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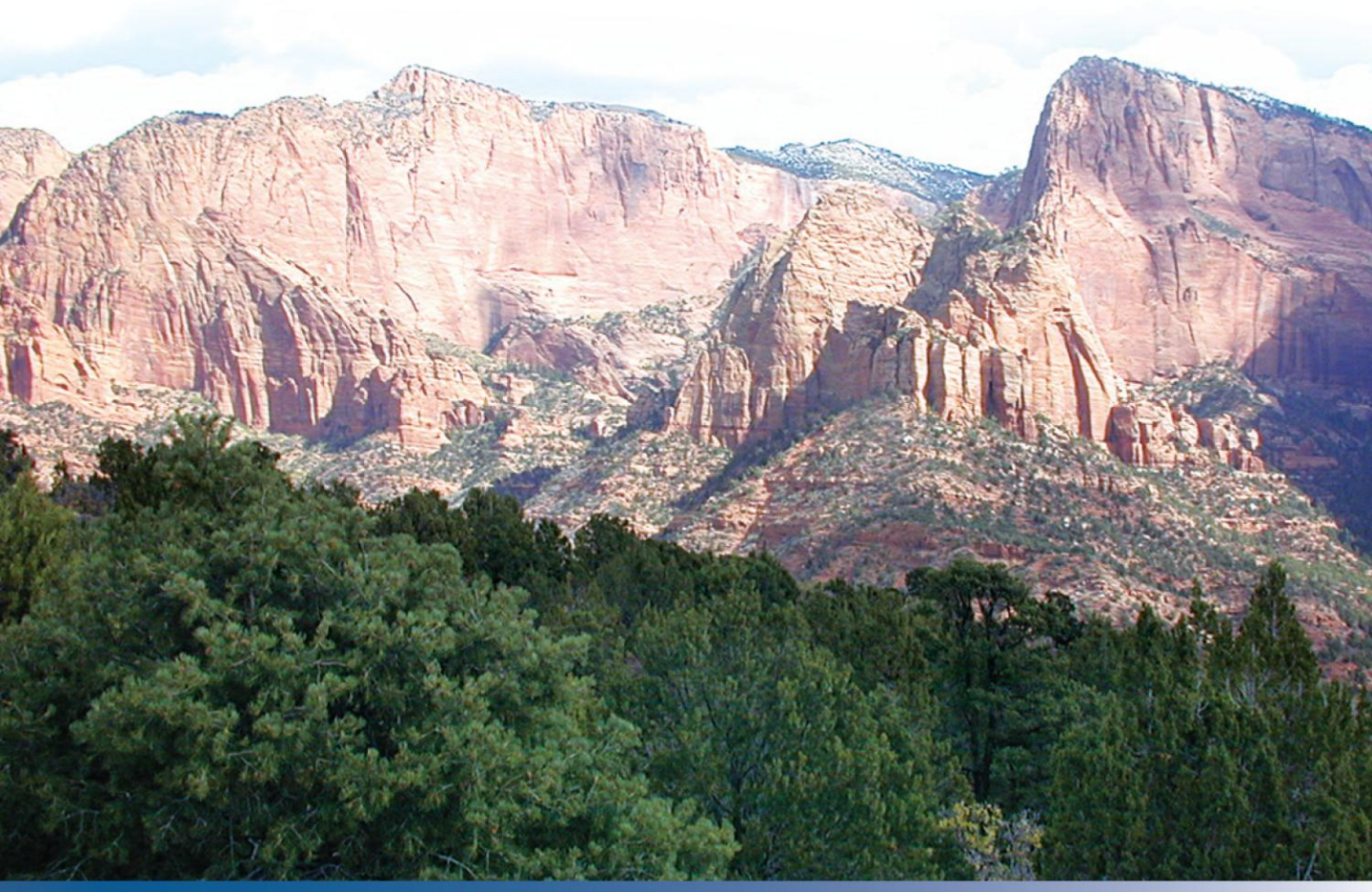
Fiscal Year 2011 Business Report



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Cover photo: *Pinyon-juniper forest near Zion National Park, UT. Courtesy of Tammy Fikstad, former Crew Leader, Interior West Forest Inventory and Analysis, currently the Planning Specialist for the Wallowa Mountains Office on the Wallowa-Whitman National Forest.*

Contents

Executive Summary 1

Introduction 3

Changes From Previous Years' Business Reports 5

Fiscal Year 2011 Program Overview 7

- Outputs and Products 7
- Program Resources 8
- FIA Grants and Partners' Contributions 10
- Adjunct Projects 11
- FIA Data Availability 13
- Quality Assurance 14

Fiscal Year 2011 Regional Accomplishments 17

- Northern Research Station 17
- Pacific Northwest Research Station 19
- Rocky Mountain Research Station 21
- Southern Research Station 23
- National Office 24

FIA Data Requests and Access 27

- News, Changes, and Updates 27
- FY 2011 Spatial Data Requests 27
- Web Tools Surpass 130,000 Retrieval Mark in FY 2011 27
- Consultations by FIA Staff 28

National Inventory and Monitoring Applications Center 31

- National Forest Collaboration 31

Other FIA Program Features 33

- Forest Products, Utilization, and Woodland Owner Studies 33
- Forest Health Indicator Surveys 33

Program Safety 37

- Regional Safety Notes 38

Comparing FY 2010 Plans With FY 2011 Accomplishments and FY 2012 Plans 41

Fiscal Year 2012 FIA Program Direction 47

Long-Term Strategic Direction 49

Conclusions 51

Glossary of Terms Used in Appendixes 53

Appendix A. Contacts 57

Appendix B. Tables 59

List of Figures and Tables

Figure 1. FIA implementation status, 2011 8

Figure 2. FIA program available funds and expenses by category, 2011 9

Figure 3. FIA appropriated funding level, 2000–2012 (projected) 10

Figure 4. FIA program employees by job group, 2011 10

Figure 5. Grants and agreements by recipient group, 2011 11

Figure 6. Availability of online FIA data, 2011 13

Figure 7. Publication status of State reports, 2011 14

Figure 8. Relationship between precision and cost under different scenarios of population variance, remote sensing data type, and strength of relationship (r2) between ground data and regression estimates used in the regression estimator. 17

Figure 9. Net growth and mortality rates for eastern hemlock by duration of HWA infestation 18

Figure 10. Map of sugar maple live-tree basal area, ranging from low (light yellow) to high (dark green), and range boundary (a), with scatterplot comparisons of estimates at three scales (b), and map of differences at 216,500-ha scale (c) 19

Figure 11. LIDAR data swath, upper Tanana Valley of interior Alaska, USA. 20

Figure 12. Photographs show several representative forest types in the study area, located in the upper Tanana Valley of interior Alaska. Insets show the LIDAR point cloud within each 1/30th-ha plot, as well as the estimated biomass and the list of LIDAR-based structural metrics for each plot. Background graphic shows outline of study area, with diagonal lines indicating location of LIDAR flight lines 21

Figure 13. Requests made to the FIA Spatial Data Services Center, 2011 27

Figure 14. Number of injury or illness incidents by FIA unit, 2006 through 2011 37

Figure 15. Number of reportable motor vehicle accidents by FIA unit, 2006 through 2011 37

Figure 16. Planned FIA implementation status, FY 2012 47

Figure A-1. FIA regions and headquarters 57

Table 1. Overview of land area; forest area; and estimated P1 pixels, P2 plots, and P3 plots by region, FY 2011 7

Table 2. Annual FIA appropriations and allocation of State and private funds to meet congressional intent 9

Table 3. FIA grants and partner contributions, 2000 through 2011 11

Table 4. Number of database retrievals using FIA Web applications by fiscal year 28

Table 5. Number and hours of significant consultations by FIA staff by customer group, FY 2011 29

Table 6. FIA program estimated hours worked, miles driven, aircraft hours flown, and safety incidents reported for FY 2011 37

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 the management of 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, 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, approved by Congress, included a requirement for an Annual Business Report that would outline the status and progress of the national annual inventory program.

This Annual Business Report, our 14th, tells the taxpayers, partners, and clients what the program has accomplished with the financial resources that they were 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 of the key findings of this report follow.

Annualized progress—In fiscal year (FY) 2011, 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 partner 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 2011 was $81.4 million, a net increase of $1.1 million from 2010. This funding consisted of $71.5 million appropriated by Congress plus $0.7 million in net adjustment from the previous fiscal year and $9.1 million in partner funds (up $1.1 million from 2010). State partner funds are used to maintain annual measurement and 5-year State report cycles. In FY 2011, the total funding from all sources was 8 percent less than the amount needed for full program implementation.

Partner support—Partners contributed $9.1 million to the program in FY 2011. Through cost-share, 34 States contributed $4.9 million toward buying down their measurement and reporting cycles to 5 years, and States and other partners added $4.2 million for plot intensification and other program enhancements. Overall, partner contributions increased by $1.1 million from FY 2010, which assured that annual plot production would remain on schedule.

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 $14.3 million was spent in this way in FY 2011. 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 implementation of FIA field plot measurements. Table 2 summarizes FIA funding activity to States from FY 2004 through 2011 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-six States and coastal Alaska now have access to online data that are less than 2 years old. This data supplied information for 414 spatial data requests and 132,413 online data requests.

Five-year reports—By FY 2011, FIA had completed at least one 5-year report or periodic report for 92 percent of the States and 75 percent of the islands since annualized inventory began in 1999. In all, FIA had 204 publications, of which 62 were published in peer-reviewed journals in FY 2011.

Quality assurance—FIA quality-checked 9 percent of all field plots measured in FY 2011 to ensure that the highest quality data are loaded into FIA databases.

User 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 2011, FIA held eight regional and one national user group meetings to gauge how well it is meeting the goals stated in the strategic plan and the prior year's annual report.

Personnel—Directly and through cooperators, FIA employed 598 people in FY 2011. Cooperators are integral to the efficient delivery of the FIA program, comprising 201 of the 598 employees, or 34 percent of the total workforce. Of the total

workforce, 189 were employed in information management, techniques research, or resource analysis. They provided 1,753 consultations (8,584 hours) to help users and clients effectively use FIA data.

Other program features—Although plot-based field surveys provide most of FIAs information, additional questionnaires and surveys are conducted to report on Timber Products Output, logging utilization, fuelwood production, the characteristics and management objectives of the Nation's private woodland owners, and several indicators of forest health. Since FY 2000, FIA has collected such data from more than 89,000 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 2011. We look forward to further progress in FY 2012. Important goals for FY 2012 include—

- Continue annualized inventory of 49 States and coastal Alaska.
- Complete at least 10 State 5-year reports.
- Prepare final version of Field Guide 6.0 for implementation in FY 2012.
- Prepare draft revision of the FIA Strategic Plan.
- Initiate a new National Woodland Owners Survey.
- Nationalize and modernize the program's forest products sector monitoring.
- Work with partners to improve land-cover and land-use classifications.
- Maintain and improve the Forest Inventory Data Online system.
- Complete layout production of the Forest Atlas of the United States.
- Report on urban forest inventory pilots in Colorado and Tennessee.

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) 2011 (October 1, 2010, through September 30, 2011), 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 wish 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 continuous 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, as well as how the trees and other forest vegetation are growing, how much has died or been removed, and how the harvested trees are 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 in order 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.

The safety section of the annual report has been revised and improved for better summarization of program safety progress. A new accounting system has been added to provide more consistent reporting across FIA units.

The FIA grants section has been moved to accompany the partner contribution section to better highlight the important relationship between these two items. A summary of grants and partner contributions by organization since 2000 is included.

President Obama's American Recovery and Reinvestment Act (ARRA) passed by Congress provided supplemental appropriations to create jobs and promote economic stability; two of these projects had a direct effect on FIA. One is related to base forest inventory in New Mexico and the other related to urban forest inventory in the West Coast States. A brief summary of progress on these projects is provided in this report.

Appendixes have been modified to include summaries of historic data access statistics (appendix table B-7), timber product and ownership surveys (appendix table B-8), and forest health indicator samples (appendix table B-9). Previous appendix tables B-7, B-8, and B-9 have been renumbered as B-10, B-11, and B-12 for comparison with annual reports published before 2010.

Fiscal Year 2011 Program Overview

In FY 2011, the FIA program completed the 13th year of program transition to an annual inventory system as outlined in the *Strategic Plan for Forest Monitoring*, written in response to the Agricultural Research, Extension, and Education Reform Act of 1998 (Public Law 105-185). The FIA program includes three sample levels or phases: Phase 1 (P1), which consists of remote sensing for stratification to enhance precision; Phase 2 (P2), which is based on the original set of FIA forest measurement plots (approximately one plot per 6,000 acres); and Phase 3 (P3), which consists of a subsample of P2 plots measured for a broader set of forest ecosystem indicators (approximately one sample location per 96,000 acres). 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, 15 percent of P2 sample locations per year in the Eastern United States, and P3 sample locations at 1 of every 16th P2 location each year in all States. Table 1 shows the overall distribution of P1, P2, and P3 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 actual plots that have to be visited to collect data.

FIA is now several years behind in completing items in the original strategic plan because of decreased funding. The base program includes annual compilations of the most recent year's information, with full 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 2011, the total funding level remained $5.8 million short of the target level required to complete the transition of the base program to full implementation. The following sections highlight current outputs and products, program resources, and partner 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 2011, we were active in 49 States plus coastal Alaska (fig. 1), measuring 48,806 P2 and P3 sample locations (21,148 forest and 26,658 nonforest) from the base grid, or 14 percent of the total. At the end of FY 2011, 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 $365,000 in FY 2011 was offset by an increase in partner support of $1.6 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 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.

The FIA program produced 204 reports and publications in FY 2011, one more than in FY 2010. Of these publications,

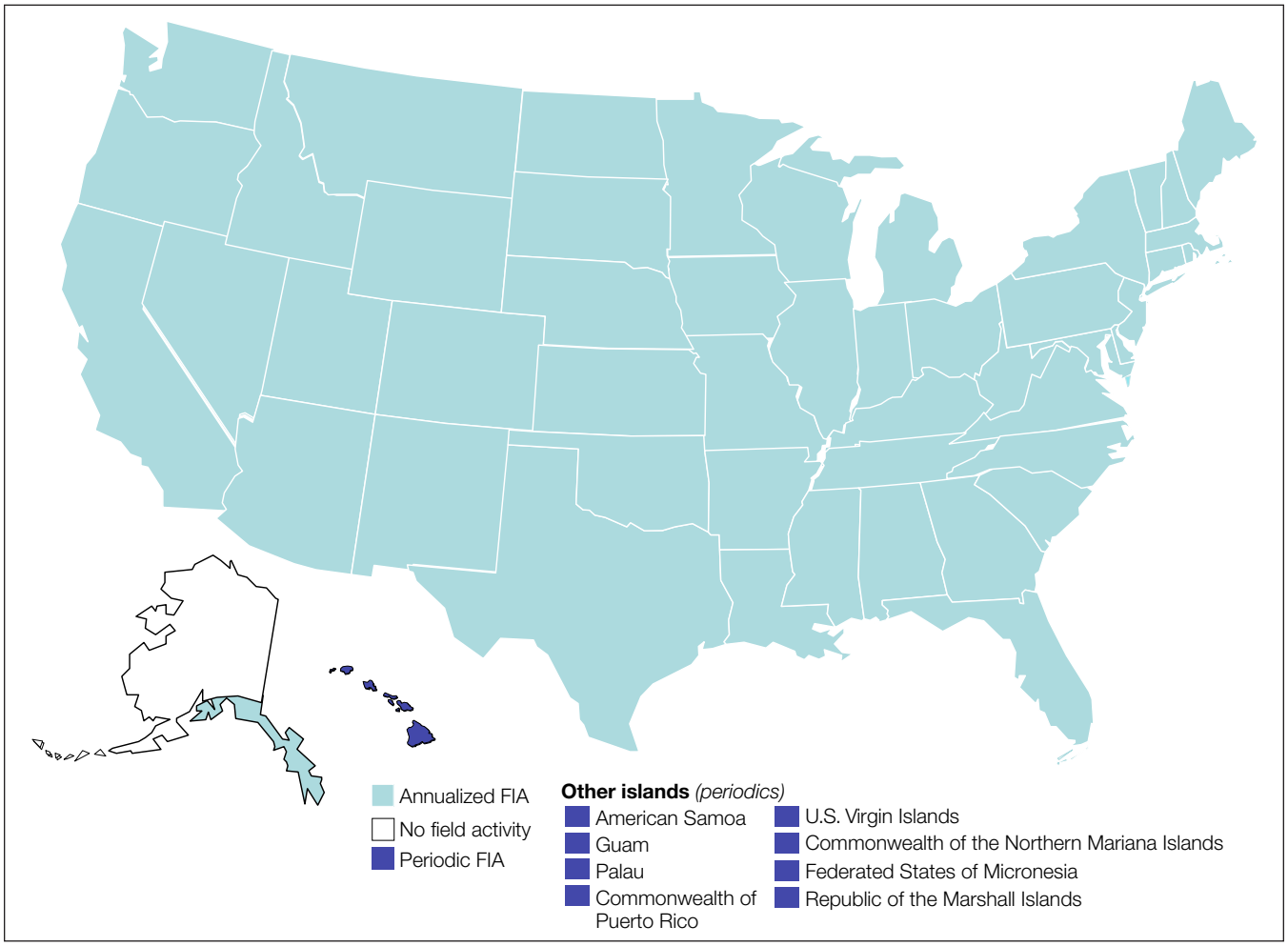
Table 1.—*Overview of land area; forest area; and estimated P1 pixels, P2 plots, and P3 plots by region, FY 2011.*

Region	Land area	Forest area	Forest	All P1*	All P2	All P3	Total P2, P3
	Mil. acres	*Mil. acres*	*Percent*	*Mil. pixels*	*Plots*	*Plots*	*Plots*
North	608	182	30	39.5	94,928	6,414	101,342
South	535	267	50	34.8	83,559	5,646	89,205
Interior West	548	146	27	35.6	85,560	5,781	91,341
Pacific Coast (California, Oregon, Washington)	203	85	42	13.2	31,753	2,145	33,898
Coastal Alaska	41	14	35	2.7	6,444	435	6,880
Interior Alaska	324	112	35	21.0	not set	3,415	3,415
Islands (including Hawaii)	7	4	53	0.5	1,083	73	1,156
Total	2,267	810	33	147	303,327	23,910	327,237

FY = fiscal year. P1 = Phase 1. P2 = Phase 2. P3 = Phase 3.

** MODIS 250m pixels at 15.4 acres each.*

Figure 1.—*FIA implementation status, 2011.*



FIA = Forest Inventory and Analysis.

89 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 62 articles in peer-reviewed journals (12 fewer than in FY 2010) and 18 articles in proceedings from scientific meetings and conferences (compared with 30 articles in FY 2010). FIA staff participated in 1,753 significant consultations with FIA customers, requiring 8,584 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 132,000 data retrievals in which FIA customers obtained user-defined tables, data downloads, and maps of interest.

Program Resources

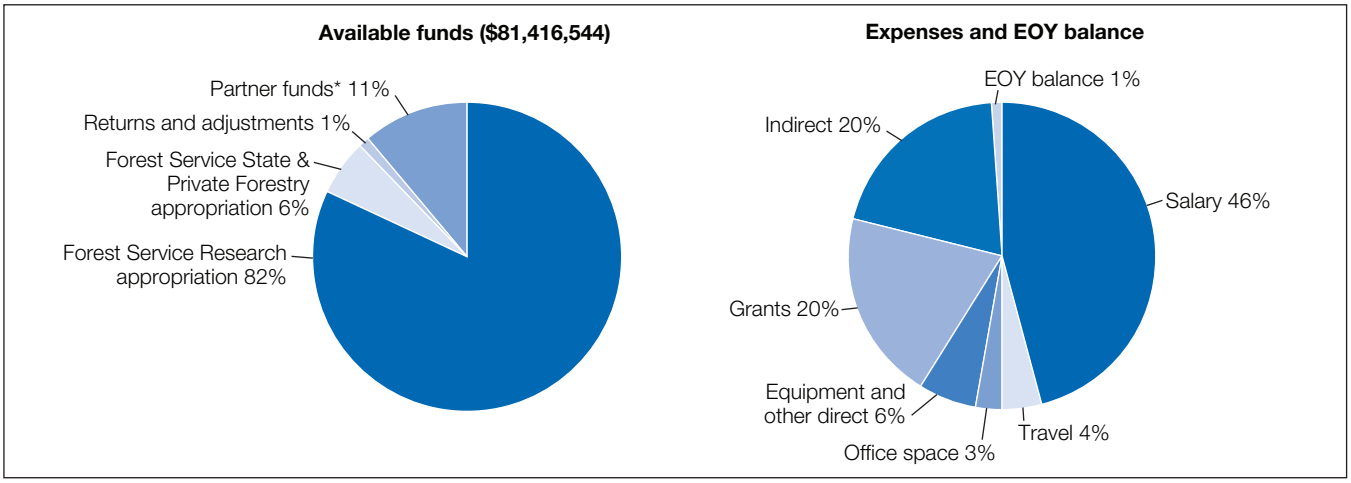
Congress appropriates funds annually for the FIA program in two different Forest Service deputy areas: (1) Research and Development (R&D), which had $66,805,000 in appropriated funds in FY 2011, and (2) State and Private Forestry (S&PF), which had $5,062,000 in appropriated funds in FY 2011 ($4,647,000 net to FIA after S&PF overhead charges). Most Federal FIA funding, or 93 percent, is contained within the R&D budget of the Forest Service. In FY 2011, the amount of total funding appropriated by Congress for the FIA program was $71,452,000, a reduction of $365,000 from the FY 2010

level of $66,939,000 (appendix table B-12). The S&PF Forest Resource Inventory and Assessment budget line is provided to support the FIA program in States that provide cost-share contributions. States providing inventory cost-share funds contributed $4,861,766 toward supporting the base 5-year cycle program. And, States and other partners provided an additional $4,247,087 for plot intensification and other program enhancements. Total available program funding, including $708,570 in preyear adjustments, was $81,416,544 in FY 2011 (fig. 2).

