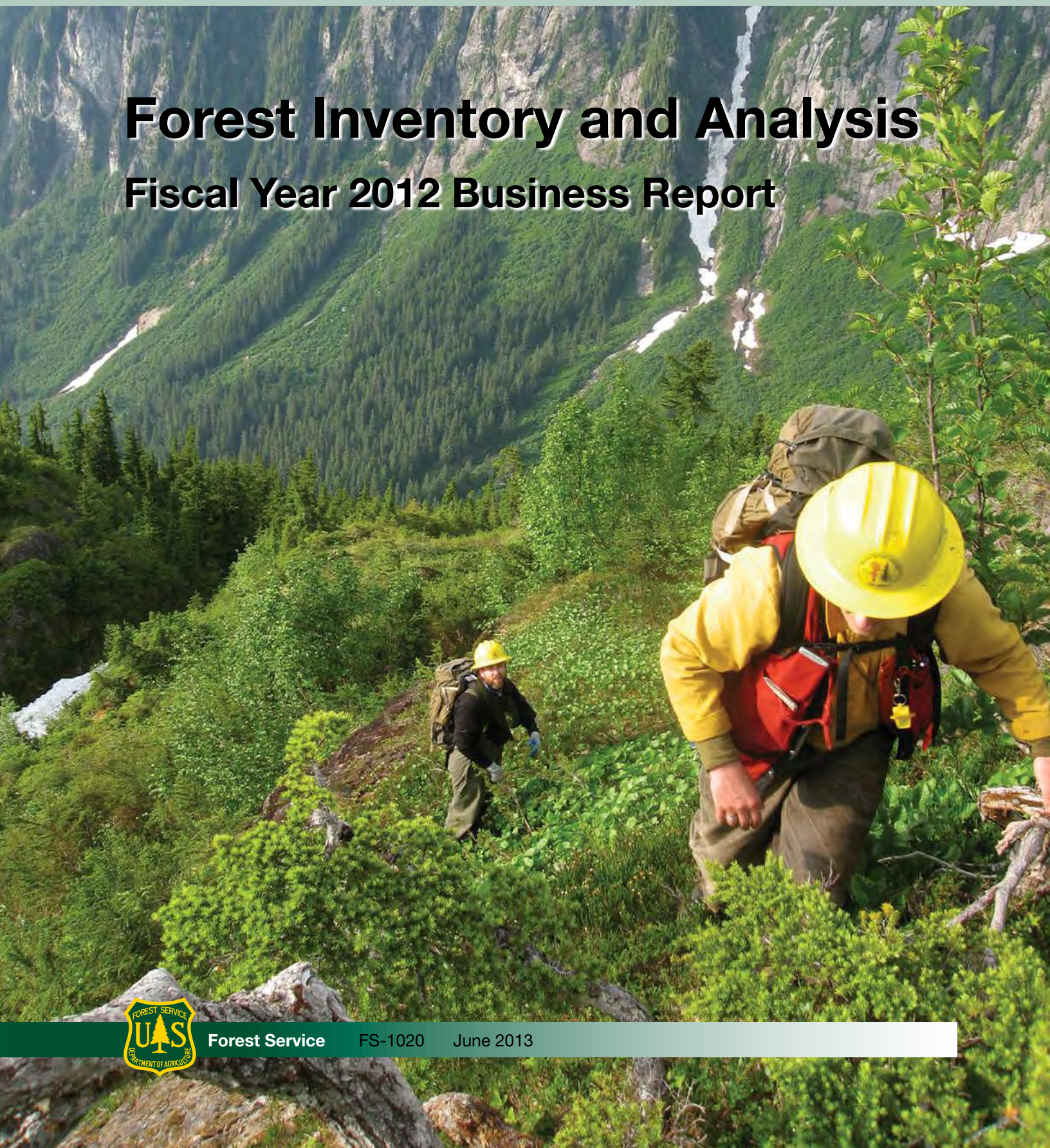
USDA

United States Department of Agriculture

Forest Inventory and Analysis

Fiscal Year 2012 Business Report



Forest Service FS-1020 June 2013

United States
Department of
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Cover photo: *Near Taku Inlet in southeast Alaska. Eric Straley (top) and Steve Trimble (bottom), Forest Inventory and Analysis (FIA) crew in southeast Alaska, access a field plot in the subalpine zone in southeast Alaska. Courtesy of Jon Williams, Supervisory Biological Scientist and Washington State Coordinator for the Pacific Northwest Research Station FIA Data Collection Team.*

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Executive Summary

For more than 80 years, the Forest Inventory and Analysis (FIA) program has played an integral role in providing the information vital to managing the Nation's forest resources. In recent years, an increased number of major decisions affecting the Nation's forests has 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 U.S. Department of Agriculture (USDA), Forest Service 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, which would outline the status and progress of the national annual inventory program.

This Annual Business Report, our 15th, tells the taxpayers, partners, and clients what the program has accomplished with the financial resources provided and what the program will accomplish in the coming year with budgeted financial resources. This relationship with taxpayers, partners, and clients is integral to FIA's continued success, because accountability is our first priority. The following paragraphs summarize some key findings of this report.

Annualized progress—In fiscal year (FY) 2012, FIA maintained annualized inventory activity in all 50 States (excluding interior Alaska). Despite significant budget restrictions for travel, 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 2012 was $79.8 million, a net decrease of $1.6 million from 2011 (appropriated funding declined $2.3 million). This funding consisted of $69.2 million appropriated by Congress plus $0.5 million in net adjustment from the previous fiscal year and $10.1 million in partner funds. State partner funds are used to maintain annual measurement and 5-year State report cycles. In FY 2012, total funding from all sources was 10 percent less than what was needed for full program implementation.

Partner support—Partners contributed $10.1 million to the program in FY 2012. Through cost sharing, 34 States contributed $4.1 million toward buying down their measurement and reporting cycles to 5 years and States and other partners added $6.0 million for plot intensification and other program enhancements. Overall, partner contributions increased by $1.0 million from FY 2011, 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 $13.5 million was spent in this way in FY 2012. In its annual appropriation, Congress intended for an amount equal to the State and Private Forestry (S&PF) Forest Resource Inventory and Assessment (FRIA) appropriation to be provided to States each year for implementing FIA field plot measurements. Table 2 summarizes FIA funding activity to States from FY 2005 through FY 2012 and demonstrates the program's full compliance with congressional intent of the FRIA appropriation; 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. These data supplied information for 605 spatial data requests and 94,027 online data requests.

Five-year reports—By FY 2012, FIA had completed at least one 5-year report or periodic report for 92 percent of the States and 100 percent of the islands since annualized inventory began in 1999. In all, FIA produced 272 publications, of which 90 were published in peer-reviewed journals in FY 2012.

Quality assurance—FIA quality-checked 8 percent of all field plots measured in FY 2012 to ensure that the highest quality data are loaded into FIA databases.

Users groups—FIA relies heavily on periodic meetings with users and clients to ensure that the program is providing the highest quality service and meeting planned objectives. In FY 2012, FIA held five regional and one national users group meetings to gauge how well we are meeting the goals stated in the strategic plan and the previous year's Annual Report.

Personnel—FIA directly, and through cooperators, employed 575 people in FY 2012. Cooperators, who are integral to the efficient delivery of the FIA program, comprise 203 of the 575

employees, or 35 percent of the total workforce. Of the total workforce, 169 people were employed in information management, techniques research, or resource analysis; they provided 848 consultations (8,807 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 facilitated to report on Timber Products Output, logging utilization, fuel wood production, the characteristics and management objectives of the Nation's private woodland owners through the National Woodland Owner Survey (NWOS), and several indicators of forest health. Since FY 2000, FIA has collected such data from more than 58,000 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 2012, and we look forward to making further progress in FY 2013. Important goals for FY 2013 include—

- Continue the annualized inventory of 50 States (excluding interior Alaska).
- Complete at least 10 State 5-year reports.
- Prepare and publish a 2012 update of FIA's Resource Planning Act (RPA) statistics for the 2015 assessment.
- Prepare input for the Food and Agriculture Organization of the United Nations global Forest Resource Assessment (FRA).
- Implement "Field Guide 6.0."
- Prepare the final version of the new FIA strategic plan.
- Prepare a new NWOS draft report.
- Continue to modernize the FIA 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."

Introduction

The Forest Inventory and Analysis (FIA) program of the U.S. Department of Agriculture (USDA), Forest Service 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) 2012 (October 1, 2011, through September 30, 2012), 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 readers 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 continual forest census since 1930. We collect, analyze, and report information on the status and trends of America's forests: how much forest exists, where it exists, who owns it, and how it is changing, 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 decision-making activities undertaken by public and private enterprises, and predicting the effects of climate change. The FIA program combines this information with related data on insects, diseases, and other types of forest damage to assess the current health and potential risks to forests. These data are also used to project how forests are likely to appear in 10 to 50 years under various scenarios to evaluate whether current forest management practices are sustainable in the long run and to assess whether current policies will enable our grandchildren and their grandchildren to enjoy America's forests as we do today.

Changes From Previous Years' Business Reports

The FIA program continues to seek performance measures that accurately reflect the program's progress toward meeting the goal of annualized inventory in all 50 States.

Because of funding constraints, FIA-funded research of Experimental Forests and Ranges (EFRs) has been suspended.

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. Although the safety section will include less trend data initially, we think this reporting system will more accurately reflect FIA's safety journey.

President Obama's American Recovery and Reinvestment Act (ARRA) passed by Congress provided supplemental appropriations for FY 2010 and FY 2011 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.

Fiscal Year 2012 Program Overview

In FY 2012, the FIA program completed the 14th year of program transition to an annual inventory system as outlined in the *Strategic Plan for Forest Inventory and Monitoring*, written in response to the Agricultural Research, Extension, and Education Reform Act of 1998 (Public Law 105-185). The FIA program includes three sample protocols, 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 previously consisted of a subsample of P2 plots measured for a broader set of forest ecosystem indicators and are now being incorporated into the P2 measures with more efficient modified protocols. 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. Table 1 shows the overall distribution of P1 and P2 elements of the FIA sample for the United States. The numbers in this table are for illustrative purposes only and do not include possible additional plots that may be required as a result of partially forested sample locations. This process can add 15 to 20 percent more actual plots that must be visited to collect data.

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 2012, the total appropriated funding was $8.5 million less than the target level outlined in the FIA strategic plan[1] to complete the transition of the base program to full implementation. The following sections highlight current outputs and products, program resources, and 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 2012, we were active in 49 States plus coastal Alaska (fig. 1), measuring 46,804 P2 and P3 sample locations (19,673 forest and 27,131 nonforest) from the base grid, or 17 percent of the total. At the end of FY 2012, some level of annual FIA program activity covered all States, but only 49 States (98 percent) were fully implemented, with interior Alaska awaiting funding. An appropriated funding loss of $2.3 million in FY 2012 was partially offset by an increase in partner support of $1.0 million. FIA's congressional mandate, under the Renewable Resources Research Act of 1978 (Public Law 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. Reinventory of the islands began with American Samoa in 2012 and will continue with Guam in 2013.

