person trainings on our Web tools. NRDD team webinars and training sessions covering the use of FIA data, and our tools have been provided since 2010. With FY 2013 budget reductions, in-person outreach from the team declined but virtual outreach in the form of webinars and online presentations continued.

Consultations by FIA Staff

Consulting with FIA customers is a growing part of our business. Just as we have increased the amount of information (both data and analyses) made available on our Web site, our FIA staff are increasingly in demand by customers seeking either to understand more about the FIA program and our results or seeking to address a specific question not obviously addressed through other means. Questions pertaining to a single administrative unit (e.g., to a single State or national forest) often are referred to partners within that administrative unit (e.g., State foresters and national forest analytical staff) who can often provide better context and who prefer to maintain their contacts with their customers. When questions span multiple administrative units, FIA staff will try to help the customer find an answer. FIA does not compete with private-sector consultants; rather, we answer questions about our methods and help customers (including private consultants) use FIA data to answer their own or their clients' questions. Appendix table B-6 shows the number of significant consultations that FIA staff provided in FY 2012, by unit and by type of customer. A significant consultation is defined as any dialogue with a customer outside of FIA that requires more than 1 hour to address and which is not part of our normal course of business in collecting, analyzing, and reporting on FIA information.

Table 4. Number of database retrievals using FIA Web applications by fiscal year.

	Fiscal year										
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of retrievals	14,973	26,548	56,475	24,335	26,615	59,609	90,974	101,643	132,413	94,027	103,211

FIA = Forest Inventory and Analysis. FY = fiscal year.

Combined, FIA staff addressed 827 significant consultations, which required 8,124 staff hours to complete (table 5)—equivalent to 4 full-time staff years. Of the consultations, 310 were conducted with other Government agencies, such as State agencies and other Federal agencies, accounting for 69 percent of the time. The staff also had internal discussions within the Forest Service. Other major client groups included academic clients (approximately 21 percent of the consultations and 16 percent of the time), industry (16 percent of the consultations and 7 percent of the time), and NGOs (13 percent of the consultations and 6 percent of the time). The data also show some regional variations. For example, mostly State government organizations are the major clients throughout the country. FIA data indicate that industry and academic customers are the second most prominent clients (appendix table B-6).

Table 5. Number and hours of significant consultations by FIA staff, by customer group, FY 2013.

Customer group	Number	Hours
Academic	176	1,283
Government	310	5,582
Industry	131	551
NGO	108	465
NIPF	24	71
Media	15	32
Other	60	140
Total	**824**	**8,124**

FIA = Forest Inventory and Analysis. FY = fiscal year. NGO = nongovernmental organization. NIPF = nonindustrial private forest.

National Inventory and Monitoring Applications Center

The National Inventory and Monitoring Applications Center (NIMAC) was formed in 2006 during the merger of the North Central and Northeastern Research Stations. Although NIMAC is part of the NRS FIA program, it is responsible for providing national technical assistance to FIA customers on planning, conducting, processing, and analyzing forest inventories.

National Forest Collaboration

In FY 2002, the Deputy Chief for R&D and the Deputy Chief for the NFS signed an internal MOU, providing for permanent inclusion of all national forest lands within the FIA program. This provision was a significant step forward for FIA customers, guaranteeing the availability of consistent FIA information across the entire United States. Under the terms of the agreement, NFS provides permanent funding to help cover the cost of the FIA program on their lands, and, in return, the FIA program agrees to implement the program in a manner consistent with other forested lands within the same State and to load FIA data into the national forest vegetation database for use in forest planning and other landscape and regional assessments. FIA also provides advice for and assistance in developing forest and regional sampling protocols linked to FIA and collaborates with national forests that want to contribute additional resources for additional sampling.

NFS is funding FIA's NIMAC to develop the Design and Analysis Toolkit for Inventory and Monitoring (DATIM). The design tool helps identify inventory information needs, such as additional sampling or intensification, and aids in developing Forest Plan Monitoring Plans. The analytical tools enable NFS to quickly analyze an enhanced form of existing FIA data that better serves NFS needs by adding NFS attributes computed using the FVS. These analyses can be localized using a Geographic Information System, or GIS, and map attributes can be used in the analysis. The first production version will be available to Forest Service employees in 2014. We hope to make it available to all FIA customers in 2015.

After working with NIMAC on determining intensification levels on a few forests, NFS Southern Region is working on its own with the remaining forests using the design tool and has hired a retired FIA analyst to work with the existing and intensified FIA data. NFS Eastern Region continues to fund NRS FIA to ensure that all its forests are intensified two- or three-fold.

NFS Pacific Southwest and Pacific Northwest Regions continue to work with PNW to intensify the sample and collaborate in crew training, contract administration, and data collection. NFS Northern and Intermountain Regions have collaborated with IW-FIA to further expand current FIA protocols to include collecting information on all land types, not just the forested portion. Both regions are using an intensification system that integrates with the IW-FIA base data yet enables the regions to use NFS applications to collect intensified data and store them in the NFS vegetation database. NFS Region 3 worked with IW-FIA to remeasure plots in recently burned areas to update their forest-level data. NIMAC is assisting NFS Alaska Region with monitoring efforts on the Tongass.

FIA is collaborating on a Forest Service-wide effort to improve inventory, monitoring, and assessment. As part of the all-land approach and the new Planning Rule, FIA data will be more heavily used by NFS and also by other partners. For example, each national forest must now complete a climate scorecard, a significant portion of which can be addressed using FIA data. In collaboration with NASA and R&D Global, FIA has provided results for all forests.

Based on feedback from the nine NFS regions, FIA is meeting many of the needs of NFS partners. The development of streamlined vegetation and down woody material protocols for use on all plots has helped the western regions define and collect a consistent set of regional variables on NFS lands to meet NFS needs. More effort is required to get FIA data from NFS lands into the hands of NFS staff and in developing data presentations, analyses, and reports tailored to the specific needs

of NFS managers. DATIM is working to help automate data delivery by creating a more comprehensive and accessible datamart. FIA will continue to work on these issues in FY 2014. Increasing demands from NFS customers for additional forest planning data and increasing emphasis on individual forest and regional forest monitoring plans will likely require changes in current financial arrangements with NFS. Stronger funding support at the national level, including additional NFS funding for needs beyond the core FIA program, will be needed.

In a meeting with NFS inventory specialists on inputs to the FIA Strategic Plan, the FIA identified the following suggestions as NFS priorities:

- Implement the annual system in all States.
- Collect data on all lands, including reserved and range lands.
- Collect a full suite of vegetation and associated information.
- Follow standard protocols across all NFS lands.
- Allow for a la carte protocols with local and regional funding support.
- Allow for increasing the intensity of the core grid, as needed.
- Provide an inventory compilation and analysis package that meet NFS business needs.

NFS will participate in the process to help define the next FIA strategic plan.

Other FIA Program Features

Forest Products, Utilization, and National Woodland Owner Survey Studies

FIA is charged with monitoring and reporting on the status, condition, and trends of all the Nation's forests. Although plot-based field surveys provide most of this information, additional questionnaire and field-based surveys are conducted to report on timber product output (TPO), fuelwood production, and characteristics and management objectives of the Nation's private woodland owners. The number of surveys is listed in appendix table B-8, followed by a brief overview of each survey type.

Primary mill surveys: FIA conducts TPO studies to estimate industrial and nonindustrial uses of roundwood in a State. To estimate industrial uses of roundwood, all primary wood-using mills in a State are canvassed. TPO questionnaires are designed to determine location, size, and types of mills in a State; the volume of roundwood received by species and geographic origin; and the volume, type, and disposition of wood residues generated during primary processing.

Logging utilization studies: Logging utilization studies provide the information to convert TPO volumes to inventory volume. Utilization factors developed from the data translate a standard unit of product (1,000 board feet of sawlogs, one cord of pulpwood, etc.) into a common volume unit and type of tree harvested. Estimate are made of how much product came from sawtimber growing stock, poletimber growing stock, and nongrowing stock sources such as cull trees, dead trees, saplings, and limbwood. The overall process provides a cross-section of logging operations to characterize the sites logged, trees cut, products taken, and residues left behind. More detailed information on the forest products studies may be found in Smith (1991), Blyth and Smith (1979), and Morgan et al. (2005). Additional information and online data from all of these surveys are available at http://fia.fs.fed.us.

Fuelwood surveys: Studies of fuelwood production from roundwood are necessary to provide information to forest managers and users about the fuelwood harvest and its effect on the resource. The amount of fuelwood (and from what source) harvested from forest land, urban areas, fence rows, windbreaks, or other sources is estimated from these studies.

National Woodland Owner Survey: The NWOS is the official survey of nearly 10 million forest owners in the United States. Its aim is to increase our understanding of woodland owners who are the critical link between forests and society. The first survey was conducted by the Forest Service in 1978 and was subsequently followed by another national survey in 1994. Beginning in 2000, on an annual basis, the NWOS contacts forest landowners from across the county to ask them questions about the forest land they own, their reasons for owing it, how they use it, if and how they manage it, sources of information about their forests, their concerns and issues related to their forests, their intentions for the future of their forests, and their demographics. Summary information from the NWOS is used to provide, design, and implement services and policies that affect forest owners that include government agencies, NGOs, landowner organizations, private-service providers, forest industry companies, and academic researchers. A new cycle of data collection for the NWOS began in 2011. The most recent NWOS findings are available in Butler (2008).

Blyth, J.E.; Smith, W.B. 1979. Minnesota logging utilization factors, 1975–1976—development, use, implications. Res. Bull. NC-48. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 8 p.

Butler, B.J. 2008. Family forest owners of the United States. Gen. Tech. Rep. NRS-27. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 72 p.

Morgan, T.A.; Spoelma, T.P.; Keegan, C.E.; Chase, A.L.; Thompson, M.T. 2005. Montana logging utilization, 2002. Res. Pap. RMRS-52. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 12 p.

Smith, W.B. 1991. Assessing removals for North Central forest inventories. Res. Pap. NC-299. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 48 p.

Ecosystem Health Indicator Surveys

FIA began implementing a nationwide, field-based forest ecosystem health indicator monitoring effort in the 1990s, and it currently collects forest health measures in 47 States. Most indicators are documented in terms of sampling protocols, data management structures, and estimation procedures (Bechtold

and Patterson 2005). Field data from most sample years and indicators are available online with numerous analytical examples published both internally and externally. Field protocols associated with each indicator are available in the national field guide (USDA Forest Service 2006). Next, we briefly describe the indicators and follow that with an overview of the current direction FIA is taking to improve its functionality.

Crown condition: Tree crowns are an important component of net primary production, and deteriorating foliage is a visible sign of stress that often precedes reduced growth and increased mortality. For this indicator, measurements are recorded on all sampled trees greater than 12.7 cm diameter at breast height, including uncompacted live crown ratio, crown diameter (for some years), crown density, foliage transparency, crown dieback, crown light exposure, and canopy position. The crown indicator is described in Schomaker et al. (2007).

Lichen communities: Long-term observation of epiphytic (i.e., tree-dwelling) lichen communities indicates changes in air quality, climate, and land use. For this indicator, field crews observe the presence of lichen species, estimate the abundance of each species, and collect specimens for identification by a specialist. Lichen community measurements are made within a 37-m radius of each plot center (~ 0.38-ha area). The lichen indicator is described in Will-Wolf (2011).

Forest soils: Environmental stressors that interfere with soil function have the potential to influence the productivity, species composition, and hydrology of forest ecosystems. For this indicator, crews complete ocular estimates of the percentage and type of soil compaction or erosion, and they check for the presence of restrictive layers within the top 50 cm of soil. The crew then collects five soil samples—three forest floor samples to measure organic matter and carbon content, and a mineral soil core collected at two depths: 0 to 10 cm and 10 to 20 cm. Soil samples are sent to the laboratory immediately after collection and stored for future physical and chemical analysis. The soils indicator is described in O'Neill et al. (2005).

Vegetation diversity: The vegetation diversity and structure indicator is designed to evaluate the composition, abundance, and spatial arrangement of all vascular plants, for assessing wildlife habitat, site productivity, and the effects of invasive species. For this indicator, crews with previous botanical experience record both species and overall structural data for vascular plants including their total canopy cover and cover in different height zones (0 to 2 m, 2 to 5 m, and more than 5 m). Specimens of species not readily identified in the field are collected for future identification by a specialist. The vegetation indicator is described in Schulz et al. (2010).

Down woody material: The down woody material indicator is designed to estimate detrital aboveground biomass in the form of coarse woody debris, fine woody debris, litter, and duff pertaining to important fire, wildlife, and carbon issues. For this indicator, coarse woody debris (greater than 7.5 cm in diameter) is sampled on a series of transects across the plot totaling 88 m in length. Fine woody debris between 2.5 and 7.5 cm is sampled on a series of transects totaling 12 m in length. Fine woody debris less than 2.5 cm is sampled on a series of transects totaling 7 m in length. Duff and litter depth measurements are taken at 12 points located on the plot. The DWM indicator is described in Woodall and Monleon (2008).

Ozone injury: Ozone is a widely dispersed pollutant that reduces tree growth, changes species composition, and predisposes trees to insect attack and disease. Because ozone injury causes direct foliar injury to particular forest plant species, these species are used as bioindicators to identify the presence and severity of local air pollution. Ozone injury is not observed directly on the FIA plot network because indicator species are not always present and openings in the canopy are necessary to obtain useful results. For this indicator, crews evaluate up to 30 individual bioindicator plants for amount and severity of ozone damage. The ozone injury indicator is briefly described in Will-Wolf and Jovan (2008).

Other indicators: Other key indicators of forest health such as tree mortality and growth and the abundance of invasive and nonnative tree species are found in the basic plot data and subsequent remeasurements.

Bechtold, W.A.; Patterson, P.L., eds. 2005. The enhanced Forest Inventory and Analysis program—national sampling design and estimation procedures. Gen. Tech. Rep. SRS-80. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 85 p.