In its annual appropriation, Congress intended for an amount equal to the S&PF Forest Resource Inventory and Assessment 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 2004 through 2011 and demonstrates that the FIA program has consistently complied with congressional intent, typically exceeding the cost-share 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 2011 ranged from 7 to 14 percent across the country (appendix table B-2), reflecting differences in both sources of funding as well as research station indirect expense

Figure 2.—*FIA program available funds and expenses by category, 2011.*



EOY = end-of-year. FIA = Forest Inventory and Analysis.

** Partner includes $147,111 special.*

Table 2.—*Annual FIA appropriations and allocation of State and private funds to meet congressional intent.*

Category	Fiscal year							
	2004	2005	2006	2007	2008	2009	2010	2011
	Thousand dollars							
R&D appropriation	51,714	55,923	59,329	59,380	60,372	60,770	66,939	66,805
S&PF appropriation[a]	4,939	4,958	4,312	4,225	4,269	4,766	4,878	4,647
Total appropriated	56,653	60,881	63,641	63,605	64,641	65,536	71,817	71,452
FIA data collection grants to States	**6,318**	**5,954**	**7,364**	**7,209**	**6,924**	**7,907**	**8,289**	**7,952**
Number of States	**28**	**22**	**24**	**26**	**24**	**28**	**26**	**17**
Average support	**226**	**271**	**307**	**277**	**289**	**282**	**319**	**468**
Additional FIA allocation above congressional intent for the S&PF appropriation	**1,379**	**996**	**3,052**	**2,984**	**2,655**	**3,141**	**3,411**	**2,952**

FIA = Forest Inventory and Analysis. 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.

assessment practices. The National Office has an 83-percent rate of indirect cost because of its budget including the USDA overhead and program-wide charges to the Albuquerque Service Center, which was $6,304,000 in FY 2011. Overall, program indirect expenses totaled 19.3 percent. Figure 3 shows the total appropriated funding available from all sources for FIA from FY 2000 to FY 2011, as well as the projected future total funding needed to deliver the base Federal program beyond FY 2011. Refer to appendix table B-12 to view the trend data in FIA performance measures for 2005 through 2011.

In FY 2011, FIA Federal program staffing consisted of 397 Federal person-years of effort (appendix table B-3a), up from 392 Federal person-years in FY 2010. Cooperators, especially State forestry organizations, through grants and agreements, accomplish much of the work done by FIA, and they added 201 employees for a total workforce of 598. The additional cooperator employees included 137 State field employees, 19 information management specialists, 13 analysts, 11 researchers, and 5 administrative specialists. Cooperator employees constitute 34 percent of the total FIA workforce.

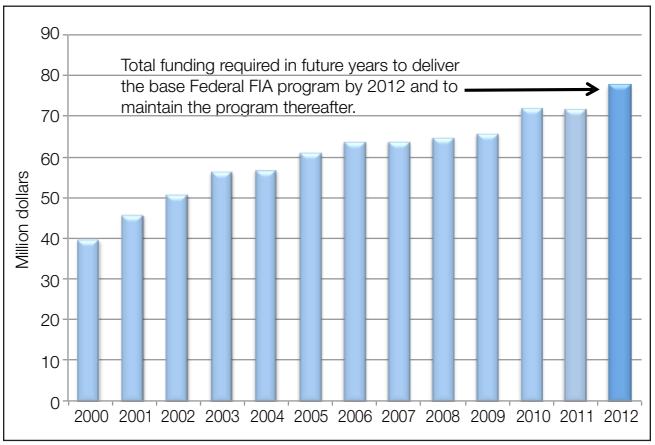
Of all FIA employees, both Federal and cooperator, approximately 62 percent were involved with data collection and field support, 24 percent with analysis and information management, 5 percent with program management and administration, 7 percent with techniques research, and 2 percent with P1 production work (fig. 4).

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 partner 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 the FIA program; in other cases, they share the workload. Appendix table B-5 lists 91 grants and agreements

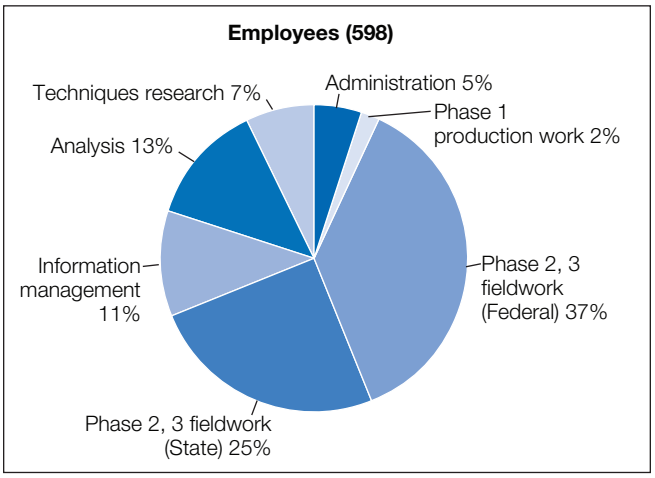
Figure 3.—*FIA appropriated funding level, 2000–2012 (projected).*



FIA = Forest Inventory and Analysis.

** Dark blue bar is estimated total funding required to deliver the base Federal FIA program by 2012.*

Figure 4.—*FIA program employees by job group, 2011.*

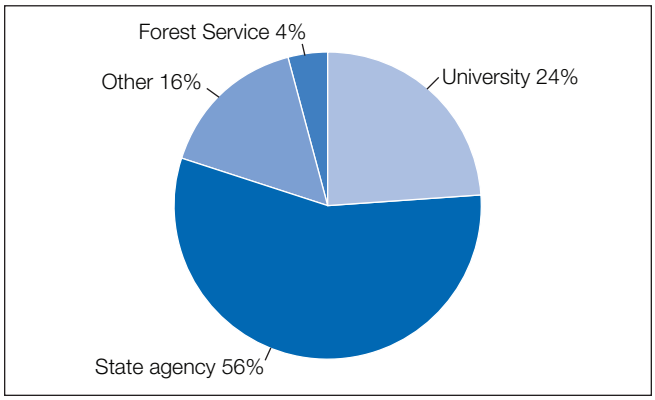


FIA = Forest Inventory and Analysis.

funded in FY 2011, comprising $14,348,537, or approximately 20 percent of total FIA appropriated funds. This amount is an increase of more than $400,000 from FY 2010. This number fluctuates from year to year, but 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 agency (56 percent of funds) and university partners (23 percent of funds) (fig. 5).

Additional cooperators included other Federal and Forest Service offices (6 percent of grants) and other non-Federal partners (14 percent of grants). The major purpose for all grants was for collaboration in data collection, information management, and research in techniques development. We expect to continue to

Figure 5.—*Grants and agreements by recipient group, 2011.*



make significant use of grants and agreements to augment FIA staff capacity in the analysis and reporting of annual FIA data for individual States.

Partner 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 that is described in the authorizing legislation. In addition, or alternately, 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 upon which to address other issues of interest.

Appendix table B-4 lists those partners that have contributed resources to the FIA program in FY 2011, 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 $4.9 million toward the full 20-percent FIA program that was envisioned by Congress, and another $4.2 million in contributions that add value to the FIA program, for a total of $9.1 million in partners' contributions. This amounts to $1.6 million more than was contributed by partners in FY 2010. The source of the partner contributions depends on the region of the country and the ability of States and partners to contribute funds. In the West, where forest land ownership is primarily Federal, the major cost-sharing partners tend to be Federal land managers, particularly the National Forest System (NFS) branch of the Forest Service, which contributed approximately $0.3 million in additional funds to add value to the basic FIA program. The increase in State support in FY 2011 shows a strong State commitment to resource monitoring in the face of tough economic times. Additional funds were acquired by States and are detailed in the section on ARRA later in this report.

Since 2000, FIA has provided grants in excess of $127 million to efficiently carry out annualized inventory, and partners have contributed more than $91 million to leverage Federal dollars to reduce inventory cycles and provide for other annual inventory enhancements. Table 3 summarizes FIA grants and partner contributions by organization.

Adjunct Projects

Experimental Forests and Ranges

In FY 2011, FIA provided approximately $1.0 million for intensive site monitoring for Forest Service Experimental Forests and Ranges (EFRs). Five selection criteria were identified to guide site selection: (1) sites with long-term data, (2) sites where an intensified plot grid could provide data for an early warning

Table 3.—*FIA grants and partner contributions, 2000 through 2011.*

Group	Total FIA grants	Average annual grants	Percent of grants	Total partner contibutions	Average annual contributions	Percent of contributions
	Dollars			*Dollars*		
States/islands	73,976,349	6,164,696	58	70,408,425	5,867,369	77
Universities	33,254,493	2,771,208	26	13,483,072	1,123,589	15
Forest Service	11,151,958	929,330	9	4,552,261	379,355	5
Other partners	8,217,337	684,778	6	2,355,106	196,259	3
Other Federal	936,357	78,030	1	252,936	21,078	0
Total	**127,536,495**	**10,628,041**	**100**	**91,051,799**	**7,587,650**	**100**

FIA = Forest Inventory and Analysis.

system, (3) sites in areas expected to be highly sensitive to climate changes, (4) sites that connect widespread gradients of conditions, and (5) practical or administrative considerations in the current fiscal year that make site selection effective. We used these criteria to screen 81 EFRs and select 22 sites. More thorough screening of other sites may take place in the future. The sites selected for investment in FY 2011 included—

- Bonanza Creek Experimental Forest, AK.
- Fort Valley Experimental Forest, AZ.
- Alum Creek and Crossett Experimental Forests, AR.
- Fraser Experimental Forest, CO.
- Hawaii Experimental Tropical Forest, HI.
- Priest River Experimental Forest, ID.
- Baltimore Ecosystem Study, MD.
- Marcell Experimental Forest, MN.
- Tallahatchie and Harrison Experimental Forests, MS.
- Tenderfoot Creek Experimental Forest, MT.
- Bartlett and Hubbard Brook Experimental Forests, NH.
- Pine Barrens Experimental Forest, NJ.
- Coweeta Hydrological Lab, NC, and Santee Experimental Forest, SC.
- Luquillo Experimental Forest and San Juan Urban Long Term Research Area (ULTRA), PR.
- Great Basin Experimental Range, UT.
- Estate Thomas Experimental Forest, VI.

Funding in FY 2011 supported plot intensification on experimental forests as well as ecological representation assessments of existing EFRs and historic data archiving across the EFR system. Additional research was associated with linkages to the national Carbon Eddy Flux Tower Network sites at Bartlett, Hubbard Brook, Marcell, and New Jersey Pine Barrens Experimental Forests and the Baltimore Long-Term Ecological Research site.

In FY 2012, FIA funding for EFRs will be suspended because of budget constraints. Some residual funding remains for the Pacific Northwest region and other work started in FY 2011 may be completed.

American Recovery Reinvestment Act

In 2011, two projects continued under the President's 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 forest conditions in urbanized areas of 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 of the urban areas in Alaska, Washington, Oregon, California, and Hawaii. PNW FIA is providing overall technical assistance while funding for data collection is provided by a recovery grant. The sample plots are on-grid, typically classified as nonforest, and within boundaries designated by the 2000 Census as Urbanized Area. In 2010 our partners hired private contractors to accomplish the field work in Oregon and Alaska. In 2011 private contractors were hired and trained in field procedures, and data were then collected from approximately 900 urban plots in California, Hawaii, and Washington. Sampling protocols follow the FIA guidelines developed for urban inventories and are compatible with the urban inventories recently installed for Colorado and Tennessee. The data will provide information about the species composition, condition, and extent of the urban canopy cover. It is anticipated that the data collected from these plots will provide valuable information over time about potential changes in the composition and health of urban ecosystems. Early in the 2012 field season any remaining plots will be visited while compilation and analysis will begin simultaneously.

ARRA Project: Inventory of New Mexico's Forest Resources.

The ARRA project in New Mexico, which started in 2010 and will continue through FY 2012, will result in the completion of more than 80 percent of the State's annual forest inventory plots. In this collaborative effort, the New Mexico State forester's staff, with support from the Rocky Mountain Research Station and NFS Region 3, developed a proposal to create new jobs within New Mexico through field inventory work, hiring several private contractors and local tribes to collect FIA data. Updated inventory data were needed for New Mexico forests because significant resource events such as drought, fire, and insect mortality have changed the State's forests dramatically since the most recent statewide periodic inventory was completed in 2000. The FIA data collection staff provide field training and conducts quality assurance checks. This effort has significantly accelerated the update of information for the State. Compilation and analysis will follow field work, with a State report expected in 2013.

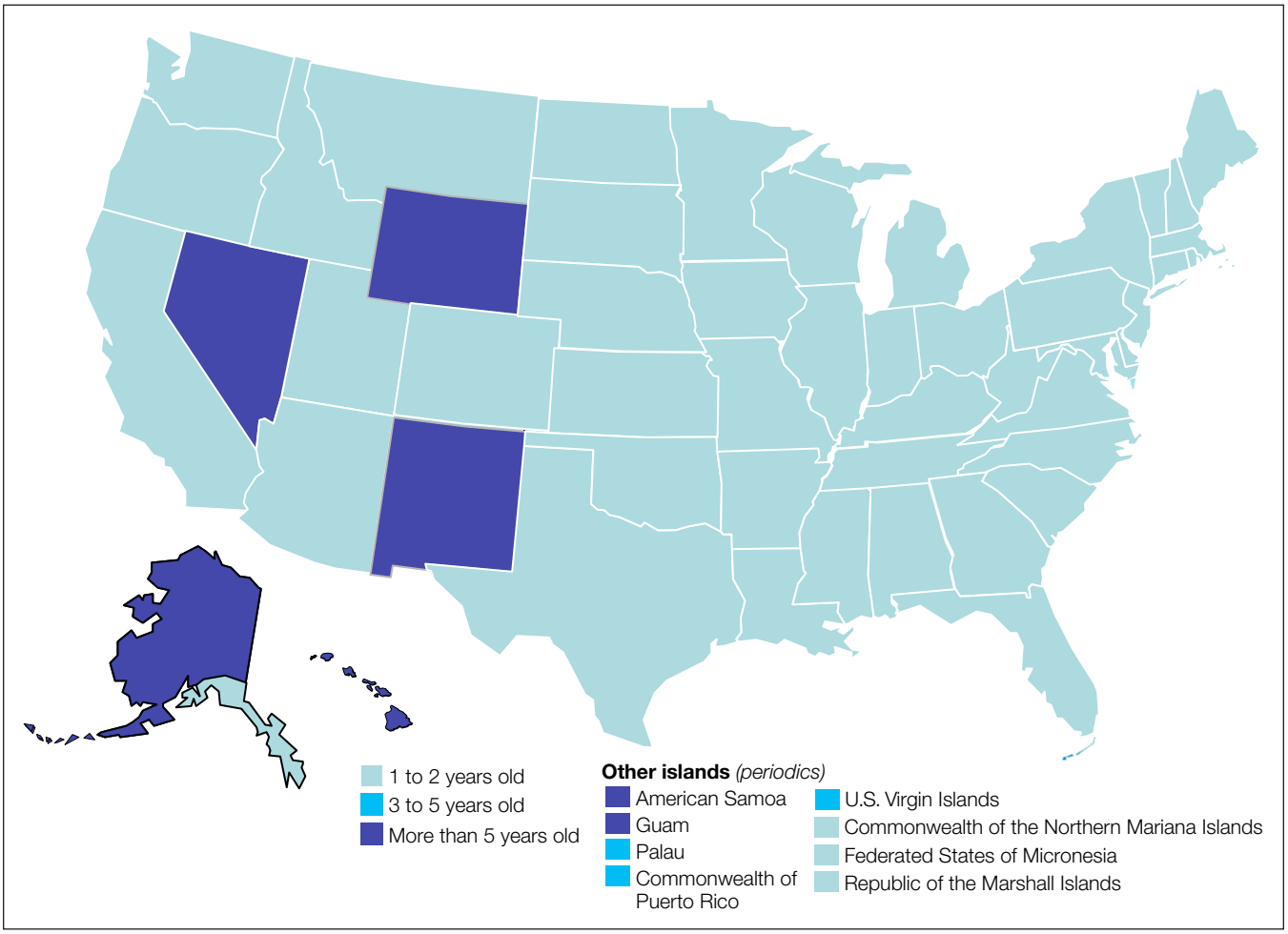
FIA Data Availability

In 2011, FIA completed migration of its data and data processing procedures to the new Forest Service corporate servers in Kansas City. 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, and FIA data service and access are returning to normal levels that are commensurate with FIA's high customer service standards.

The FIA program is designed and intended to provide continuously updated, accurate, and reliable information on status and trends in the Nation's forested resources. Obtaining current information is one of the chief interests 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 those two objectives. Figure 6 shows, for each State, the age of FIA data accessible in our public database as of the end of September 2011—the end of FY 2011. States with 1- to 2-year-old data—the program objective—are shaded light blue; States with 3- to 5-year-old data are shaded medium blue; and States with data that are more than 5 years old are shaded dark blue. This map shows that progress is being made in all regions of the country. The few States with data older than 2 years are in the West where annualized inventories began later. In 2011, the

Figure 6.—*Availability of online FIA data, 2011.*



FIA = Forest Inventory and Analysis.

number of light blue States was 45 plus coastal Alaska, and 4 dark blue States plus interior Alaska. Continued improvements in data processing and the NIMS are now paying dividends by enabling us to catch up with the previous data backlog and move toward a more routine schedule.