Table 1.—*Overview of land area; forest area; and estimated P1 pixels, P2 plots, and P3 plots by region in FY 2012.*

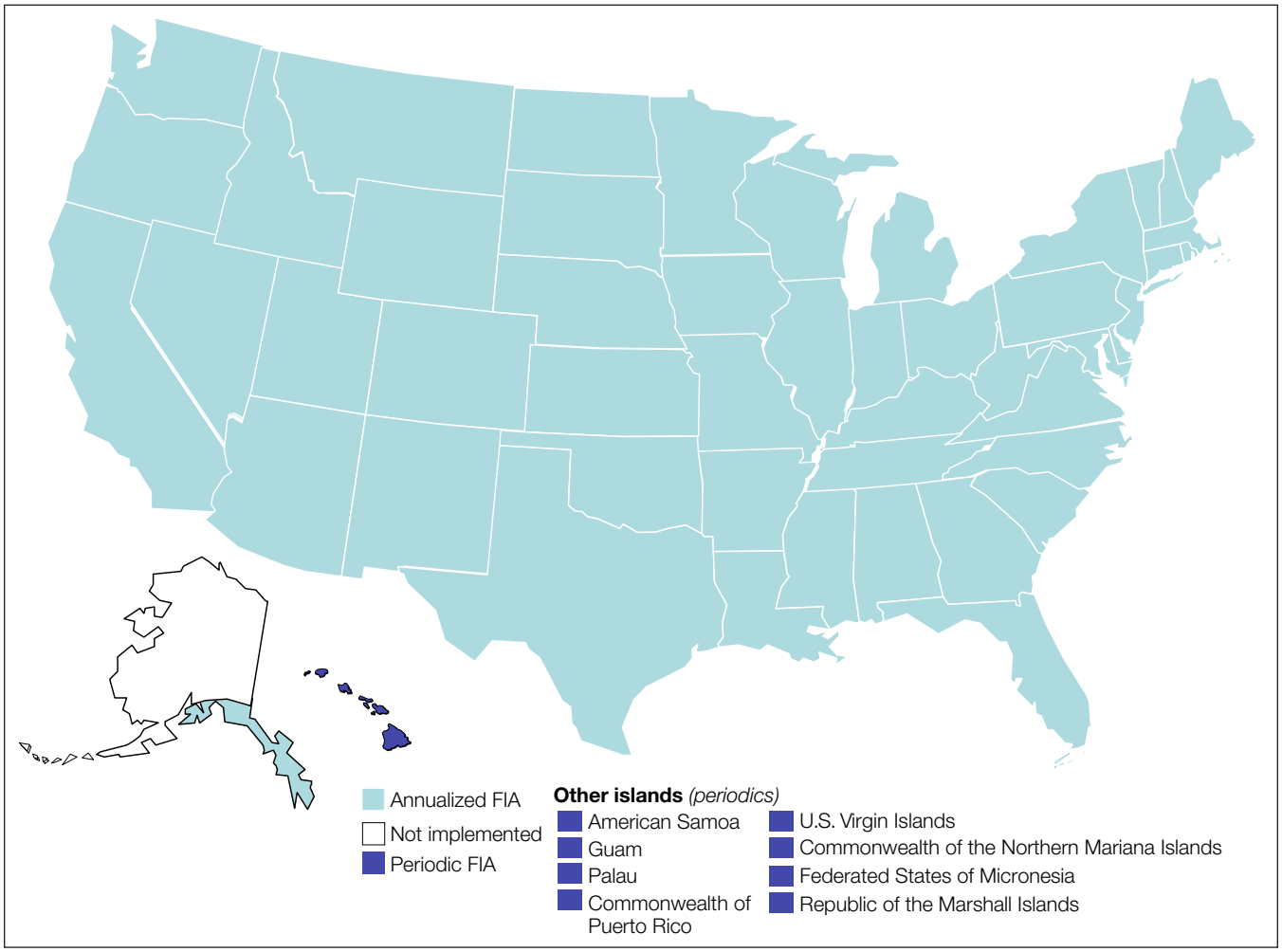
Region	Land area	Forest area	Forest	All P1*	All P2	All P3	Total P2, P3
	Mil. acres	*Mil. acres*	*Percent*	*Mil. pixels*	*Plots*	*Plots*	*Plots*
North	608	182	30	39.5	95,008	6,334	101,342
South	535	267	50	34.8	83,630	5,575	89,205
RMRS Interior West	548	146	27	35.6	85,632	5,709	91,341
Pacific Coast (California, Oregon, Washington)	203	85	42	13.2	31,780	2,119	33,898
Coastal Alaska	41	14	35	2.7	6,450	430	6,880
Interior Alaska	324	112	35	21.0	—	3,373	3,373
Islands (including Hawaii)	7	4	53	0.5	1,084	72	1,156
Total	2,267	810	33	147.2	303,583	23,611	327,194

FY = fiscal year. P1 = Phase 1. P2 = Phase 2. P3 = Phase 3. RMRS = Rocky Mountain Research Station.

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

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

Figure 1.—*FIA implementation status, FY 2012.*



FIA = Forest Inventory and Analysis.

The FIA program produced 272 reports and publications in FY 2012, nearly 70 more reports than in FY 2011. Of these publications, 92 were core publications consisting of reports specific to a complete survey unit, complete State, national forest, or national report. Core reports include 5-year State reports required by legislation. FIA also published 90 articles in peer-reviewed journals and 38 articles in proceedings from scientific meetings and conferences. FIA staff participated in 848 significant consultations with FIA customers, requiring 8,807 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 them on the Web. Our Internet resources processed more than 94,027 data retrievals in which FIA customers obtained user-defined tables, data downloads, and maps of interest. These retrievals were nearly 40,000 fewer than in the previous year because the program consolidated and migrated computer operations to centralized Forest Service servers in Kansas City, MO, and the new facility struggled to get FIA programs installed and maintained in a timely manner. Online retrievals should return to normal levels in 2013.

Program Resources

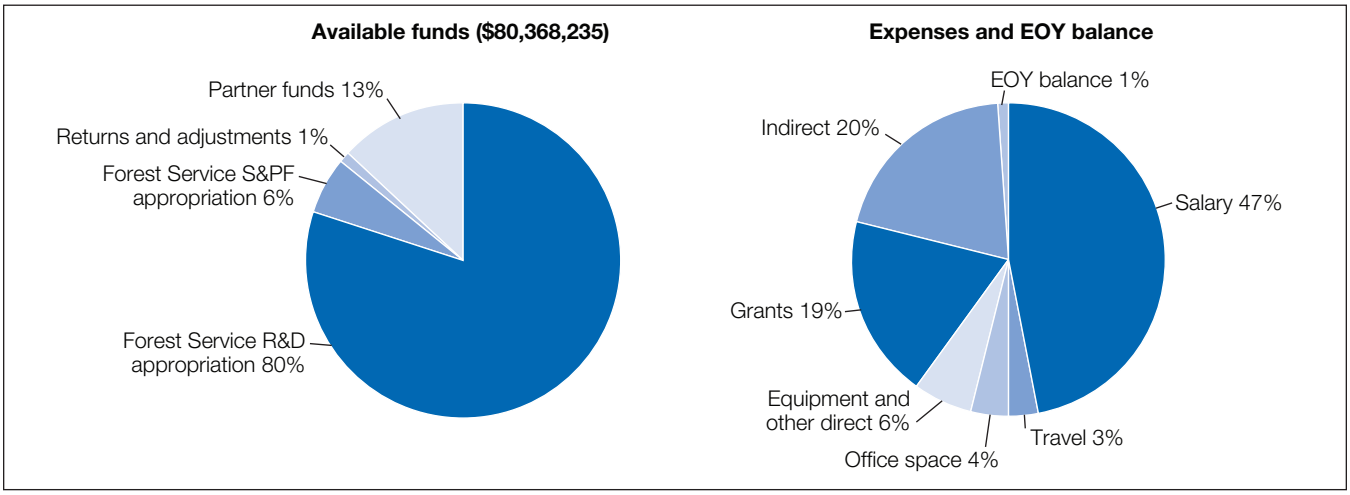
Congress appropriates funds annually for the FIA program in two different Forest Service deputy areas: (1) Research and Development (R&D), which had $64,269,000 in appropriated funds in FY 2012, and (2) S&PF, which had $4,917,000 in appropriated funds in FY 2012. Most Federal FIA funding, or 93 percent, is contained within the R&D budget of the Forest Ser-

vice. In FY 2012, the amount of total funding appropriated by Congress for the FIA program was $69,186,000, a reduction of $2,266,000 from the FY 2011 level of $71,452,000 (appendix table B-12). The S&PF Forest Resource Inventory and Assessment (FRIA) budget line is provided to support the FIA program in States that provide cost-sharing contributions. States providing inventory cost-sharing funds contributed $4,157,996 toward supporting the base 5-year cycle program, and States and other partners provided an additional $5,970,634 for plot intensification and other program enhancements. Total available program funding, including $528,062 in pre-year adjustments, was $79,842,692 in FY 2012 (fig. 2).

In its annual appropriation, Congress intended for an amount equal to the S&PF FRIA appropriation to be made available to cost-sharing States each year to help implement the FIA program. During budget allocation, FIA treats funds from all sources as a single pool and then allocates funds from the various inflow accounts to maximize efficiency. Each year, however, FIA ensures that congressional intent is met for the S&PF appropriation. Table 2 summarizes FIA funding activity to States from FY 2005 through 2012 and demonstrates that the FIA program has consistently complied with congressional intent, typically exceeding the cost sharing 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 FY 2012 ranged from 9 to 13 percent across the country (appendix table B-2), reflecting differences both in sources of funding and in research station indirect expense assessment practices. The National Office has an 83-percent rate of indirect cost, because that budget item includes the USDA

Figure 2.—*FIA program available funds and expenses by category, FY 2012.*



EOY = end of year. FIA = Forest Inventory and Analysis. R&D = Research and Development. S&PF = State and Private Forestry.

Table 2.—*Annual FIA appropriations and allocation of S&PF funds to meet congressional intent.*

Category	Fiscal year							
	2005	2006	2007	2008	2009	2010	2011	2012
	Thousand dollars							
R&D appropriation	55,923	59,329	59,380	60,372	60,770	66,939	66,805	64,269
S&PF appropriation[a]	4,958	4,312	4,225	4,269	4,766	4,878	4,647	4,917
Total appropriated	60,881	63,641	63,605	64,641	65,536	71,817	71,452	69,186
FIA data collection grants to States	**5,954**	**7,364**	**7,209**	**6,924**	**7,907**	**8,289**	**7,952**	**7,475**
Number of States	**22**	**24**	**26**	**24**	**28**	**26**	**17**	**17**
Average support	**271**	**307**	**277**	**289**	**282**	**319**	**468**	**440**
Additional FIA allocation to States above congressional minimum for the S&PF appropriation	**996**	**3,052**	**2,984**	**2,655**	**3,141**	**3,411**	**2,952**	**2,475**

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.*

overhead and programwide charges to the Albuquerque Service Center, which were $6,304,000 from R&D and $601,000 from S&PF in FY 2012. Overall, program indirect expenses totaled 20.3 percent. Figure 3 shows the total appropriated funding for FIA from FY 2001 to FY 2013. Refer to appendix table B-12 to view the trend data in FIA performance measures for FY 2006 through FY 2012.

In FY 2012, FIA Federal program staffing consisted of 372 Federal person-years of effort (appendix table B-3a) down from 397 Federal person-years in FY 2011. Cooperators, especially State forestry organizations, through grants and agreements, accomplish much of the work done by FIA, and they added 203 employees for a total workforce of 575. The additional cooperator employees included 162 State field employees, 16 information management specialists, 13 analysts, 9 researchers, and 2 administrative specialists. Cooperator employees constitute 35 percent of the total FIA workforce.