O'Neill, K.P.; Amacher, M.C.; Perry, C.H. 2005. Soils as an indicator of forest health: a guide to the collection, analysis, and interpretation of soil indicator data in the Forest Inventory and Analysis program. Gen. Tech. Rep. NC-258. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 53 p.

Schomaker, M.E.; Zarnoch, S.J.; Bechtold, W.A.; Latelle, D.J.; Burkman, W.G.; Cox, S.M. 2007. Crown condition classification: a guide to data collection and analysis. Gen. Tech. Rep. SRS-102. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 78 p.

Schulz, B.K.; Bechtold, W.A.; Zarnoch, S.J. 2010. Sampling and estimation procedures for the vegetation diversity and structure indicator. Gen. Tech. Rep. PNW-GTR-781. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 53 p.

U.S. Department of Agriculture, Forest Service. 2012. Forest Inventory and Analysis national core field guide (Phase 3), version 6.0. Washington, DC: U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis, Washington, DC. http://www.fia.fs.fed.us/library/field-guides-methods-proc/ (accessed October 2012).

Will-Wolf, S. 2011. Analyzing lichen indicator data in the Forest Inventory and Analysis program. Gen. Tech. Rep. PNW-GTR-818. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 62 p.

Will-Wolf, S.; Jovan, S. 2008. Lichens, ozone, and forest health—exploring cross-indicator analyses with FIA data. In: McWilliams, W.; Moisen, G.; Czaplewski, R., eds. 2008 Forest Inventory and Analysis symposium. October 21–23, 2008. Park City, UT. Proc. RMRS-P-56CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Woodall, C.W.; Monleon, V.J. 2008. Sampling protocols, estimation procedures, and analytical guidelines for down woody materials indicator of the Forest Inventory and Analysis program. Gen. Tech. Rep. 22. U.S. Department of Agriculture, Forest Service, Northern Research Station. 68 p.

Beyond Standing Trees: The Evolution of FIA Forest Health Indicators

For more than a decade, FIA has conducted a so-called Phase 3 inventory program where a subset of Phase 2 plots were sampled to characterize aspects of the forest other than standing trees using the indicators listed above. FIA is now in the process of developing revised sampling techniques for these indicators, which will now be called ecosystem health indicators in response to fluctuating budgets, emergent user needs, and evolving forest health science.

Some revised indicators (down woody material, understory vegetation, and crown conditions) were implemented in FY 2012 in a "Phase 2 Plus Program/Ecosystem Indicator Program" (included, but not separate, in appendix B-7). The P2 sampling scheme facilitates the collection of a national core set of indicator information on more plots for less cost than the original Phase 3 protocols, with sampling as a systematic subsample of each subpanel that can change in response to budgetary fluctuations (i.e., flexibility) without compromising long-term analytical capabilities. Although the revised protocols collect less detailed information on each sampled plot, substantially more plots are sampled, potentially increasing the statistical power of future forest health analysis.

These changes represent a first step for FIA to take the opportunity to address current budget realities and adapt for the future to continue to meet customer needs. FIA will work closely with clients to ensure a successful transition from the current Phase 3 Program to a fully integrated Phase 2 Plus/Ecosystem Indicator Program that continues to provide a comprehensive survey of forest biomass, carbon pools, and ecosystem health in addition to the "traditional" function of the FIA program.

The next FIA Strategic Plan due to be finalized in FY 2014 will continue to promote the evolution of more efficient ecosystem indicator implementation strategies.

Program Safety

FIA takes safety very seriously and considers it a top priority. People in FIA cover hundreds of thousands of miles in travel each year while conducting business and they work in very difficult terrain across all types of plant and forest communities. FIA remains focused on creating an entire workforce culture that seeks to protect our employees, partners, and the public from daily exposure to hazards that threaten safety and health. Table 6 summarizes the program's safety record for FY 2013. Figures 22 and 23 show program safety trends by incident type for FY 2008 through FY 2013 followed by regional safety highlights for FIA units in FY 2013.

Table 6. Base safety reference data, recordable incidents, and incident frequency by FIA unit, FY 2013.

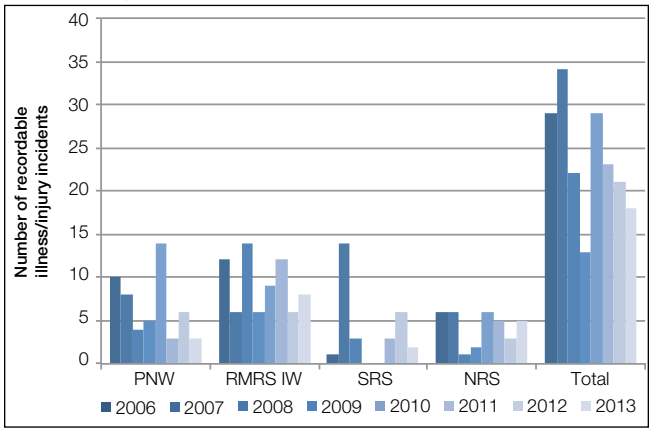
Category	FIA Unit					
	PNW	RMSM IW	SRS	NRS	NO	Total
Base data						
Federal FTE equivalents[a]	84	96	86	98	4	368
Total estimated hours worked[b]	191,259	204,237	179,004	213,200	7,280	794,980
Total vehicle miles driven	301,814	669,667	700,771	895,167	—	2,567,419
Total flight hours logged	185	22	—	—	—	207
Recordable incidents by class						
Time lost illness/injury incidents	3	8	2	5	—	18
Motor vehicle accidents	0	3	1	3	—	7
Aircraft accidents	0	0			—	0
Safety incident frequency rate						
Time lost illness/injury rate per 100 FTEs	3.6	8.3	2.3	5.1	—	4.9
Motor vehicle accidents per million miles driven	—	4.5	1.4	3.4	—	2.7
Aircraft accidents per 100,000 flight hours	—	—	—	—	—	—

FIA = Forest Inventory and Analysis. FY = fiscal year. PNW = Pacific Northwest Research Station. RMRS = Rocky Mountain Research Station. NRS = Northern Research Station. NO = National Office.

[a]Based on appendix table B-3 number of Federal employee estimated Full Time Equivalents (FTE).

[b]Based on appendix table B-3 number of Federal employees times 2,080 hours per FTE, small percentage of overtime not included in estimate.

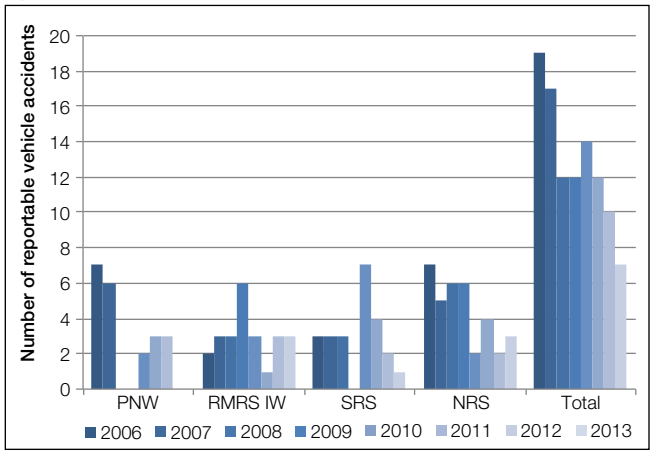
Figure 22. Number of recordable illness and injury incidents by FIA unit, FYs 2008–13.



FIA = Forest Inventory and Analysis. FY = fiscal year. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. RMS = Rocky Mountain Research Station. SRS = Southern Research Station.

Notes: Work-related injury or illness resulting in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness. Value for SRS for FYs 2009 and 2010 is zero.

Figure 23. Number of reportable motor vehicle accidents by FIA unit, FYs 2008–13.



FIA = Forest Inventory and Analysis. FY = fiscal year. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. RMS = Rocky Mountain Research Station. SRS = Southern Research Station.

Notes: Any occurrence involving the use of a Government-owned or Government-leased motor vehicle (automobile, truck, or bus) that results in a total combined damage exceeding $500 or more. This definition also applies to privately owned vehicles when used on official Government business. Value for PNW for FY 2008 is zero. Value for PNW and SRS for FY 2009 is zero.

Standard safety training is mandatory and is conducted at each field unit. Safety training and equipment are provided for headquarters offices, field offices, and field crews, including driver training, first aid kits, cell phones, etc. In regions with special circumstances, such as the need for aircraft, access to large areas of wilderness, or exposure to potentially dangerous wildlife or remote difficult-to-access areas, additional training and equipment are provided. Information on specific safety training and criteria are available on line at http://fia.fs.fed.us.

As a demonstration of our commitment to safety, FIA units have now completed three consecutive annual safety engagements as part of the ongoing Chief's Safety Journey, giving all employees a voice toward improving policies and procedures around safety.

Regional Safety Notes

Standard safety training is mandatory and is conducted at each field unit. Safety training and equipment are provided for headquarters offices, field offices, and field crews, including driver training, first aid kits, cell phones, etc. In regions with special circumstances, such as the need for aircraft, access to large areas of wilderness, or exposure to potentially dangerous wildlife or remote difficult-to-access areas, additional training and equipment are provided. Information on specific safety training and criteria are available on line at http://fia.fs.fed.us.

As a demonstration of our commitment to safety, FIA units have now completed three consecutive annual safety engagements as part of the ongoing Chief's Safety Journey, giving all employees a voice toward improving policies and procedures around safety.

Northern Research Station FIA Safety Highlights for FY 2013

An ongoing commitment to safety is what propels NRS-FIA to refine existing safety protocols and procedures. During the Phase 2 Safety Engagements, a Coast Guard veteran stated the old Coast Guard rescue motto: "You have to go out, but you don't have to come back!" The motto was later changed to "If you don't think you'll come back, don't go out!" This latter motto serves as a reminder to NRS-FIA to keep all employees safe in the field and in the office. Our check-in/check-out procedures, primarily for the field but for the office as well, continue to be refined to ensure a safe return of all NRS-FIA employees. Continually updating the phone tree came in handy twice in 2013, first when the Government was called back to work and then, specifically, when NRS-FIA had two employees (a runner and a spectator) at the 2013 Boston Marathon. NRS-FIA staff are thankful that both were safe and past the site when the bombing occurred.

As part of the Phase 2 Safety Engagement Work Improvement Project (WIP) for FY 2014, the NRS-FIA field crew identified five WIPs:

1. This year the field crew will participate in the "Verbal Judo" tactical communication training course, designed to give participants the ability to calm and redirect difficult or hostile people, diffuse potentially dangerous situations, and continue to perform professionally under any condition.
2. Portable weather radios were purchased to offer real-time weather in the field.
3. A regional variable will be added to the MIDAS plot file in the next version of the field guide to alert the next crew of plot safety challenges during the previous inventory (angry landowners, mad dogs, access challenges, etc.). In addition, FIA dispatcher duties will be expanded to accommodate prelandowner and postlandowner contact check-ins to provide for increased safety during face-to-face contacts and decreased response time, should something go amiss.
4. The field crews provided suggested improvements to the near-miss reporting in Safety and Health Integrated Portal System to Liz Smith, NRS Safety Manager, who in turn forwarded them to the National Office.
5. The field crews drafted a proposal for deploying aerosol defense sprays to field employees for defense against wild and domesticated animals; two false charges by black bears were reported in 2013.

The St. Paul office identified wellness as a WIP for sedentary office staff and quickly formed a wellness committee, which includes two FIA employees. A weekly walking club has been formed, and a health assessment is being scheduled for all St. Paul employees in the coming year. NRS-FIA employees in the Newtown Square office are equally active in their wellness committee. NRS-FIA continues to encourage office and field employees to be healthy and safe while exercising.

In FY 2013, NRS-FIA is revising how ergonomics is viewed within the unit. This year, it purchased standup workstations for four employees who spend many hours working in front of the computer. Further, the unit encourages employees "to get up and move" throughout the day to prevent eye strain, aching muscles, and headaches. The unit addressed ergonomic needs by purchasing ergonomic friendly keyboards and wireless mice, ergonomic chairs to alleviate back strain, and chair mats to avoid rolling-chair falls.

During FY 2013, NRS-FIA staff continued to participate in the annual cardiopulmonary resuscitation (CPR)/First Aid/Driver's Training. Both the St. Paul and Newtown Square office personnel attended separate active shooter seminars. A St. Paul active shooter assessment was completed by both Forest Service and

University of Minnesota law enforcement officers to identify related safety concerns. New tone alert weather radios were purchased for the St. Paul office, and campus emergency text messaging to personal cellphones was offered to St. Paul employees. NRS-FIA continues to have staff involved in Safety Committees at the unit and station levels.

Job Hazard Analyses were updated and included on the NRS-FIA Web site. In anticipation of conducting wood utilization studies, a new analysis was created, approved, and posted on the NRS-FIA Web site.

Pacific Northwest Research Station FIA Safety Highlights for FY 2013

The PNW Resource Monitoring and Assessment Program's FIA unit continues the commitment to safety and wellness to improve the lives of employees. We have continued our wellness focus and extended challenges to off-season field personnel to help them maintain their high levels of fitness throughout the year. We continue to emphasize safety with our Safe-T-Bucks reward system and the publication of our monthly newsletter, the *Careful Chronicle* (since 2006). Our annual safety survey suggested refinements to some key communication areas: improved CB (citizens band) radio testing, training for text messaging on satellite phones, refinements to check-in/check-out procedures, and reemphasis of our near-miss reporting system, where we collect and analyze close calls documented by all personnel. In addition to our normal emphases on safety, this year we took on a number of new items to improve safety and wellness. We have developed a SharePoint safety site to improve communication among teams and team members. We emphasized earthquake preparedness via posters and a handout with follow-up actions. Our field crews in the islands now carry epi-pens to counter the effects of severe allergic reactions to stinging insects. And we pilot tested equipment that alerts field-going personnel to lightning strikes in their vicinity. We continue to document safety-related training attendance by employees, annually review and update job hazard analyses, strengthen and develop effective mechanisms to share information on safety issues, build corporate solutions to Forest Service safety issues, and work with the regional safety committees and program managers to continue building our common safety vision for the good of our most valuable resources.