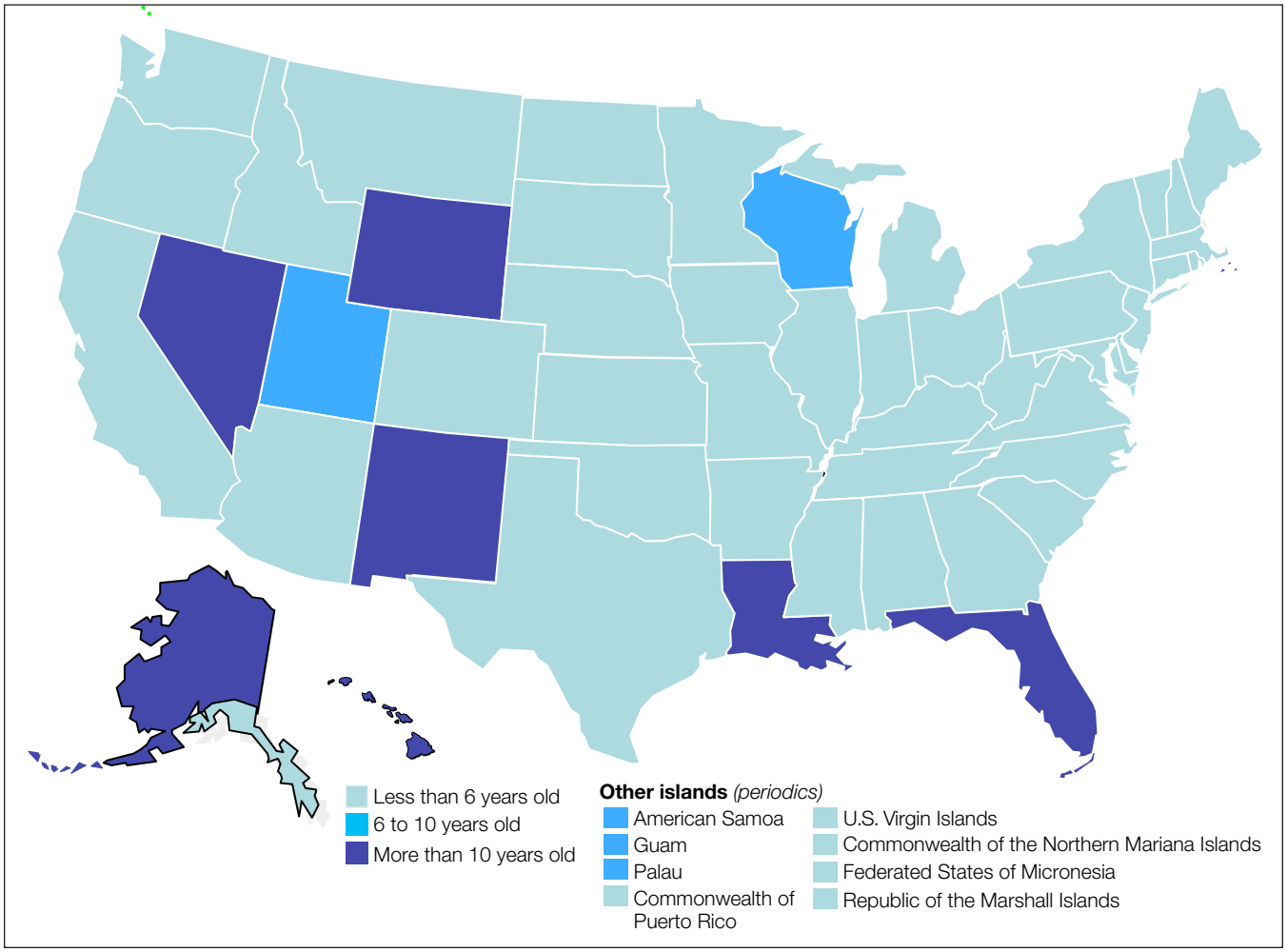
Figure 7 shows the age of the most recently published statewide FIA report for each State. States with publications based on data less than 6 years old—the program objective—are shaded light blue. States with publications 6 to 10 years old are shaded medium blue, and States where the most recent publication reports are based on data more than 10 years old are shaded dark blue. The Northern FIA program leads the Nation in States having reports based on data that are less than 6 years old, with 23 of 24 States; the Southern FIA program is second with 11 of 13; the Pacific Northwest FIA program is third with 4 of 5 States; and the Interior West FIA program has 4 of 8 States with reports less than 6 years old.

FIA made significant strides in catching up with the backlog of 5-year reports in FY 2011 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 2012.

Quality Assurance

The FIA program is committed to producing and delivering complete, accurate, and unbiased information of known quality. The Quality Assurance (QA) program supports this goal using a framework that promotes consistency during all stages of the national core FIA inventory process to ensure the collection, compilation, summarization, and delivery of quality data products are completed with known precision, completeness, representativeness, comparability, and accuracy. A summary of the 4,450 QA plot checks is provided in appendix table B-1.

Figure 7.—*Publication status of State reports, 2011.*



The National Quality Assurance Coordinator provides direction and coordination for the FIA QA program. The National QA Coordinator works with the Washington Office and the regional and national indicator advisors to assist with QA issues in the program.

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

- The National Pre-Field Guide, training module, and rigorous QA protocols define a nationally consistent process to collect information about FIA plots before field visits.
- Up-to-date national field guides ensure consistent collection of CORE program data items.
- The field QA check procedures guide promotes field QA consistency from region to region.
- The FIA Database (FIADB) Description and Users Guide provides detailed information to users about published FIA data.
- Staff support for ongoing effort to fully document NIMS.
- The analytical QA guide outlines steps for checking compiled data for accuracy and completeness before releasing them to the public. This guide promotes analytical QA consistency across regions.
- A cataloged collection of unpublished FIA procedures with Forest Service Intranet interface is under development.

New and ongoing FIA QA tasks in FY 2011 designed to identify errors and increase consistency in the national inventory include—

- Testing and distributing QA Tools to FIA State analysts nationally. QA Tools is a desktop tabling and graphing application that FIA analysts use to examine data for errors before public posting.
- Developing FIADB QA with systematic edit checks of periodic and annual FIA data.
- Defining rigorous national cold-check field and scoring procedures to allow for 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.

Fiscal Year 2011 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 in appendix A.)

Northern Research Station

Finding: National Inventory and Monitoring Applications Center (NIMAC) researchers participated in a study that compared the cost effectiveness of different carbon monitoring methodologies. The study was conducted to help inform decisions on the design of carbon monitoring systems to be used for developing countries that are interested in participating in United Nations programs that are aimed at reducing deforestation and forest degradation, and can also be used to inform decisions on forest monitoring investments in the Forest Service.

Accomplishment: Using data on the variance structure of forest carbon in Puerto Rico—which was obtained from the FIA database and different combinations of statistical design, remote sensing data type, relationship strength between field and remote sensing data, field plot counts, and associated costs—a simulation study was conducted to characterize the relative benefits of several inventory scenarios. Results indicate that the cost of the remote sensing information is decisive for the cost efficiency of a sampling design (fig. 8).

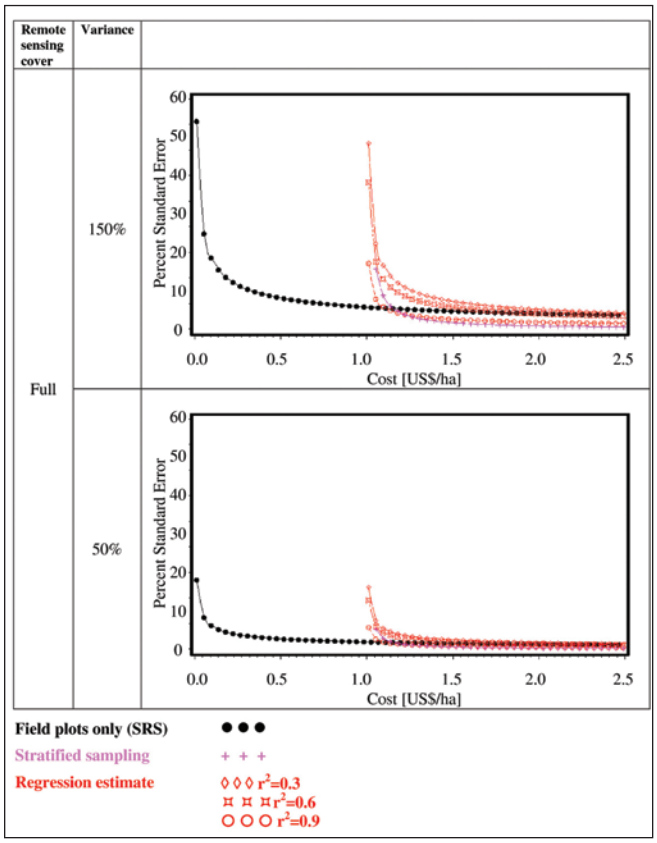
Outcome: Results of the study were presented at the 17th Conference of the Parties to the United Nations Framework Convention on Climate Change in South Africa, and at an international Politics Against Hunger conference in Germany. In addition to providing a framework for conducting cost-efficiency analyses during the design phase of carbon stock assessment studies, it will provide developing countries with an example of how to use freely available FIA data to calibrate forest inventory projects. For more detailed information, see—

> Köhl, M.; Lister, A.; Scott, C.T.; Baldauf, T.; Plugge, D. 2011. Implications of sampling design and sample size for national carbon accounting systems. Carbon Balance and Management. 6(10): 1–20.

Contact: Andy Lister (alister@fs.fed.us).

Finding: Hemlocks are still abundant despite hemlock woolly adelgid (HWA) infestation.

Figure 8.—*Relationship between precision and cost under different scenarios of population variance, remote sensing data type, and strength of relationship (r^2) between ground data and regression estimates used in the regression estimator.*



Note: This figure is an example of one set of inventory scenarios that were assessed using Forest Inventory and Analysis data from Puerto Rico.

Accomplishment: FIA researchers from the Northern Research Station (NRS) and Southern Research Station (SRS) partnered with non-FIA researchers from the NRS to conduct an analysis of hemlock abundance, growth, and mortality using 20 years of data collected across 433 counties that stretch from southern Maine into northern Georgia. Two native species of hemlock—eastern and Carolina—grow in the Eastern United States. Although a minor component in most of the forests of the Eastern United States, high densities of eastern hemlock are found in New England and the mountains of the Southeast and Mid-Atlantic. A tiny insect introduced into the United States from East Asia, HWA feeds at the base of hemlock needles, defoliating and eventually killing trees. Since the insect was first noticed in the

1950s, it has expanded its range at between 4.7 and 12.7 miles a year and currently infests about 45 percent of the range of hemlocks in the United States and 41 percent of all hemlock trees.

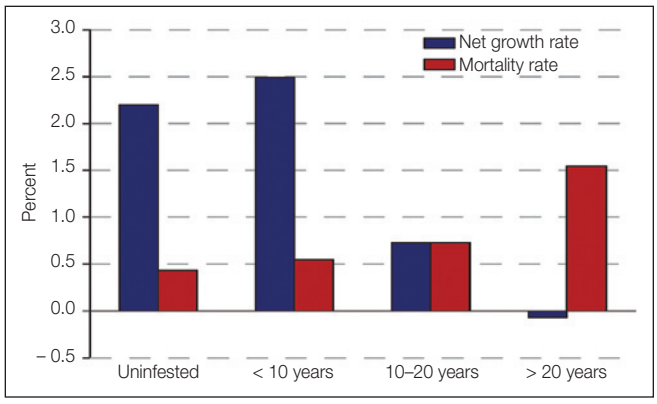
Outcome: The researchers published an e-Science Update before a congressional visit to West Virginia to look at HWA-induced hemlock mortality. The analysis showed an overall increase in live-tree hemlock basal area in both HWA infested and uninfested counties. In addition, results of the analysis showed that the general regional trend in the Eastern United States over the past 50 years has been one of increasing hemlock volume, even with infestation by HWA. Despite increasing hemlock volume over the past four decades across most of the Eastern United States, however, regions with long-established HWA populations are also the regions with the slowest accumulation of hemlock, indicating the effects of HWA on net growth and mortality rates may begin to reverse this trend. Net growth rates decrease as years of HWA increase and mortality rates increase as years of HWA increase. Mortality equals net growth in areas where HWA has been present for 10 to 20 years, and mortality exceeds net growth in areas where HWA has been present for more than 20 years (fig. 9).

Morin, R.S.; Oswalt, S.N.; Trotter, R.T., III; Liebhold, A.W. 2011. Status of hemlock in the Eastern United States Forest Inventory and Analysis factsheet. e-Science Update SRS–038. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 4 p.

Contacts: Randy Morin, rsmorin@fs.fed.us; Sonja Oswalt, soswalt@fs.fed.us; R. Trotter, rttrotter@fs.fed.us; A. Liebhold, aliebhold@fs.fed.us.

Partners: SRS and NRS.

Figure 9.—*Net growth and mortality rates for eastern hemlock by duration of HWA infestation.*



HWA = hemlock woolly adelgid.

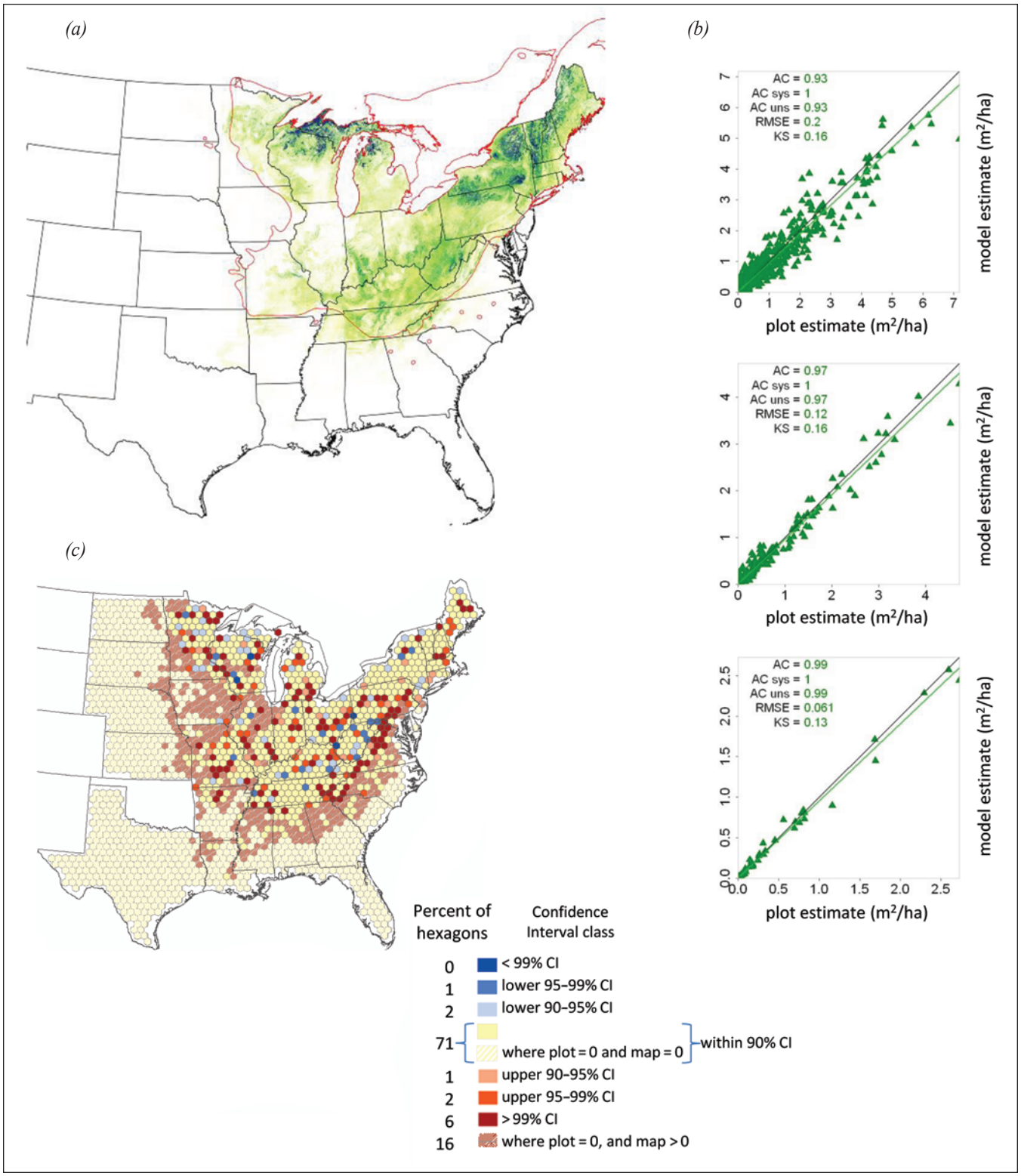
Notes: Forest Inventory and Analysis data from 2007 and 2008; HWA duration based on 2006 distribution.

Finding: An effective assessment protocol was developed for continuous geospatial data sets of forest characteristics using FIA data.

Accomplishment: Continuous geospatial data sets of forest characteristics provide an incredible source of information at the landscape level for ecosystem research, policy analysis, and planning applications—all of which are critical to understanding and addressing current challenges related to climate change, urbanization pressures, and carbon monitoring. The effectiveness of these applications is always dependent upon the accuracy of the geospatial input data sets, however. A comprehensive set of robust measures is necessary to effectively assess such data sets, yet challenges in the availability of reference data, in the appropriateness of assessment methods to use, and in the completeness of assessment methods available have always hampered the timely and consistent application of map assessments. We developed a suite of assessments that together provide essential information on the type, magnitude, frequency, and location of errors in each data set, at several scales. It is a comparative accuracy assessment in which each modeled data set is compared with a set of reference data, thereby recognizing both the potential for error in reference data and differences in spatial support between the data sets. For full multiscale and multiregion applications, the assessments depend upon reference data with large sample sizes, such as the Forest Service FIA database, which is of sufficient sampling intensity to take full advantage of these assessments and facilitate their prompt application after modeled data sets are developed. The information provided by this suite of assessments substantially improves a user's ability to apply modeled geospatial data sets effectively and to assess the relative strengths and weaknesses of multiple data sets that have been developed depicting the same forest characteristic.

Outcome: The assessments, and their associated metrics and graphics, used in this protocol have been carefully chosen to provide clear, robust information on the variation in error that can occur across a geospatial data set, and that can change in magnitude and character with scale. The development of this assessment protocol provides an approach for assessing any continuous modeled data sets of forest characteristics immediately after data sets are developed, and can be incorporated into the services provided by FIA's Spatial Data Services. It also offers an approach that can be applied to every modeled geospatial data set developed by FIA, such as the data sets developed by Wilson et al. (2012) (fig. 10), providing a detail of assessment information characterizing each data set that has never before been available.

Figure 10.—*Map of sugar maple live-tree basal area, ranging from low (light yellow) to high (dark green), and range boundary (a), with scatterplot comparisons of estimates at three scales (b), and map of differences at 216,500-ha scale (c).*



AC = [?]. CI = Confidence Interval. KS = [?]. RMSE = [?].

Riemann, R.; Wilson, B.T.; Lister, A.; Parks, S. 2010. An effective assessment protocol for continuous geospatial data sets of forest characteristics using USFS Forest Inventory and Analysis (FIA) data. Remote Sensing of Environment. 114: 2337–2352.

Wilson, B.T.; Lister, A.J.; Riemann, R. 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: 162–198.

Contact: Rachel Riemann, rriemann@fs.fed.us.

Pacific Northwest Research Station

Finding: FIA measurements proved integral in developing habitat models for fisher, a rare carnivore in California. Implementation in the Forest Vegetation Simulator (FVS) simplifies monitoring of future habitat from FIA data and simulating effects of alternative management.

Accomplishment: FIA protocols were used to install plots at sites selected for resting by fisher in the southern Sierra Nevada. Models predicting habitat quality were built by comparing resting site plots with FIA inventory plots in the region. Core inventory variables and dead wood regional add-ons were important in the models. Repeated measurements of inventory plots enable managers to assess changes in the amount of habitat provided on their lands. The model has been incorporated into a module in the FVS.

Outcome: The FIA sample was efficiently used to develop habitat models for a rare species and provide a cost-effective approach to monitor future changes in habitat. Similar approaches are being developed with other species in other areas of the region.

Zielinski, W.J.; Gray, A.N.; Dunk, J.R.; Sherlock, J.W.; Dixon, G.E. 2010. Using Forest Inventory and Analysis data and the Forest Vegetation Simulator to predict and monitor fisher (*Martes pennanti*) resting habitat suitability. Gen. Tech. Rep. PSW-GTR-232. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station.

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

Partners: Pacific Southwest Research Station, Humboldt State University, Forest Management Service Center.

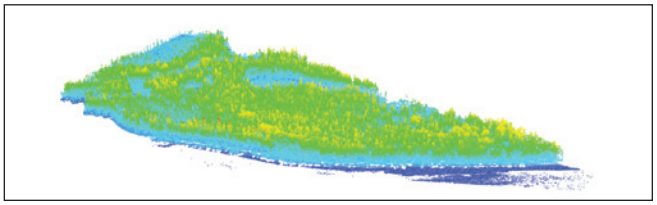
Finding: Using airborne LIDAR (Light Detection and Ranging) as a sampling tool for estimating forest biomass resources in the upper Tanana Valley of interior Alaska (fig. 11).

Accomplishment: Airborne laser scanning—collected in a sampling mode—has the potential to be a valuable tool for estimating the biomass resources available to support bioenergy production in rural communities of interior Alaska. In this study, we present a methodology for estimating forest biomass over a 201,226 ha area (of which 163,913 ha are forested) in the upper Tanana Valley of interior Alaska using a combination of 79 field plots and high-density airborne LIDAR collected in a sampling mode along 27 single strips (swaths) spaced approximately 2.5 km apart (fig. 12). A model-based approach to estimating total aboveground biomass for the area is presented. In addition, we investigated the influence of plot location (that is, global positioning system) error, plot size, and field-measured diameter threshold on the variance of the total biomass estimate. Using a bootstrapping approach to variance estimation, sampling error (because of using LIDAR collected in single swaths spaced 2.5 km apart instead of wall-to-wall LIDAR) represents the largest component of the error budget (4.6 percent), but variability because of model selection contributes a significant additional source of error (3.4 percent). Using a larger plot (1/30th ha versus 1/59th ha) and a lower diameter threshold (7.6 cm versus 12.5 cm) significantly reduces the variance of the total biomass estimate (by approximately 20 percent), and plot location error (over a range from 0 to 20 m root-mean-squared-error (RMSE)) steadily increases variance at both plot sizes.