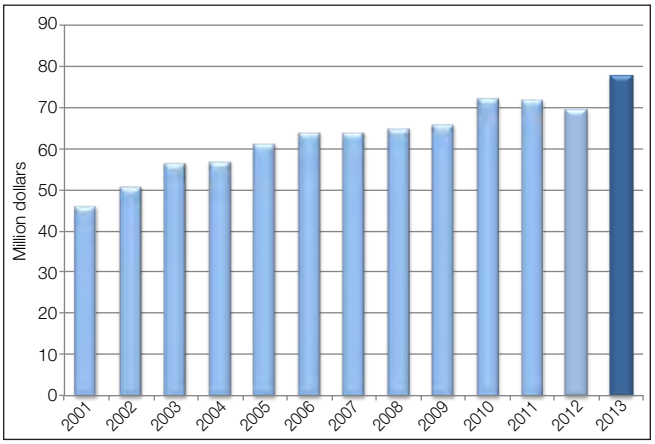
Of all FIA employees, both Federal and cooperator, approximately 65 percent were involved in data collection and field support, 23 percent in analysis and information management, 4 percent in program management and administration, 6 percent in techniques research, and 2 percent in P1 production work (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 83 grants and agreements to 65 organizations funded in FY 2012, comprising $13,537,301. This number fluctuates from year to year, but demonstrates the reliance of the FIA program on collaborating with external partners to get

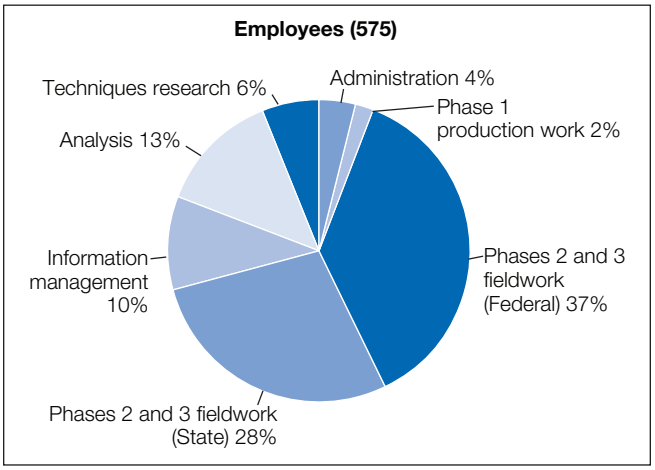
Figure 3.—*FIA appropriated funding level, FY 2001 through FY 2013 (projected).*



FIA = Forest Inventory and Analysis.

Note: Dark blue bar is estimated total funding required for delivering the base FIA program by FY 2013.

Figure 4.—*FIA program employees by job group, FY 2012.*



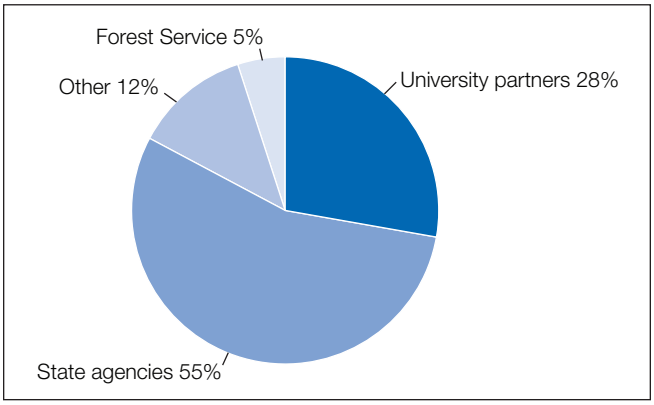
FIA = Forest Inventory and Analysis.

work done efficiently. Most of these grants and agreements were with State agencies (28 percent) and university partners (36 percent) (fig. 5).

Additional cooperators included other Federal and Forest Service offices (14 percent) and other non-Federal partners (22 percent). The major purpose for all grants was for collaboration in data collection, information management, and research techniques development. We expect to continue to make significant use of grants and agreements to augment FIA staff capacity in the analysis and reporting of annual FIA data for individual States.

Partner Contributions—At their discretion, partners may choose to contribute the resources that are needed to bring the

Figure 5.—*Grants and agreements by recipient group, FY 2012.*



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 a 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 2012, either to achieve the 20-percent cost-sharing 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 $4.1 million toward the 20-percent FIA program that Congress envisioned, and another $6.0 million in contributions that add value to the FIA program, for a total of $10.1 million in partners' contributions. This FY 2012 contribution amounts to $1.0 million more than was contributed by partners in FY 2011. The source of the partner contributions depends on the region of the country and the ability of States and partners to contribute. In the West, where forest land ownership is primarily Federal, the major cost-sharing partners tend to be Federal land managers, particularly the National Forest System (NFS) branch of the Forest Service, which contributed approximately $1.6 million in additional funds to add value to the basic FIA program. The increase in State support in FY 2012 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 FY 2000, FIA has provided grants in excess of $141 million to efficiently carry out annualized inventory and partners have contributed more than $101 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

Because of budget constraints, FIA-funded research on EFRs has been suspended.

American Recovery and Reinvestment Act

In FY 2012, two projects continued under the President's ARRA that will have a direct effect on the FIA program. A brief summary of these projects follows.

Table 3.—*FIA grants and partner contributions, FY 2000 through FY 2012.*

Group	Total FIA grants	Average annual grants	Percent of grants	Total partner contibutions	Average annual contributions	Percent of contributions
	Dollars			*Dollars*		
States/islands	81,511,305	6,270,100	53	75,975,888	5,844,299	69
Universities	36,948,414	2,842,186	24	4,871,862	374,759	4
Forest Service	11,842,307	910,947	8	16,868,694	1,297,592	15
Other partners	9,562,162	735,551	6	252,936	19,457	0
Other Federal	1,167,370	89,798	1	3,111,050	239,312	3
Total	**141,031,559**	**11,752,630**	**100**	**101,080,430**	**8,423,369**	**100**

FIA = Forest Inventory and Analysis.

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

In 2010, the Pacific Northwest Research Station (PNW) partnered with the Oregon Department of Forestry and California Polytechnic State University (San Luis Obispo) to conduct an FIA inventory in the urban areas of Alaska, Washington, Oregon, California, and Hawaii. PNW-FIA provided technical oversight with training assistance from the Southern Research Station (SRS) and Colorado Department of Forestry. Funding for training and data collection was provided by a Recovery grant. In 2010 and 2011, private contractors installed roughly 1,000 on-grid plots in urbanized areas of the 5-State region. In 2012, the remaining funding was directed at sampling plots previously skipped because of difficulties in contacting property owners. The next project objective is to produce State-level reports that will include an iTree evaluation of the ecosystem services provided by the urban forests. Both partners will remain involved, with the addition of Oregon State University, for the analysis and reporting phase. 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 about potential changes in the composition and health of urban ecosystems over time.

ARRA Project—Inventory of New Mexico's Forest Resources

In FY 2012, the Rocky Mountain Research Station, Interior West (RMRS IW) FIA program (RMRS IW-FIA) continued its support of the State of New Mexico ARRA forest inventory project. Calendar year 2012 was the final year of the 3-year project. FIA has been providing historical files and an electronic field data entry program, plot packets with aerial photos and other materials, initial and ongoing training for contract crews, and inspections of completed fieldwork. To date, New Mexico contractors have completed 4,005 field plots, including 1,217 completed in FY 2012. When combined with the data collected by FIA crews, nine complete, 10-percent annual inventory panels will have been installed in the past 5 years.

An analysis of New Mexico forest inventory data started in the fall of 2012, using the eight inventory panels that had been completed at that time. Early analysis revealed two important findings: (1) a low rate of access to private lands required adjustments to standard analysis methods, and (2) the area of forest is higher than reported in the previous (2000) inventory—24.8 versus 16.7 million acres. Most of the apparent increase in forest acreage is attributable to definitional changes between inventories. Analysis plans for FY 2013 include publishing the first eight panels data to the national FIA database (including analytical adjustments), a data analysis training session for New Mexico stakeholders, and publishing the New Mexico State report. Publication of the 9th panel is expected to occur as scheduled (by June 2013), along with the data collected in other States during the FY 2012 field season.

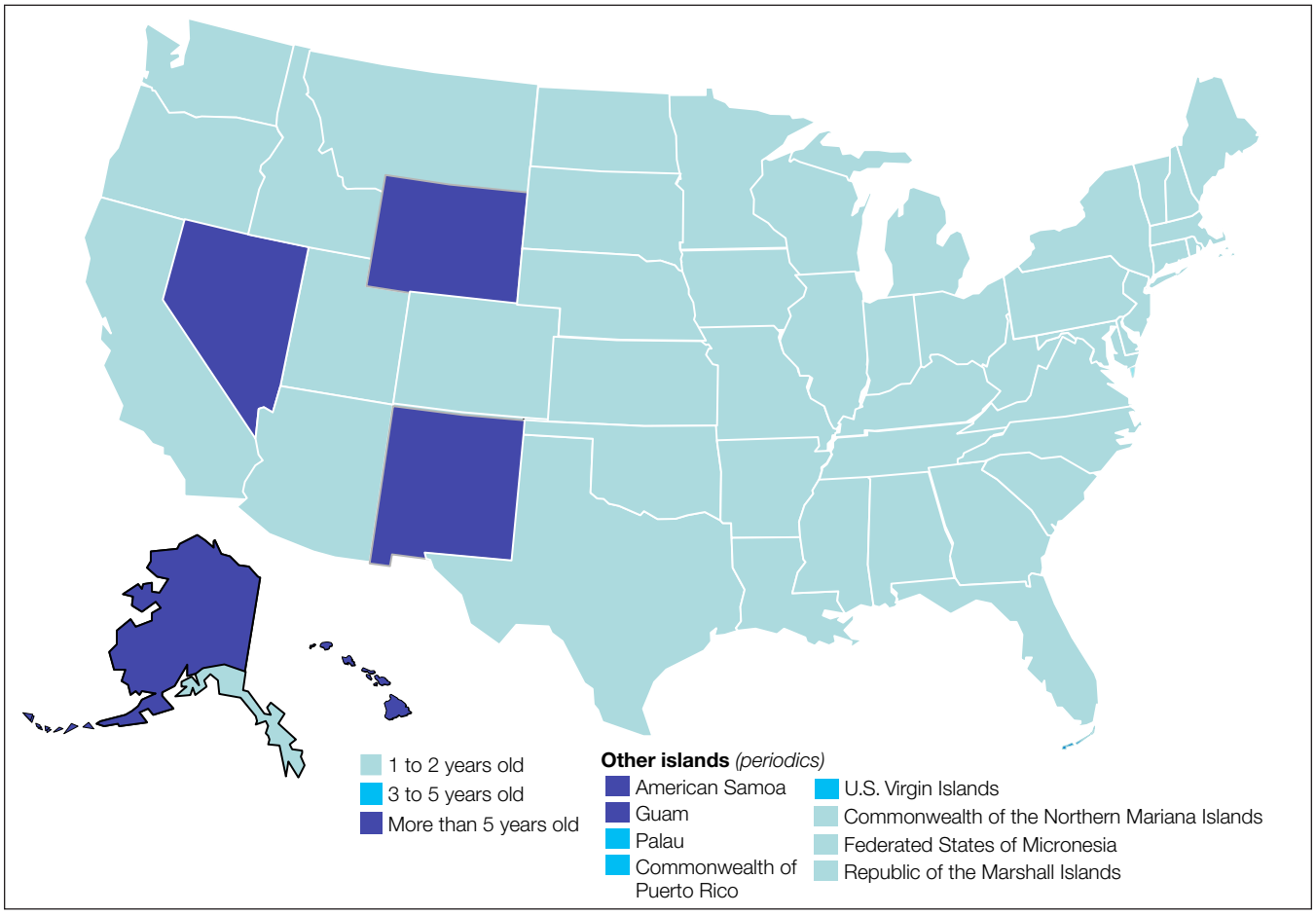
FIA Data Availability

In FY 2012, FIA completed migrating its data and data processing procedures to the new Forest Service corporate servers in Kansas City, MO. The overall goal of this migration was to move the Forest Service data operations 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. The new service center, however, continues to struggle to return FIA data service to normal levels that are commensurate with FIA's high customer service standards as evidenced by the sharp drop in successful online access by FIA clients (appendix B-7).

The FIA program is designed and intended to provide continually 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 2012—the end of FY 2012. 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. The islands are currently maintaining periodic reporting cycle. In 2012, the number of light blue States was 45 plus coastal Alaska, and 4 dark

Figure 6.—*Availability of online FIA data, FY 2012.*



FIA = Forest Inventory and Analysis.

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.