Rocky Mountain Research Station, Interior West FIA Safety Highlights for FY 2013

The IW-FIA program is committed to developing a proactive safety culture by modeling and reinforcing safety as our core value. This goal requires building trust; learning from mistakes, understanding human performance, and careful, intentional response to people, situations, and accidents. During the past year, the unit has focused extra attention on sharing our personal safety stories in the program's safety newsletter and through Facilitated Learning Analyses.

As we continued on the Forest Service Learning Journey, program leadership conducted five Safety Engagement sessions throughout the year. Each session developed multiple WIP proposals for which employees then voted for their top choice. Because of the value of the WIPs, five projects were ultimately selected for completion. The two office-related and three field-related project teams include managers and staff personnel and have varying target completion dates. Projects include improving building access, office ergonomics, plot planning, field equipment, and fitness and wellness in the field.

The IW-FIA program continued work on the ongoing "Field Safety Competencies," which is focused on not only required safety training but also skills that are somewhat "commonplace" yet critical for safety in the field. The program continues to refine these essential skill sets into a usable and measurable framework to help ensure that new and returning employees have the necessary skills to perform their duties safely and respond appropriately in emergencies.

In addition to reviewing accident trends, learning summaries, and required safety training, spring field training included additional information about illegal marijuana on public lands and a hands-on session with a physical therapist focused on reducing knee and ankle injuries in the field. While driving remains our highest risk activity, the majority of injuries are associated with slips, trips, and falls that happen while employees are hiking. Proper conditioning, stretching, varying workloads, and proper equipment are key to reducing these injuries.

Some additional program safety highlights include enabling SPOT tracking feature for all field-going employees, revising check-in/check-out procedures for working alone, encouraging wearing lighter field gear, providing a winter wellness challenge, and continuing to foster relationships with Forest Service law enforcement personnel.

Southern Research Station FIA Safety Highlights for FY 2013

The SRS FIA unit is committed to developing sound safety initiatives and a safety culture that is proactive in making safety a prime value. We realize our employees are our most valuable asset. Our goal is to incur zero accidents and injuries.

Our continuing journey through the Chief's Safety Engagement led to two meetings this year, one with our office personnel and one with our field-going crews. Each meeting highlighted multiple concerns to address in our safety program. Through a vote, we selected the most critical issues and then gathered a team to address each issue. The office personnel selected a review of inclement weather procedures as their project. This team looked at different areas of the building to group people in the event of high winds or tornados and selected a suitable area. The field-going crews selected a test deployment of smartphones as their project to evaluate different applications and programs, including timelier monitoring of weather conditions. We have reported our findings to the SRS and are waiting on word regarding when we might be allowed to fully equip our crews with smartphones.

SRS-FIA developed a check-in/check-out policy to better pinpoint our employees' locations during emergencies. Combined with our Satellite Emergency Notification Devices, we feel that we can get aid to our employees very quickly in the event of an emergency. We will continue to update this policy to meet the ever-changing conditions and challenges associated with distances, weather and terrain.

For our field-going vehicles, we initiated a policy of deploying winches consistently on new vehicles, as budgets allow. We developed a safety policy to ensure our employees know the specific dangers associated with the new equipment. SRS-FIA had previously conducted hands-on winch and recovery training during FY 2012. More training will be offered at future meetings between field crews and management.

SRS-FIA conducted training sessions for CPR and first aid for office personnel. Due to a recent retirement, we lost our certified CPR/First Aid trainer. Our plan is to have a minimum of two personnel certified as trainers in the first half of FY 2014. We also completed a fire drill exercise with the assistance of the Knoxville Fire Department. The results were considered "excellent."

SRS-FIA began discussing a collaborative effort most recently with the University of Tennessee's Medical and Veterinary Entomologist to collect ticks throughout the Southeast. Our plan is to collect ticks encountered incidentally by our field-going crews as they go about their daily activities and to send them to University researchers for species identification. A subset of sampled ticks will be processed for pathogen identification. This collaborative effort has the potential to yield important and novel information on tick distribution, something that has not received the attention it deserves in the literature, given the medical importance of tick bites. It has the potential added benefit of earlier notification of people who may have been bitten by an infected tick. We believe that this effort will enable our employees to seek treatment in the early stages of possible infections. Tentative procedures have been distributed to SRS-FIA employees for comment and suggestions.

Our safety Web page (http://fsweb.fia.srs.fs.fed.us/safety/) continues to provide open communication and information sharing to our employees. We think it is among the best in the Forest Service, and we will continue to update it with valuable information.

To end the year, we have begun to recruit new members to our safety committee. This activity always provides a good opportunity for new ideas and thoughts to be integrated into our safety program. We try to maintain a broad diversity of committee members from different parts of SRS-FIA to capitalize on unique viewpoints and promote our safety culture.

Looking ahead to FY 2014, we hope to (1) have another meeting of field-going crews to accomplish important, interactive, hands-on safety training, much like our meeting centered on off-road vehicle operation in FY 2012; (2) fully equip our field crews with smartphones, as budgets and Forest Service guidance allow; and (3) continue to make reporting processes easier and more user friendly. SRS-FIA will continue to strive to be proactive. Mitigating hazards before accidents occur will always be a primary goal of our organization.

Comparing FY 2012 Plans With FY 2013 Accomplishments and FY 2014 Plans

In the FY 2012 business report for FIA, we included a section stating our plans for FY 2013. In the following table we show how our actions in FY 2013 matched our plans from FY 2012 and our plans for FY 2014.

In the FY 2012 business report, we said that in FY 2013 we would—	In FY 2013, we—	In FY 2014, we will—
Base inventory and reporting		
Continue base inventories in 49 States and coastal Alaska, although travel restrictions and budget constraints may continue. As of March 2013, a final 2013 budget was still unavailable, making projection of accomplishments for this report difficult.	Continued base inventories in 49 States and coastal Alaska.	Under continued travel restrictions, budget constraints, furlough, and budget uncertainty, projections for accomplishments in this report are tentative. Continue base inventories in 49 States and coastal Alaska contingent on FY 2014 budget.
Publish 5-year State reports for Arizona, Arkansas, California, Georgia, Illinois, Kentucky, Louisiana, New Mexico, North Carolina, Ohio, Oregon, South Dakota, and Texas.	Published 5-year State reports for Illinois, Kentucky, Louisiana, South Dakota, the U.S. Virgin Islands, and Virginia. Reports for Arkansas, California, Georgia, North Carolina, Oregon, and Texas were delayed. Completed ARRA project in New Mexico and started inventory report for the State.	Publish 5-year State reports for Arizona, Arkansas, California, Georgia, New Hampshire, North Carolina, Ohio, Oregon, Nevada, New Mexico, Texas, Utah, and Washington, and a status update for American Samoa.
Continue developing cost-effective inventory methods for interior Alaska.	Developed partner-supported pilot for the 2014 inventory of interior Alaska, Tanana Valley.	Conduct 2014 interior Alaska, Tanana Valley inventory pilot.
Begin reinventory of Guam.	Initiated Guam reinventory.	Continue remeasuring U.S.-affiliated Pacific Islands, finishing Guam in late 2013 and Palau in early 2014.
Complete the ARRA inventory project in New Mexico and develop the first annual inventory report for the State.	Completed the ARRA inventory project in New Mexico and developed the first annual inventory report for the State.	
	Implemented the modified protocols for down wood, vegetation, and crowns in the East.	Continue eastside implementation of the modified protocols for down wood, vegetation, and crowns.
Release a fully comprehensive database of lichen data (1994-present) to the public. Use P3 lichen data to revise critical loads for Nitrogen (N) for all forested ecoregions of the United States.	Implemented P3 soils remeasurements in NRS and RMRS.	Continue implementing protocols for remeasuring soils in NRS.
Develop a comprehensive P3 Indicator database for public use; Continue to analyze P3 VEG data to investigate diversity issues (response to N deposition; over story/understory diversity relationships).		Continue working on comprehensive, user-friendly Ecosystem Indicator database. Develop, refine, and test modified Ecosystem Indicator protocols.
	Initiated the "National Standardization of FIA reporting templates" for annual reporting to be used by all FIA units.	Implement the "National Standardization of FIA reporting templates" for all annual reporting by all FIA units.

In the FY 2012 business report, we said that in FY 2013 we would—	In FY 2013, we—	In FY 2014, we will—
Base inventory and reporting (continued)		
		Initiate the "National Standardization of FIA reporting templates" for 5-year reports to be used by all FIA units.
	Based on preliminary Farm Bill language, began engaging partners in the development of needs and goals for a new strategic plan for the program.	With the passage of the Farm Bill, complete a new strategic plan for FIA in full collaboration with partners and users.
National Woodland Owner and Timber Products Surveys		
Deploy the beta-version of a national TPO data management and processing system that will eventually allow for consistent, nationwide delivery of TPO data.	Deployed the beta version of a national TPO data management and processing system that will allow for consistent, nationwide delivery of TPO data.	Implement and thoroughly test the national TPO data management and processing system nationally. Publish a 2013 national pulpwood report and begin work on national TPO data query system. Deploy beta version of a large corporate forest ownership questionnaire survey.
Contact additional private ownerships as part of the final phase of the current cycle of the NWOS.	Completed the final contact phase of the current cycle of the NWOS. Finished processing the 2011 NWOS data and made substantial progress in processing 2012–13 data.	Complete processing of the 2012–13 NWOS data and submit products that summarize the data.
Finish processing the 2011, 2012, and 2013 NWOS data and begin preparations of the final products.	Initiated preparations for the final products.	
Incorporate NWOS data into FIA's NIMS database. Begin planning for the 2014 NWOS, including submission of the requisite OMB paperwork.	Initial planning commenced on incorporating NWOS data into FIA's NIMS database.	Incorporate NWOS data into FIA's NIMS database and online access tools. Begin planning for the next (FY 2015) NWOS including commencement of the OMB review process.
Submit the improved ownership map for publication.	Submitted the improved ownership map for publication as both a cartographic product and a downloadable dataset.	
Continue to work with partners to further the analysis of the NWOS.	Initiated the development of the large corporate forest ownership questionnaire that parallels the NWOS. Continued to work with partners to further the analysis of the NWOS.	Continue to work with partners to further the analysis of the NWOS.

In the FY 2012 business report, we said that in FY 2013 we would—	In FY 2013, we—	In FY 2014, we will—
Pilot studies		
Process the data and prepare report on urban FIA pilot work in Colorado.	Processed the data and prepared report on urban FIA pilot work in Colorado.	Continue to implement regional ICE project working with RSAC to develop new FIA product lines addressing enhanced land cover/land use objectives in upcoming strategic plan. Publish report on Colorado urban inventory pilot.
Prepare GTRs describing the urban inventory results for all five Pacific States.	Prepared GTRs describing the urban inventory results for all five Pacific States. Processed the urban data and began the iTree analysis for three States. Tested a poststratification method to reduce variance based on NLCD land use imagery for urban plots.	Finish iTree compilation and finalize urban FIA report that includes all five States.
	Completed LandTrendr analyses for one large mapping region, encompassing much of the Oregon Cascades. Included biomass estimates and change from 1984 through 2010.	Extend LandTrendr analyses to the rest of Oregon and all of Washington. Pilot submeter accuracy GPS coordinate collection.
Complete full production of the NLCD Tree Canopy-cover data for CONUS. Conduct NLCD Tree Canopy-cover project within California, Oregon, and Washington.	Completed full production of the NLCD Tree Canopy-cover data for CONUS. Conducted NLCD Tree Canopy-cover project within California, Oregon, and Washington.	Pilot height subsampling to model tree heights based on diameter class.
Complete and deliver CONUS data, 4th quarter of 2013.	Completed and delivered CONUS data, 4th quarter of 2013.	Extend RMRS tree core collection and processing to PNW for spatiotemporal patterns of growth related to climate.
Continue science team work on change algorithms, complete the INA process, and initiate an interagency pilot to identify gaps in existing program data and analysis products.	Continued science team work on change algorithms, completed the INA process, and initiated an interagency pilot to identify gaps in existing program data and analysis products.	No rangeland pilot studies are planned for 2014.
Continue implementation across NFS, producing template reports for specific “early adopter” forests.	Continued implementation across NFS, producing template reports for specific “early adopter” forests.	
Develop models using LandTrendr to estimate carbon flux from remeasured FIA field plots as a function of land use, management, and disturbance.	Developed models using LandTrendr to estimate carbon flux from remeasured FIA field plots as a function of land use, management, and disturbance.	
Implement regional ICE project working with RSAC to develop new FIA product lines addressing enhanced land cover and land use objectives in the upcoming strategic plan.	Implemented regional ICE project working with RSAC to develop new FIA product lines addressing enhanced land cover and land use objectives in the upcoming strategic plan.	