Outcome: The results of this study indicate that LIDAR sampling can be used to produce estimates of total aboveground tree biomass in areas surrounding rural communities of interior Alaska at a reasonable cost and acceptable level of precision (8 percent). These results suggest that use of airborne LIDAR sampling could have a role to play in supporting bioenergy development in interior Alaska.

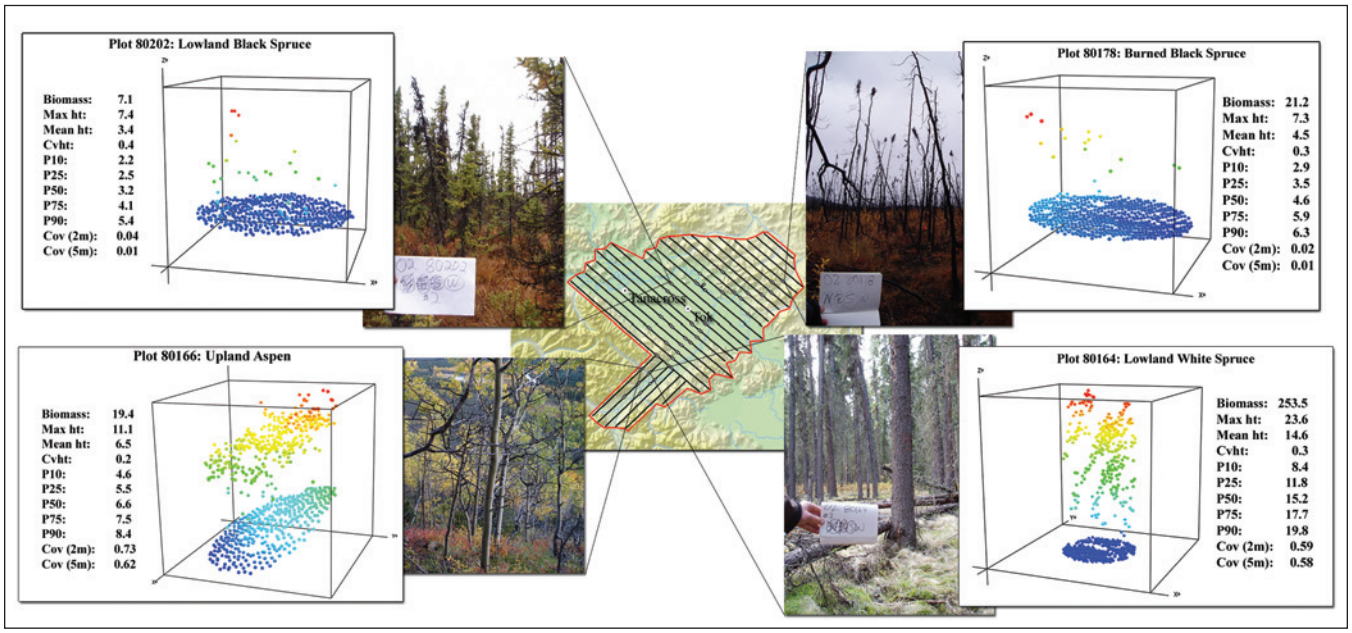
Even in cases where much of the area is inaccessible and the sample size for field plot data is necessarily limited, a stratified approach to field plot sampling within accessible areas can be used to ensure that a representative sample of field plots is obtained to develop the LIDAR biomass models. Although the

Figure 11.—*LIDAR data swath, upper Tanana Valley of interior Alaska, USA.*



LIDAR = Light Detection and Ranging.
Note: Points are color-coded by height (blue: low; green: medium; yellow/red: high).

Figure 12.—*Photographs show several representative forest types in the study area, located in the upper Tanana Valley of interior Alaska. Insets show the LIDAR point cloud within each 1/30th-ha plot, as well as the estimated biomass and the list of LIDAR-based structural metrics for each plot. Background graphic shows outline of study area, with diagonal lines indicating location of LIDAR flight lines.*



LIDAR = Light Detection and Ranging.

use of a model-based LIDAR sampling approach introduces variability because of sampling error and modeling error, the estimated precision for the total biomass estimate is still at an acceptable level, with a relative standard error of 8 percent. While the approach used here can be used to generate estimates of a total aboveground tree biomass over a very large area (201,226 ha) at a reasonable cost (27 LIDAR strips plus 79 field plots) with acceptable precision, all inference is conditional on the correctness of the underlying superpopulation model. A model-assisted approach would be advisable if design-unbiased estimates are required, although this approach would require a probability sample of field plots over the entire LIDAR coverage, likely leading to much higher overall project costs.

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

Partners: Oregon State University College of Forestry.

Finding: Intensity of western spruce budworm outbreak detected by FHP was associated with increases in down wood and snags on FIA plots. Managed stands had less dead wood and snag volume declined over 10 years following the outbreak.

Accomplishment: Insect outbreaks appear to be increasing across the West, causing widespread tree mortality. While dead wood can be valuable wildlife habitat, it can also increase fire severity. The duration of these effects and impacts of management are not clear. A severe western spruce budworm outbreak in the late 1980s and early 1990s in eastern Oregon was investigated by relating aerial survey data of damage intensity with remeasurement of inventory plots in susceptible stands in the 1990s and 2000s. Dead wood volumes increased with outbreak intensity, but were lower in stands that had been managed, with many stands on private lands showing evidence of salvage logging. Down wood volumes did not change significantly but snag volume declined 10 to 15 years following the outbreak.

Outcome: This study demonstrated the value of linking annual assessments of forest health from aerial surveys with periodic field data measurements, and of monitoring the status of dead wood over time on monitoring plots. Additional studies are investigating relationships with fire severity and ongoing insect outbreaks in the West.

Azuma, D. 2010. The effects of a western spruce budworm outbreak on the dead wood component in relation to ownership in forests of eastern Oregon. Western Journal of Applied Forestry. 25: 176–180.

Contact: Dave Azuma, dazuma@fs.fed.us.

Partners: Pacific Northwest Region Forest Health Protection, Pacific Northwest Region Current Vegetation Survey.

Rocky Mountain Research Station

Finding: FIA data can be used to monitor long-term trends in the whitebark pine (*Pinus albicaulis*) resource.

Accomplishment: Whitebark pine (*P. albicaulis*) has become recognized as an important component of high elevation ecosystems in Western North America. Its periodic crops of large wingless seeds provide a major food source for several species of birds and mammals including the black bear and grizzly bear. Wildlife biologists have noted that for several months after production of a large whitebark pine cone crop, bears concentrate their feeding on cone caches made by squirrels and tend to stay away from lower elevation encounters with humans and their habituations. Whitebark pine aids in the protection of watersheds by stabilizing soil and rock on the harshest sites and by catching and retaining snowpack. In many areas in the West, whitebark pine stands have experienced heavy mortality as a result of both natural and man-caused factors. The principal agents named in the decline are the introduced disease white pine blister rust (*Cronartium ribicola*), epidemics of mountain pine beetle (*Dendroctonus ponderosae*), and successional replacement by shade-tolerant trees in the absence of fire. The decline issue of whitebark pine in Idaho and Montana was addressed by an analysis of long-term trends using remeasurement data from permanently established FIA plots. In the previous periodic inventory of Idaho and Montana, which occurred between 1988 and 1998, variable radius plots were the samples used to conduct the field inventory. When the annual inventory began in 2000, Interior West FIA (IW FIA) changed the sampling design to the fixed-radius national mapped plot design. In addition to the initial establishment of the mapped plot, field crews were instructed to relocate and remeasure trees tallied on the previously established variable-radius plot. All trees measured in the previous inventory (time 1) were accounted for and current status recorded (live, dead, cut) in the current inventory (time 2). This remeasurement and accounting for trees on previously established plots provides an accurate measure of growth, removal, and mortality rates since the status of trees are known at both points in time. Using this sampling scheme, an analysis of the following components of change using mean basal area per acre of whitebark pine 5.0 in and larger was performed: (1) initial inventory, (2) survivor growth, (3) ingrowth, (4) mortality, (5) removals, and (6) terminal inventory.

Outcomes: Mean basal area per acre of whitebark pine in Idaho decreased 25 percent or by about 2.3 percent per year. Mortality reduced the estimate of initial inventory by 32 percent. Mortality rate of whitebark pine averaged 3 percent per year. Mean basal area per acre of whitebark pine in Montana decreased 22 percent or by about 2.2 percent per year. Mortality reduced the estimate of initial inventory by 27 percent. Mortality rate of whitebark pine averaged 2.6 percent per year. These results indicate a very significant decline in live basal area of whitebark pine. This analysis did not attempt to identify cause of death or damage to whitebark pine but the drop in inventory basal area is likely because of insect, disease, and succession acting in concert. The annual level of mortality is greatly outpacing the combined annual basal area growth of survivor trees and ingrowth trees. Similar studies conducted in the early 1970s in western Montana also indicated significant basal area reductions in whitebark pine because of heavy mortality. The power to detect significant effects related to whitebark pine mortality and other parameters of interest is greatly enhanced with estimates derived from remeasured (paired) plots.

Contact: Mike Thompson, mtthompson@fs.fed.us.

Partner: Forest Service, Northern Region.

Finding: A study of nonresponse highlights appropriate modifications in the Forest Inventory and Analysis estimation process.

Accomplishment: The Forest Service FIA monitoring system employs a statistically based sample from which status and trends in forest resources across all ownerships can be assessed. The information is used for strategic planning at the State, regional, or national level. As with many broad-scale environmental surveys, a portion of the sample cannot be observed because of denied access and hazardous conditions—these situations are referred to as nonresponse. Any appreciable amount of nonresponse can cause bias in FIA's estimates of population parameters. A recently convened task team quantified the magnitude of nonresponse and described the mechanisms that result in nonresponse. In addition, the task team also described and qualitatively evaluated FIA's assumptions regarding nonresponse and identified appropriate strategies to pursue that minimize bias. The nonresponse rates ranged from 0 to 21 percent and differed by land owner group; with denied access to private land the leading cause of nonresponse. Current FIA estimators assume that nonresponse occurs at random. A certain portion of the FIA sample locations fall in, for example, agricultural fields, high-density urban centers, and census water. Because it is not cost-effective to send field crews to these clearly nonforest areas, an initial screening of sample locations is performed to determine whether each sample location potentially meets the FIA definition of forest. If the sample location is obviously nonforest in its entirety, the sample location is not scheduled for visitation by a field crew. For these sample locations, no

possibility of nonresponse exists. The task team analyzed the effect of differing rates of nonresponse for forested and nonforested sample locations on the estimators, which assume that the nonresponse occurs at random. Although in most cases the assumption of nonresponse occurring randomly appears tenable, the qualitative assessment indicated a few situations where the assumption is not tenable.

Outcomes: FIA has traditionally viewed stratification as a method for variance reduction; however, since forest plots have higher probability of nonresponse, FIA should also take nonresponse into account when constructing strata. In the short term, the task team recommended that FIA examine its stratification schemes and modify those approaches to more adequately stratify differing sampling intensities (caused by nonresponse) and different sampling mechanisms (field observed versus office call). In the longer term, the task team recommended that FIA investigate the properties and technical feasibility of alternative estimators that use appropriate weighting and auxiliary information to mitigate the effects of nonresponse. Permanently hazardous plots that occupy large and unique geographic areas are likely to be different from visited plots and may require techniques that do not rely on the missing-at-random hypothesis.

Contact: Paul Patterson, plpatterson@fs.fed.us.

Partners: SRS, NRS, and PNW.

Finding: Analysis of paired forest inventory plots reveals unexpected trends in standing forest biomass and carbon storage.

Accomplishment: The FIA program provides data for monitoring forest biomass at State, regional, and national scales. For example, the U.S. Environmental Protection Agency's greenhouse gas inventory uses FIA-derived biomass data from the 1990 Resources Planning Act (RPA) assessment report as a baseline for assessing forest carbon, and evaluates trends by comparing subsequent FIA data with the 1990 baseline. The sample designs and protocols used in the historical forest inventories of Idaho during the 1980s and 1990s, including those used for the 1990 RPA, however, were neither internally consistent nor spatially balanced. In 2000, the FIA program implemented a spatially and temporally balanced sample design referred to as the annual inventory. Previous analyses have suggested that the sampling and estimation procedures used in pre-2000 inventories tended to overestimate forest metrics such as standing biomass. The purpose of this study was to reconcile baseline forest inventories from the 1980s and 1990s with post-2000 annual FIA data and quantify long-term trends in standing forest biomass. This purpose was achieved by comparing biomass estimates from the historical inventories with biomass estimates from the current annual inventory, and then repeating the comparison for only those plots that were measured during both historical and annual inventories. A direct comparison of the two disparate inventories suggests that total biomass in Idaho's forests has decreased over the past 20 years, while live biomass has significantly decreased. A comparison of only plots that were measured during both inventories reveals a significant increase in total biomass, however, a slight decrease in live biomass, and a significant increase in dead biomass. Specific trends in live and dead biomass varied both geographically and among species. For example, the greatest increases in dead biomass occurred in the east-central portion of the State, where forests were subject to large wildfires and/or insect epidemics. The greatest increases in live biomass occurred in the northern Panhandle region.

Outcomes: As shown by previous FIA analyses, the ability to detect significant long-term trends is greatest when we include remeasured or paired plot data. This study demonstrates that reanalyzing historical data in the context of current inventory procedures will produce different results than making incompatible temporal comparisons. In this case, accounting for different inventory designs results in the conclusion that Idaho's forests act as a long-term carbon source, instead of a sink. Comparisons of historical forest inventories against annual FIA data illustrate that Idaho's long-term increases in total standing forest biomass are explained primarily by increases in standing dead biomass. This result, coupled with a slight decrease in live biomass, indicates that biomass accumulation because of growth and regeneration is being outweighed by conversion of live to dead biomass because of tree mortality. Ongoing declines in live biomass could translate to a reduced rate of carbon sequestration.

Contact: Sara A. Goeking, sgoeking@fs.fed.us.

Southern Research Station

Finding: Statistical advances for national inventory and monitoring increase transparency and efficiency for the FIA program.

Accomplishment: Our Nation's forests provide a range of goods and services. The wise use and management of the forest resource base requires current information on the conditions and trends of the resource. The FIA program employs a statistical sample to provide this information. The precision and accuracy of the information can be increased through statistical advances.

From 2009 to 2011, the SRS FIA program led a national team of FIA researchers to examine two major issues affecting broad-scale inventory and monitoring programs: sample size for post-stratified estimation, and survey nonresponse. As with any survey program, sample size is an important consideration and before this work, guidance on sample size for post-stratified estimation using FIA data were lacking. Estimates of the mean were unbiased across the range of within strata and total sample sizes tested. To obtain estimated standard errors with less than 3-percent bias, however, a within strata sample size of 10 and minimum total sample sizes of 25 and 75 were recommended for proportion forest land and cubic net volume, respectively.

The research team also provided an overview of survey nonresponse (missing data because of hazardous conditions or denied access) in the FIA program and provided guidance so that the statistical assumption about nonresponse made under post-stratified estimation is tenable. In addition, alternative forest area estimators were developed for various nonresponse scenarios where the assumptions made under post-stratified estimation are not tenable.

Outcome: The successful completion of this project resulted in transparent and documented guidelines for implementation as part of the compilation process, increased the overall efficiency of FIA program, and provided sound, statistically valid guidance for two major issues affecting broad-scale inventory and monitoring programs. The results are also applicable to other national forest inventory programs (for example, South Korea, Peru, and Estonia).

Patterson, P.L.; Coulston, J.W.; Roesch, F.A.; Westfall, J.A.; Hill, A.D. 2011. A primer for nonresponse in the U.S. Forest Inventory and Analysis program. Environmental Monitoring and Assessment. http://www.springerlink.com/content/y67257245387x068/.

Roesch, F.A.; Coulston, J.W.; Hill, A.D. [In press]. Statistical properties of alternative national forest inventory area estimators. Forest Science.

Westfall, J.A.; Patterson, P.L.; Coulston, J.W. 2011. Post-stratified estimation: within-strata and total sample size recommendations. Canadian Journal of Forest Research. 41(5): 1130–1139.

Contact: John Coulston, jcoulston@fs.fed.us.

Partners: NRS FIA, IW FIA, PNW FIA, SRS FIA.

Finding: SRS FIA set a new standard in posting and issuing the most current set of FIA data available.

Accomplishment: SRS FIA had a successful year in posting 2010 annual data on line. Data for 2010 were posted for Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, Oklahoma (East and West), South Carolina, Tennessee, Texas (East), and Virginia. Other activities included posting 2008 data for Kentucky, South Carolina, Tennessee, and Texas (West) and posting 2009 data for Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Texas (East and West), and Virginia. All 13 Southern States had data for 2010 posted, with the two exceptions of West Texas and Louisiana. Louisiana 2009 data are currently under review and the 2010 data for Louisiana and West Texas are more than 93 percent collected in the field. In addition to making the most current data available through the online Forest Inventory and Analysis Database (FIADB) query tool, all previously posted annual data were updated to meet NIMS 4.0 and FIADB 4.0 standards.

Outcome: Decisionmakers such as Congress, government agencies, and industry leaders have access to the most recent FIA data through the FIADB and online query tools.

Contact: A. Conner, aconner@fs.fed.us.

Partner: Southern State Forestry Agencies.

Finding: Urban Forest Inventory in Tennessee.

Accomplishment: Trees in cities can contribute significantly to human health and environmental quality. Unfortunately, little is known about the urban forest resource in the State of Tennessee and what it contributes locally and regionally in terms of ecology, economy, and social well-being. In an effort to better understand the urban forest resource in the State of Tennessee and its value, the Forest Service FIA and Community Forestry programs, in partnership with Forest Service R&D and the Tennessee Department of Agriculture, Division of Forestry, initiated a pilot study to sample trees within all urban areas across the State; the first for Tennessee.

Urban forest structure, functions, health and values in Tennessee were analyzed using the i-Tree Eco (formerly known as Urban Forest Effects) model. Results reveal urban areas in Tennessee have an estimated 284 million trees in urban areas with canopies that cover 33.7 percent of the area. Most trees are found in forested areas (56 percent) with the most dominant species being yellow-poplar, chestnut oak, and white oak (ratings based on basal area). Hackberry, yellow-poplar, and flowering dogwood were the top three in terms of leaf area. Tennessee's urban forests currently store about 16.9 million tons of carbon valued at approximately $350 million. In addition, these trees remove about 890,000 tons of carbon per year ($18.4 million per year) and about 27,100 tons of pollution per year ($203.9 million per year). Trees in urban Tennessee are estimated to reduce annual

residential energy costs by $66 million per year. The structural, or compensatory, value is estimated at $79 billion. Information in this report can be used to advance the understanding and management of urban forests to improve human health and environmental quality in Tennessee.

Outcome: A report, currently in development, will be published by the SRS FIA and will be available in 2012. The primary author of the report is David J. Nowak of the NRS.

Contacts: Dave Nowak, dnowak@fs.fed.us; Chris Oswalt, coswalt@fs.fed.us; A. Cumming, acumming@fs.fed.us; D. Twardus, dtwardus@fs.fed.us; R.E. Hoehn III, rhoehn@fs.fed.us; Tom Brandeis, tjbrandeis@fs.fed.us.

Partners: Tennessee Department of Agriculture, Division of Forestry; NRS, Urban Forests, Human Health, and Environmental Quality; Forest Service Northeastern Area, Northeast Center for Urban and Community Forestry and Forest Service Forest Health Protection program.

National Office

The National Office of the FIA program helps to guide and coordinate the FIA field units engaged 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 2011, the National Office staff—

- 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 Baltimore, MD, in March 2012.
- Published the *Forest Inventory and Analysis Fiscal Year 2010 Business Report*.
- Continued working with the Conservation Biology Institute (CBI) in Corvallis, OR, to develop and improve the Protected Areas Database. Provided membership on a new steering committee made up of CBI, Forest Service, U.S. Geological Survey, and The Nature Conservancy to develop an official protected-areas database for the United States.
- Completed renewal of the memorandum of understanding (MOU) with the National Park Service guiding FIA operations on National Park Service lands.
- 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 implementing the Global Remote Sensing Project to estimate and monitor area changes of the world's forests.
- Continued collaborative work with National Aeronautics and Space Administration (NASA) on land cover-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 (REDD+), and is a U.S. contribution to the Forest Carbon Tracking task of the intergovernmental Group on Earth Observations.
- Wrote *Forestry Source* article "Forest Sector Reeling During Economic Downturn," which appeared in January 2012.
- Prepared response on behalf of Canada, the United States, and Mexico for North American Forestry Commission on reporting of protective forest areas to United Nations Global Forest Assessments.