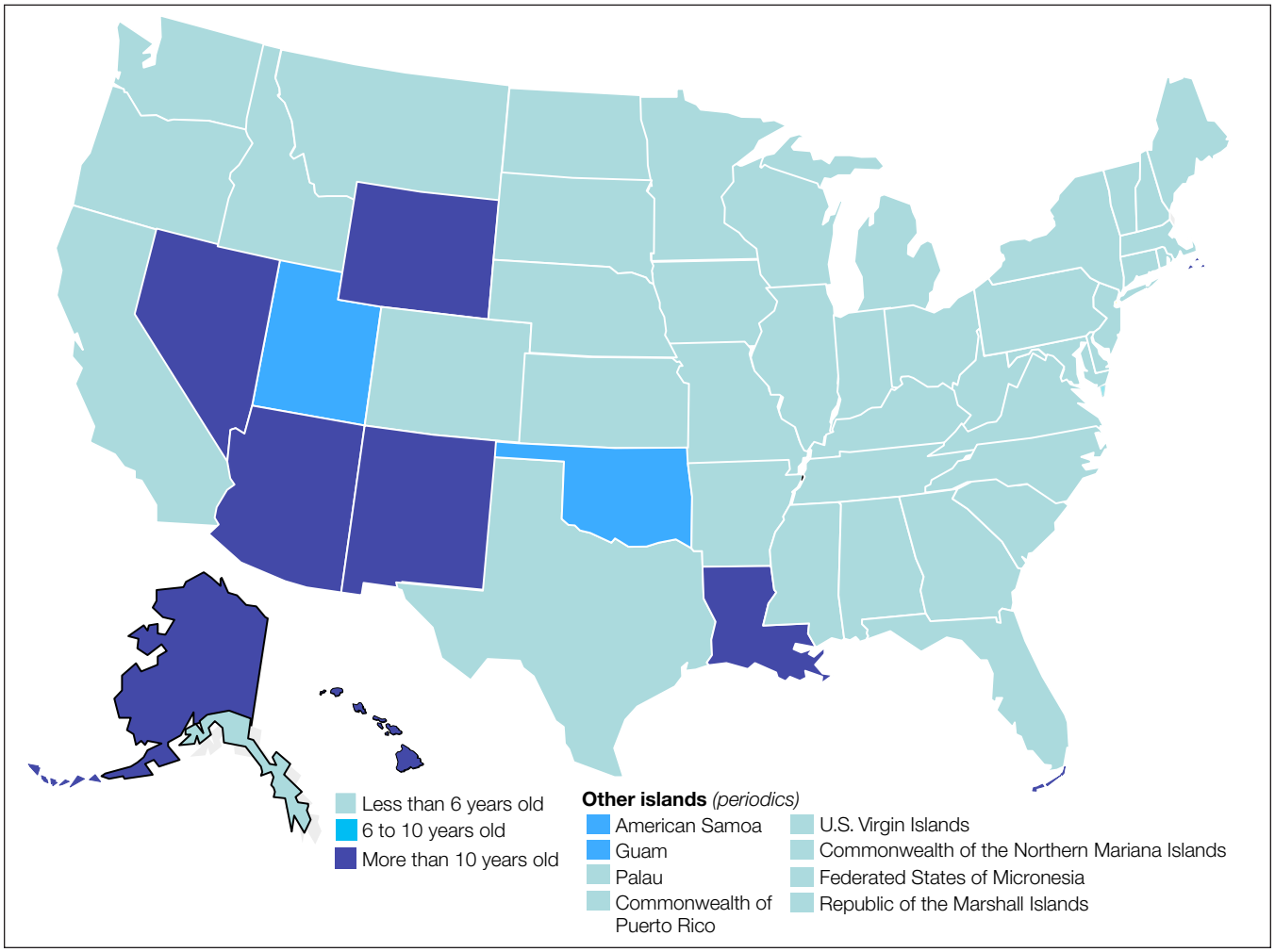
Figure 7 shows the age of the most recently published statewide FIA report for each State. States with reports based on data that are less than 6 years old—the program objective—are shaded light blue. States with reports based on data that are 6 to 10 years old are shaded medium blue, and States where the most recent reports are based on data more than 10 years old are shaded dark blue. The Northern Research Station (NRS)-FIA program leads the Nation in States having reports based on data that are less than 6 years old, with 24 of 24 States; the SRS-FIA program is second, with 11 of 13 States; the PNW-FIA program is third, with 4 of 5 States; and the RMRS IW-FIA program has 3 of 8 States with reports based on data that are less than 6 years old.

FIA made significant strides in catching up with the backlog of 5-year reports in FY 2012 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 2013.

Quality Assurance

FIA is committed to producing and delivering complete, accurate, and unbiased information with known precision, completeness, representativeness, comparability, and accuracy. The Quality Assurance (QA) program supports this goal using a framework that promotes consistency during all stages of the national core FIA inventory process. A national CORE field guide documents the protocols, ensuring consistent field collection of CORE program data items. FIA's national field data entry program, the Mobile Integrated Data Acquisition

Figure 7.—*Publication status of State reports, FY 2012.*



System (MIDAS), is integrated into the overall FIA information management structure and provides consistent logic and error checking in the field. The NIMS database and compilation system provides additional error checks and consistently calculates a variety of derived variables using estimation equations as described in general technical reports. The National QA Coordinator works with the National Office and the regional and national indicator advisors to provide direction and coordination for the FIA QA program.

The FIA program promotes process transparency and consistency by extensively documenting methods and procedures, including the following:

- A 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 CORE Field Guides ensure consistent CORE program data collection.

- The field QA check procedures guide promotes field QA consistency from region to region. (A summary of the QA plot checks is provided in appendix table B-1.)
- The FIA Database Description and Users Guide provides detailed information to users about published FIA data.
- The newly created Forest Inventory and Analysis DataBase (FIADB) displays standardized output tables and is accompanied by detailed documentation, database description, and users manual.
- The analytical QA guide outlines steps for verifying compiled data for accuracy and completeness before releasing them to the public.
- A National FIA QA Plan describes the overall QA process (2013 release date).

The following new and ongoing FIA QA tasks in FY 2013 are aimed at identifying errors and increasing consistency in the national inventory:

- Distributing QA Tools, an error checking application, and other analytical QA tools to FIA State analysts nationally.
- Developing systematic edit checks of periodic and annual FIADB data.
- Defining rigorous national cold check field and scoring procedures to 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 (check edit system), a consolidated FIA data processing system.
- Developing a catalog of unpublished FIA procedures.

FY 2012 Regional Accomplishments

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

Northern Research Station FIA Program

Finding: Tax policies do not appear to be the main reason that family forest owners take unplanned actions such as prematurely selling their land or harvesting trees, but, in combination with other factors, tax policies, especially property tax policies, do appear to influence ownership and forest management decisions.

Accomplishment: Coordinated by the Forest Service's Family Forest Research Center, a joint venture between NRS-FIA and the University of Massachusetts Amherst, a multimodal approach was used to assess the influence of taxation on family forest owners. Taxes are a prominent policy tool and one of a number of factors that have the potential to influence the decisions of the millions of family forest owners across the United States. After conducting a literature review, researchers catalogued tax policies most relevant to family forest owners, surveyed preferential property tax program administrators, held focus groups with family forest owners and forestry and conservation professionals, and synthesized results with the aid of experts. The results suggest that tax policies are not the main reason that forest owners take unplanned actions such as prematurely selling their land or harvesting trees. In combination with other factors, however, tax policies, especially property tax policies, can influence ownership and forest management decisions. Preferential forest property tax policies exist across the United States, but a general lack of awareness, confusion, and misinformation about these programs and their often complicated and restrictive requirements are preventing the programs from reaching their full potential.

Outcome: Presentations of the findings have been made to the funding organization and at various professional meetings. A summary article has been published in the *Journal of Forestry* (Butler et al. 2012), and additional journal articles are being prepared.

Butler, B.J.; Catanzaro, P.F.; Greene, J.L.; Hewes, J.H.; Kilgore, M.A.; Kittredge, D.B.; Ma, Z.; Tyrrell, M.L. 2012. Taxing family forest owners: effects of Federal and State policies in the United States. Journal of Forestry. 110(7): 371–380.

Contact: Brett Butler, bbutler01@fs.fed.us

Partners: American Forest Foundation, SRS, University of Massachusetts Amherst, University of Minnesota, Utah State University, Yale University

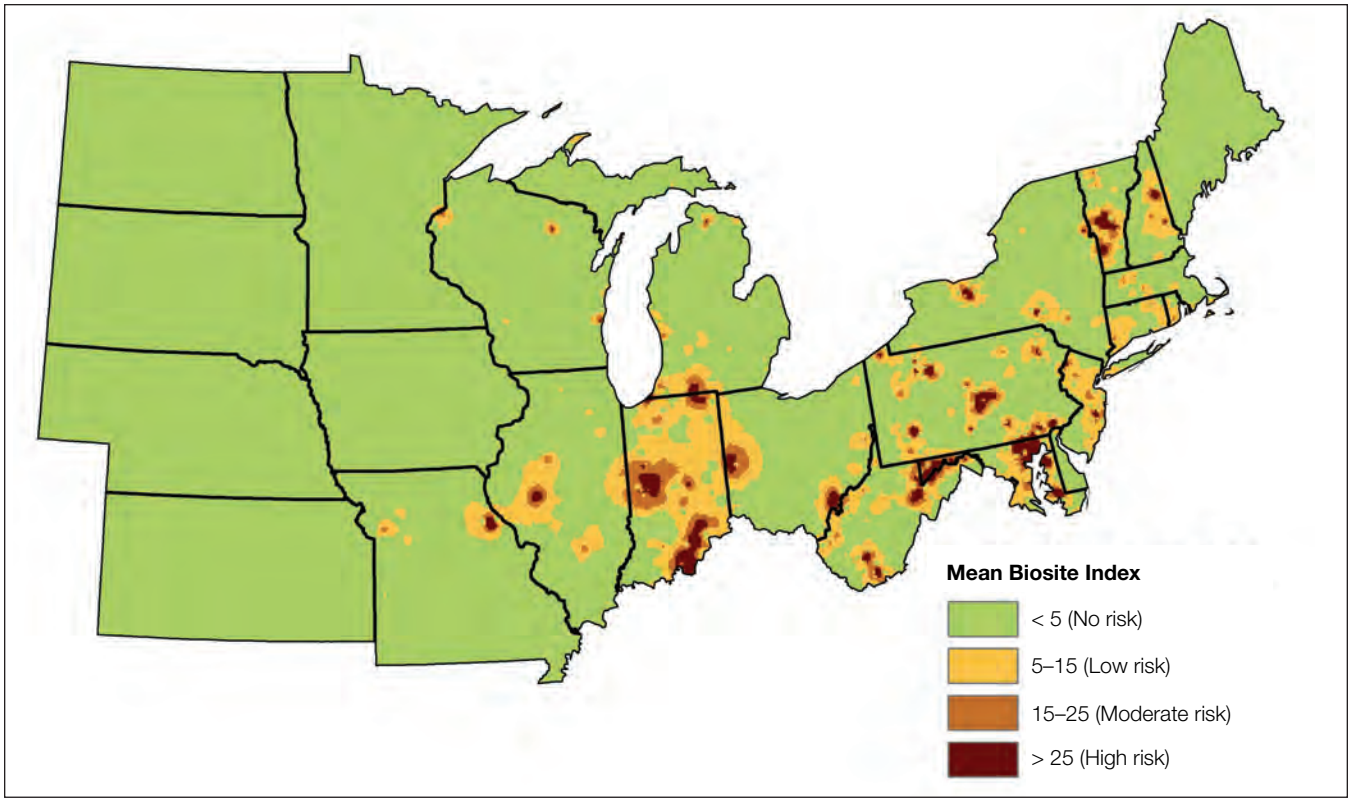
Finding: The results of 17 years of ozone injury detection provide evidence that ozone-induced foliar injury symptoms occur routinely on ozone-sensitive bioindicator plants across much of the forested landscape of the North Central and Northeastern United States.