In the FY 2012 business report, we said that in FY 2013 we would—	In FY 2013, we—	In FY 2014, we will—
Forest carbon		
Explore refined techniques for extrapolating and interpolating between FIA periodic inventories to develop 1990-to-present National Greenhouse Gas Inventory baselines.	Published summaries of downed dead wood carbon and biomass attributes based on the P3 inventory and incorporated them into the 2014 National Greenhouse Gas Inventory.	Initiate pilot project (with NASA, etc.) to test the utility of airborne LIDAR/hyperspectral/thermal remote-sensing data for estimating aboveground carbon stocks in the Tanana Valley of interior Alaska.
Explore refined techniques for estimating forest floor and soil organic carbon stocks with the possibility of using P3 DWM and soils data.	Explored technical approaches to addressing missing data in forest inventories used in carbon monitoring with research pending completion of journal review.	Initiate development of a prototype MRV (monitoring, reporting, and verification) system—using a combination of FIA plot data, airborne LIDAR sampling, and Landsat time series data—to retrospectively estimate carbon stocks back to a 1990 baseline.
Conduct research to explore improved belowground and understory carbon models.	Received grant awarded by NASA to FIA scientists to explore refined techniques for extrapolating and interpolating between FIA periodic/annual inventories using LANDSAT information.	Evaluate the impacts of a refined woodland delineation on the National Greenhouse Gas Inventory of forest C stocks.
	Explored techniques for estimating forest floor carbon stocks using P3 soils information.	Complete evaluation a forest floor carbon estimation approach using P3 soils information and explore potential application to the U.S. greenhouse gas inventory.
	Conducted research into estimating understory vegetation carbon stocks using P3 understory vegetation information with research pending completion of journal review.	Evaluate the implications of a refined "managed land" delineation of U.S. forests and implications regarding the U.S. greenhouse gas inventory.
		Initiate research exploring potential use of LANDSAT imagery to stratify forest inventories across the 1990s for greenhouse gas inventories per a NASA grant.
Experimental forests and rangers		
No activity funded or planned for FY 2013.	Conducted limited activity on select forests on a regional basis in FY 2013 as part of ongoing studies.	Limited activity on select forests on a regional basis may be conducted in FY 2014 as part of ongoing studies.
Information management and distribution—FIDO		
Add the ability to produce KMZ files of ratio estimates to allow for shaded county maps with legends to be viewed in GoogleEarth and easily migrated to a Web server for display as a GoogleMap.	Posted Version 5.1.6 of the FIADB Users Guide to FIA Library webpage. Updated DataMart to this version of FIADB.	Deploy 100-m pixel base map reporting nationally for all FIA data and provide access to external users.
	Produced KMZ files of ratio estimates to allow for shaded county maps with legends to be viewed in GoogleEarth.	Develop automated quality assurance scoring system and reporting to document FIA data quality.
Post version 1.5.1.05 of the FIADB Users Guide to the FIA Library Web page and update the DataMart to be in sync with this version of FIADB.	Posted version 1.5.1.05 of the FIADB User's Guide during February 2013 and posted version 1.5.1.06 during July 2013.	
Conduct training webinars.	Conducted a training webinar on January 16, 2013.	Conduct training webinars.
	Conducted an "FIA Spotlight" session for Forest Service R&D personnel on February 19, 2013.	
Make necessary changes to implement "growth accounting" for attributes that customarily change between measurements.		Make necessary changes to implement "growth accounting" for attributes that customarily change between measurements.

In the FY 2012 business report, we said that in FY 2013 we would—	In FY 2013, we—	In FY 2014, we will—
Information management and distribution—FIDO (continued)		
Continue to update documentation, databases, and tools to support users' changing needs.	Presented FIA online tools to the Woody Biomass Utilization Group on June 25, 2013. Released a new version of EVALIDator that implements "growth accounting" for online retrievals and updated tabulation programs and scripts to produce summaries using "growth accounting."	Continue to update documentation, databases, and tools to support users' changing needs. Complete and post an addendum to FIADB User'sGuide 1.5.1.06 Begin work on FIADB User's Guide based on version 6.0 of the national field guide. Implement general online tool improvements.
Information management and distribution—MIDAS		
Continue implementing *National Field Guide* version 6.0 for field data collection.	Continued implementing and refining *National Field Guide* version 6.0 for field data collection.	Continue implementing *National Field Guide* version 6.0 for field data collection (modify as necessary). Assess user needs and upcoming changes for implementation in *National Field Guide* version 7.0. Prepare for implementing more complete ownership information. Continue to improve error detection.
Information management and distribution—NIMAC		
Process and make all completed panels of data available with EVALIDator for Missouri and Wisconsin and complete development of applications for Wisconsin, via the Web, using FIDO. Assist Indiana, as needed, with NIMS processing software and creating EVALIDator databases for their use. Release the first versions of the Design and Analytical Tools for use and will begin the second round of software development of Phase 2 protocols. Continue to provide technical assistance and software tools in three continents (South America, Africa, and Asia) as part of the SilvaCarbon effort.	Processed and made the first remeasured panel of data available to Wisconsin DNR. The data are available in EVALIDator but not yet in FIDO due to delay in the new release of FIDO. Assisted Wisconsin with the analysis of their report on the first 5-year report on their State forests. Continued to provide assistance through NIMAC to Indiana DNR as they collect, process, and analyze data on State lands, including the first year of remeasurement. Entered into an agreement with Missouri Department of Conservation to process data from their intensified sample of State forests. They have completed the 3rd year of data collection. Installed a prototype version of the DATIM on Forest Service servers. The second version is being beta-tested. NFS continues to fund development. In collaboration with the Food and Agriculture Organization of the United Nations, developed data-collection and data-processing software for international use. Conducted FIA training for representatives from Vietnam in Knoxville, TN.	Conduct FIA field training in Vietnam for representatives from Vietnam. Conduct FIA portable-data recorder programming training for representatives from Mexico and Canada in Houston, TX. Process and make all completed panels of data available with EVALIDator for Missouri and Wisconsin and complete the Web applications using FIDO for Wisconsin. Continue to assist Indiana as needed with data-processing software and creating EVALIDator databases for their use. Release the second versions of DATIM for use and will begin developing version 3 for use within the Forest Service. Continue to provide technical assistance and software tools in three continents (South America, Africa, and Asia) as part of the SilvaCarbon effort. Conduct FIA training for representatives from Honduras in Knoxville, TN.

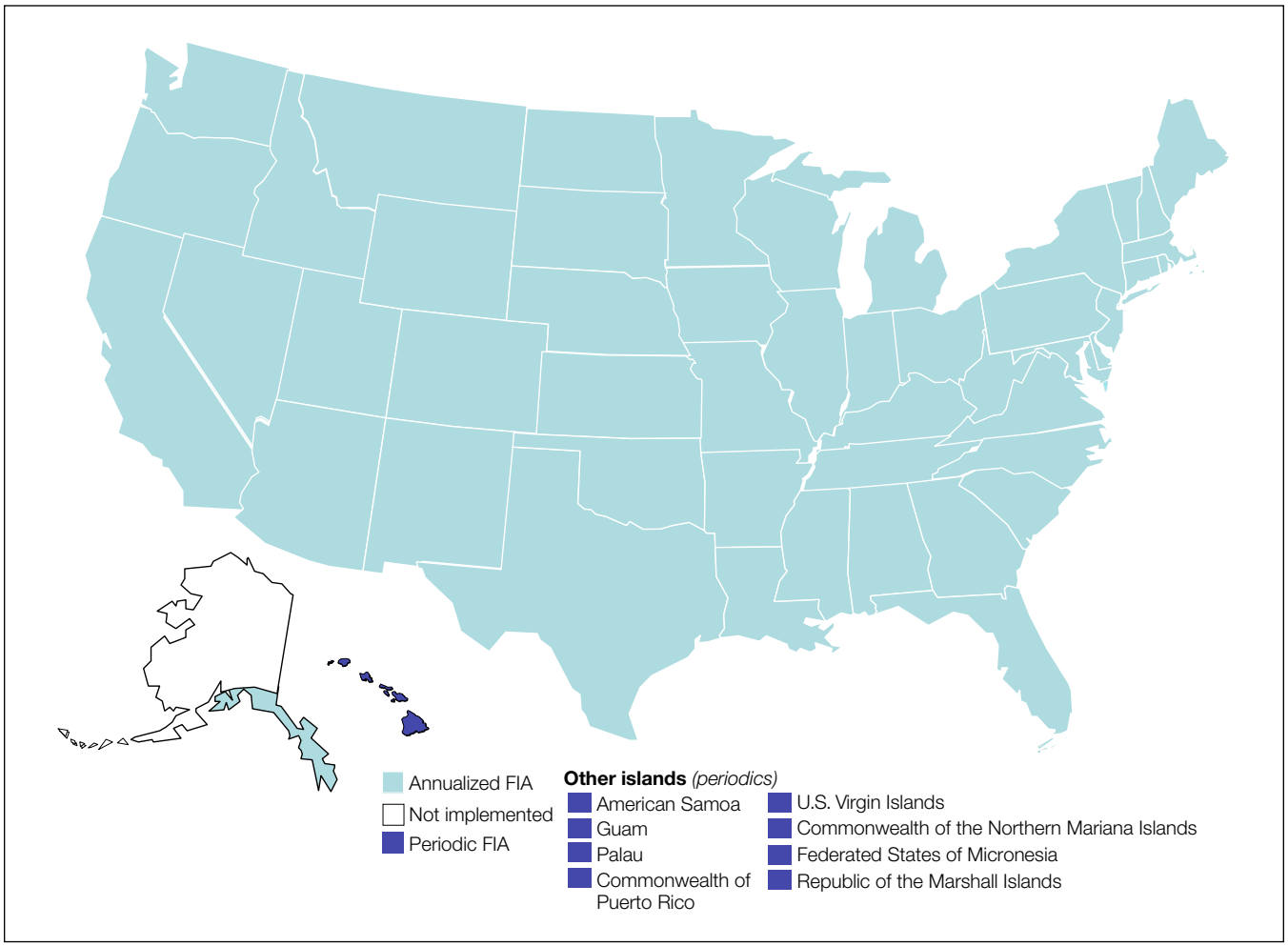
In the FY 2012 business report, we said that in FY 2013 we would—	In FY 2013, we—	In FY 2014, we will—
Information management and distribution—NIMS-CS		
Implement NIMS-CS version 6.0 and process data collected during FY 2012 at the data center. Implement FIADB version 6.0 and publish 2012 data at the data center. Make necessary changes to provide the detailed components of change in NIMS and FIADB so the online tools can implement the new growth accounting method.	Began implementing NIMS-CS version 6.0 and processed data collected during FY 2012 at the data center. Completed the necessary changes to provide detailed components of change in NIMS and FIADB for the online tools to implement the growth accounting methods.	Continue implementing NIMS-CS and FIADB version 6.0 at the data center.
FIA Atlas project		
Complete policy and technical reviews with National Office and USDA.	Identified manuscript as nationally significant and new National Office staff brought into review process.	Complete new policy and technical reviews with National Office and USDA.
Complete design and layout of features.	Completed design and layout of 1/3 of features matching new National Office standards.	Complete design and layout of remaining features.
Print Atlas.	Shifted print date to fall of 2014 to release at IUFRO World Congress.	Print Atlas for release at IUFRO World Congress in Salt Lake City.
Prepare content for release on companion Web site.	Selected ESRI as online data delivery solution.	Develop prototype Web delivery tools.
Collaboration and partnerships		
Continue collaborative stewardship of the FIA program by holding users group meetings in all regions of the country and at the national level and holding regional management team meetings in all regions of the country.	Continued collaborative stewardship of the FIA program by holding users group meetings in all regions of the country and at the national level and holding regional management team meetings in all regions of the country.	Continue collaborative stewardship of the FIA program by holding users group meetings in all regions of the country and at the national level and holding regional management team meetings in all regions of the country.
Release a draft of the FIA Strategic Plan for 2013-2017 that includes regional users' input in.	Released a draft of the FIA Strategic Plan for 2013-2017 that includes regional users' input in May 2013. Incorporated feedback from regional and national users into final draft FIA Strategic Plan. Awaiting final direction on pending Farm Bill passage.	Pending final Farm Bill legislation, release final FIA Strategic Plan with regional user input in March 2014.
Plan alternatives for the 2014 FIA Science Symposium.	Planned alternatives for the 2014 FIA Science Symposium and determined it should be delayed until 2015 due to budget constraints.	Begin planning for FIA Science Symposium in 2015.

ARRA = American Reinvestment and Recovery Act. CONUS = contiguous United States. DATIM = Design and Analytical Tools for Inventory and Monitoring. DNR = Department of Natural Resources. DWM = down woody material. FIA = Forest Inventory and Analysis. FIADB = Forest Inventory and Analysis Data Base. FIDO = Forest Inventory Data Online. FY = fiscal year. GPS = global positioning system. GTR = general technical report. ICE = Image-Based Change Estimation. INA = Information Needs Assessment. IUFRO = International Union of Forest Research Organizations. KMZ = Keyhole Markup language Zipped. MIDAS = Mobile Integrated Data Acquisition System. NASA = National Aeronautics and Space Administration. NFS = National Forest System. NIMAC = National Inventory and Monitoring Applications Center. NIMS = National Information Management System. NIMS-CS = NIMS check edit system. NLCD = National Land Cover Dataset. NWOS = National Woodland Owner Survey. OMB = Office of Management and Budget. P3 = Phase three. PNW = Pacific Northwest Research Stataion. R&D = Research and Development. RMRS = Rocky Mountain Research Station. RSAC = Remote Sensing Applications Center. S&PF = State and Private Forestry. TPO = Timber Products Output. USDA = U.S. Department of Agriculture.

Fiscal Year 2014 FIA Program Direction

The FY 2014 budget, as in many recent years, has considerable uncertainties following the sequester actions in the FY 2013 budget. S&PF funding is eliminated in the FY 2014 budget, which totals $66.8 million all in R&D. A continuing resolution partially restored the sequester losses with added funds of $2.3 million in the R&D budget but total appropriated funding remains well below the FIA high water mark in FY 2010 of $71.8 million. The FIA program will continue inventory operations in 49 States and coastal Alaska (fig. 24). Other major activity planned for 2014 includes full compliance of State 5-year reports, completing the recent iteration of the NWOS, modernizing the program's TPO operations and reporting, improving land cover and land use classification, completing the FIAtlas project, and completing a final draft of the program's 2015 through 2019 FIA Strategic Plan. FY 2014 funding also continues to eliminate support for FIA-related research at Experimental Forests and Ranges for long-term monitoring needs.

Figure 24. Planned FIA implementation status, FY 2014.



FIA = Forest Inventory and Analysis. FY = fiscal year.

Long-Term Strategic Direction

The FIA program initially intended to implement the *Strategic Plan for Forest Inventory and Analysis* by achieving a base Federal program of 10 percent per year in the West and 15 percent per year in the East by FY 2003. Aggressive partners' financial support has enabled FIA to achieve full implementation and 5-year cycles throughout most States from the Great Plains eastward. This support has been negatively impacted as Federal budgets dip and provide less matching funding. Stronger Federal support is needed to continue and expand as partners find exceptional value in leveraging Federal resources to provide improved information and service to their constituents.