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 consist of—

Liz LaPoint—Team Lead, Northern National projects.

Rich McCullough—NRS FIA.

Sam Lambert—SRS FIA.

Jock Blackard—IW FIA.

Dale Weyermann and John Chase—PNW FIA.

News, Changes, and Updates

MOU agreements continue to be put in place for those clients where 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. Some of the new MOUs put in place are with the following organizations: University of Vermont, State of Vermont, West Virginia University, University of Maine, Oregon State University, and NASA Goddard Space Flight Center. FIA continues to work closely with the Forest Service Remote Sensing Application Center on a number of projects, including mapping forest canopy cover.

FY 2011 Spatial Data Requests

In FY 2011, 414 spatial data requests were active. National or multiregional data requests accounted for 11 percent of the total number of requests. Of the received requests, 93 percent were completed by the end of the fiscal year and 3 percent remain in progress. The remaining 4 percent of requests were either canceled by the client, put on hold by the client, or the client did not remain in contact with SDS.

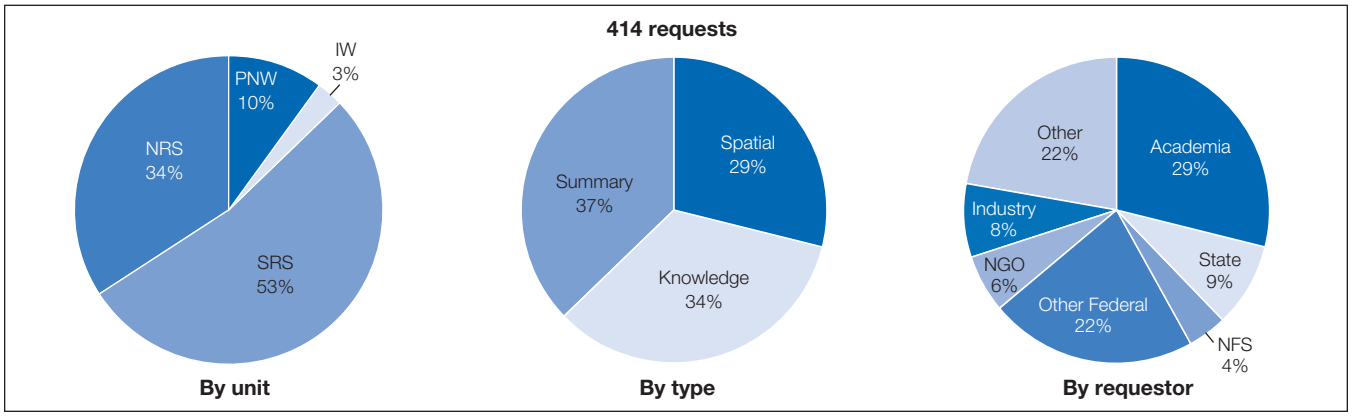
Academia continues to be SDSC's largest client, with 29 percent of all new requests (fig. 13). States accounted for 9 percent of requests and other Federal groups 22 percent.

Web Tools Surpass 130,000 Retrieval Mark in FY 2011

In FY 2011, 132,413 retrievals were made from FIA Web tools (table 4) and a detailed summary of the various tools is provided in appendix table B-7 of this report. Some highlights of 2011 Web tool activity are presented here.

The FIA program began providing Internet database retrieval programs in 1996 with the introduction of the FIA Data Base Retrieval System (DBRS). The DBRS enabled the public to query regional FIA data sets 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 FIADB. The current generation of data retrieval programs produces estimates and their associated

Figure 13.—*Requests made to the FIA Spatial Data Services Center, 2011.*



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

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

	Fiscal year									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of retrievals	11,579	14,973	26,548	56,475	24,335	26,615	59,609	90,974	101,643	132,413

FIA = Forest Inventory and Analysis.

sampling errors. Forest Inventory Data Online (FIDO) was introduced in 2008 and the EVALIDator Web application was introduced in 2009.

Based on an analysis of the FY 2011 Internet protocol addresses using FIDO, academia accounted for 22 percent of the users, corporate use 41 percent, government use (State and Federal combined) 16 percent, nongovernmental organizations (NGOs) accounted for 2 percent, and 19 percent was indeterminate. The total number of FIDO users was 72,946.

In 2009, a Web application was developed that enabled querying of the National Woodland Owner Survey (NWOS) database. Nearly 12,000 retrievals have been completed using the NWOS Tablemaker. In FY 2011, 2,070 retrievals were completed.

The FIA DataMart was revised in 2009 to include the ability to download FIADB 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 2 but undoubtedly run into the thousands or tens of thousands. In FY 2009, users downloaded 2,014 State databases in Access files. In FY 2010, users downloaded 3,033 State databases. In FY 2011, the number of State databases downloaded dropped to 1,929. These State databases are now included on DVDs that are distributed with each NRS State's 5-year reports.

The FIA DataMart also enables the user to download data as text files. In FY 2010, users downloaded 89,980 text files containing data from an FIADB table. In FY 2011, users downloaded 67,021 text files containing single tables from the FIADB.

In FY 2010, users downloaded 18,026 Zip files that contained data from one or more FIADB tables. In FY 2011, 24,576 Zip files for a single table were downloaded. In FY 2011, users downloaded 2,544 Zip files containing the entire set of text files for a given State.

In 2003, the FIA Mapmaker program added a module that enabled the user to download FIA data in Forest Vegetation Simulator (FVS) format. This feature was lost with the retirement of the Mapmaker program in 2009. 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 a 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 provides Webinars and in-person trainings on our Web tools. In FY 2010, the team provided one Webinar and three trainings. In FY 2011, the NRDD team held six Webinars and collaborated with Purdue University on another set of Webinars covering the use of FIA data and our tools. The NRDD team also provided in-person training at three meetings. FIA has also been performing outreach by attending meetings. The NRDD team is involved in staffing the booth, and it distributes information about FIA data during those meetings.

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 (for example, to a single State or national forest) often are referred to partners within that administrative unit (for example, 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 client's questions. Appendix table B-6 shows the number of significant consultations that FIA staff provided in FY 2011, 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.

All together, FIA staff addressed 1,753 significant consultations, which required 8,584 staff-hours to complete (table 5)—equivalent to four full-time staff-years. Of the consultations, 547 were conducted with other Government agencies 59 percent of the time, such as State agencies and other Federal agencies, as well as having internal discussions within the Forest Service. Other major client groups included academic clients (approximately 39 percent of the consultations and 19 percent of the time), industry (8 percent of the consultations and 7 percent of the time), and NGOs (9 percent of the consultations and 7 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 2011.*

Customer group	Number	Hours
Academic	682	1,643
Government	547	5,070
Industry	144	631
NGO	164	584
NIPF	24	79
Media	16	48
Other	176	529
Total	**1,753**	**8,584**

FIA = Forest Inventory and Analysis. NGO = nongovernmental organization. NIPF = nonindustrial private forest landowner.

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 memorandum of understanding providing for permanent inclusion of all national forest lands within the FIA program. This 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, the national forests provide 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 broad-level assessments. FIA will also provide advice for and assistance in developing forest-level sampling protocols linked to FIA, and collaborate with national forests that want to contribute additional resources for additional sampling.

NFS funds FIA's NIMAC to develop the Design Tool for Inventory and Monitoring to help guide intensification and other monitoring efforts and the Analytical Tool for Inventory and Monitoring to analyze the resulting data as well as existing FIA data in a format that better serves NFS needs. The Southern Region is working with NIMAC to determine intensification levels on each of their forests. The Eastern Region is now funding NRS FIA to ensure that all their forests are intensified two- or three-fold. Regions 8 and 9 began funding a term employee in NIMAC in FY 2011.

The Pacific Northwest and Pacific Southwest Regions continue to work with PNW to intensify the sample and collaborate in crew training, contract administration, and data collection. The 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.

FIA is collaborating on a Forest Service-wide effort to improve inventory, monitoring, and assessment. As part of the USDA all-land approach and the new Planning Rule, FIA data will be more heavily used by NFS, as well as other partners. For example, each national forest must now complete a Climate Scorecard—a significant portion of which can be addressed using FIA data. NRS FIA and NIMAC are developing analytical tools to facilitate the process.

Based on feedback from the nine NFS regions, FIA is meeting many of the needs of NFS partners. The development of streamline 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 needs to be made in getting 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. FIA will continue to work on these issues in FY 2012. 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 following issues were raised as NFS priorities:

- Implement of 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 meets 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 Woodland Owner 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, and the volume of roundwood received by species and geographic origin as well as 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. Estimates 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. How much fuelwood (and from what source) is 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 national woodland owner 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, nongovernmental organizations, landowner organizations, private-service providers, forest industry companies, and academic researchers. A new cycle of data collection for the NWOS is scheduled to begin in 2012. The most recent woodland owner survey 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, 2006. 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.

Forest Health Indicator Surveys

FIA began implementing a nationwide, field-based forest 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 on line 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 present a brief description of the indicators and number of recent samples (appendix table B-9).

Crown condition—Tree crowns are an important component of net primary production, and trees with deteriorating foliage show visible signs of stress that often precede 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 (that is, 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 (DWM) 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.

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Program Safety

Safety is a high priority for the Forest Service and especially for FIA, which travels hundreds of thousands of miles each year to conduct its business. Our vision for the national FIA program is to create 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 2011. Figures 14 and 15 show program safety trends by incident type for FY 2006 through FY 2011 followed by regional safety highlights for FIA units in FY 2011.

Table 6.—*FIA program estimated hours worked, miles driven, aircraft hours flown, and safety incidents reported for FY 2011.*

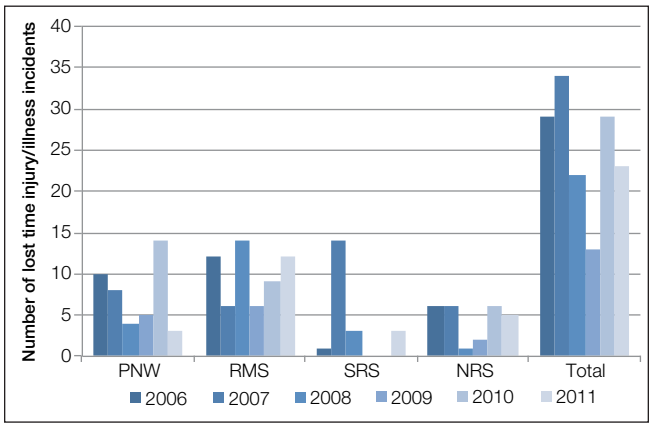
Category	FIA Unit					
	PNW	IW	SRS	NRS	NO	Total
Base data						
Federal FTE equivalents[a]	97	99	92	106	4	397
Total estimated hours worked[b]	202,176	205,920	191,360	219,856	7,280	826,592
Total vehicle miles driven	385,077	860,000	710,000	908,633	—	2,863,710
Total flight hours logged	187					
Recordable incidents by class						
Time lost illness/injury incidents	3	12	3	5	—	23
Motor vehicle accidents	2	1	4	2	—	9
Aircraft accidents	0	0			—	0
Safety incident frequency rate						
Time lost illness/injury rate per 100 FTEs	3.1	12.1	3.3	4.7	—	5.8
Motor vehicle accidents per million miles driven	5.2	1.2	5.6	2.2	—	3.1
Aircraft accidents per 100,000 flight hours	—	—				—

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. IW = Intermountain West Research Station. NO = National Office. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. SRS = Southern Research Station.

[a] Based on appendix table B-3 number of Federal employee estimated 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.

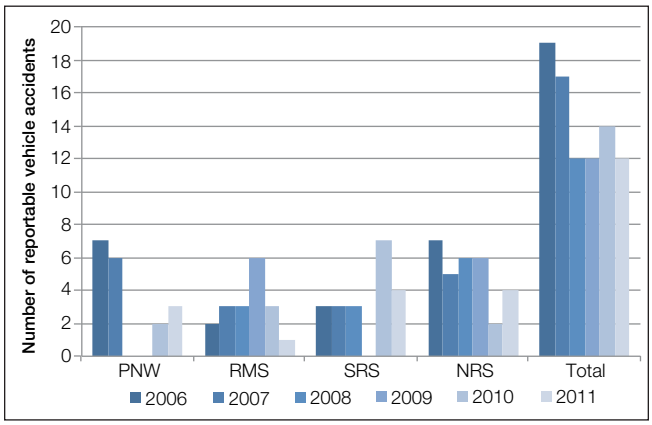
Figure 14.—*Number of injury or illness incidents by FIA unit, 2006 through 2011.*



FIA = Forest Inventory and Analysis. 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 2009 and 2010 is zero.

Figure 15.—*Number of reportable motor vehicle accidents by FIA unit, 2006 through 2011.*



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

Notes: A reportable motor vehicle accident is 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. This definition also applies to privately owned vehicles when used on official Government business. Value for PNW for 2008 is zero. Value for PNW and SRS for 2009 is zero.

Standard safety training is mandatory and is conducted at each field unit. Safety training and equipment is 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, additional training and equipment is provided. Information on specific safety training and criteria are available online at http://fia.fs.fed.us.

Regional Safety Notes

Northern FIA Safety Highlights for FY 2011

The NRS FIA unit has been successful in providing a more defined set of standards regarding safe work practices. This unit has adopted a higher safety management profile, which sets a comprehensive safety structure through the Chief's Safety Initiative and the regional Safety Committee. In staying with the commitment to the Chief's Safety Initiative, 98 percent of NRS FIA unit employees will have participated in local Safety Engagement Sessions. This initiative is important in terms of getting all employees to embrace safety as a core value at work and in life. Four NRS FIA employees were chosen as Catalyst, Safety Cadre 1, and Safety Cadre 2 trainers. These employees were essential in leading healthy safety discussions and opening up the lines of communication amongst managers, researchers, scientists, and staff.

The NRS FIA Safety Committee continues to involve staff and provide meaningful safety information and resources through monthly project staff meetings, e-mails, and their program Web page. The annual safety story was established 5 years ago and remains as a popular system for staff members to be engaged by sharing their safety stories, offering humor, and valuable real life lessons. This method provides staff with good awareness techniques and significant support and advice.

To improve the overall safety, the NRS-FIA check-in and check-out system continues to be refined to address issues and to meet a higher standard. Recently, two NRS FIA field employees were awarded with keepsake awards for their immediate response to calls for help from other stranded field members. This result indicates that the check-in and check-out system was used correctly to ensure the safe and expedient return of the missing field members.

In addition, the St. Paul office location conducted a safety inspection. This opportunity ensures that all offices and personnel are safety compliant. NRS FIA field and office staff continue to attend indepth training courses on Wilderness Responder and First Aid and CPR, and Defensive Driving.

Pacific Northwest FIA Safety Highlights for FY 2011

The PNW Resource Monitoring and Assessment (RMA) program was honored this year by earning the Chief's award for Safety and Occupational Health, specifically for the coastal Alaska data collection operations. The overall incident-related results of the collection efforts in Alaska include more than 6,000 hours of helicopter flights without accidents, and thousands of plots visited from a boat base station, with no major injuries. We are proud of the national recognition for FIA's success for safety and occupational health.

Our safety committee continues to emphasize ongoing safety recognition with a Safe-T-Bucks reward system and Safety Employee of the Month selection. For increasing safety awareness, PNW RMA has published a monthly newsletter called Careful Chronicle for the past 6 years, conducts and actively discusses the results of the annual survey of employee safety perceptions and issues, and collects and analyses near-miss and tailgate safety session reports. RMA explores ways, among and between employee teams, as well as with clients and partners, to more effectively summarize and use this information to improve processes and procedures and provide feedback to our personnel—working both in the office and in the field—on critical safety issues and trends. RMA has had 100-percent participation in the national Safety Engagement effort, working toward strengthening our safety culture.

Other highlights from 2011 include the creation of working alone guidelines, whether in the field or in any remote location, which include the use of satellite devices to provide employee location and check-in procedures. We continue to document safety-related training attended by PNW-RMA-FIA employees; develop job hazard analyses for field-going and office personnel in forest, urban, island, and interior Alaska projects; strengthen and develop effective mechanisms to share information on safety issues; build corporate solutions to FIA safety issues; and work with the regional safety committees and program managers to construct a common safety vision for the four FIA units.

Rocky Mountain FIA Safety Highlights for FY 2011

The IW FIA program continued to focus on proactive risk management and employee involvement. In addition to the

daily risk assessment tool that was implemented in 2010, the IW program updated all of the required job hazard analyses to include a risk assessment. The process of performing an assessment commonly yields greater benefits than the final risk results produced. The much larger importance of the process arises from the creative yet systematic thought process that is necessary to produce risk estimates. It provides reassurance and a record that an important and reasonably practical step has been taken to anticipate what might go wrong and what could be done to prevent it. The risk assessment is not intended to give a clear-cut decision about safety measures but aids in a more complex decision by paying attention to the benefits of learning from the process.

During the program's second year of motorbike operation, one minor accident was reported; this accident resulted in a lessons learned document that identified the importance of proper equipment and ushered a change in required personal protective equipment to continue to ensure employee safety. In addition to all required training, the unit offered a Wilderness First Aid class and a session with a professional athletic trainer and physical therapist focusing on knee injury prevention and strengthening techniques.

The program continued to develop and disseminate a bimonthly safety newsletter that provides timely safety and health information, messages from the program manager, quarterly incident summaries, and recognizes safety award recipients. Multiple awards were given throughout the year for proactive safety performance. Although the program incurred 12 recordable injuries, the unit had fewer restricted duty days than the prior year. The unit had one serious vehicle accident (no injuries) in which a Facilitated Learning Analysis (FLA) was completed to glean as much learning as possible. The unit also participated in a FLA when two employees encountered a marijuana garden and workers.

Southern FIA Safety Highlights for FY 2011

During the year, SRS FIA improved the effectiveness of increased safety awareness within the region in response to the Chief's Safety Initiative. This year SRS FIA made a concerted effort to broaden our safety program giving a high degree of reliability and assurance. These efforts were rewarded when FIA received the Station Director's Safety and Occupational Health award in recognition for best practices. It should be noted that 100 percent of SRS FIA employees participated in a 2-day safety journey provided by the Cadre 1 and Cadre 2 leaders. These sessions were designed to increase awareness of safety in all aspects of our work and life.

In July, we participated in a Washington Office safety review, including a review by Station Headquarters. Using recommendations from the review, the safety committee was restructured to provide a more inclusive team that reflects a better representation of both field and office. The committee met monthly throughout the year to improve the range-of-safety factors and to ensure safety awareness.

We had planned a week-long training session for the field crews and QA but, because of the travel reductions, we were limited to only 2 days. We were able to provide refresher training on four-wheel drive operation, use of winches and come-a-longs, and boating safety. All supervisors and field staff received refresher training on CPR, first aid, and blood-borne pathogens.

Our safety journey has led us to continue making improvements to several aspects of our program. We had two representatives of a local bank provide a health and safety training session concerning identity theft. Office and field Job Hazard Analyses (JHAs) were updated where a driving JHA was incorporated into both. Each employee was provided a copy of the JHA for his or her position during his or her performance review to ensure awareness of the JHA. Training videos were made available for field crew on situational awareness while working in remote locations because of the increase in methamphetamine labs and marijuana cultivation in national forests. The flu shot program was expanded to include vouchers for the field crew to obtain shots at their individual locations and a local clinic provided flu shots to office staff. The FIA headquarters building was tested for radon and air quality because of increased employee health and safety concern. Both tests reported zero hazards, but as a precaution, all HVAC ducts and vents were cleaned and sanitized and a carbon monoxide detector installed. Two fire drills and an emergency weather drill were conducted because of increased tornado activity.

The Occupant Emergency Plan was reviewed and updated, designating new floor wardens and emergency evacuation procedures. The update was timely in light of the extreme weather that occurred this spring. On April 27, 2011, the same storm that caused catastrophic damage to Alabama, Missouri, and other parts of the south, hit Knoxville, TN. More than 20 tornadoes touched down in east Tennessee. The FIA headquarters building sustained some broken windows, slight water damage, and downed tree limbs, and two office vehicles sustained significant hail damage, but no major damage or lost time occurred. Many employees sustained significant, costly damage to their homes and personal vehicles, but no employees or their families were injured.

Comparing FY 2010 Plans With FY 2011 Accomplishments and FY 2012 Plans

In the FY 2010 business report for FIA, we included a section stating our plans for FY 2011. In the following table we show how our actions in FY 2011 matched our plans from FY 2010 and our plans for FY 2012.