Accomplishment: FIA researchers from NRS-FIA partnered with the Ozone Indicator Advisor at the University of Massachusetts to produce an NRS General Technical Report (GTR). The report focuses on ozone injury data collected from FY 1994 through FY 2010 in the States in the NRS-FIA region, which has the longest record of ozone biomonitoring in the country. The results of 17 years of ozone injury detection provide indisputable evidence that ozone-induced foliar injury symptoms occur routinely on ozone-sensitive bioindicator plants across much of the forested landscape and in areas previously thought to be relatively ozone free (fig. 8). This report provides State-level information about where ozone stress occurs and whether ozone stress is increasing or decreasing over time. It also provides State-level estimates of the acres of forest land and the volume of ozone-susceptible species at risk of ozone impact.

Outcome: The primary objectives were to summarize the core ozone indicator data for all 24 States in the NRS-FIA region and to examine relationships between injury and exposure within the context of variable site moisture conditions and wet versus dry years. Because the P3 portion of the FIA survey has been suspended due to budget cuts, the GTR serves as a final synopsis of 17 years of ozone biomonitoring in the Northern United States (Smith et al. 2012).

Smith, G.C.; Morin, R.S.; McCaskill, G.L. 2012. Ozone injury to forests across the Northeast and North Central United States, 1994–2010. Gen. Tech. Rep. NRS-103. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 46 p.

Figure 8.—*Spatial interpolation of the mean biosite index for FY 1994 through FY 2010.*



Contacts: Gretchen Smith, gcsmith.stiefel@gmail.com; Randy Morin, rsmorin@fs.fed.us; George McCaskill, georgemccaskill@fs.fed.us

Partner: University of Massachusetts

Finding: A nationally consistent and comprehensive empirical analysis of standing dead tree resources has never been produced before. Numerous facets of research were conducted to facilitate such an accomplishment: developing standing dead tree density reduction factors, developing standing dead tree structural deduction factors, and comparing differences between previously modeled estimates and new empirical estimates.

Accomplishment: FIA now has a field inventory of standing dead trees across the Nation that replaces models that were generalizations of regional averages by broad forest types (Woodall et al. 2012). Instead of missing the impact of disturbances (e.g., droughts and insect outbreaks), we now more fully gauge their impact on standing dead tree biomass/carbon estimates in yearly time-steps as opposed to decades. In addition, beyond simply counting standing dead trees, emerging research on standing dead tree wood density reduction and structural deductions (Domke et al. 2011) improves the accuracy of standing dead tree carbon stock estimates. Emerging work to map these pools of biomass indicate that they are very prevalent in forests of the Western United States (Wilson et al. In press).

Outcome: Results of this study were incorporated into the U.S. official greenhouse gas inventory in 2012. As such, the standing dead tree components of the greenhouse gas inventory more closely reflect empirical estimates of dead wood resources. In addition, completed research to develop wood density reduction and structural deductions needed for standing dead trees reduces uncertainty associated with these estimates. Beyond carbon inventories, these advances refine estimates of standing dead tree biomass across the United States.

Domke, G.M.; Woodall, C.W.; Smith, J.E. 2011. Accounting for density reduction and structural loss in standing dead trees: Implications for forest biomass and carbon stock estimates in the United States. Carbon Balance and Management 6: 14. Available at http://www.nrs.fs.fed.us/pubs/40208. (31 March 2013).

Harmon, M.E.; Woodall, C.W.; Fasth, B.; Sexton, J.; Yatkov, M. 2011. Differences between standing and downed dead tree wood density reduction factors: A comparison across decay classes and tree species. Res. Pap. NRS-15. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 40 p. Available at http://www.nrs.fs.fed.us/pubs/38699. (31 March 2013).

Smith, J.E.; Woodall, C.W. 2011. Forest sections of the land use change and forestry chapter, and annex. In: U.S. Environmental Protection Agency, Inventory of U.S. greenhouse gas emissions and sinks: 1990–2009. USEPA #430-R-11-005. Available at http: http://epa.gov/climatechange/emissions/usinventoryreport.html. (31 March 2013).

Woodall, C.W.; Domke, G.M.; MacFarlane, D.W.; Oswalt, C.M. 2012. Comparing field- and model-based standing dead tree carbon stock estimates across forests of the United States. Forestry. 85: 125–133. Available at http://www.nrs.fs.fed.us/pubs/40127. (31 March 2013).

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

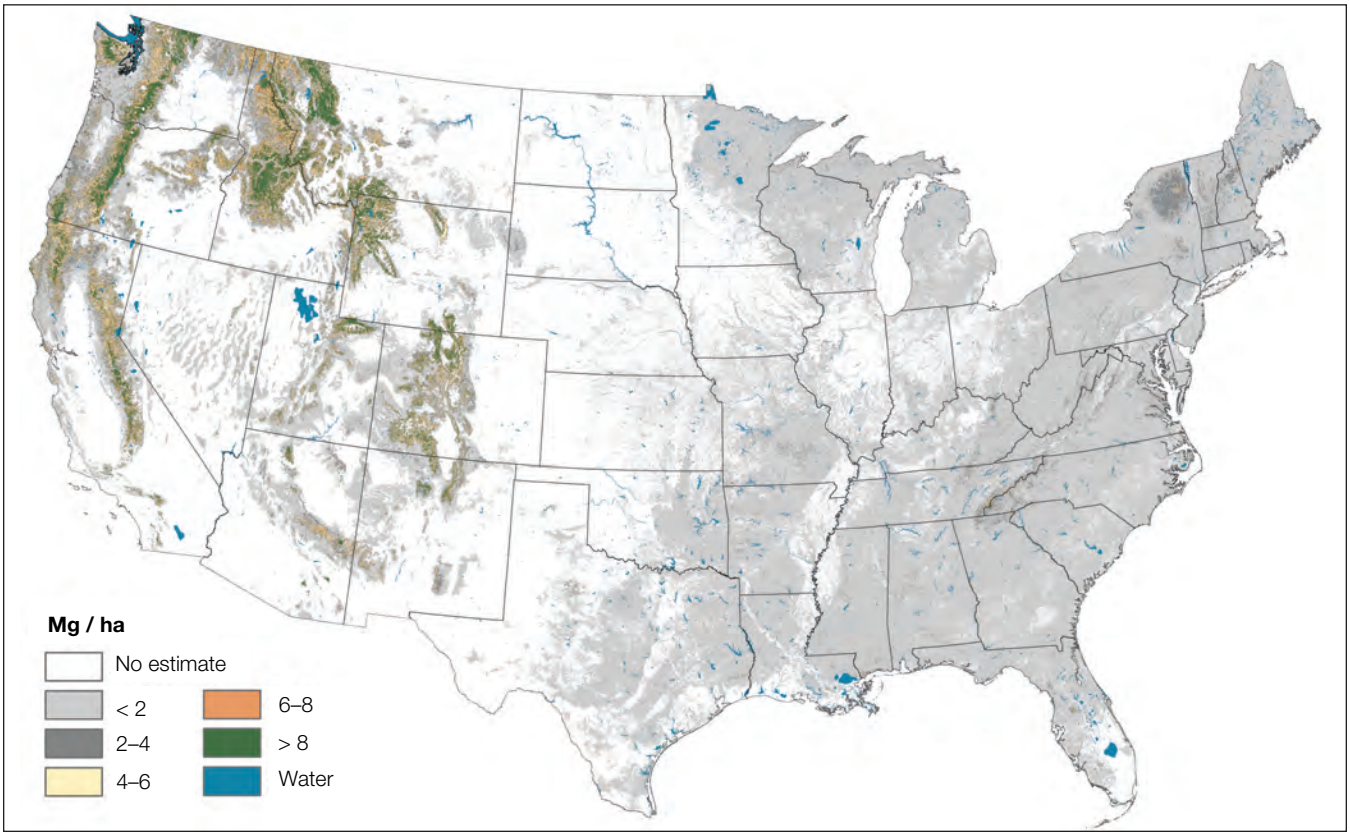
Pacific Northwest Research Station FIA Program

Finding: Lichen community shifts occurred since earlier quantitative surveys (1976–77) and distribution records (dating back to the early 1900s), suggesting a worsening of pollution impacts in the Los Angeles Basin in California. The most pollution-sensitive species declined markedly in abundance between the 1976–77 and 2008 survey periods. Lichen species with an affinity for nitrogen (N) pollutants demonstrated increases in abundance. No pollution-sensitive species reappeared in the record since the 1976–77 surveys.

Accomplishment: In 2008, we surveyed 21 sites in the mountains surrounding the Los Angeles basin for lichens, 18 of which were surveyed in 1976–77. We quantitatively compared communities across the 30-year span to determine changes in lichen communities regarding their affinity toward N pollutants.

Outcome: The lichen community bioindicator demonstrates that nontree vegetation is quite sensitive to a variety of pol-

Figure 9.—*Estimates of standing dead tree carbon stocks across the conterminous United States.*



ha = hectares. Mg = miligrams.

Credit: Ty Wilson and Christopher Woodall, Forest Service, Northern Research Station; Wilson et al. In press. Carbon Balance and Management.

lutants and environmental stressors. Ecosystem Indicator data collection can serve as an early warning sign for larger cumulative effects on forest ecosystems. Long-term comparison of Ecosystem Indicators is critical for assessing high-risk areas throughout the Nation. Baseline coverage of a variety of indicators will serve as comparison points for work several decades into the future.

Riddell, J.; Jovan, S.; Padgett, P.E.; Sweat, K. 2011. Tracking lichen community composition changes due to declining air quality over the last century: the Nash legacy in southern California. Bibliotheca Lichenologica. 106: 263–277.

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

Partners: Pacific Southwest Research Station (PSWRS); Arizona State University, School of Life Sciences

Finding: Affordable alternatives to field inventory in remote locations like interior Alaska are possible using a combination of cutting-edge remotely sensed data and lower intensity field sampling. For example, the precision of biomass estimates was substantially improved when the estimate was based on a biomass map derived via nearest neighbor imputation (reduction in relative standard error from 7.3 to 5.1 percent).

Accomplishment: We (1) describe the conceptual basis of multilevel sampling, (2) provide a detailed review of several previously implemented multilevel inventory designs, (3) describe several important technical considerations that can influence the efficiency of a multilevel sampling design, and (4) demonstrate the application of a modern multilevel sampling approach for estimating the forest biomass resources in a remote area of interior Alaska. This approach used a combination of ground plots, Light Detection and Ranging strip sampling, satellite imagery (multispectral and radar), and classified land cover information. The variability in the total biomass estimate was assessed using a bootstrapping approach.

Outcome: We believe we can produce reasonable estimates of key interior Alaska characteristics by relying heavily on remote sensing to supplement ground plots at one-fifth the cost of the traditional inventory design. The use of advanced remote-sensing technologies in Alaska is both cost-effective and efficient, because high-resolution airborne imagery and measurements can be used for resource management (e.g., timber inventory, habitat assessments) and multiple science objectives (e.g., biodiversity, climate studies). Airborne measurements provide forest canopy height and density information over large areas. Field plots are used to calibrate estimates from remote-sensing data and collect information on attributes that cannot be measured with remote sensing.

Leveraging advanced remote-sensing technologies for a cost-effective implementation of FIA in interior Alaska provides timely and important data on forests. The nested scales of analysis, from satellite and airborne remote-sensing and field measurements, provide a benchmark of current conditions to better evaluate ecosystem responses to climate change.

Andersen, H.E.; Strunk, J.; Temesgen, H.; Atwood, D.; Winterberger, K. 2011. Using multi-level remote sensing and ground data to estimate forest biomass resources in remote regions: a case study in the boreal forests of interior Alaska. Canadian Journal of Remote Sensing. 37(6): 596–611.

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

Partners: Oregon State University, Department of Forest Engineering, Resources, and Management; University of Alaska, Fairbanks, Geophysical Institute

Finding: A unique partnership between the State of Oregon and FIA has detailed patterns in land use change for 35 years. For example, land uses on private land shifted significantly toward more developed uses; between 1974 and 2009, 586,000 acres changed from forest, agricultural, and range uses to low-density residential or urban uses. In addition, the data demonstrate that development of resource lands slowed down after comprehensive land use plans were implemented in the mid-1980s.