The Government Performance and Results Act (GPRA) of 1993 directs Federal entities to develop long-term goals and performance measures to monitor progress toward those goals. Although intended for application at the agency level, the GPRA framework also provides an excellent tool for guiding progress at the project level. The following table shows our key goals, performance measures, and benchmarks for the FIA program for 2008 through 2013 and targets for a fully implemented program. In future business reports, we will repeat this table to show how we are progressing toward our goals.

In 2013, FIA began drafting a new strategic plan to update the current plan that was published in 2007 in response preliminary language that eventually formed the text of the recently passed Farm Bill and its requirements for FIA. The new plan is forward looking and attempts to balance emerging client demands for new information, tools, and values with necessary decisions on priorities and budget constraints. The new FIA strategic plan will be developed in cooperation with partners and stakeholders and will identify the base program, enhancements to the base, priorities for new programs, and areas for increased flexibility in the future. The final plan is expected to be delivered to Congress by late July 2014.

Goal	Performance measure	2008 level	2009 level	2010 level	2011 level	2012 level	2013 level	Target level
		Inputs						
Maintain sufficient funding to support the base Federal FIA program[a]	Percentage of total Federal funding necessary for annualized inventory received	85	87	90	92	89	85	100
		Outputs						
Include 100 percent of U.S. forest lands in the FIA sample population	Percentage of Nation's forest land included in the target FIA sample population	100	100	100	100	100	100	100
Keep fieldwork current	Percentage of States actively engaged in the annualized inventory program	94	94	98	100	100	100	100
Make data accessible to national forest customers	Percentage of national forest land for which FIA data are loaded into NRIS	92	92	100	100	100	100	100
		Outcomes						
Keep analysis current	Percentage of States with FIA State report less than 6 years old	60	76	74	92	88	90	100
Keep online data current	Percentage of States with FIA online data less than 2 years old	90	90	84	92	92	96	100
Customer satisfaction	Percentage of customers rating service as satisfactory or better	85	85	87	87	87	87	100
Partners' participation	Partners' financial contributions expressed as percentage of total program funds	11	9	10	11	13	10	20

FIA = Forest Inventory and Analysis. NRIS = Natural Resource Information System.

[a] Revised percentages based on new congressional target of $77,761,000.

Conclusions

We continue to operate in a new era of partnership and collaboration in which Federal and State agencies and other colleagues work together to plan, manage, implement, and continually improve the FIA program. We are gathering and disseminating information on a wider array of ecological attributes, while continuing to serve our traditional customers who require timely information on forest resources. We are increasing the timeliness of our surveys and of our reporting to provide a continually updated, publicly accessible information base that includes meaningful reports, analyses, and elemental data for others to use. We are exploring and using the latest technology to expand the scope of our products and to deliver them more efficiently. We are also openly reporting on our progress, accomplishments, successes, and challenges.

In summary, we are committed to working collaboratively with our partners to deliver the best program possible with the resources that we have at our discretion. We hope this report gives you a transparent view of the business practices of the FIA program, and we encourage you to help us improve the program with your feedback.

Glossary of Terms Used in Appendixes

base Federal FIA program. A level of FIA program delivery that includes sampling 10 percent of base grid (Phase 2) plots per year in the Western United States, 15 percent of base grid plots per year in the Eastern United States with data compiled and made available annually, and complete State analyses done every 5 years. A subsample of these plots also provides data on key ecosystem health indicators.

base grid plots sampled. The base grid consists of one sample location per approximately 6,000 acres (Phase 2), and one location per approximately 96,000 acres provides data on key ecosystem health indicators. Some partners chose to intensify beyond the base grid.

buy down. Plots installed at State expense to reach 20 percent implementation level of the base grid.

core reports. A class of publications that summarizes forest status and trends for a complete administrative unit, such as a whole State or a national forest. Examples include survey unit reports, State statistical or analytical reports, or national forest reports. Congressionally required 5-year State reports are part of the program's core reporting.

direct expenses. All expenses directly attributable to the FIA unit incurred as a part of doing FIA business. Excludes indirect business costs (such as rent, telephones, and administrative overhead outside the FIA unit staff), which are included below in "effective indirect expenses." Includes work done for other units as a normal part of FIA business and the following items:

equipment. Costs for durable goods used for FIA. Includes the following—

computer/telecommunications. Computer hardware, software, communications costs.

imagery. Aerial photos, satellite imagery data files.

field equipment. Measurement tools and equipment, such as data recorders, carried by field crews.

other. Any cost that does not fit into one of the above equipment categories.

vehicles. All vehicle costs, including items such as operating costs, depreciation, and leases.

grants and agreements. Cost of cooperative grants and agreements that directly support the FIA mission.

office space and utilities. Charges for rent, lease, or other real estate costs for FIA staff, plus utilities.

other direct expenses. Any cost that does not fit into one of the above categories, including training costs, unemployment, office supplies, postage, awards, moving expenses, and other expenses related to delivering the FIA program.

publications. Costs for laying out, editing, printing, and distributing publications.

salary. Includes direct salary and costs, plus benefits charged to the FIA unit, broken into the following categories:

administration. Program manager, project leader, and clerical staff.

analysts. Staff who analyze data and write publications.

Phase 1 production. Aerial photo-interpreters, satellite image analysts engaged in Phase 1 stratification.

data collection. All staff spending at least 50 percent of their time measuring regular plots.

field support. Field-crew supervisors who spend less than 50 percent of their time measuring plots; others involved in supporting and coordinating field crews.

information management. Programmers, data compilers, computer system support staff.

QA (quality assurance) crews. All staff spending at least 50 percent of their time doing QA fieldwork.

techniques research. Mainly research staff who conduct FIA-related research on methods and techniques.

travel. Broken into the following categories:

field/QA travel. Travel costs for field crews and QA crews.

office travel. Travel costs for all staff except field crews and QA crews.

effective indirect expenses. Indirect expenses include items such as research station management and administrative salaries, operating expenses, research station budget shortfalls, and other items for which the FIA unit is assessed by the research station. Each station has its own means for determining these assessments. Rather than reporting the different rates, we simply calculate the "Effective Indirect Expenses" item by subtraction: Effective indirect expenses = (total available funds) - (total direct FIA expenses + end of year balance)

effective indirect rate. Effective indirect expenses divided by total available funds, which is not necessarily the same as the standard station overhead rate; instead this rate reflects the total indirect cost as a fraction of the total funds available to FIA.

ecosystem indicators. Data collected on a subset of Phase 2 sample locations, previously referred to as Phase 3, measured for a more extended set of ecosystem attributes, including tree crown condition, lichen community diversity, soil data, and down woody debris.

FRIA (Forest Resource Inventory and Assessment). An account created by Congress within the State and Private Forestry portion of the Forest Service budget to provide funds to support Forest Inventory and Analysis collaboration with States.

FY (end-of-the-year) balance. Funds reported in the previous fiscal year business report as unspent at the end of that fiscal year and presumably available for use in the current fiscal year.

intensification. Plots installed at the expense of State, National Forest System, or other partner to achieve higher quality estimates for smaller areas or to purchase the base Federal sample down to a 5-year cycle.

management meetings held. Number of national or regional management team meetings held by each Forest Inventory and Analysis (FIA) unit. A management team for each FIA region consists of partners who share in the funding and implementation of the FIA program. The team typically consists of representatives from the FIA unit, NFS regional offices, State and Private Forestry offices, and State forestry agencies.

NGO (nongovernmental organization). A class of customers with whom FIA staff are asked to consult. Includes environmental organizations, professional societies, and other generally nonprofit organizations.

NIPF (nonindustrial private forest land owners). Private individuals or organizations that own forest land for purposes other than industrial operations.

percentage of full funding. Total available funds divided by the funding needed to fully implement the base Federal program for a given year's target funding.

percentage of region covered by annual FIA. Sum of forested acres in States currently implementing annual FIA, divided by the total number of forested acres in each FIA region; a measure of the degree to which the FIA region has moved from periodic to annual inventory.

percentage of total plots sampled. Total number of base grid plots sampled divided by the total number of plots in the base grid. In the East, the current target is 15 percent and, in the West, 10 percent annually as set by Congress.

Phase 1. Stratification of the land base into forested and nonforested classes by using remotely sensed imagery (aerial photographs or satellite imagery). Done to increase the efficiency of fieldwork and estimation.

Phase 2. A set of sample locations, approximately 1 for every 6,000 acres of land, measured for basic mensurational forest attributes.

Phase 3. This term is no longer used; see ecosystem indicators.

publications. Number of publications per unit, by type of publication, as reported in official agency attainment reports. Publications are among the major outputs of the FIA program. Types of publications include the following:

core reports. A report pertaining to reporting inventory results for a complete geographic entity. Includes:

national forest reports. A complete analysis for a single national forest.

national report. A report for the entire Nation, such as the Resource Planning Act report.

regional reports. A report for a group of States or other contiguous unit larger than a single State, such as a regional assessment.

State resource reports. A complete statistical or analytical summary of the forested resources within a single State.

State timber product output (TPO) reports. A complete analysis of TPO data for a single State.

other. Publications that do not fit into any of the above categories, such as abstracts, books, or other government publications.

other station publications. A manuscript published by the Forest Service, for example, a general technical report.

peer-reviewed journal articles. An article appearing in a refereed or peer-reviewed journal.

proceedings papers. An article appearing in the proceedings from a meeting or symposium.

significant consultations. Cases in which an FIA staff person spent at least 1 hour in discussion, analysis, or research to address a specific question or need raised by an external FIA program customer, and which is not part of our normal course of business in collecting, analyzing, and reporting FIA information.

total available funds. Total funds available for delivering the FIA program, including funds appropriated by Congress for the FIA program, other funds made available by Forest Service partners, and previous year carryover funds. These funds are a measure of Federal funding for the base Federal program.

users group meetings held. Number of users group meetings sponsored or attended by each FIA unit. A users group meeting is an open meeting in which a complete regional cross-section of FIA partners and customers are invited to attend. Users group meetings differ from the usual smaller meetings with one or two partners that all FIA units call as a normal course of business.

Appendix A. Contacts

For information about the status and trends of America's forests, please contact the appropriate office below.

Northern Research Station FIA Program
Program Manager, FIA
USDA Forest Service
North Central Research Station
1992 Folwell Avenue
St. Paul, MN 55108
651–649–5139

Southern Research Station FIA Program
(includes Commonwealth of
Puerto Rico and the U.S. Virgin Islands)
Program Manager, FIA
USDA Forest Service
Southern Research Station
4700 Old Kingston Pike
Knoxville, TN 37919
865–862–2073

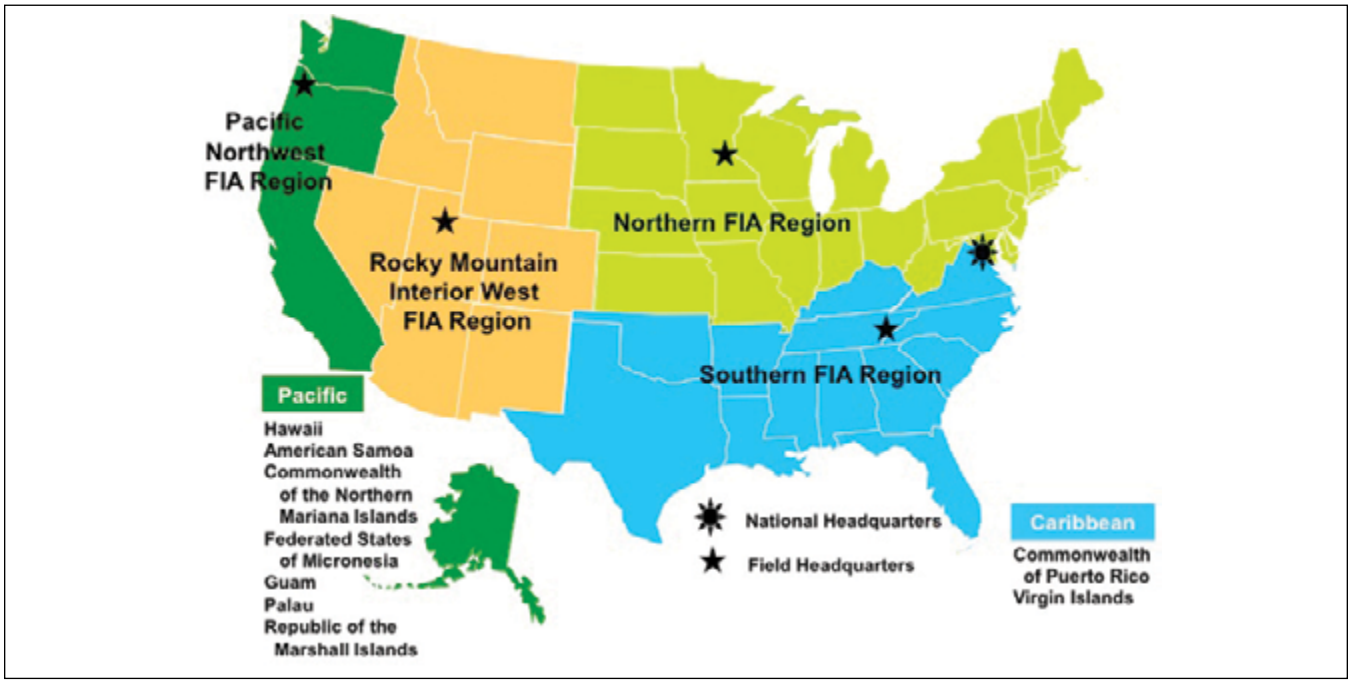
National FIA Program Office
National Program Leader, FIA
USDA Forest Service
201 14th Street, SW
Washington, DC 20250
703–605–4177

Rocky Mountain Research Station,
Interior West FIA Program
Program Manager, FIA
USDA Forest Service
Rocky Mountain Research Station
507 25th Street
Ogden, UT 84401
801–625–5388

Pacific Northwest Research Station FIA Program
Program Manager, RMA (FIA)
USDA Forest Service
Pacific Northwest Research Station
620 SW Main Street, Suite 400
Portland, OR 97205
503–808–2034

All regional Internet home pages and a wealth of statistical and other information are available through the national FIA home page at http://www.fia.fs.fed.us.