In the FY 2010 business report, we said that in FY 2011 we would—	In FY 2011, we—	In FY 2012, we will—
Base inventory and reporting		
Continue base inventories in 49 States and coastal Alaska if funding remains constant.	Continued base inventories in 49 States and Coastal Alaska. Plot production increased even with severe travel restrictions that were offset by increased contracting and partner participation. Phase 3 (P3) measurements deferred on all States because of funding constraints and late budget allocation.	Continue base inventories in 49 States and coastal Alaska if funding remains constant. Travel restrictions will continue to be a challenge. Reinventory U.S.-affiliated Pacific Islands, starting with America Samoa for 2012.
Investigate cost-effective methods for interior Alaska.	Investigated cost-effective methods for interior Alaska for further review.	Begin 10-year review of the FIA P3, forest health indicators to determine State-by-State implementation, data availability, utility, client needs, potential for spatial intensification, and potential cost savings via protocol modifications.
Finalize development of Field Manual 6.0 for implementation in FY 2012.	Finalized development of version 6.0 of the National Field Guide for implementation in FY 2012. Modified protocols for down wood and vegetation indicators were developed, and soils and crowns will be examined for potential as P2 forest health or P2 plus protocol versions.	Implement version 6.0 of the National Field Guide in FY 2012.
Continue to work with American Recovery and Reinvestment Act (ARRA) inventory project in New Mexico to provide statewide inventory data.	Worked with ARRA inventory project in New Mexico to provide statewide inventory data.	Complete the ARRA inventory project in New Mexico, which will provide more than 80 percent of the State's annual forest inventory plots
Publish 5-year State report for Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, Maine, Missouri, Florida, Texas (eastern and western), Oklahoma (close-out periodic, eastern only), North Carolina, Montana, Coastal Alaska, Commonwealth of Puerto Rico, and Republic of the Marshall Islands.	Published 5-year State reports for Connecticut, Delaware, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Rhode Island, Vermont, West Virginia, Oklahoma, Idaho, Montana, Coastal Alaska, and the Republic of the Marshall Islands. Florida and North Carolina were delayed until 2012.	Publish 5-year State reports for Illinois, North Dakota, Nebraska, Pennsylvania, South Dakota, Wisconsin, Alabama, Arkansas, Florida, Kentucky, North Carolina, Tennessee, Texas, Arizona, New Mexico, Federated States of Micronesia, and Commonwealth of the Northern Mariana Islands.
Proposed 15 State and island reports.	Completed 20 State and island reports.	Propose 18 State and island reports.

In the FY 2010 business report, we said that in FY 2011 we would—	In FY 2011, we—	In FY 2012, we will—
National Woodland Owner and Timber Products Surveys		
Timber Product Output (TPO)—Present national vision and strategic plan for TPO at 2012 national users group meeting and, upon approval, develop national TPO database. Publish first national pulpwood report.	Formed a National Forest Inventory and Analysis (FIA) Team was that developed and presented a strategic vision for the national program at the 2012 national users group meeting. Developed draft table structures for a TPO national information management system, along with publication of the first national pulpwood report.	Develop beta-version of a national TPO data management and processing system that will eventually allow for consistent Web delivery of TPO data nationally.
National Woodland Owners Survey (NWOS)—Continue planning for the next iteration of the NWOS.	Completed planning for the next iteration of the NWOS and began implementation.	Complete processing of the 2011 NWOS data and submit the results for publication.
Conduct focus groups in five locations across the United States to test the survey instrument, gain additional insight into survey responses, and explore emerging topics for future surveys.	Conducted focus groups in California, Maine, Missouri, New Mexico, and North Carolina. These focus groups allowed for pilot testing the survey instrument and gaining deeper insights into owner attitudes and behaviors. Contacted nearly 16,000 private forest owners from across 48 States and asked them to participate in the NWOS. The data are still being processed, but the preliminary cooperation rate is 48 percent.	Contact additional owners to augment the 2011 sample size to reach the State-level target sample sizes. This will likely need to be done in 2013 as well.
Continue to work with partners to further the analysis of the NWOS.	Worked with partners from other Forest Service research units, universities, State forestry agencies, and nongovernmental organizations (NGOs) to further the NWOS analyses.	Continue to work with partners to further the analysis of the NWOS.
Deploy a more comprehensive test of the mapping techniques in selected States, select a final technique, and release a national map.	Completed analysis for the ownership mapping project and started work to make the results ready for electronic, cartographic, and peer-journal outputs.	Publish the improved ownership map.
Pilot studies		
Continue work with USDA Natural Resources Conservation Service (NRCS) to deliver consistent indicators of rangeland sustainability to the National Forest System (NFS), U.S. Department of the Interior, Bureau of Land Management (BLM), State agencies, NGOs, and private landowners.	Completed final report on the Oregon Multi-agency Rangeland Pilot. Will be released and peer reviewed by an external panel.	No rangeland pilot studies are planned for 2012.
Complete urban FIA report on the urban pilot work in Tennessee and Colorado.	Initiated the development of an urban FIA report for the Tennessee pilot project. Processed data for the urban pilot work in Colorado.	Publish urban FIA report on the urban pilot work in Tennessee. Complete urban FIA report on the pilot work in Colorado.
For the ARRA project, continue urban inventory work in California, Hawaii, and Oregon.	For the ARRA project, completed urban inventory pilot in Washington and Alaska.	For the ARRA project, continue urban inventory work in Oregon, California, and Hawaii. Complete pilot testing for the NLCD Tree Canopy Cover (TCC) product.

In the FY 2010 business report, we said that in FY 2011 we would—	In FY 2011, we—	In FY 2012, we will—
Pilot studies		
Complete pilot testing for the National Land Cover Dataset (NLCD) TCC product.	Conducted pilot testing for the NLCD Tree Canopy Cover product.	Conduct NLCD Tree Canopy Cover project within Washington, Oregon, and California.
Launch activities in support of the Monitoring Trends in Land Change System. (National Aeronautics and Space Administration [NASA] funding pending.)	Started transition to cover and land use as basis for extent of forest land.	Launch activities in support of the Monitoring Trends in Land Change System. (NASA funding pending.) Integrate Landtrender and FIA field plots to estimate the effect on carbon flux of land use, management, and disturbance. Develop and publish models to estimate crown cover in west Texas. Publish report on determining critical loads for air pollution effects in California using the P3 lichen indicator. Publish report on nonnative plant effects to forest health using the P3 vegetation indicator.
Forest carbon		
Fully document all volume equations used by FIA nationally.	Published a general technical report (GTR) documenting volume/biomass/carbon estimation procedures used in FIA (NRS-88).	Increase the carbon estimate capability of FIA's online tools while exploring possibilities for reporting carbon attributes in expanded outlets (for example, resource bulletins).
Program the Carbon Calculation tool to use FIA-defined volume equations and Component Ratio Method (CRM) biomass apportionment, enabling more consistency between official National Greenhouse Gas Inventory (NGHGI) and estimates derived from FIA tools.	CRM was adopted in the United State's NGHGI system such that carbon estimates from future U.S. Environmental Protection Agency reports should more closely align with carbon estimates from the FIADB.	Incorporate Phase 3 down woody material (DWM) estimates into the 2013 NGHGI, which will necessitate the creation of an operational DWM estimation engine in National Information Management System (NIMS).
Complete the research study plan and initiate the CRM3 research funding process for all FIA volume and biomass calculation.	Based standing dead tree carbon stocks for the NGHGI on Phase 2 standing dead tree measurements instead of using simulations. Published various publications to document this effort.	Refine managed land delineations in Alaska for the purpose of NGHGI reporting.
Experimental forests and ranges		
Continue with the implementation of FIA and Experimental Forest and Range (EFR) projects if funds permit.	Due to late funding, funded only $1.0 million in EFR projects. Projects included intensification plots on several EFRs and historic data archiving. Some funding was held over at the Pacific Northwest Research Station (PNW) for work in 2012.	Funding for EFR work eliminated in initial budget estimates. Heldover FY 2011 funding will be obligated at PNW.

In the FY 2010 business report, we said that in FY 2011 we would—	In FY 2011, we—	In FY 2012, we will—
Information management and distribution—FIDO		
Continue to improve Forest Inventory Data Online (FIDO) user interface.	Released new production version of FIDO in February 2011 that significantly extended the functionality of the earlier version, enabling users to create custom reports for tree carbon FIADB 4.0 Users Guide published in print and to the Web in December 2010.	Continue to improve the user interface to FIDO.
Release printed FIADB 4.0 documentation and Web release FIADB 5.0 documentation.	Migrated all online tools, including FIDO, EVALIDator, NWOS, and TPO tools, to the national data center.	Release the Web release of FIADB 5.0 documentation to coincide with release of new, improved versions of FIDO, EVALIDator, and the FIA DataMart.
Conduct training Webinars, including some being held by Purdue University in conjunction with the Forest Service.	Served more than 72,946 data requests with FIDO in FY 2011, and staff participated in supporting the Forest Service booth for national conferences.	Develop online tools and users guide documentation supporting FIADB 6.0.
Complete migration to data center by September 30, 2012.	Held six Webinars on FIDO and FIA data tools. Collaborated with Purdue University on Webinars involving FIA data and tools. Held trainings at national users meeting, the Northeast Society of American Foresters meeting, and FIA symposium on FIA tools and data.	Conduct training Webinars.
Information management and distribution—MIDAS		
Begin work on the next version of MIDAS to incorporate suggested feature enhancements and new technologies and prepare for version 6.0 of the National Field Guide. (Implement changes by October 1, 2012.)	Delayed work on the next version of MIDAS to incorporate suggested feature enhancements and new technologies for version 6.0 of the National Field Guide.	Incorporate feature enhancements and new technologies and prepare for version 6.0 of the National Field Guide. (Implement changes by October 1, 2012.)
Improve security protocols to prepare for a public proxy server to MIDAS behind the firewall for contract users without access to the Forest Service network.	Completed security protocols for the proxy server for MIDAS for partner and contract users without access to the Forest Service network.	
Initiate the Chief Information Officer process to get the FIA suite of applications (MIDAS, MIDAS-National Inventory and Monitoring Applications Center [NIMAC], core reports, Field Data Manager, NIMAC Field Data Manager) ported to a new server environment.	Ported the FIA suite of applications (MIDAS, MIDAS-NIMAC, core reports, Field Data Manager, and NIMAC Field Data Manager) to the Chief Information Officer's new server environment.	Complete necessary modifications to collect P2-Plus on a subset of P2 plots during the summer months.

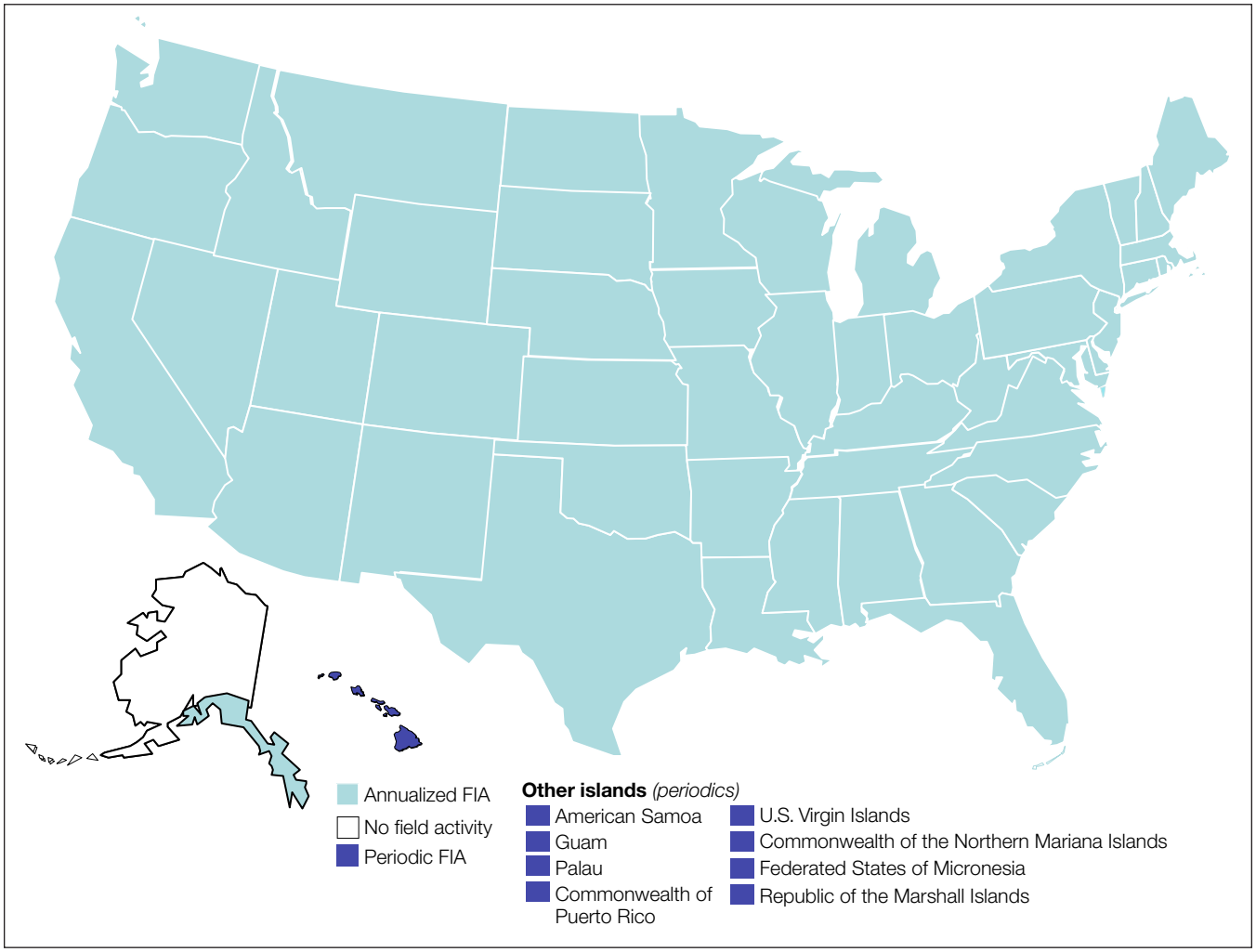
In the FY 2010 business report, we said that in FY 2011 we would—	In FY 2011, we—	In FY 2012, we will—
Information management and distribution—NIMAC		
Complete the 5th panel of data collection in Wisconsin (start remeasurement in FY 2012) and the 4th panel in Indiana.	Processed another panel of data in Indiana and Wisconsin. Made data available using the EVALIDator analytical tool for both States. Wisconsin completed the last panel of the first cycle of data collection. Indiana completed its fourth year. Data for Wisconsin State Forests are available via the Web using FIDO. Designed intensification on Missouri State Forests. Missouri collected the first year of data.	Process and make all completed panels of data available with EVALIDator and via the Web using FIDO for Wisconsin.
Publish the Plains States inventory methodology.	Published the Plains States inventory methodology in a journal article.	Install NIMS processing software and train Indiana and Missouri on its use. Instruct them on creating EVALIDator databases and their use.
Begin development of Web-based, preproduction analytical tool for NFS. Continue with plot intensification planning on NFS lands. Implement intensification in NFS Eastern Region.	Continued development of the analytical tool with associated spatial tool for NFS use on FIA data as well as their own. Began development of the Design Tool for Inventory and Monitoring in collaboration with NFS and the United Nations Food and Agriculture Organization. Funded by the Southern and Eastern Regions to provide technical support for intensification and use of FIA data.	Release first versions of the Design and Analytical Tools for testing. Continue to provide technical support to the Southern and Eastern Regions.
Develop and implement bilingual data collection software. Collect and process data from Honduras rainforest plots.	In Honduras, successfully implemented the data-collection software that was also used in the Peruvian Amazon. Completed the draft report on Honduran forests with emphasis on mahogany. As part of interagency SilvaCarbon effort, provided technical assistance to Peru, Ecuador, and Central America on monitoring forest carbon.	Provide technical assistance and software tools in three continents as part of the SilvaCarbon effort.
Information management and distribution—NIMS-CS		
Finalize NIMS-CS 6.0 production version for release in FY 2012. NIMS-CS 6.0a with enhanced functionality and support for FIADB 6.0.	Released NIMS-CS 5.1 test version that supported processing Field Guide 5.0 data. Released FIADB 5.1 test version.	Implement NIMS-CS version 5.1 at the data center and process 2011 data at the data center.
NIMS-CS will also be transferred to the data center.	Completed transferring all FIA databases, processing systems, and online tools to the National Information Technology Center.	Implement FIADB 5.1 at the data center and publish 2011 data. FIADB 5.1 includes enhancements for DW reporting and analysis.
Transfer NIMS-CS 5.0 to the data center and process 2012 data at the data center. Modify NIMS-CS version 6.0 variable collection and processing.	NIMS-CS 4.0 updated and used to process and publish 2008, 2009, and 2010 data to FIADB 4.0. Began preliminary development of NIMS-CS 6.0 components.	Develop NIMS-CS for 6.0 2013 variable collection and processing.
Finish transferring all of the FIA databases, processing systems, and online tools to the National Information Technology Center.	Anticipated NIMS-CS and FIADB version development was delayed by 1 year because of the data migration initiative.	Develop FIADB 6.0

In the FY 2010 business report, we said that in FY 2011 we would—	In FY 2011, we—	In FY 2012, we will—
FIA Atlas project		
Complete final maps and storyboards and prepare features for each chapter, with a goal to lay out and print the atlas in 2012.	Continued working on FIA Atlas. Extensively revised the storyboards to better portray the important role that forests play ecologically and economically. Secured partnerships with the USDA National Agroforestry Center, Aldo Leopold Wilderness Research Institute, and independent scientists in the Southern Research Station and Rocky Mountain Research Station to provide content. Shared the atlas poster at the NASF annual meeting, Society of American Foresters national convention, ESRI Users Group meeting, and Pecora 18 conference. Moved the rollout date to 2013.	Complete final maps and storyboards and prepare features for each chapter, with a goal to lay out the atlas in 2012 for printing in 2013.
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.	Held a total of 14 users group and 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.
Begin planning for the next FIA Strategic Plan with regional user input and four strategy sessions around the country in 2011 and early 2012.	Began planning for next FIA Strategic Plan for 2013–2017. The FIA science symposium was held in Knoxville in October 2010, with more than 200 attendees from dozens of organizations. Planned for the FY 2012 FIA Science Symposium.	Begin planning for the next FIA Strategic Plan with regional user input and four strategy sessions around the country in 2011 and early 2012. Hold the 2012 FIA Science Symposium.
Make increased use of electronic communications and training Webinars in an effort to balance travel costs while meeting client needs.	Continued to use WebEx and VTR to reduce travel costs.	Make increased use of electronic communications and training Webinars in an effort to balance travel costs while meeting client needs.

Fiscal Year 2012 FIA Program Direction

The FY 2012 budget has considerable uncertainties and while restored in FY 2012, S&PF funding is currently eliminated in the preliminary FY 2013 budget. Final FY 2012 funding remains near the FY 2011 level, and the FIA program will continue inventory operations in 49 States and coastal Alaska (fig. 16). Other major activity planned for 2012 includes accomplishing full compliance of State 5-year reports, initiating the next iteration of the NWOS, modernizing the program's TPO operations and reporting, improving land-cover and land-use classification, completing the FIAtlas project, and developing the program's 2013 through 2017 FIA strategic plan. Current FY 2012 funding eliminates FIA-related research at experimental forests and ranges for long-term monitoring needs.

Figure 16.—*Planned FIA implementation status, FY 2012.*



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 partner financial support has enabled FIA to achieve full implementation and 5-year cycles throughout most States from the Great Plains eastward. This support is expected 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, benchmarks, and targets for the FIA program for 2006 through 2011. In future business reports, we will repeat this table to show how we are progressing toward our goals.

Goal	Performance measure	2006 level	2007 level	2008 level	2009 level	2010 level	2011 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	84	84	85	87	90	92	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	88	90	94	94	98	100	100
Make data accessible to national forest customers	Percentage of national forest land for which FIA data are loaded into NRIS	84	90	92	92	100	100	100
		Outcomes						
Keep analysis current	Percentage of States with FIA State report less than 6 years old	42	42	60	76	74	92	100
Keep online data current	Percentage of States with FIA online data less than 2 years old	84	88	90	90	84	92	100
Customer satisfaction	Percentage of customers rating service as satisfactory or better	85	85	85	85	87	87	100
Partner participation	Partner financial contributions expressed as percentage of total program funds	10	10	11	9	10	11	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 continuously 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 continuously 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 P2 plots per year in the Western United States, 15 percent of base grid plots per year in the Eastern United States, and 20 percent of P3 plots nationwide, with data compiled and made available annually and complete State analyses done every 5 years.

base grid plots sampled. The base grid consists of one sample location per approximately 6,000 acres (P2) and one location per approximately 96,000 acres (P3). Some partners chose to intensify beyond the base grid.

buy down. Plots installed at State expense to reach 20 percent implementation level.

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.

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.

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

imagery. Aerial photos, satellite imagery data files.