Accomplishment: We collected consistent, sample-based data from imagery to address two key topics: (1) changes in the distribution of private and public non-Federal land-by-land use class and (2) development patterns on private land by land use class and by planned, county-level land use zone. Data collected for this report may also be used to analyze the effects that land use change has on forest resources and forest management practices on non-Federal ownerships in a later report. Highlighted in this report are trends in land use before and after the implementation of comprehensive land use plans in the mid-1980s. An appendix provides detailed statistics in tabular formats for Oregon and by region and county.

Outcome: FIA clients and partners have asked that we enhance our ability to report on land use and land cover change through time. These types of projects demonstrate how we can partner to achieve detailed information on the most permanent changes to forest land that we face.

Lettman, G.J.; Herstrom, A.A.; Heibenthal, D.R.; McKay, N.; Robinson, T.J. 2011. Land use change on nonfederal land in Oregon, 1974–2009. Salem, OR: Oregon Department of Forestry. 69 p.

Contact: Gary Lettman, gary.lettman@state.or.us

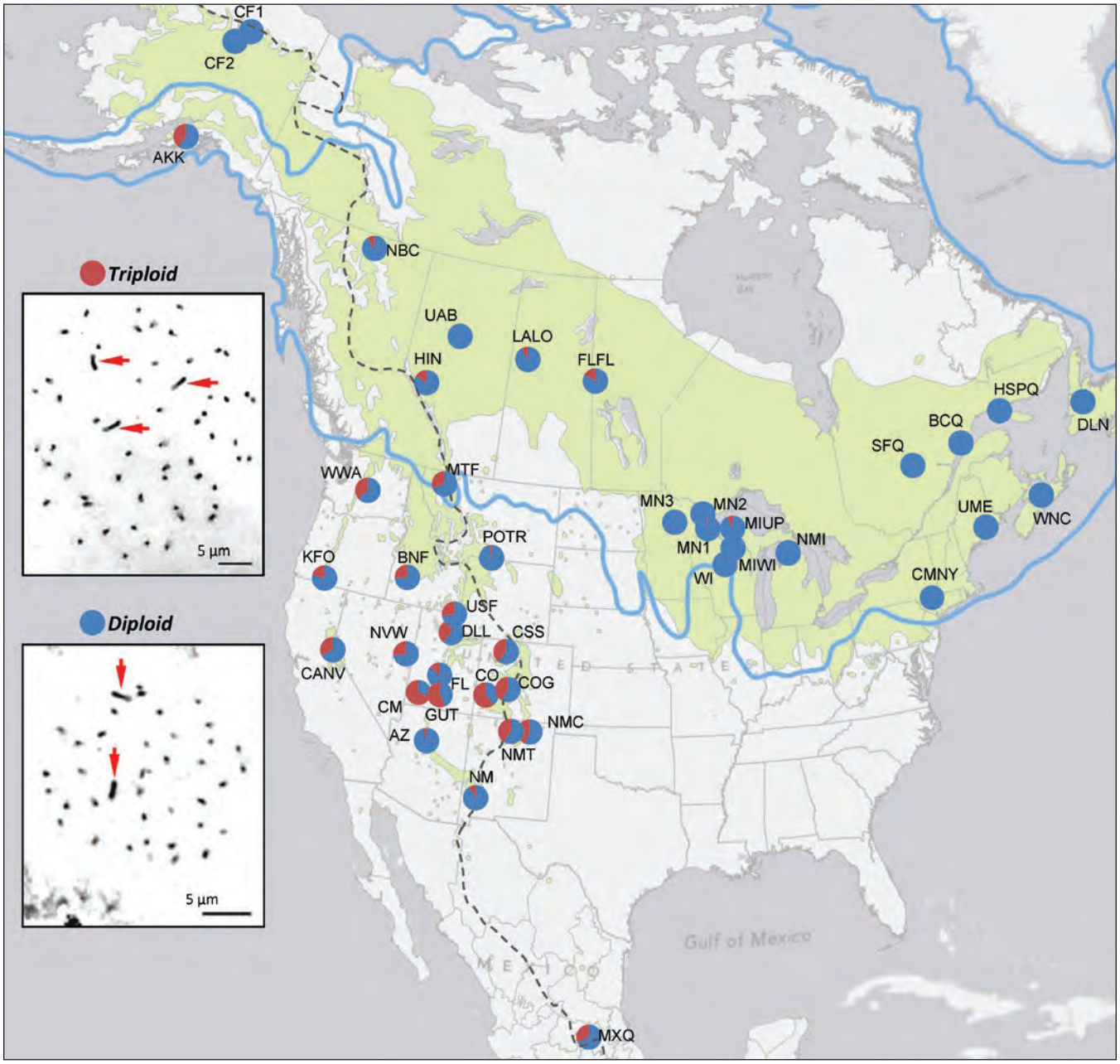
Partner: Oregon Department of Forestry

Figure 10.—*More than 37,000 sample points were evaluated from six dates of aerial photography and were assigned into one of eight land uses (mixed range/agriculture not shown). These uses, interpreted from the imagery, were defined by general land use, size, and the degree of development.*

Rocky Mountain Research Station, Interior West FIA Program

Finding: Genetic characteristics of the North American quaking aspen (*Populus tremuloides*) population were explored using FIA grid-based genetic sample collections and supplemental collections (fig. 11). Phylogeographic analysis identified two major genetic clusters across the range: a southwestern cluster and a northern cluster. The southwestern cluster was approximately bounded by the continental divide to the west and the last glacial maximum to the north. The southwestern cluster was further subdivided into two subclusters. Genetic distance was significantly correlated with geographic distance in the southwestern cluster but not the northern cluster. Allelic

Figure 11.—*Map of aspen sample clusters, with pie charts showing proportions of diploid (blue) and triploid (red) samples. Incidence of triploidy was found to be as high as 69 percent in the southwestern group of sample locations—far higher than is commonly found in most plant species. High rates of triploidy are correlated with warmer, drier summers as compared with other parts of aspen's range.*



richness was significantly lower in sampling sites from the southwestern cluster than sites from the northern cluster. Regional allelic richness values, obtained by pooling genotypes across sampling sites within clusters, did not differ significantly between the southwestern and northern clusters. In addition, a substantial fraction of the sampled trees in the southwestern cluster were found to be triploids. Triploidy is hypothesized to confer to a competitive advantage on drier sites, where reproduction of the sterile triploids is limited to cloning. We found that triploidy and low ombrothermic index (relatively warmer, drier summers) were well correlated, consistent with the belief that reproduction of aspen by seeding is rare in the Southwest because of the high sensitivity of aspen seed and seedlings to low summer moisture and high heat.

Accomplishment: Results were published in *PLOS One*; additional results are in revision for publication in *Biogeography*.

Outcome: The results of this study provide one example of the potential benefit of collecting ancillary data (in this case, genetic information) on the FIA production plot system. This study used a small fraction of the available sampling locations, so the potential exists for producing future analyses at much higher spatial resolution. In addition to analyzing general biogeographic patterns, the potential exists for analyzing genetic characteristics as they relate to endemic and exotic biotic agents (e.g., pathogens) and to abiotic factors (e.g., climate).

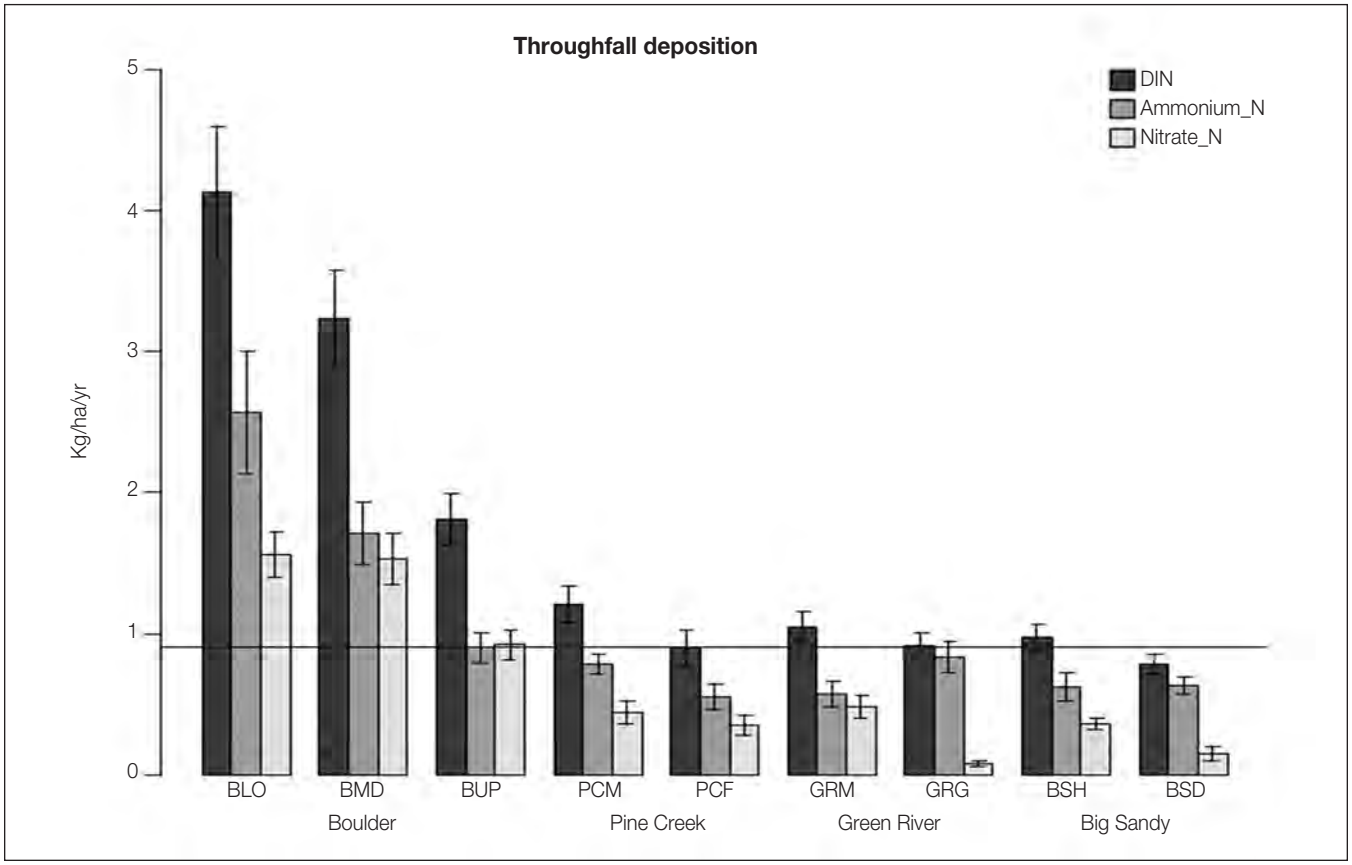
Contact: John D. Shaw, jdshaw@fs.fed.us

Partner: Utah State University

Finding: We used direct tissue analysis of lichen samples to explore alternative approaches to the traditional, diversity-based indicator approach used by FIA. Rapid expansion of natural gas drilling in Sublette County, WY, from 1999 through 2012, has raised concerns about the potential ecological effects of enhanced atmospheric N deposition to the Wind River Range (WRR), including the Class I Bridger Wilderness. We sampled annual throughfall (TF) N deposition and lichen thalli N concentrations under forest canopies in four different drainages of the WRR (fig. 12). Measurements of TF N deposition and N concentrations in lichen thalli were highest at plots closest to drilling operations (less than 30 kilometers). N concentrations in lichens decreased exponentially with distance from drilling activity. Highest TF N deposition, 4.1 kilogram (kg) hectare $(ha)^{-1}$ $year^{-1}$, coincided with clear evidence of damage to lichen thalli (fig. 13). This deposition value is above estimated preindustrial deposition conditions (0.9 kg N ha^{-1} $year^{-1}$) and regional critical loads

Figure 12.—*Ion-exchange resin columns measuring nitrogen in bulk deposition.*

Figure 13.—*Annual throughfall N deposition from four drainages in the Wind River Range. DIN refers to total dissolved inorganic N (ammonium N plus nitrate N). The horizontal line represents background levels of N deposition in the northern Rockies.*



(a deposition value below which ecosystem harm is prevented) of N deposition for sensitive ecosystem components. N concentrations in *Usnea lapponica* were strongly correlated (r = 0.96) with TF N deposition, demonstrating that elemental analysis of lichen material can be used to estimate TF N deposition. N concentrations below 1.35 percent in *U. lapponica* and 1.12 percent in *Letharia vulpine* were associated with 0.9 kg N ha^{-1} $year^{-1}$. Additional lichen sampling in the Bridger Wilderness is recommended to further quantify and monitor spatial patterns of N deposition and to define areas of elevated N deposition. We will further explore use of this approach in Interior West States as opportunities are identified.