Figure A-1. FIA regions and headquarters.



FIA = Forest Inventory and Analysis.

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Table B-1. Performance measures for the FY 2013 FIA program

	Pacific Northwest	Interior West[a]	Southern	Northern	National Office	Total
Total available Federal funds, FY 2013 ($)	13,481,465	14,130,336	15,841,204	15,626,041	9,156,000	68,235,046
Total appropriated Federal funds, FY 2013 ($)	13,086,000	13,130,000	14,602,000	15,593,000	9,156,000	65,567,000
Estimated % of FY 2013 full funding[b]	86/74	86	86	86	77	85
Contributions from partners:						
Supporting the 20% FIA program ($)	76,869	914,245	1,476,819	798,401	0	3,266,334
Value-added contributions ($)	900,829	646,500	335,802	2,518,020	0	4,401,151
Total contributions ($)	977,698	1,560,745	1,812,621	3,316,421	0	7,667,485
Total all available funds, FY 2013 ($)	**14,459,163**	**15,691,081**	**17,653,825**	**18,942,462**	**9,156,000**	**75,902,531**
Base grid plots sampled:						
Forest[c]	1,527	2,848	6,352	6,345		17,072
Nonforest	2,891	5,709	4,505	11,736		24,841
Total base plots	4,418	8,557	10,857	18,081		41,913
Spatial and temporal intensification plots sampled:						
Forest[c]	822	—	1,520	1,849		4,191
Nonforest	33	—	709	2,100		2,842
Total intensification plots	855	—	2,229	3,949		7,033
Total base grid plots	5,273	8,557	13,086	22,030		48,946
Forest plots with one or more health indicators	2,354	2,848	2,137	852		8,191
Number of quality assurance plots *(field checked)*						
Forest	254	313	969	1,090		2,626
Nonforest	12	1,427	337	563		2,339
Total quality assurance plots	266	1,740	1,306	1,653		4,965
Percent forested quality assurance plots	11%	11%	12%	13%		12%
Special Study plots sampled:						
Forest[c]	5	211	6	—		222
Nonforest	682	24	18	—		724
Total Special Study plots	687	235	24	—		946
Total base grid plots and percent sampled[d]						
Total base grid plots	41,463	91,341	89,205	101,342		323,351
Average percent of land with forest cover	37%	23%	46%	30%		36%
Estimated percent of base grid sampled	10%	14%	15%	21%		15%
Percentage of States with annual FIA activity[e]	100%	100%	100%	100%		100%
Number of publications						
National forest reports	—	1	—	1	—	2
State/island resource reports	1	—	6	28	—	35
State timber product output reports	1	—	3	5	—	9
Regional reports	1	—	3	—	—	4
National reports	1	—	—	—	1	2
5-Year State reports	—	—	2	3	—	5
Subtotal—core reports	4	1	14	37	1	57
Peer-reviewed journal articles	17	24	18	31	—	90
Proceedings articles	1	28	22	22	—	73
Other station publications	—	3	—	3	—	6
Other publications	—	3	1	7	1	12
Total, all reports	22	59	55	100	2	238
Number of publications per Federal FTE	0.26	0.62	0.64	1.02	0.57	0.65

Table B-1. Performance measures for the FY 2013 FIA program (continued).

	Pacific Northwest	Interior West[a]	Southern	Northern	National Office	Total
Consulting activities						
Number of significant consultations	100	159	287	248	33	827
Total hours of significant consultations	651	1,593	1,180	4,534	166	8,124
Meetings						
Users group meetings held	1	2	2	1	1	7
Management meetings held	2	0	1	1	1	5

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. FY = fiscal year. QA = quality assurance. RMRS = Rocky Mountain Research Station.

[a] A unit of the Rocky Mountain Research Station.

[b] Excludes any supplemental funding provided for Experimental Forests and Ranges. PNW values reflect percentage excluding vs. including interior Alaska.

[c] Includes only plots where trees were measured, excluded denied access and hazardous plots where no trees measured.

[d] Base grid targets shown are 20 percent of samples per year as stated in the Farm Bill. Congressional conference notes recommended annual federal targets of 15 percent in the East and 10 percent in the West. Interior Alaska as well as the Caribbean and Pacific Island inventories are periodic and excluded from the annualized mandate in compliance with Congressional recommendations.

[e] Revised measure based on number of States where annualized inventory is active (see last section of app. 11 for previous measures). Includes only coastal Alaska.

Table B-2. Financial statement for the FY 2013 FIA program Federal funds.

	Pacific Northwest	Interior West	Southern	Northern	National Office	Total
	($)	*($)*	*($)*	*($)*	*($)*	*($)*
Available funds						
Previous year end-of-year balance	131,200	187,708	329,604	623	0	649,135
Post-year adjustments[a]	264,265	243,529	909,600	32,418	0	1,449,812
Subtotal pre-year adjustments	**395,465**	**431,237**	**1,239,204**	**33,041**	**0**	**2,098,947**
FY appropriated funds						
Research (base)	12,280,000	12,324,000	13,641,000	14,598,000	8,064,000	60,907,000
State and Private-FRIA (base)[b]	806,000	806,000	961,000	995,000	1,092,000	4,660,000
Subtotal appropriated funds	**13,086,000**	**13,130,000**	**14,602,000**	**15,593,000**	**9,156,000**	**65,567,000**
Special project funding	0	569,099	0	0	0	569,099
Total available Federal funds	**13,481,465**	**14,130,336**	**15,841,204**	**15,626,041**	**9,156,000**	**68,235,046**
Direct expenses						
Salary—	**7,499,833**	**7,515,557**	**8,075,861**	**9,668,731**	**416,000**	**33,175,982**
Administration	532,498	672,701	547,110	414,397	416,000	2,582,706
Phase 1 production	16,356	0	227,026	312,617	0	555,999
Field support	1,254,426	847,412	1,094,460	954,357	0	4,150,656
Data collection	2,196,979	2,355,009	826,076	2,216,684	0	7,594,748
Quality assurance	516,299	647,101	1,656,977	546,746	0	3,367,123
Information management	1,143,406	998,859	868,249	1,571,579	0	4,582,093
Analysis	1,064,798	1,051,677	1,968,260	2,610,232	0	6,694,968
Techniques research	775,069	942,798	887,702	1,042,119	0	3,647,689
Travel—	**598,942**	**567,829**	**555,507**	**446,600**	**28,000**	**2,196,878**
Office travel	75,523	76,582	24,212	66,990	28,000	271,308
Field/quality assurance crew travel	523,419	491,247	531,295	379,610		1,925,571
Equipment—	**441,026**	**679,504**	**342,112**	**526,824**	**0**	**1,989,466**
Imagery	0	26,026	0	7,000		33,026
Vehicles	211,556	446,860	334,379	304,803		1,297,597
Field equipment	111,883	87,342	7,733	30,712		237,670
Information technology/communications	117,588	65,703	0	69,214		252,505
Other	0	53,573	0	115,095		168,668
Publications	**2,574**	**5,524**	**21,390**	**34,000**	**5,000**	**68,488**
Grants and agreements[c]	**1,843,705**	**2,521,781**	**4,481,554**	**2,204,234**	**1,058,000**	**12,109,274**
Fieldwork/data	*1,206,466*	*1,516,004*	*4,049,554*	*1,195,842*	*0*	*7,967,866*
Information management	*3,965*	*0*	*140,000*	*436,718*	*518,000*	*1,098,683*
Research	*633,274*	*1,005,777*	*292,000*	*571,675*	*540,000*	*3,042,726*
Office space and utilities	**837,797**	**537,808**	**479,751**	**540,500**		**2,395,856**
Other direct expenses	**545,969**	**363,261**	**182,218**	**96,610**		**1,188,058**
Total direct expenses	**11,769,848**	**12,191,264**	**14,138,392**	**13,517,498**	**1,507,000**	**53,124,002**
Effective indirect expenses						
Total effective indirect[d]	**1,812,333**	**1,753,572**	**1,439,678**	**2,049,043**	**7,649,000**	**14,703,626**
Total effective indirect rate (%)	13.4	12.4	9.1	13.1	83.5	21.5
End of year (EOY) balance	**(100,716)**	**185,500**	**263,134**	**59,500**	**0**	**407,418**
Total Federal expense	**13,481,465**	**14,130,336**	**15,841,204**	**15,626,041**	**9,156,000**	**68,235,046**

EOY = end-of-year. FIA = Forest Inventory and Analysis. FY = fiscal year. FRIA = Forest Resource Inventory and Analysis. QA = quality assurance. RMRS = Rocky Mountain Research Station. S&PF = State and Private Forestry.

[a] Some bookkeeping is not completed until after the new FY begins, which may affect beginning balances. These adjustments including items such as carryover, return of fire transfer, Station adjustments, etc. are accounted for here.

[b] Amount includes S&PF overhead charges of $996,000 in the "National Office" column. Previous Annual Reports showed S&PF funds net of overhead charges.

[c] Incudes special funding from NASA to support North American Forest Dynamics Project, Carbon Assessment and Global Forest Biomass.

[d] Grants and Agreements include general allocation to basic categories.

[e] Program-wide charges for Albuquerque Service Center included in National Office indirect expense, including S&PF charges for ASC.

Table B-3a. Federal staffing (FTEs) for the FY 2013 FIA program.

	Pacific Northwest	Interior West	Southern	Northern	National Office*	Total
Administration	5.1	6.9	6.0	4.0	2.5	24.5
Phase 1 production work	0.2	0.0	4.1	4.0	0.0	8.3
Field support	14.3	12.4	10.7	9.1	0.0	46.5
Data collection	31.5	39.5	8.6	28.9	0.0	108.5
Quality assurance crew	6.5	6.6	20.6	7.0	0.0	40.8
Information management	10.0	9.9	8.2	14.8	0.0	42.9
Analysis	9.2	11.2	19.8	23.2	0.0	63.4
Techniques research	6.8	8.0	8.0	7.1	1.0	30.9
Total	**83.6**	**94.5**	**86.0**	**98.1**	**3.5**	**365.8**

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. QA = quality assurance. RMRS = Rocky Mountain Research Station.

* Techniques person is in unit funded by National Office at Research Triangle Park, NC.

Table B-3b. Estimate of cooperator staffing (FTEs) funded by FIA grants and agreements for the FY 2013 FIA program.

	Pacific Northwest	Interior West	Southern	Northern	National Office	Total
Administration		1.0		0.0	0.0	1.0
Phase 1 production work		0.0		0.7	0.0	0.7
Field support	0.7	1.6	12.0	2.2	0.0	16.5
Data collection	6.5	15.6	77.0	21.4	0.0	120.5
Quality assurance crew		0.5		0.0	0.0	0.5
Information management	0.3	1.0	1.0	4.2	6.0	12.5
Analysis	2.5	5.2		3.8	3.0	14.5
Techniques research	0.5	11.9		3.8	2.0	18.2
Total	**10.5**	**36.8**	**90.0**	**36.1**	**11.0**	**184.4**

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. QA = quality assurance. RMRS = Rocky Mountain Research Station.

Table B-3c. Estimate of total federally funded staffing (FTEs) for the FY 2013 FIA program.

	Pacific Northwest	Interior West	Southern	Northern	National Office	Total
Administration	5.1	7.9	6.0	4.0	2.5	25.5
Phase 1 production work	0.2	0.0	4.1	4.7	0.0	9.0
Field support	15.0	14.0	22.7	11.3	0.0	63.0
Data collection	38.0	55.1	85.6	50.3	0.0	229.0
Quality assurance crew	6.5	7.1	20.6	7.0	0.0	41.2
Information management	10.3	10.9	9.2	19.0	6.0	55.4
Analysis	11.7	16.4	19.8	27.0	3.0	77.9
Techniques research	7.3	19.9	8.0	10.9	3.0	49.1
Total	**94.1**	**131.3**	**176.0**	**134.2**	**14.5**	**550.2**

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. QA = quality assurance. RMRS = Rocky Mountain Research Station.

Table B-4. Partners' contributions toward implementing FIA in FY 2013.

Unit	Partner	Contributions toward the base program	Contributions that add value
		($)	($)
Interior West	Colorado State Forest Service	231,400	15,846
	Nevada Division of Forestry	3,594	
	New Mexico Energy, Minerals & Natural Resources Dept (ARRA)	437,100	
	USDA Forest Service Region 1	123,400	
	USDA Forest Service Region 2	6,000	1,000
	USDA Forest Service Region 4	112,751	
	NO Forest Service (for NFS/FIA Carbon study)		225,000
	NO Forest Service (Landscape Change Monitoring System)		120,000
	NO Forest Service (Image-based Change Estimation, FIA Remote Sensing synthesis, other studies)		154,534
	NO Forest Service (LANDFIRE)		90,000
	Weber State University		30,418
	North Carolina State		9,702
	Interior West total	**914,245**	**646,500**
National Office			0
	NO total	**0**	**0**
Northern	Connecticut Dept of Cons.	500	0
	Colorado State University	0	5,000
	Delaware Department of Agriculture	7,770	0
	Illinois Division of Forest Resources	23,359	0
	Indiana Department of Natural Resources	57,545	63,170
	Iowa Department of Natural Resources	17,645	0
	Kansas State Forest Service	34,938	0
	Maine Forest Service	128,406	233,905
	Maryland Department of Natural Resources Forest Service	12,300	0
	Massachusetts Department of Conservation and Recreation	8,200	0
	Michigan Division of Forest Management	40,200	0
	Michigan State University	0	18,750
	Minnesota Department of Natural Resources	87,500	425,575
	University of Georgia/Virginia Tech	0	27,500
	Missouri Department of Conservation	67,494	31,053
	Nebraska Department of Forestry, Fish, and Wildlife	5,853	0
	New Hampshire Department of Resources & Economic Development	20,400	0
	New Jersey Forest Service	3,667	0
	New York Department of Environmental Conservation	19,890	0
	New York State University	0	4,250
	North Dakota Forest Service	7,200	0
	Ohio Department of Natural Resources	11,345	0
	Pennsylvania Department of Conservation & Natural Resources	43,000	17,536
	Resources Planning Act	0	28,290
	Rhode Island Department of Environmental Management	3,069	0
	South Dakota Department of Forestry and Natural Resource Management	21,851	0
	University of Massachusetts	0	44,750
	University of Minnesota	0	18,000
	University of Nevada Las Vegas	0	104,250
	USDA Forest Service Research and Development	0	55,000
	USDA Forest Service National Forest System	1,667	881,675
	USDA Forest Service State & Private Forestry	67,000	25,000
	Vermont Department of Forests, Parks & Recreation	8,600	0
	University of Maine	0	18,750
	West Virginia Division of Forestry	49,300	0
	Wisconsin Department of Natural Resources	49,702	515,566
	NRS total	**798,401**	**2,518,020**

Table B-4. Partner contributions toward implementing FIA in FY 2013 (continued).