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.

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.

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

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

techniques research. Mainly research staffs 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 their 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. This 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.

FRIA (Forest Resource Inventory and Assessment). An account created by Congress within the S&PF portion of the Forest Service budget to provide funds to support FIA 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 State, National Forest System, or other partner expense to achieve higher quality estimates for smaller areas.

management meetings held. Number of national or regional management team meetings held by each FIA unit. A management team for each FIA region consists of partners who are sharing in the funding and implementation of the FIA program. The team typically consists of representatives from the FIA unit, NFS regional offices, S&PF 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 who 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.

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. A subset of P2 sample locations, approximately 1 for every 96,000 acres of land, measured for a more extended set of ecosystem attributes, including tree crown condition, lichen community diversity, soil data, and down woody debris.

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. This is a measure of Federal funding for the base Federal program.

user-group meetings held. Number of user-group meetings sponsored or attended by each FIA unit. A user-group meeting is an open meeting in which a complete regional cross section of FIA partners and customers are invited to attend. User-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 program office.

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

Southern 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

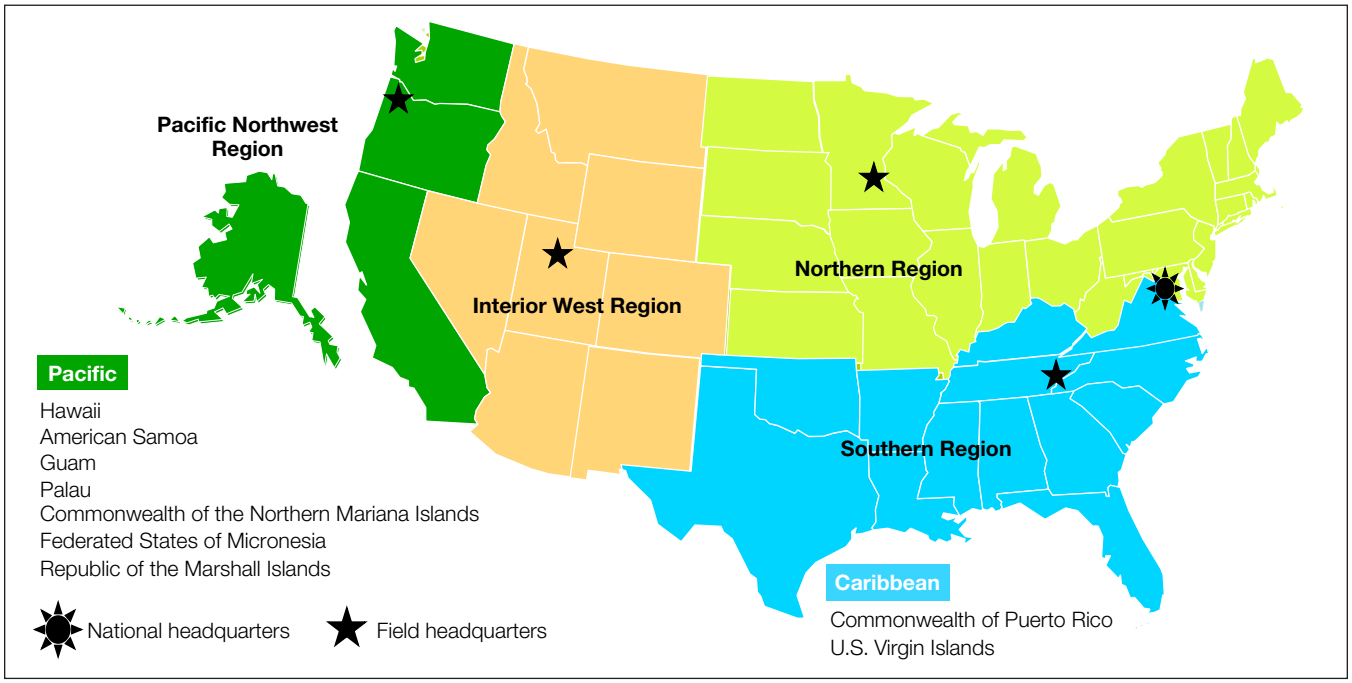
National FIA Program Office
National Program Leader, FIA
USDA Forest Service
1601 North Kent Street, Suite 400
Arlington, VA 22209
703–605–4177

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 FIA Program
Program Manager, RMA (FIA)
USDA Forest Service
Pacific Northwest Research Station
620 SW Main Street, Suite 400
Portland, OR 97205
503–808–2026

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.

Appendix B. Tables

Table B-1. Performance measures for the FY 2011 FIA program 60
Table B-2. Financial statement for the FY 2011 FIA program Federal funds 62
Table B-3a. Federal staffing (FTEs) for the FY 2011 FIA program 63
Table B-3b. Estimate of cooperator staffing funded by FIA grants and agreements (FTEs) for the FY 2011 FIA program 63
Table B-3c. Estimate of total federally funded staffing (FTEs) for the FY 2011 FIA program 63
Table B-4. Partner contributions toward implementing FIA, FY 2011 64
Table B-5. Grants and agreements entered into by FIA units, FY 2011 66
Table B-6. Number and hours of significant consultations by FIA staff by customer group, FY 2011 68
Table B-7. FIA data access by online tools and Spatial Data Services Center requests, 2003–2011 68
Table B-8. Mill, fuelwood, and ownership surveys processed and utilization sites visited, 2000–2011 68
Table B-9. Forest health indicator, year of initiation, and number of samples collected, 2000–2011 69
Table B-10. Status of FIA special project areas excluded from annualized inventory 69
Table B-11. Land and forest area and FIA annualized implementation status by State and region, FYs 2007–2011 69
Table B-12. FIA summary statistics and performance measures, 2005–2011 71

Table B-1.—*Performance measures for the FY 2011 FIA program.*

	Pacific Northwest	Interior West	Southern	Northern	National Office	Total
Total available Federal funds, FY 2010 ($)	15,101,600	14,877,111	16,717,724	17,384,246	8,227,000	72,307,681
Total appropriated Federal funds, FY 2011 ($)	14,895,000	14,730,000	16,440,000	17,160,000	8,227,000	71,452,000
Estimated % of FY 2010 full funding[a]	94/81	94	94	94	81	92
Contributions from partners						
Supporting the 20% FIA program ($)	45,000	1,995,444	1,710,490	1,110,842	0	4,861,776
Value-added contributions ($)	124,850	1,110,998	178,147	2,833,092	0	4,247,087
Total contributions ($)	169,850	3,106,442	1,888,637	3,943,934	0	9,108,863
Total all available funds, FY 2011 ($)	**15,271,450**	**17,983,553**	**18,606,361**	**21,328,180**	**8,227,000**	**81,416,544**
Base grid plots sampled (includes buy down)						
Phase 2, forested[b]	1,834	4,189	8,499	6,615		21,137
Phase 2, nonforested	2,249	7,032	3,299	14,223		26,803
Total Phase 2 plots	4,083	11,221	11,798	20,838		47,940
Phase 3, forested[b]	15	53	—	28		96
Phase 3, nonforested	2	29	—	734		765
Total Phase 3 plots	17	82	—	762		861
Total base grid plots	4,100	11,303	11,798	21,600		48,801
Intensification plots sampled						
Phase 2/3, forested[b]	848	195	497	1,777		3,317
Phase 2/3, nonforested	9	66	4	2,383		2,462
Total intensification plots	857	261	501	4,160		5,779
Number of QA plots						
Phase 2 (forest + nonforest)	301	653	2,148	1,418		4,520
Phase 3 (forest + nonforest)	—	—	—	30		30
Total QA plots	301	653	2,148	1,448		4,550
Total base grid plots and percent sampled[c]						
Total Phase 2 and 3 target base grid plots	41,463	91,341	89,205	101,342	—	323,351
Average percent of region forested	41%	27%	50%	30%		36%
Est. phase 2/3 base forest plots measured	11%	17%	19%	22%		18%
Percentage of States with annual FIA activity[d]	100%	100%	100%	100%		100%
Number of publications						
National forest reports	—		1	—	—	1
State/island resource reports	1	2	7	47	—	57
State timber product output reports	—		14	1	1	16
Regional reports	5		5	1	—	11
National reports	—		2	—	2	4
Subtotal—core reports	6	2	29	49	3	89
Peer-reviewed journal articles	4	12	10	35	1	62
Proceedings articles	—	1	13	4	—	18
Other station publications	6	2	4	2	—	14
Other publications	9	1	6	4	1	21
Total, all reports	25	18	62	94	5	204
Number of publications per Federal FTE	0.26	0.18	0.67	0.89	1.43	0.51
Consulting activities						
Number of significant consultations	157	220	389	957	30	1,753
Total hours of significant consultations	1,656	1,508	1,732	3,552	136	8,584

Table B-1.—*Performance measures for the FY 2011 FIA program.*

	Pacific Northwest	Interior West	Southern	Northern	National Office	Total
Meetings						
User-group meetings held	6	1	0	1	1	9
Management meetings held	0	1	2	1	1	5

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. FY = fiscal year. QA = quality assurance.

[a] *Excludes any supplemental funding provided for Experimental Forests and Ranges.*

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

[c] *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 this mandate in compliance with congressional recommendations.*

[d] *Revised measure based on number of States where annualized inventory is active (see table B-11 for previous measures). Includes only coastal Alaska.*

Table B-2.—*Financial statement for the FY 2011 FIA program Federal funds.*

	Pacific Northwest ($)	Interior West ($)	Southern ($)	Northern ($)	National Office ($)	Total ($)
Available funds						
Previous year EOY balance	369,742	24,117	165,208	(144,088)	0	414,979
Postyear adjustments[a]	(163,142)	(24,117)	112,516	368,334	0	293,591
Subtotal preyear adjustments	**206,600**	**0**	**277,724**	**224,246**	**0**	**708,570**
FY appropriated funds						
Research (base)[b]	13,890,000	13,695,000	15,285,000	15,925,000	8,010,000	66,805,000
State and private FRIA (base)[c]	1,005,000	1,035,000	1,155,000	1,235,000	217,000	4,647,000
Subtotal appropriated funds	**14,895,000**	**14,730,000**	**16,440,000**	**17,160,000**	**8,227,000**	**71,452,000**
Special project funding	0	147,111	0	0	0	147,111
Total available Federal funds	**15,101,600**	**14,877,111**	**16,717,724**	**17,384,246**	**8,227,000**	**72,307,681**
Direct expenses						
Salary—	**8,445,309**	**7,766,424**	**7,773,443**	**9,138,451**	**386,000**	**33,509,627**
Administration	629,999	738,301	548,238	396,029	386,000	2,698,567
Phase 1 production	0	0	346,811	293,744	0	640,555
Field support	1,365,458	999,938	699,916	851,685	0	3,916,997
Data collection	2,706,391	3,140,798	1,085,750	2,194,374	0	9,127,313
QA	587,031	587,474	1,288,688	506,985	0	2,970,178
Information management	1,388,658	961,732	1,149,527	1,532,540	0	5,032,457
Analysis	1,092,464	731,941	1,865,882	2,415,139	0	6,105,426
Techniques research	675,308	606,240	788,631	947,955	0	3,018,134
Travel—	**792,695**	**927,976**	**547,207**	**599,110**	**19,740**	**2,886,728**
Office travel	91,552	97,136	118,264	208,189	19,740	534,881
Field/QA crew travel	701,144	830,840	428,943	390,921	0	2,351,848
Equipment—	**357,765**	**899,976**	**454,609**	**818,229**	**0**	**2,530,579**
Imagery	1,458	58,356	5,200	18,800	0	83,814
Vehicles	237,612	490,719	326,032	383,888	0	1,438,251
Field equipment	79,266	114,763	115,377	199,384	0	508,790
Information technology/communications	39,429	123,815	8,000	130,788	0	302,032
Other	0	112,323	0	85,369	0	197,692
Publications	**36,979**	**10,009**	**0**	**327,524**	**4,500**	**379,012**
Grants and agreements[d]	**1,379,141**	**2,094,847**	**6,108,394**	**3,758,155**	**1,008,000**	**14,348,537**
Fieldwork/data	*1,186,844*	*1,559,400*	*5,578,394*	*1,888,314*	*250,000*	*10,462,952*
Information management		*25,000*	*30,000*	*916,799*	*488,000*	*1,459,799*
Research	*192,297*	*510,447*	*500,000*	*953,042*	*270,000*	*2,425,786*
Office space and utilities	**808,533**	**440,066**	**403,389**	**567,241**	**0**	**2,219,229**
Other direct expenses	**1,001,946**	**363,089**	**254,857**	**178,988**	**19,760**	**1,818,640**
Total direct expenses	**12,822,368**	**12,502,387**	**15,541,899**	**15,387,698**	**1,438,000**	**57,692,352**
Effective indirect expenses						
Total effective indirect[e]	**2,181,749**	**1,815,012**	**1,176,110**	**1,995,925**	**6,789,000**	**13,957,796**
Total effective indirect rate (%)	14.4	12.2	7.0	11.5	82.5	19.3
2011 EOY balance	**97,483**	**559,712**	**(285)**	**623**	**0**	**657,533**
Total Federal expense	**15,101,600**	**14,877,111**	**16,717,724**	**17,384,246**	**8,227,000**	**72,307,681**

EOY = end-of-year. FIA = Forest Inventory and Analysis. FRIA = Forest Resource Inventory and Analysis. FY = fiscal year. QA = quality assurance.

[a] Some bookkeeping is not completed until after the new fiscal year 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] Initial allocation per station for Experimental Forests was $615,000 (PNW), $295,000 (IW), $440,000 (SRS), and $295,000 (NRS).

[c] Appropriated funding from State & Private Forestry (S&PF) was $5.025 million. Amount shown is net of S&PF overhead charges of $415,000.

[d] Grants and agreements include general allocation to basic categories plus allocation to Experimental Forests/Ranges.

[e] Programwide charges for Albuquerque Service Center included in National Office indirect expense.

Table B-3a.—*Federal staffing (FTEs) for the FY 2011 FIA program.*

	Pacific Northwest	Interior West	Southern	Northern	National Office[a]	Total
Administration	5.0	8.3	5.7	4.6	2.5	26.1
Phase 1 production work	0.0	1.0	5.5	4.2	0.0	10.7
Field support	16.4	8.8	7.0	9.1	0.0	41.3
Data collection	38.6	53.1	17.0	32.6	0.0	141.3
QA crew	7.1	5.7	18.3	7.1	0.0	38.2
Information management	12.3	8.2	11.0	15.6	0.0	47.1
Analysis	10.6	8.6	20.5	25.1	0.0	64.8
Techniques research	7.2	5.3	7.0	7.4	1.0	27.9
Total	**97.2**	**99.0**	**92.0**	**105.7**	**3.5**	**397.4**

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. FY = fiscal year. QA = quality assurance.

[a] *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 2011 FIA program.*

	Pacific Northwest	Interior West	Southern	Northern	National Office	Total
Administration		1.0	4.0	0.4	0.0	5.4
Phase 1 production work		0.0	0.0	1.1	0.0	1.1
Field support	1.5	1.0	8.8	3.3	0.0	14.6
Data collection	3.0	14.5	87.6	32.0	0.0	137.1
QA crew		0.2	0.0	0.0	0.0	0.2
Information management	1.0	1.0	1.5	9.2	6.0	18.7
Analysis	0.5	2.5	0.2	6.7	3.0	12.9
Techniques research	2.3		0.0	6.7	2.0	11.0
Total	**8.3**	**20.2**	**102.1**	**59.3**	**11.0**	**200.9**

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. FY = fiscal year. QA = quality assurance.

Table B-3c.—*Estimate of total federally funded staffing (FTEs) for the FY 2011 FIA program.*

	Pacific Northwest	Interior West	Southern	Northern	National Office	Total
Administration	5.0	9.3	9.7	5.0	2.5	31.4
Phase 1 production work	0.0	1.0	5.5	5.3	0.0	11.8
Field support	17.9	9.8	15.8	12.4	0.0	55.9
Data collection	41.6	67.6	104.6	64.6	0.0	278.4
QA crew	7.1	5.9	18.3	7.1	0.0	38.4
Information management	13.3	9.2	12.5	24.8	6.0	65.8
Analysis	11.1	11.1	20.7	31.8	3.0	77.7
Techniques research	9.5	5.3	7.0	14.1	3.0	38.9
Total	**105.5**	**119.2**	**194.1**	**165.0**	**14.5**	**598.2**

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. FY = fiscal year. QA = quality assurance.

Table B-4.—*Partner contributions toward implementing FIA, FY 2011.*

Unit	Partner	Contributions toward the base program ($)	Contributions that add value ($)
Interior West Research Station	Bureau of Land Management (westwide assessment)		50,000
	Colorado State Forest Service		233,450
	Forest Service Region 1—field data collection	52,600	
	Forest Service Region 1—support, training, travel		67,940
	Forest Service Region 1—carbon framework project		50,000
	Forest Service Region 2—FIA support		2,000
	Forest Service Region 3—FIA support		2,000
	Forest Service Region 4—field data collection	85,000	
	Forest Service Region 4—support , training, travel		17,191
	Montana Department of Natural Resources and Conservation		500
	NASA (5 funded science/application projects, including North American Forest Dynamics and Forest Carbon Monitoring Framework)		596,379
	Nevada Division of Forestry		300
	New Mexico Forestry Division (ARRA Funding FIA acceleration)	1,857,844	
	University of Montana—TPO data collection		90,488
	Utah State Division of Forestry, Fire, and State Lands		750
	IW total	**1,995,444**	**1,110,998**
National Office			0
	NO total	**0**	**0**
Northern Research Station	Connecticut Division of Forestry	500	0
	Conservation Biology Institute	0	12,000
	Curators of the University of Missouri	0	24,600
	Delaware Forest Service	7,770	12,719
	Enivronmental Protection Agency	0	80,000
	Forest Service National Forest Systems	1,667	1,171,225
	Forest Service Resources Planning Act	0	30,000
	Forest Service State and Private Forestry	67,000	65,000
	Illinois Division of Forest Resources	23,359	0
	Indiana Department of Natural Resources	92,588	131,861
	Iowa Department of Natural Resources	17,645	0
	Kansas Forest Service	34,938	0
	Maine Forest Service	206,213	233,905
	Maryland Department of Natural Resources	12,300	0
	Massachusetts Department of Conservation and Recreation	8,200	0
	Michigan Department of Natural Resources	40,200	0
	Michigan State University	0	14,800
	Michigan State University	0	11,850
	Minnesota Department of Natural Resources	184,507	298,105
	Mississippi State University	0	6,031
	Missouri Department of Conservation	67,492	0
	Nebraska Forest Service	5,853	0
	New Hampshire Division of Forests and Lands	20,400	0
	New Jersey Forest Service	1,667	0
	New York Department of Environmental Conservation	19,890	0
	North Dakota Forest Service	7,200	0
	Ohio Department of Natural Resources	11,345	0
	Oregon State University	0	9,000
	Pennsylvania Department of Conservation & Natural Resources	$43,000	139,008
	Rhode Island Department of Environmental Management	3,069	0
	Rutgers University	0	8,307
	South Dakota Department of Forestry and Natural Resources Management	19,652	0
	The Davey Tree Expert Company	0	20,000

Table B-4.—*Partner contributions toward implementing FIA, FY 2011.*

Unit	Partner	Contributions toward the base program ($)	Contributions that add value ($)
	University of California	0	8,312
	University of Maine	0	14,800
	University of Maryland	0	3,488
	University of Massachusetts	0	25,985
	University of Minnesota	0	19,434
	University of Minnesota	0	5,400
	University of Nevada Las Vegas	106,786	0
	University of New Hampshire	0	8,312
	University of Pennsylvania State	0	3,000
	Vermont Department of Forests, Parks & Recreation	8,600	0
	Virginia Tech University	0	3,600
	West Chester University of Pennsylvania	0	4,797
	West Virginia Division of Forestry	49,300	0
	Wisconsin Department of Natural Resources	49,702	467,553
	NRS total	**1,110,842**	**2,833,092**
Pacific Northwest Research Station	Forest Service Region 6, State and Private Forestry		50,000
	University of California		32,000
	University of Montana		42,850
	USGS and USDA NRCS Islands Imagery Cooperative	45,000	
	PNW total	**45,000**	**124,850**
Southern Research Station	Alabama Forestry Commission	41,635	11,770
	Arkansas Forestry Commission	107,016	
	Florida Department of Agriculture and Consumer Services	139,843	24,087
	Georgia Forestry Commission	165,119	15,400
	Kentucky Division of Forestry	265,095	24,530
	Mississippi Forestry Commission	119,145	7,480
	North Carolina Division of Forest Resources	0	31,850
	Oklahoma Department of Agriculture and Forestry	41,993	0
	South Carolina Forestry Commission	73,248	7,700
	Tennessee Department of Agriculture	98,449	28,820
	Texas Forest Service	513,520	10,780
	University of Tennessee	6,818	
	Virginia Department of Forestry	138,609	15,730
	SRS total	**1,710,490**	**178,147**
Grand total, all FIA units		**4,861,776**	**4,247,087**

ARRA = American Recovery and Reinvestment Act. EFR = Experimental Forests and Ranges. FIA = Forest Inventory and Analysis. FY = fiscal year. IW = Interior West Research Station. NASA = National Aeronautics and Space Administration. NO = National Office. NRCS = Natural Resources Conservation Service. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. SRS = Southern Research Station. TPO = timber product output. USDA = U.S. Department of Agriculture. USGS = U.S. Geological Survey.