Accomplishment: The results of this study have been submitted for publication.

Outcome: The study produced a successful calibration of lichen tissue N concentration with directly measured atmospheric N deposition. The results provide an alternative tool for use of the FIA lichen indicator—i.e., use of tissue sampling in addition to diversity gradient analysis.

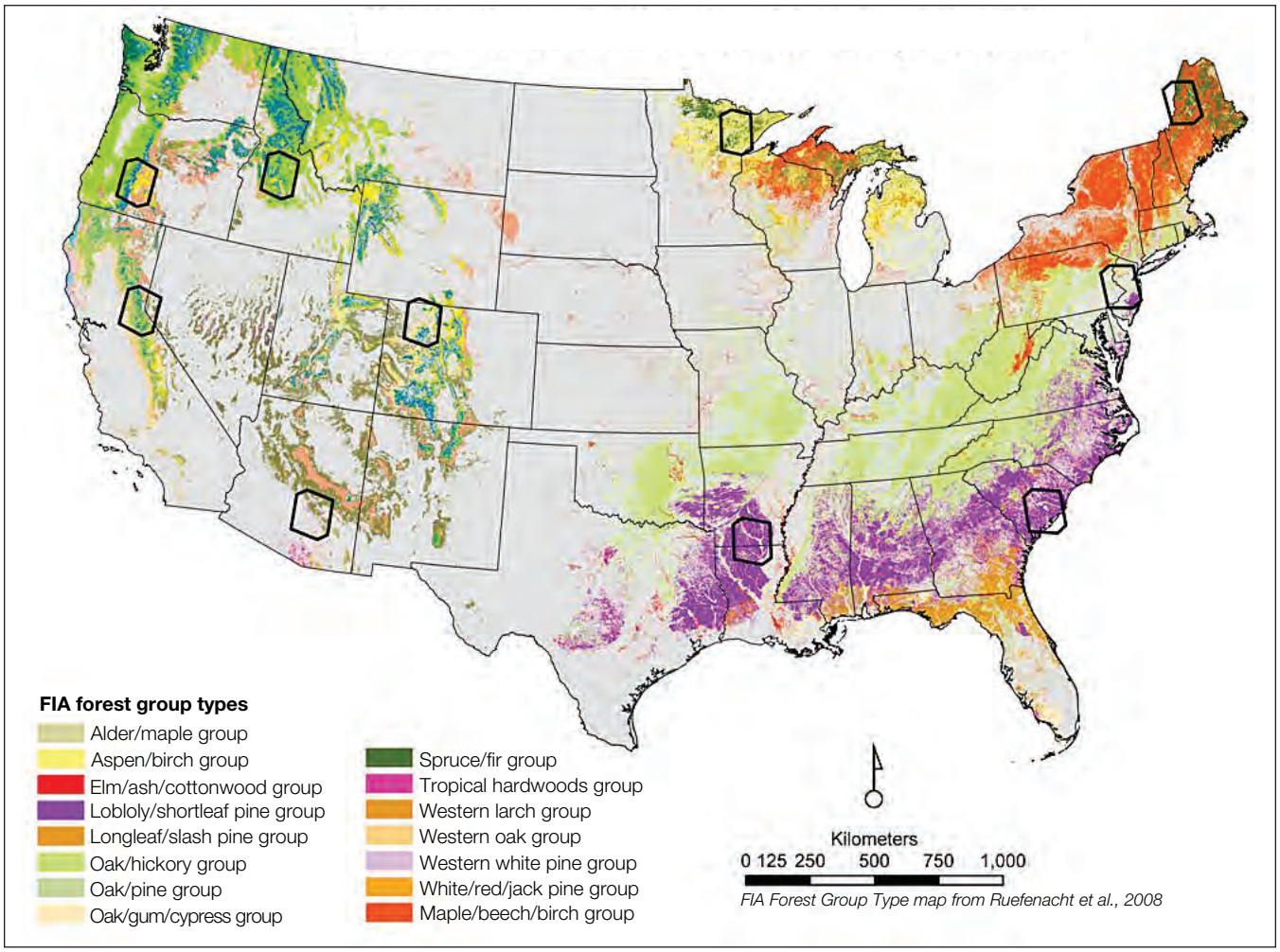
Contact: Sarah Jovan, sjovan@fs.fed.us

Partners: Forest Service Regions 1, 4, and 6; Montana State University; PSWRS

Finding: Currently in its third phase, the North American Forest Dynamics project has launched nationwide processing of historic Landsat data to provide a comprehensive annual, wall-to-wall analysis of U.S. disturbance history during the past 30 or more years. Because understanding the cause of disturbance is important to quantifying carbon dynamics, work is under way to attribute causal agents to these nationwide change maps.

Accomplishment: Developing empirical models of the diverse causal agents in this country involves many decisions. Alternative response designs (such as the varying size, shape, and quantity and the level of detail in training data) are being evaluated in terms of their costs and benefits for national mapping applications (fig. 14.). Many classes of predictor variables (such as spectral signatures, textural metrics, extant geospatial disturbance libraries, and bioclimatic information) are being tested for

Figure 14.—*Ten sample scenes selected for pilot testing causal attribution methods for Phase 3 of the North American Forest Dynamics Project. Scenes were selected to capture a variety of causal agents in diverse forest types.*



their contribution to classification models. Flexible modeling techniques, such as the Random Forests models used here, are powerful predictive tools, but they must be coupled with simple rule-based models reflecting expert knowledge. Also, decisions about appropriate modeling subpopulations are being made in light of available training data, diversity of ecological zones, and computational efficiency. We are in the process of synthesizing results from our initial exploratory work and from pilot analyses conducted across 10 Landsat Thematic Mapper scenes representing diverse causal agents, forest types, and forest prevalence levels.

Outcome: These results will help determine methods adopted by the new Forest Service Landscape Change Monitoring System (LCMS). National causal disturbance models will allow for extensive analyses of temporal and spatial patterns in causal agents across the United States.

Contact: Gretchen G. Moisen, gmoisen@fs.fed.us

Partners: National Aeronautics and Space Administration (NASA); University of Maryland, PNW; Colorado State University

Southern Research Station FIA Program

Finding: Signs of thousand cankers disease (TCD) in the Eastern United States were not evident in the crown condition and mortality data collected by FIA between 2000 and 2010.

Accomplishment: FIA crown condition and mortality data collected by NRS-FIA and SRS-FIA between 2000 and 2010 were examined for evidence of TCD. TCD is an insect-fungal disease complex that causes mortality among species in the *Juglans* genus, particularly eastern black walnut (*Juglans nigra* L.). Early symptoms of TCD include yellowing leaves and thinning foliage in the upper part of the crown. As the disease progresses, crown dieback continues, killing larger branches and eventually the entire tree. TCD was discovered in Tennessee in July 2010 and shortly thereafter in Pennsylvania and Virginia. TCD may have been present in these areas for at least 10 years before discovery; however, no evidence of TCD in the forest at large was apparent in the crown condition and mortality data collected by FIA. Evidence of TCD, if present, was expected to manifest itself in poor crown conditions and mortality, either increasing over time or clumped together in a given space. Neither condition was observed in this study. Black walnut crown conditions were within the range of what is typically considered normal and healthy for hardwood trees, and dead black walnut accounted for less than 5 percent of the total number of black walnut trees in 82 percent of the counties where black walnut occurred. Given that the presence of TCD in the East was unknown when these data were collected, any mortality attributable to the disease would not have been recognized as such and, thus, would have been recorded only incidentally in the insect or disease cause of death categories. An abundance of the unknown cause of death would have been expected if TCD had been present, but this was not the case.

Outcome: This study provides a baseline of information against which future changes in the black walnut resource may be compared.

Randolph, K.C.; Rose, A.K.; Oswalt, C.M.; Brown, M.J. In press. Status of black walnut (*Juglans nigra* L.) in the Eastern United States in light of the discovery of thousand cankers disease. *Castanea.*

Contact: KaDonna Randolph, krandolph@fs.fed.us

Partner: Forest Service National Forest Health Monitoring Program (Evaluation Monitoring project SO-EM-B-11-01)

Finding: Every day, FIA data is becoming better suited for use in monitoring forest species conversion rates to provide the knowledge of current trends that is essential for ensuring the sustainability of forested ecosystems.

Accomplishment: Overall, this research, resulting from a partnership between the SRS and the National Council for Air and Stream Improvement (NCASI), has accentuated the value of the Forest Service's recently implemented annual forest inventory design for the timely evaluation of trends in the Nation's forests. The transitioning of land from forest use to other uses is of increasing interest as urban areas expand and the world's population continues to grow. Also of interest, but less recognized, is the transitioning of land from other uses into forest use. With this research, the partners have explored how rates of conversion from forest to nonforest and nonforest to forest can be estimated in the United States from the continually improving publicly available annual forest inventory database collected and maintained by the FIA program. In addition, they have shown why a discussion and evaluation of conversion rates must be based on well-defined criteria, what some of those criteria might be, and how one might use publicly available databases to address those criteria.

Outcome: A seminal weighted maximum likelihood estimation approach was developed and contrasted with traditional approaches. Example applications have demonstrated the utility of the methodology, which is broadly useful for estimating the annual rate of change from an initial condition to another condition. To date, two journal publications (Roesch and Van Deusen 2012; Van Deusen and Roesch 2009) have resulted.

Roesch, F.A.; Van Deusen, P.C. 2012. Monitoring forest/non-forest land use conversion rates with annual inventory data. Forestry: An International Journal of Forest Research. 85(3): 391–398, first published on line April 16, 2012. doi:10.1093/forestry/cps037.

Van Deusen, P.C.; Roesch, F.A. 2009. Estimating forest conversion rates with annual forest inventory data. Canadian Journal of Forest Research. 39(10): 1993–1996.

Contact: Francis A. Roesch, froesch@fs.fed.us

Partner: Paul C. Van Deusen, NCASI, pvandeus@gmail.com

Finding: SRS-FIA is assisting forest inventory stakeholders from Peru and Colombia in support of the Forest Service International Programs' (IP's) Peru Forest Sector Initiative (PFSI).

Accomplishment: A group of nine forest inventory stakeholders from Peru and Colombia visited the SRS-FIA research unit in Knoxville, TN, on May 14–17, 2012. Accompanying them were personnel from the Forest Service IP's PFSI, SilvaCarbon, and the NRS-FIA. PFSI is a Forest Service program in Peru that aims to provide technical support and implementation of best practices to help the Peruvian Government improve management of natural resources, with emphasis in the forestry sector. SilvaCarbon, a multiagency U.S. Government program

that supports countries participating in reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks (Reducing Emissions from Deforestation and Degradation—REDD+) in developing countries, sponsored the visitors from Colombia. The goal of this visit was to help the visitors to better understand forest inventory objectives, data flow, data processing, and quality control and to learn how to disseminate the information after it is gathered.