Unit	Partner	Contributions toward the base program	Contributions that add value
		($)	*($)*
Pacific Northwest	USDA Forest Service Region 6 for LSOG GNN/LT Mapping Project or Drought Stress Vulnerbility Project		32,508
	Remote Sensing Applications Center for Landscape Change Monitoring System Project	8,906	
	USDA Intermountain Region 4 for Image-based Change Estimations Project	30,000	
	Summer Crew Housing		4,400
	USDA Forest Service Region 10 for Non Forest Plot Project		137,200
	USDA Forest Service Region 5 for Guam Forest Inventory Analysis		29,400
	USDA Forest Service, Pacific Southwest Research Station for Guam Forest Inventory Analysis		24,952
	USDA Forest Service, Pacific Southwest Research Station for Guam Forest Inventory Analysis		4,539
	USDA Forest Service Region 6 for Region Add On Project		25,520
	USDA Forest Service Region 5 for Region Add On Project		29,427
	USDA Forest Service Washington Office for Joint Fire Science Project		196,655
	USDA Forest Service PNW Research Directors Office for Fire Effects & Recovery Study		25,000
	USDA Forest Service PNW Research Directors Office for Oregon BioSum Project		25,000
	USDA Forest Service PNW Research Directors Office for Biomass Carbon Database Project		25,000
	USDA Forest Service PNW Research Directors Office for Modeling Tree Height & Growth Project		25,000
	USDA Forest Service, Pacific Southwest Research Station for Bio-Sum	37,962	
	USDA Forest Service, RMRS for Lichen Support		25,000
	USDA Forest Service, Western Wildland Environmental Threat Assessment Center for Invasives Project Support		12,000
	USDA Forest Service, Land Watershed Mangement for Project Support		23,000
	USDA Forest Service Region 6 for C Stock Flux Assessment		24,500
	USDA Forest Service, State & Private Forest Health Management Cooperative Lands for White Bark Pine Disturbance Project		15,000
	USDA Forest Service, State & Private Forest Health Management Federal Lands for Lichen Project		29,400
	USDA Forest Service Region 6 for Off Grid Plot Project		30,000
	U.S. Geological Survey		1,182
	U.S. Geological Survey		1,286
	USDA Forest Service PNW Research Directors Office for Civil Rights Advisory Group Scholarship Awards		14,700
	USDA Forest Service PNW Research Directors Office for Science Finding Award		10,000
	National Aeronautics & Space Administration		17,760
	Oregon Department of Forestry		70,000
	National Aeronautics & Space Administration		42,400
	PNW total	**76,869**	**900,829**

Table B-4. Partner contributions toward implementing FIA in FY 2013 (continued).

Unit	Partner	Contributions toward the base program ($)	Contributions that add value ($)
Southern	Alabama Forestry Commission	64,146	12,650
	Arkansas Forestry Commission	133,627	10,450
	Florida Department of Agriculture and Consumer Services	53,668	5,720
	Georgia Forestry Commission	184,432	16,610
	International Institute of Tropical Forestry	0	100,000
	Kentucky Division of Forestry	106,668	24,750
	Mississippi Forestry Commission	85,333	6,930
	North Carolina Department of Agriculture and Consumer Services	0	14,850
	Oklahoma Department of Agriculture and Forestry	196,968	2,640
	South Carolina Forestry Commission	116,300	7,700
	Tennessee Department of Agriculture	0	27,940
	Texas A&M Forest Service	300,499	8,910
	Virginia Department of Forestry	109,984	13,530
	Virginia Tech - Organize FS Data-Integrate knowledge from sources in South	12,200	0
	Virginia Tech - Biomass Equation Project	57,670	4,061
	Virginia Tech - Legacy Data Project	15,280	0
	University of Georgia - Biomass Equation Project	40,045	4,061
	University of Tennessee	0	75,000
	SRS total	**1,476,819**	**335,802**
Grand total, all FIA units		**3,266,334**	**4,401,151**

EPA = Environmental Protection Agency. FIA = Forest Inventory and Analysis. NASA = National Aeronautics and Space Administration. NFS = National Forest System. NO = National Office. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. PSW = Pacific Southwest Research Station. RMRS = Rocky Mountain Research Station. SRS = Southern Research Station. USDA = U.S. Department of Agriculture. Virginia Tech = Virginia Polytechnic Institute and State University. WFHF = Wildland Fires Hazardous Fuels.

Table B-5. Grants and agreements entered into by FIA units, FY 2013.

Unit	Amount ($)	Recipient	Purpose
Interior West	74,000	Boston University	LANDSAT Time Series Analysis
	890,000	Colorado State Forest Service	Implementation of annual FIA
	30,383	Colorado State University	Global Forest Biomass study (NASA)
	40,137	Great Basin Bird Observatory	Pinyon-Juniper Habitat study
	49,000	METI Contracting	History of FIA Remote Sensing synthesis
	95,006	North Carolina State University	FVS Processing for the Forest Carbon Mgt Framework
	24,500	PNW FIA	R3 Lichen Study
	203,949	Private Contractors (multiple)	Implementation of annual FIA
	80,574	Private Contractors (multiple)	Field Data Collection - AREBA (R3 Burned Areas)
	104,000	RMRS, Forest and Woodland Ecosystems	FIA Soils Indicator Lead and sampling
	42,624	RMRS, Forest and Woodland Ecosystems	Pinyon-juniper remeasurement study
	44,068	RMRS, Forest and Woodland Ecosystems	FIA/Experimental Forests and Range study
	90,000	RMRS, Forest and Woodland Ecosystems	Metegenomics/FIA Study
	74,664	RMRS, Forest and Woodland Ecosystems	Forest Vegetation Simulator Development Support
	150,789	Student Conservation Association	Implementation of annual FIA
	72,000	University of Montana	FIA Biomass Study
	21,516	University of Washington	FIA Plot Climate Analysis (W/RMRS Forest and Woodlands Ecosystems)
	319,164	Utah State University	National Forest Carbon Analyses (multiple studies, external funds)
	50,233	Weber State University	Water Quality and Forest Disturbance (NASA)
	65,174	Weber State University	Carbon Cycle Science (NASA) Biomass Estimation
IW total	**2,521,781**		
National Office	20,000	Auburn University	Tree planting data
	100,000	Ecological Society of America	National Vegetation Classification System
	120,000	Northern Research Station, St. Paul	FIA Biomass Study
	50,000	Oregon State University	FIA Biomass Study
	75,000	Redcastle Resources Inc	RSAC FIA projects
	240,000	Research Triangle Park FHM Unit	National FHM support
	15,000	Conservation Biology Institute	Protected Areas Database
	18,000	Society of American Foresters	National User Group support
	380,000	University of Nevada in Las Vegas	Information Management
	40,000	University of Wisconsin	Lichen communities for FIA
NO total	**1,058,000**		
Northern	20,476	Access Ability Inc.	Prefield document imaging services
	11,250	Chestnut Ridge Forestry	Implementation of annual FIA, Illinois, Missouri
	68,370	Chestnut Ridge Forestry	Implementation of annual FIA, West Virginia
	20,000	Colorado State University	Carbon Landuse Change
	92,831	Daniel Huberty	Implementation of annual FIA, Iowa
	146,400	Daniel Huberty	Implementation of annual FIA, Kansas
	28,326	Daniel Huberty	Implementation of annual FIA, North Dakota
	62,600	Glenn Summers	Implementation of annual FIA, West Virginia
	79,781	Indiana Department of Natural Resources	Implementation of annual FIA
	32,464	International Programs	Keith Philippe
	156,505	Joel Fyock	Implementation of annual FIA, New York
	130,000	Maine Forest Service	Implementation of annual FIA
	44,400	Mark Webb	Implementation of annual FIA, Ohio
	73,050	Michigan State University	FIA Biomass Study
	130,000	Minnesota Department of Natural Resources	Implementation of annual FIA
	75,750	Northern Research Station Grand Rapids	Soil analyses
	71,880	Quercus Consultations Inc	Implementation of annual FIA, Nebraska
	58,397	South Dakota Dept of Forestry & Nat. Res. Mgmt.	Implementation of annual FIA
	110,000	University of Georgia/Virginia Tech	FIA Biomass Study
	102,270	University of Maine	FIA Biomass Study
	178,775	University of Massachusetts	NWOS/Family Forest Research Center
	12,100	University of Minnesota	FIA Biomass Study
	58,480	University of Minnesota	Carbon Effux from Woody Debris

Table B-5. Grants and agreements entered into by FIA units, FY 2013 (continued).

Unit	Amount ($)	Recipient	Purpose
	416,242	University of Nevada Las Vegas	Information Management
	17,000	University of New York Syracuse	Enhancing ITREE Spatial Simulation
	6,888	Wilfred Previant	Implementation of annual FIA, Michigan
NRS total	**2,204,234**		
Pacific Northwest	578,851	Student Conservation Association	Forest Inventory and Analysis FY-12, 9 Interns, 24 weeks
	123,399	University of Guam	Guam's forest inventory and analysis (FIA) program and Micronesia Challenge's terrestrial monitoring program's forest inventory
	3,965	Oregon State University	National imputed database: building a project plan in cooperation with a national team
	29,500	Oregon State University	Lichen and bryophyte indicators and roles in forests
	100,000	National Aeronautics & Space Administration	USDA Forest Service-NASA partnership to leverage advanced remote sensing technologies for forest inventory: a pilot project in Tanana Valley of interior Alaska
	79,890	University of Washington	Characterizing forest structure using airborne lidar
	43,994	Portland State University	Modeling forest resilience, biomass and carbon management potential
	65,000	Oregon State University	Regional carbon models from linking field measurements and satellite change detection
	64,890	University of Idaho	FVS:OPCOST: extending and enhancing the fuel reduction cost simulator as a user-friendly FVS extension to estimate costs of all types of forest fuels management
	250,000	University of HI at Hilo	Monitoring with forest inventory and analysis in Hawaii experimental tropical forest
	504,216	Alaska Contract	Implementation of Annual FIA
PNW total	**1,843,705**		
Southern	192,438	Alabama Forestry Commission	Implementation of Annual FIA
	400,882	Arkansas Forestry Commission	Implementation of Annual FIA
	20,000	Auburn, Purdue, Idaho	Tree seedling planting survey
	161,000	Florida Department of Agriculture and Consumer Services	Implementation of Annual FIA
	253,296	Georgia Forestry Commission	Implementation of Annual FIA
	66,000	International Institute of Tropical Forestry (IITF)	Experimental Forest Study
	320,000	Kentucky Division of Forestry	Implementation of Annual FIA
	256,000	Mississippi Forestry Commission	Implementation of Annual FIA
	394,054	North Carolina Dept of Agric. and Consumer Services	Implementation of Annual FIA
	300,000	Oklahoma Dept of Agriculture Food and Forestry	Implementation of Annual FIA
	348,900	South Carolina Forestry Commission	Implementation of Annual FIA
	369,200	Tennessee Department of Agriculture	Implementation of Annual FIA
	720,500	Texas A&M Forest Service	Implementation of Annual FIA
	45,000	University North Carolina - Asheville	NEC Mobile App
	73,000	University of Georgia	FIA Biomass Study
	75,000	University of Tennessee	Information Management - Cooperative research
	333,284	Virginia Tech University	Implementation of Annual FIA
	35,000	Virginia Tech University	Assessing NTFP Inventory using FIA Forest Inventory Data
	25,000	Virginia Tech University	Forest Inventory & Analysis Report Simulator Phase II
	20,000	Virginia Tech University	Organize USDA Forest Service Data - Integrate knowledge from sources in South
	73,000	Virginia Tech University	FIA Biomass Study
SRS total	**4,481,554**		
Grand total	**12,109,274**		

BBER = University of Montana, Bureau of Business Economics Research. EF&R= Experimental forests and ranges. ESA = Endangered Species Act. FEW = Forest and Woodland Ecosystems. FHM = Forest Health Monitoring. FHTET = Forest Health Technology Enterprise Team. FIA = Forest Inventory and Analysis. FIDO = Forest Inventory Data Online. FVS = Forest Vegetation Simulator. FWE = Forest and wildlife ecology. GEOS = Global Earth Observing System. GLEES = Glacier Lake Ecosystem Experiments Site. IW = Interior West. LTER = Long-Term Ecological Research. NASA = National Aeronautics and Space Administration. NASS= National Agricultural Statistical Service. NFS = National Forest System. NO = National Office. NRS = Northern Research Station. NTFP = nontimber forest products. NVCS= National Vegetation Classification System. NWOS = National Woodland Owner Survey. QA/QC = quality assurance/quality control. RC&D = Resource Conservation and Development. RMRS = Rocky Mountain Research Station. RSAC = Remote Sensing Applications Center. RWU = Research Work Unit. TEAMS = a Forest Service Enterprise Unit. TPO = timber products output. USDA = U.S. Department of Agriculture. VA Tech = Virginia Polytechnic Institute and State University.

* SRS State Totals do not include $480,996 de-obligated prior year funds returned to SRS FIA and included in Grants written in FY13 - Georgia FRRE4511 $135,707, Georgia FRRE4510 $164,293 and Texas FRRE4512 $180,996

Table B-6. Number and hours of significant consultations by FIA staff by customer group, FY 2013.