Table B-5.—*Grants and agreements entered into by FIA units, FY 2011.*

Unit	Amount ($)	Recipient	Purpose
Interior West Research Station	104,000	RMRS FWE Program	FIA soils indicator lead and soils sample analysis
	25,000	NRS FIA	FIA Atlas
	50,000	University of Maine	National FIA Biomass Estimation Study (through NRS)
	68,818	Contractor—private	Contracted field data collection—Wyoming and Idaho
	90,000	Contractor—private	Experimental Forests—Intensification plot data collection contract
	376,307	University of Montana, BBER	Ongoing TPO 2011–2012
	12,000	Utah State University	Soil characteristics of Interior West forests
	12,000	Utah State University	Tree core archiving
	21,999	University of Utah	Long-term disturbance patterns in Interior West forests
	837,575	Colorado State Forest Service	Implementation of annual FIA and EF&R plots
	49,700	Colorado State Forest Service	Experimental Forests—Intensification plot data collection
	8,000	Rocky Mountain Research Station	Experimental Forests—Great Basin
	25,000	Rocky Mountain Research Station	Experiemental Forests—Studies and travel
	8,000	Northern Arizona University	Experiemental Forests—Fort Valley
	181,403	Utah State University	National Forest Carbon Budgets—part of NASA project
	225,045	Colorado State University	Statistical procedures for integrating Landsat with FIA—part of NASA-funded projects
IW total	**2,094,847**		
National Office	30,000	National Council for Air and Stream Improvement	Imputation and modeling project
	400,000	University of Nevada, Las Vegas	Information management support
	60,000	Conservation Biology Institute	Protected areas database
	18,000	Society of American Foresters	National user group support
	75,000	Redcastle Resources Inc	RSAC FIA projects
	100,000	Ecological Society of America and NVCS	National Vegetation Classification System
	25,000	Forest Health Enterprise Team, Fort Collins, Colorado	Forest Health imputation
	10,000	Auburn University	Tree planting data
	40,000	University of Wisconsin	Lichens research
	250,000	Research Triangle Park FHM Unit	National FHM support
NO total	**1,008,000**		
Northern Research Station	10,000	Northern Research Station, Grand Rapids	Soil analyses
	60,170	Daniel Huberty	Iowa plots
	40,000	NASS	NWOS telephone survey
	9,000	Access Ability Inc.	Prefield document imaging services
	22,000	Opportunity Partners	Electronic scanning of FIA plots
	66,726	Quercus Consultations Inc	Nebraska plots
	6,000	Southern Research Station	Recreation futures
	500	Morris Arboretum	FIA P2/P3 plant specimen identification
	75,000	Redcastle Resources	FIA atlas
	111,250	Daniel Huberty	Kansas plots
	30,160	Daniel Huberty	North Dakota plots
	2,500	University of Minnesota	FIA P2/P3 plant specimen identification
	204,867	Defense Information Technology Contracting Org.	Senior developer for FIDO
	60,000	Conservation Biology Institute	Protected area database
	100,000	The Davey Tree Expert Company	I-Tree 2nd generation Web interface
	274,940	Indiana Department of Natural Resources	Implementation of annual FIA
	551,534	Maine Forest Service	Implementation of annual FIA
	647,535	Minnesota Department of Natural Resources	Implementation of annual FIA
	41,560	University of California	Experimental Forests—Hubbard Brook climate effects
	31,462	University of Massachusetts	Ozone biomonitoring program
	129,926	University of Massachusetts	Family Forest Research Center
	17,439	University of Maryland	Experimental Forests—Baltimore LTER study
	59,250	Michigan State University	Enhanced estimation of standing dead trees
	74,000	Michigan State University	National FIA biomass estimation study
	97,170	University of Minnesota	Experimental Forests—Marcell study
	27,000	University of Minnesota	FIA biomass estimation data access
	30,154	Mississippi State University	Developing oak decline/mortality and fuel model

Table B-5.—*Grants and agreements entered into by FIA units, FY 2011.*

Unit	Amount ($)	Recipient	Purpose
	41,560	University of New Hampshire	Experimental Forests—Barlett study
	41,535	Rutgers University	Experimental Forests—New Jersey Pine Barrens study
	62,000	South Dakota Department of Agriculture	Implementation of annual FIA
	533,932	University of Nevada, Las Vegas	Information management support
	74,000	University of Maine	National FIA biomass estimation study
	15,000	Pennslvania State University	Develop regeneration Pennsylvania hardwood forest ecosystems
	45,000	Oregon State University	Carbon content of dead wood
	18,000	Virginia Tech University	FIA legacy database
	23,986	West Chester University of Pennsylvania	Experimental Forests—carbon dioxide exchange in disturbed ecosystems
	123,000	University of Missouri	Northern forest futures
NRS total	**3,758,155**		
Pacific Northwest Research Station	4,167	Oregon State University	Decline in California using FIA data
	55,000	Oregon State University	Pacific Coast forest disturbance, regrowth, and biomass dynamics
	30,000	U.S. Geological Survey	Palau 2011 imagery cooperative
	109,284	Student Conservation Association	Forest Inventory and Analysis
	140,000	University of Hawaii, Hilo	Experimental Forests— monitoring in Hawaii Experimental Tropical Forest
	50,000	Oregon State University	Using airborne LIDAR to improve the accuracy of mapped FIA variables
	907,560	Alaska contract	Alaska data collection
	50,000	University of Maine	National FIA biomass estimation study (through NRS)
	25,000	Redcastle Resources Inc	FIA Atlas
	8,130	NASA	A LIDAR-radar-opitcal data fusion approach for estimating carbon stocks
PNW total	**1,379,141**		
Southern Research Station	135,000	International Institute of Tropical Forestry	Experimental Forest study
	80,000	University of Arkansas (through RWU 4159)	Experimental Forest study
	75,000	University of Minnesota (through RWU 4353)	Experimental Forest study
	100,000	Virginia Tech University (through RWU 4352)	Nonwood forest products
	124,906	Alabama Forestry Commission	Implementation of annual FIA
	428,065	Arkansas Forestry Commission	Implementation of annual FIA
	419,528	Florida Forest Service	Implementation of annual FIA
	571,499	Georgia Forestry Commission	Implementation of annual FIA
	319,554	Kentucky Division of Forestry	Implementation of annual FIA
	476,580	Mississippi Forestry Commission	Implementation of annual FIA
	410,207	North Carolina Department of Environment and Natural Resources	Implementation of annual FIA
	173,413	Oklahoma Division of Forestry	Implementation of annual FIA
	296,479	South Carolina Forestry Commission	Implementation of annual FIA
	401,774	Tennessee Division of Forestry	Implementation of annual FIA
	1,540,561	Texas Forest Service	Implementation of annual FIA
	415,828	Virginia Department of Forestry	Implementation of annual FIA
	60,000	Virginia Tech University	Volume/biomass work
	50,000	University of Maine	National FIA biomass estimation study (through NRS)
	30,000	University of Tennessee	Information management
SRS total	**6,108,394**		
Grand total	**14,348,537**		

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 Research Station. 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. NVCS= National Vegetation Classification System. 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.

Table B-6.—*Number and hours of significant consultations by FIA staff by customer group, FY 2011.*

Customer group	Pacific Northwest		Interior West		Southern		Northern		National Office		Total	
	No.	Hrs.	No.	Hrs.	No.	Hrs.	No.	Hrs.	No.	Hrs.	No.	Hrs.
Academic	36	359	99	513	100	556	444	203	3	12	682	1,643
Government	59	663	100	807	120	522	258	3,028	10	50	547	5,070
Industry	14	221	4	22	62	315	62	66	2	7	144	631
NGO	9	85	7	103	17	144	125	227	6	25	164	584
NIPF	3	11	—	—	7	50	12	8	2	10	24	79
Media	5	11	1	2	1	1	4	9	5	25	16	48
Other	31	306	9	61	82	144	52	11	2	7	176	529
	157	**1,656**	**220**	**1,508**	**389**	**1,732**	**957**	**3,552**	**30**	**136**	**1,753**	**8,584**

FIA = Forest Inventory and Analysis. NGO = nongovernmental organization. NIPF = non-industrial private forest.

Table B-7.—*FIA data access by online tools and Spatial Data Services Center requests, 2003–2011.*

Indicator	Number of annual accesses									Total 2003–2011
	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Online tools										
MapMaker	14,577	26,034	55,062	22,906	24,073	20,834	25,000	—	—	188,486
Forest Vegetation Simulator	396	514	763	566	497	683	—	—	—	3,419
Fuel Treatment Evaluator			650	863	1,995	50	—	—	—	3,558
Forest Inventory Data Online						38,092	55,494	70,943	72,946	237,475
National Woodland Owners Survey							6,560	1,700	2,070	10,330
EVALIDator							3,920	29,000	55,468	88,388
DATA downloads							2,014	3,033	1,929	6,976
Total	**14,973**	**26,548**	**56,475**	**24,335**	**26,565**	**59,659**	**92,988**	**104,676**	**132,413**	**538,632**
Spatial data requests										
Academia	30	40	50	104	138	140	109	114	121	846
State	12	20	31	31	44	48	49	47	36	318
NFS	1	3	-	11	15	29	16	32	17	124
Other Federal	36	50	71	174	182	135	105	116	92	961
NGO	4	6	6	10	21	34	41	31	23	176
Industry	7	10	13	14	39	29	28	35	34	209
Other	5	15	20	3	54	68	57	48	91	361
Total	**95**	**144**	**191**	**347**	**493**	**483**	**405**	**423**	**414**	**2,995**

FIA = Forest Inventory and Analysis. NFS = National Forest System. NGO = nongovernmental organization.

Table B-8.—*Mill, fuelwood, and ownership surveys processed and utilization sites visited, 2000–2011.*

Survey or site	Year initiated	Number of annual survey questionnaires or sites										Total 2000–2011
		2000–2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Timber products	1947	4,159	2,875	1,356	2,530	1,382	2,473	1,131	2,657	1,727	3,521	23,811
Fuelwood	1947	—	1,400	—	—	—	1,519	—	—	—	—	2,919
Ownership surveys	1978	2,781	4,388	3,662	—	6,450	—	—	—	—	7,960	25,241
Utilization sites	1947	32	100	142	252	99	147	486	17	66	68	1,409

Table B-9.—*Forest health indicator, year of initiation, and number of samples collected, 2000–2011.*

Indicator	Year initiated	Number of annual samples										Total 2000–2011
		2000–2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Crowns	1991	1,625	1,083	1,317	1,310	964	1,006	962	1,177	761	NA	10,205
Lichens	1998	1,320	584	252	217	123	182	127	150	167	NA	3,122
Soils	1999	1,442	1,096	1,294	1,317	289	227	349	201	266	2	6,483
Veg	2001	1,128	406	179	157	80	679	479	519	469	NA	4,096
Ozone	1994	2,966	1,088	1,151	984	957	958	948	1,003	1,018	107	11,180
DWM	2001	1,741	1,544	3,851	4,036	3,429	4,288	1,448	2,152	1,392	NA	23,881
Mortality[a]	2001	4,403	2,914	6,315	9,791	10,646	12,122	12,594	13,892	15,293	15,858	103,828

DWM = down woody material. NA = not available.

[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	2001	2004	21		Yes
Guam	135,660	63,833	47	1	2002	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	10	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	planned: 500		No
Atlantic (SRS)									
Commonwealth of Puerto Rico	2,191,815	1,260,625	57	3	2003	2007	373	61	Yes
U.S. Virgin Islands	85,590	52,478	61	3	2004	2007	73	40	Yes
Total	**6,983,641**	**3,718,957**	**612**	**52**			**719**	**101**	

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 PNW.*

[b] *Hawaii plans to implement annualized design.*

Table B-11.—*Land and forest area and FIA annualized implementation status by State and region, FYs 2007–2011.*[a]

Region and State	Land area Thousand acres	Forest area Thousand acres	Entry date	2007	2008	2009	2010	2011	2012 (planned) Thousand acres
Northern	**607,790**	**181,512**		**24**	**24**	**24**	**24**	**24**	**181,512**
Connecticut	3,101	1,687	2003	I	I	I	I	I	1,687
Delaware	1,251	341	2004	I	I	I	I	I	341
Illinois	35,580	4,861	2001	I	I	I	I	I	4,861
Indiana	22,957	4,775	1999	I	I	I	I	I	4,775
Iowa	35,760	3,026	1999	I	I	I	I	I	3,026
Kansas	52,367	2,279	2001	I	I	I	I	I	2,279
Maine	19,753	17,665	1999	I	I	I	I	I	17,665
Maryland	6,295	2,454	2004	I	I	I	I	I	2,454
Massachusetts	5,016	3,015	2003	I	I	I	I	I	3,015
Michigan	36,359	20,003	2000	I	I	I	I	I	20,003
Minnesota	50,955	17,291	1999	I	I	I	I	I	17,291

Table B-11.—*Land and forest area and FIA annualized implementation status by state and region, FYs 2006–2011.*[a]

Region and State	Land area Thousand acres	Forest area Thousand acres	Entry date	2007	2008	2009	2010	2011	2012 (planned) Thousand acres
Northern (continued)									
Missouri	44,095	15,494	1999	I	I	I	I	I	15,494
Nebraska	49,201	1,520	2001	I	I	I	I	I	1,520
New Hampshire	5,740	4,826	2002	I	I	I	I	I	4,826
New Jersey	4,748	1,985	2004	I	I	I	I	I	1,985
New York	30,223	18,964	2002	I	I	I	I	I	18,964
North Dakota	44,156	772	2001	I	I	I	I	I	772
Ohio	26,210	8,021	2001	I	I	I	I	I	8,021
Pennsylvania	28,685	16,764	2000	I	I	I	I	I	16,764
Rhode Island	668	352	2003	I	I	I	I	I	352
South Dakota	48,574	1,883	2001	I	I	I	I	I	1,883
Vermont	5,920	4,580	2003	I	I	I	I	I	4,580
West Virginia	15,415	12,081	2004	I	I	I	I	I	12,081
Wisconsin	34,761	16,872	2000	I	I	I	I	I	16,872
Southern	**534,490**	**267,472**		**12**	**13**	**13**	**13**	**13**	**267,472**
Alabama	32,481	22,815	2001	I	I	I	I	I	22,815
Arkansas	33,328	18,720	2000	I	I	I	I	I	18,720
Florida	34,520	17,323	2001	I	I	I	I	I	17,323
Georgia	37,068	24,785	1998	I	I	I	I	I	24,785
Kentucky	25,428	12,411	1999	I	I	I	I	I	12,411
Louisiana	27,883	14,412	2000	I	I	I	I	I	14,412
Mississippi	30,025	19,572	2007	I	I	I	I	I	19,572
North Carolina	31,180	18,596	2003	I	I	I	I	I	18,596
Oklahoma	43,955	12,612	2008		I	I	I	I	12,612
South Carolina	19,272	13,101	1998	I	I	I	I	I	13,101
Tennessee	26,381	13,955	1999	I	I	I	I	I	13,955
Texas	167,626	63,300	2000	I	I	I	I	I	63,300
Virginia	25,343	15,868	1998	I	I	I	I	I	15,868
Interior West	**547,920**	**146,238**		**5**	**6**	**6**	**6**	**8**	**146,238**
Arizona	72,732	18,711	2001	I	I	I	I	I	18,711
Colorado	66,387	22,966	2002	I	I	I	I	I	22,966
Idaho	52,960	21,390	2004	I	I	I	I	I	21,390
Montana	93,157	25,591	2003	I	I	I	I	I	25,591
Nevada	70,276	11,169	2010					I	11,169
New Mexico	77,674	16,687	2008		I	I	I	I	16,687
Utah	52,587	18,277	2000	I	I	I	I	I	18,277
Wyoming	62,147	11,448	2010					I	11,448
Pacific Northwest	**573,030**	**213,998**		**4**	**4**	**4**	**4**	**5**	**100,847**
Alaska, Coastal	39,041	13,718	2003	I	I	I	I	I	13,718
Alaska, Interior	326,000	113,151							
California	99,824	32,946	2001	I	I	I	I	I	32,946
Hawaii	4,111	1,748	2010					I	1,748
Oregon	61,442	30,056	2000	I	I	I	I	I	30,056
Washington	42,612	22,379	2002	I	I	I	I	I	22,379
Total	**2,263,230**	**809,220**	**—**	**45**	**47**	**47**	**47**	**50**	**696,069**
Forest area performance measure, excluding interior Alaska (%)				92	96	96	100	100	100
Forest area performance measure, including interior Alaska (%)				78	82	82	86	86	86
State activity performance measure, including all active States (%)				**90**	**94**	**94**	**100**	**100**	**100**

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

[a] *Based on area from the Forest Inventory and Analysis Database (December 2011) and entry year into annualized inventory (revised Texas area).*

Table B-12.—*FIA summary statistics and performance measures, 2005–2011.*

	2005	2006	2007	2008	2009	2010	2011
Available program funds							
Apropriated funds[a]	60,881	63,641	63,605	64,641	65,536	71,817	71,452
Other Federal funds[b]	1,776	1,775	1,272	1,559	3,320	930	856
Total Federal funds	62,657	65,416	64,877	66,200	68,856	72,747	72,308
Total partner funds	6,379	7,034	7,204	6,505	6,494	7,516	9,109
Total available funds	69,036	72,450	72,081	72,705	75,350	80,263	81,417
% full Federal appropriated funding	80	84	84	85	87	92	92
Program expenses and balances							
Administration	3,065	3,104	3,031	2,785	2,999	3,262	3,233
Image processing	1,218	919	1,300	1,198	1,102	916	724
Field support	2,940	3,287	3,175	3,357	3,003	3,594	3,917
Data collection[c]	23,470	25,106	23,630	22,989	25,243	26,162	27,057
Information management[c]	7,394	6,890	7,431	6,108	7,623	7,476	6,794
Analysis	4,161	4,499	4,518	5,147	5,354	5,357	6,105
Research[c]	3,477	3,422	4,799	5,033	5,881	6,903	5,444
Miscellaneous/other	3,963	5,231	3,454	3,406	3,909	4,473	4,417
Total direct expense	49,687	52,458	51,338	50,023	55,115	58,143	57,692
Total indirect expenses	11,313	12,587	13,194	13,586	12,653	14,189	13,958
Indirect rate	18.6%	19.8%	20.7%	21.0%	19.3%	19.8%	19.5%
Total Federal expense	61,000	65,045	64,532	63,609	67,768	72,332	71,650
Fire transfer[d]				2,318			
Total EOY balance	1,657	371	345	273	1,089	415	658
Total Federal funds	62,657	65,416	64,877	66,200	68,856	72,747	72,308
Other measures							
% States with annual activity	88	88	90	94	94	100	100
% States with FIADB 1–2 years old	80	84	90	90	90	88	94
Federal employees	447	410	387	389	381	392	397
Other employees	179	171	179	173	201	205	201
Total employees	626	581	566	562	582	596	598
Phase 2/3 base forest plots	15,675	18,245	19,880	18,208	21,545	19,272	21,233
Phase 2/3 base nonforest plots	24,445	24,190	24,757	29,351	21,996	25,238	27,568
Total plots	40,120	42,435	44,637	47,559	43,541	44,510	48,801
All QA plots	3,584	3,382	3,664	4,860	3,597	4,020	4,550
% QA plots	9	8	8	10	8	9	9
All publications	164	182	135	172	206	203	204
Journal publications	34	45	37	65	38	74	62
% journal publications	21	25	27	38	18	36	30
Consultations, number	1,510	1,608	1,571	1,659	1,399	991	1,753
Consultations, hours	5,612	5,527	5,767	6,656	8,603	10,381	8,584
User/mangement meetings	23	16	16	10	11	10	14
Spatial data requests filled	191	347	493	483	405	423	414
Online accesses	56,475	24,335	26,565	59,659	92,988	104,676	132,413

EOY = end-of-year. FIADB = Forest Inventory and Analysis Database. QA = quality assurance.

[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."*