Customer group	Pacific Northwest		Interior West		Southern		Northern		National Office		Total	
	No.	*Hrs.*	*No.*	*Hrs.*	*No.*	*Hrs.*	*No.*	*Hrs.*	*No.*	*Hrs.*	*No.*	*Hrs.*
Academic	15	49	40	407	74	468	44	340	3	20	176	1,284
Government	38	427	98	1,049	36	132	127	3,909	11	65	310	5,582
Industry	12	51	3	8	87	384	24	83	5	25	131	551
NGO	23	75	8	53	29	114	40	189	8	35	108	466
NIPF	2	2	3	48	12	15	6	3	1	3	24	71
Media	1	1	1	5	6	8	4	8	3	10	15	32
Other	9	46	6	23	43	59	3	4	2	8	63	140
	100	**651**	**159**	**1,593**	**287**	**1,180**	**248**	**4,534**	**33**	**166**	**827**	**8,124**

FIA = Forest Inventory and Analysis. NGO = nongovernmental organization. NIPF = nonindustrial private forest. RMSM = Rocky Mountain Research Station.

Table B-7. FIA data access by online tools and spatial data center requests, 2005–2013.

Indicator	Number of annual accesses									Total 2005–2013
	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Online tools										
MapMaker	55,062	22,906	24,073	20,834	25,000	—	—	—	—	147,875
FVS	763	566	497	683	—	—	—	—	—	2,509
Fuel Treatment Evaluator	650	863	1,995	50	—	—	—	—	—	3,558
FIDO				38,092	55,494	70,943	72,946	52,099	57,567	347,141
NWOS					6,560	1,700	2,070	5,515	4,502	20,347
EVALIDator					3,920	29,000	55,468	34,901	33,759	157,048
DATA downloads					2,014	3,033	1,929	1,512	7,383	15,871
Total	**56,475**	**24,335**	**26,565**	**59,659**	**92,988**	**104,676**	**132,413**	**94,027**	**103,211**	**591,138**
Spatial data requests										
Academia	50	104	138	140	109	114	121	168	143	1,087
State	31	31	44	48	49	47	36	45	29	360
NFS	—	11	15	29	16	32	17	46	31	197
Other Federal	71	174	182	135	105	116	92	169	175	1,219
NGO	6	10	21	34	41	31	23	41	35	242
Industry	13	14	39	29	28	35	34	61	41	294
Other	20	3	54	68	57	48	91	75	67	483
Total	**191**	**347**	**493**	**483**	**405**	**423**	**414**	**605**	**521**	**3,882**

FIA = Forest Inventory and Analysis. FIDO = Forest Inventory Data Online. FVS = Forest Veg Simulator. NFS = National Forest System. NGO = nongovernmental organization. NWOS = National Woodland Owners Survey.

Table B-8. Mill, fuelwood, and ownership surveys processed and utilization sites visited, 2000–2013.

Survey or site	Year initiated	Number of annual survey questionnaires or sites										Total 2000–2013
		2000–2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Timber products	1947	8,390	2,530	1,382	2,473	1,131	2,657	1,727	3,521	1,375	2,675	16,746
Fuelwood	1947	1,400	—	—	1,519	—	—	—	—	—	2,360	3,155
Ownership surveys	1978	10,831	—	6,450	—	—	—	—	7,960	4,028	5,262	7,643
Utilization sites	1947	274	252	99	147	486	17	66	58	162	189	35,040

Table B-9. Forest health indicator, year of initiation, and number of samples collected, 2000–2013.

Indicator	Year initiated	Number of annual samples										Total 2000–2013
		2000–2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Crowns	1991	4,025	1,310	964	1,006	962	1,177	761		1,510	5,031	16,746
Lichens	1998	2,156	217	123	182	127	150	167		33	—	3,155
Soils	1999	3,832	1,317	289	227	349	201	266	2	595	565	7,643
Veg	2001	7,211	1,871	1,778	2,386	2,100	2,125	2,097	1,624	7,145	6,703	35,040
Ozone	1994	5,205	984	957	958	948	1,003	1,018	107	—	—	11,180
DWM	2001	7,136	4,036	3,429	4,288	1,448	2,152	1,392	1,414	6,263	8,271	39,829
Mortality[a]	2001	13,632	9,791	10,646	12,122	12,594	13,892	15,293	15,858	20,275	13,859	137,962

DWM = down woody material.

[a] Number of remeasured annual inventory plots from which tree mortality can be estimated.

Table B-10. Status of FIA special project areas excluded from annualized inventory.

Region and area	Land area in inventory	Forest area	Percent forest	Number of major islands	Year(s) of current inventory	Year(s) of published report	Total Phase 2 plots[a]	Total Phase 3 plots	Available online data
	Acres	*Acres*							
Pacific (PNW)									
American Samoa	48,434	43,631	90	4	2013	2004	21		Yes
Guam	135,660	63,833	47	1	2013-2014	2004	46		Yes
Palau	110,028	90,685	82	10	2003	2007	54		Yes
Commonwealth of the Northern Mariana Islands	75,546	51,009	68	3	2004	2011	35		Yes
Federated States of Micronesia	161,917	143,466	89	4	2005-2006	2011	73		Yes
Marshall Islands	33,182	23,230	70	10	2008	2011	44		Yes
Hawaii[b]	4,141,469	1,990,000	48	8	2010-2019	1988	685		No
Atlantic (SRS)									
Commonwealth of Puerto Rico	2,191,815	1,213,205	55	4	2009	2013	287	182	Yes
U.S. Virgin Islands	82,164	45,163	55	3	2009	2013	48	62	Yes
Total	**6,980,215**	**3,664,222**	**604**	**47**			**1,293**	**244**	

FIA = Forest Inventory and Analysis. PNW = Pacific Northwest Research Station. SRS = Southern Research Station.

[a] Partial suite of Phase 3 data collected on all plots in Pacific region.

[b] Hawaii plans to implement annualized design.

Table B-11. Land and forest area and FIA annualized implementation status by State and region, FY 2013.[a]

Region and State	Bureau of Census land area	Forest land area defined by current FIADB	Forest land area defined by 2012 RPA Assessment	Annual inventory entry date	State annualized as of 2013
	Thousand acres	*Thousand acres*	*Thousand acres*		
Northern	***606,841***	***182,325***	***182,299***		***24***
Connecticut	3,099	1,712	1,712	2003	Yes
Delaware	1,247	340	340	2004	Yes
Illinois	35,532	4,848	4,848	2001	Yes
Indiana	22,929	4,830	4,830	1999	Yes
Iowa	35,749	3,014	3,014	1999	Yes
Kansas	52,326	2,502	2,502	2001	Yes
Maine	19,739	17,660	17,660	1999	Yes
Maryland	6,252	2,461	2,461	2004	Yes
Massachusetts	4,992	3,024	3,024	2003	Yes

Table B-11. Land and forest area and FIA annualized implementation status by State and region, FY 2013 (continued).[a]

Region and State	Bureau of Census land area	Forest land area defined by current FIADB	Forest land area defined by 2012 RPA Assessment)	Annual inventory entry date	State annualized as of 2013
	Thousand acres	*Thousand acres*	*Thousand acres*		
Northern (continued)					
Michigan	36,185	20,127	20,127	2000	Yes
Minnesota	50,961	17,371	17,371	1999	Yes
Missouri	43,995	15,472	15,472	1999	Yes
Nebraska	49,167	1,576	1,576	2001	Yes
New Hampshire	5,730	4,832	4,832	2002	Yes
New Jersey	4,707	1,964	1,964	2004	Yes
New York	30,161	18,966	18,966	2002	Yes
North Dakota	44,161	760	734	2001	Yes
Ohio	26,151	8,088	8,088	2001	Yes
Pennsylvania	28,635	16,782	16,782	2000	Yes
Rhode Island	662	360	360	2003	Yes
South Dakota	48,519	1,911	1,911	2001	Yes
Vermont	5,899	4,591	4,591	2003	Yes
West Virginia	15,384	12,155	12,155	2004	Yes
Wisconsin	34,661	16,980	16,980	2000	Yes
Southern	***533,031***	***267,214***	***244,716***		***13***
Alabama	32,413	22,877	22,877	2001	Yes
Arkansas	33,303	18,755	18,755	2000	Yes
Florida	34,447	17,461	17,461	2001	Yes
Georgia	36,809	24,768	24,768	1998	Yes
Kentucky	25,271	12,472	12,472	1999	Yes
Louisiana	27,650	14,712	14,712	2000	Yes
Mississippi	30,031	19,542	19,542	2007	Yes
North Carolina	31,115	18,588	18,588	2003	Yes
Oklahoma	43,901	12,646	12,256	2008	Yes
South Carolina	19,239	13,120	13,120	1998	Yes
Tennessee	26,390	13,942	13,942	1999	Yes
Texas	167,188	62,425	40,318	2000	Yes
Virginia	25,274	15,907	15,907	1998	Yes
Interior West	***547,691***	***154,093***	***124,614***		***8***
Arizona	72,700	18,643	10,795	2001	Yes
Colorado	66,331	22,837	19,995	2002	Yes
Idaho	52,892	21,448	21,247	2004	Yes
Montana	93,149	25,573	25,169	2003	Yes
Nevada	70,260	11,169	8,121	2010	Yes
New Mexico	77,631	24,840	16,615	2008	Yes
Utah	52,589	18,135	11,866	2000	Yes
Wyoming	62,140	11,448	10,807	2010	Yes
Pacific Northwest	***573,389***	***215,182***	***214,605***		***5***
Alaska, Coastal	39,041	14,426	14,426	2004	Yes
Alaska, Interior	326,575	114,151	114,151		
California	99,699	32,618	32,057	2001	Yes
Hawaii	4,110	1,748	1,748	2010	Yes
Oregon	61,432	29,804	29,787	2001	Yes
Washington	42,532	22,435	22,435	2002	Yes
Total	**2,260,952**	**818,814**	**766,234**	**—**	**50**
Forest area performance measure, excluding interior Alaska					100%
Forest area performance measure, including interior Alaska					86%
State activity performance measure, including all active States					**100%**

[a] Based on area defined as forest in FIADB plus area defined as forest by 2012 RPA Assessment.

Table B-12. FIA summary statistics and performance measures, 2007–2013.

	2007	2008	2009	2010	2011	2012	2013
Available program funds							
Apropriated funds[a]	63,605	64,641	65,536	71,817	71,452	69,186	65,567
Other Federal funds[b]	1,272	1,559	3,320	930	856	528	2,668
Total Federal funds	**64,877**	**66,200**	**68,856**	**72,747**	**72,308**	**69,714**	**68,235**
Total partner funds	7,204	6,505	6,494	7,516	9,109	10,129	7,667
Total available funds	**72,081**	**72,705**	**75,350**	**80,263**	**81,417**	**79,843**	**75,903**
% full Federal appropriated funding	**82**	**83**	**84**	**92**	**92**	**89**	**84**
Program expenses and balances							
Administration	3,031	2,785	2,999	3,262	3,233	2,735	2,854
Image processing	1,300	1,198	1,102	916	724	519	589
Field support	3,175	3,357	3,003	3,594	3,917	3,946	4,151
Data collection[c]	23,630	22,989	25,243	26,162	27,057	24,387	22,559
Information management[c]	7,431	6,108	7,623	7,476	6,794	6,740	5,933
Analysis	4,518	5,147	5,354	5,357	6,105	6,570	6,695
Research[c]	4,799	5,033	5,881	6,903	5,444	6,075	6,690
Miscellaneous/other	3,454	3,406	3,909	4,473	4,417	3,882	3,652
Total direct expense	**51,338**	**50,023**	**55,115**	**58,143**	**57,692**	**54,854**	**53,124**
Total indirect expenses	**13,194**	**13,586**	**12,653**	**14,189**	**13,958**	**14,180**	**14,704**
Indirect rate	*20.7%*	*21.0%*	*19.3%*	*19.8%*	*19.5%*	*20.5%*	*22.4%*
Total Federal expense	**64,532**	**63,609**	**67,768**	**72,332**	**71,650**	**69,034**	**67,828**
Fire transfer[d]		2,318					
Total EOY balance	**345**	**273**	**1,089**	**415**	**658**	**680**	**407**
Total Federal funds	**64,877**	**66,200**	**68,856**	**72,747**	**72,308**	**69,714**	**68,235**
Other measures							
% States with annual activity	90	94	94	100	100	100	100
% States with FIADB 1–2 years old	90	90	90	88	94	94	94
Federal employees	387	389	381	392	397	372	366
Other employees	179	173	201	205	201	203	184
Total employees	**566**	**562**	**582**	**596**	**598**	**575**	**550**
Phase 2/3 base forest plots	19,880	18,208	21,545	19,272	21,233	19,673	21,263
Phase 2/3 base nonforest plots	24,757	29,351	21,996	25,238	27,568	27,131	27,683
Total plots	**44,637**	**47,559**	**43,541**	**44,510**	**48,801**	**46,804**	**48,946**
All QA plots	3,664	4,860	3,597	4,020	4,550	4,417	4,965
% QA plots	8%	10%	8%	9%	9%	9%	10%
All publications	135	172	206	203	204	272	238
Journal publications	37	65	38	74	62	90	90
% journal publications	27%	38%	18%	36%	30%	33%	38%
Consultations, number	1,571	1,659	1,399	991	1,753	848	827
Consultations, hours	5,767	6,656	8,603	10,381	8,584	8,807	8,124
User/mangement meetings	16	10	11	10	14	15	12
Spatial data requests filled	493	483	405	423	414	605	605
Online accesses	26,565	59,659	92,988	104,676	132,413	94,027	94,027

EOY = end-of-year. FIADB = Forest Inventory and Analysis Database. QA = quality assurance. RMRS = Rocky Mountain Research Station.

[a] Net of rescissions.

[b] Includes return of previous year carryover, return of fire transfers, and additional Forest Service Research commitments.

[c] Includes Federal grants and agreements.

[d] Prior to 2008, fire transfer included in "Indirect expenses."