The visitors came from a variety of government agencies and universities that included the Peruvian Wildlife and Forestry Service, Environmental Ministry, National Agrarian University of La Molina, National University of the Peruvian Amazon, regional governments with emphasis in the Amazonian region, and the Colombian Institute of Hydrology, Meteorology, and Environmental Studies. Both countries have implemented pilot forest inventory projects in preparation for expanding these efforts nationwide. Their representatives presented their accomplishments, objectives and challenges of forest inventory and information management in their countries to the group. The SRS-FIA unit presented how the FIA program inventories forests in the United States. After a greeting from the SRS Director Rob Doudrick and the SRS Executive Team via video teleconference, presenters showed the group how the FIA sampling was designed, and then followed the course of data from the office to the field and back again, ending with the results that are disseminated to interested stakeholders.

Field data collection was demonstrated on the newly installed demonstration plot in the University of Tennessee's Oak Ridge Forest and Arboretum. The group toured those grounds and research projects, led by the current Director Kevin Hoyt and former Director Richard Evans. Professional translators used a system of wireless earpieces to provide continual translation between Spanish and English, which made communication between the two language groups nearly seamless.

Outcome: Both visitors and hosts agreed that the week was a success. Each presentation generated active exchanges of information and ideas about forest inventories. Participants truly enjoyed sharing their cultures both inside and outside the Knoxville SRS-FIA office.

Contact: Thomas Brandeis, tbrandeis@fs.fed.us

Partners: Forest Service IP's PFSI, SilvaCarbon, NRS-FIA

National Office FIA Staff

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 2012, the National Office staff, in collaboration with field units—

- Provided budget coordination, briefings, and guidance for FIA field units.
- Facilitated one FIA management team meeting, six conference calls, and dozens of briefings for internal and external partners, customers, collaborators, and supporters.
- Collaborated with the Society of American Foresters and helped organize the ninth national users group meeting for FIA customers, which was held in Baltimore, MD, in March 2012.
- Published the *2011 FIA Annual 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.
- Continued to work with USDA and the U.S. Department of the Interior general councils on the memorandum of understanding (MOU) with the National Park Service (NPS) for guiding FIA operations on NPS lands.
- Continued providing support for coding and testing the National Vegetation Classification System (NVCS) algorithm for use with FIA data, in cooperation with FIA by NatureServe.
- Continued to work with the United Nations (UN) Food and Agriculture Organization (FAO) on oversight of the Global Remote Sensing Project to estimate and monitor area changes of the world's forests.
- Continued collaborative work with NASA on land cover and land use tracking in the United States.

- Participated in SilvaCarbon, a flagship program under U.S. fast-start financing for REDD+ and a U.S. contribution to the Forest Carbon Tracking task of the intergovernmental Group on Earth Observations.
- Wrote two *Forestry Source* articles: "Forest Sector Reeling from Economic Downturn," which appeared in January 2012, and "U.S. Forest Products Sector Still Reeling," which appeared in April 2012. They were precursors to an article in the May 2012 *Forest Products Journal* titled "An Overview of the Forest Products Sector Downturn in the United States."
- Prepared response on behalf of Canada, the United States, and Mexico for North American Forestry Commission on reporting of protective forest areas to UN 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 consists of—

Liz LaPoint—Team Lead

Rich McCullough—NRS-FIA

Sam Lambert—SRS-FIA

Jock Blackard—RMRS IW-FIA

Dale Weyermann and John Chase—PNW-FIA

Agreements and Partners

MOU agreements continue to be put in place for those clients for whom access to the confidential data is critical for the project and when it clearly benefits FIA. Most data requests do not require an MOU and are handled by SDS personnel working with the client to provide the information needed. New partners include the University of Wisconsin–Madison, Unity College, and the Maine Forest Service. We continue to work with a variety of partners (for example, NASA, the Forest Service's Remote Sensing Applications Center, and Oregon State University).

FY 2012 Spatial Data Requests

In FY 2012, 605 requests were active, showing an increase from previous years (fig. 15). National or multiregional data requests accounted for 3 percent of the total number of requests. Of the received requests, 99 percent were completed by the end of FY 2012 and 1 percent remains in progress.

Requests are nearly evenly divided among knowledge, summary, and spatial types (fig. 15), and academia continues to be SDSC's largest client, with 28 percent of all new requests; Federal agencies comprised 36 percent of new requests.

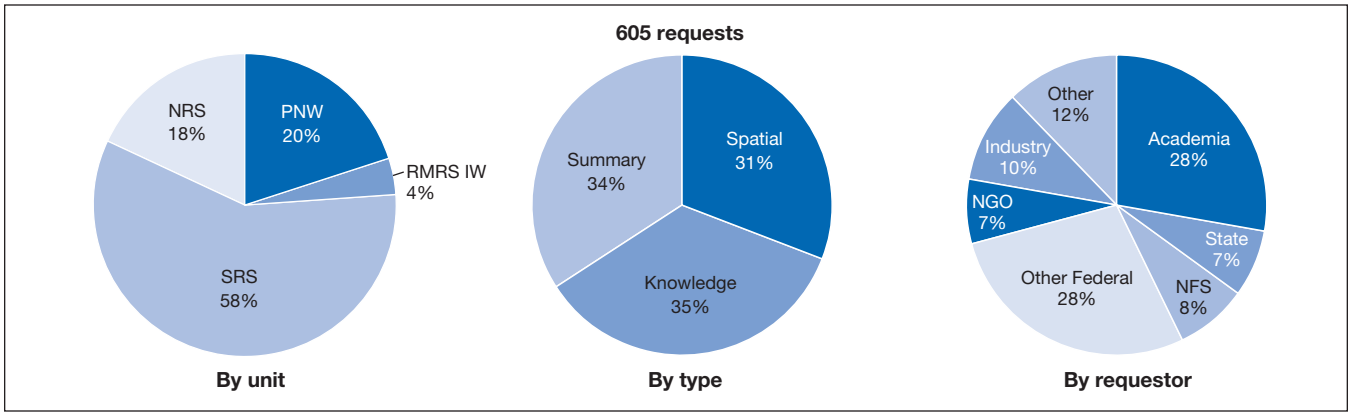
FY 2012 Web Tools

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 datasets in eastwide/westwide format. In 2002, the Forest Inventory Mapmaker program was introduced, enabling the public to generate estimates from national FIA data in the newly created FIADB. The current generation of data retrieval programs produces estimates and their associated sampling errors. Forest Inventory Data Online (FIDO) was introduced in 2008, and the EVALIDator Web application was introduced in 2009.

Based on an analysis of the FY 2012 Internet protocol addresses using FIDO, government use (State and Federal combined) accounted for 20 percent of accesses, private corporations for 17 percent, academia for 11 percent, corporate use for 17 percent, and nongovernmental organizations (NGOs) for 1 percent. In addition, 3 percent of requests were from outside the United States, and 48 percent were individuals or indeterminate entities or people. The total number of FIDO users was 52,099.

The analysis of the FY 2012 Internet protocol addresses using EVALIDator portrays a similar relative order of users: State and Federal government accesses combined constituted 41 percent,

Figure 15.—*Requests made to the FIA Spatial Data Services Center in FY 2012.*



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

corporate was 13 percent, academia was 9 percent, and NGOs constituted less than 1 percent. Accesses made from outside the United States were 3 percent, and 34 percent were indeterminate entities or people. The total number of EVALIDator users was 34,901. The largest percentage of EVALIDator and FIDO users are from government agencies, private corporations, and universities.

In 2009, a Web application was developed to allow for querying of the National Woodland Owner Survey (NWOS) database. In FY 2012, 5,515 retrievals were completed. The FIA DataMart was revised in 2009 to include the ability to download FIADBs by State as Microsoft Access database files. The Access databases contain a reporting tool (the EVALIDator-PC) that enables the user to generate reports. These reports are not included in table 2 but undoubtedly run into the thousands or tens of thousands. These State databases are included on DVDs (digital video discs) that are distributed with each NRS State's 5-year reports.

In FY 2010, users downloaded 18,026 Zip files that contained data from one or more FIADB tables. In FY 2011, they downloaded 24,576 Zip files for a single file. In FY 2011, users downloaded 2,544 Zip files containing the entire set of text files for a given State. In FY 2012, they downloaded 1,512 Zip files.

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. The FVS format is now available through a tool developed by the Forest Management Service Center: the FIA2FVS program, which is used to extract data fields from the FIADB into an FVS-ready database. Users can download the FIA2FVS program from http://www.fs.fed.us/fmsc/fvs/software/data.shtml.

The National Reporting and Data Distribution (NRDD) team provides Webinars and in-person training events on our Web tools. In FY 2010, the team provided one Webinar and three training events. 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 in FY 2011. In FY 2012, the NRDD team again provided Webinars and training. In addition, the NRDD team hosted a booth, providing information and publications to the public. In FY 2012, FIA had more than 90,000 accesses from its Web tools (table 4).

Consultations by FIA Staff

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

Combined, FIA staff addressed 848 significant consultations, which required 8,807 staff-hours to complete (table 5)—equivalent to four full-time staff-years. Of the consultations, FIA staff conducted 322 (67 percent of the time) with other government agencies, such as with State agencies and other

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

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

FIA = Forest Inventory and Analysis.

Federal agencies, and held internal discussions with other Forest Service staffs. Other major client groups included academic clients (approximately 27 percent of the consultations and 11 percent of the time), industry (10 percent of the consultations and 5 percent of the time), and NGOs (8 percent of the consultations and 7 percent of the time). The data also show some regional variations. For example, the major clients throughout the country are mostly State government organizations. FIA data indicate that the second most prominent clients are industry and academic customers (appendix table B-6).

Table 5.—*Number and hours of significant consultations by FIA staff, by customer group, FY 2012.*

Customer group	Number	Hours
Academic	230	1,010
Government	322	5,912
Industry	82	436
NGO	69	578
NIPF	28	85
Media	21	47
Other	96	739
Total	**848**	**8,807**

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 MOU, providing for permanent inclusion of all national forest lands within the FIA program. The signing of this MOU was a significant step forward for FIA customers; the MOU guarantees 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 NFS 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 and the existing FIA data in a format that better serves NFS needs. Region 8 is working with NIMAC to determine intensification levels on each of their forests. Region 9 is now funding NRS-FIA to ensure that all its forests are intensified twofold or threefold. Regions 8 and 9 began funding a term employee in NIMAC in FY 2011.

Regions 5 and 6 continue to work with PNW to intensify the sample and collaborate in crew training, contract administration, and data collection. Regions 1 and 4 have collaborated with RMRS 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 RMRS 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 and by other partners. For example, each national forest must now complete a Climate Scorecard—a significant portion of which can be addressed using FIA data. NRS-FIA and NIMAC are developing analytical tools to facilitate the process.

Feedback from the nine NFS regions indicates that FIA is meeting many of the needs of NFS partners. The development of streamlined Vegetation and Down Woody Material protocols for use on all plots has helped the western regions define and collect a consistent set of regional variables on NFS lands to meet NFS needs. More effort 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 improving these issues in FY 2013. 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 the annual system in all States.
- Collect data on all lands, including reserved lands and rangelands.
- 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 National Woodland Owner Survey Studies

FIA is charged with monitoring and reporting on the status, condition, and trends of all the Nation's forests. Although plot-based field surveys provide most of this information, additional questionnaire and field-based surveys are conducted to report on Timber Products Output (TPO), fuel wood production, and characteristics and management objectives of the Nation's private woodland owners. Appendix table B-8 lists the number of surveys, 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 and by the volume, type, and disposition of wood residues generated during primary processing.

Logging utilization studies—Logging utilization studies provide the information to convert TPO volumes to inventory volume. Utilization factors developed from the data translate a standard unit of product (1,000 board feet of sawlogs, one cord of pulpwood, etc.) into a common volume unit and type of tree harvested. Estimate are made of how much product came from sawtimber growing stock, poletimber growing stock, and non-growing 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 these surveys are available at http://fia.fs.fed.us.

Fuel wood surveys—Studies of fuel wood production from roundwood are necessary to provide information to forest managers and users about the fuel wood harvest and its effect on the resource. How much fuel wood (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 owning it, how they use it, if and how they manage it, sources of information about their forests, their concerns and issues related to their forests, their intentions for the future of their forests, and their demographics. Summary information from the NWOS is used to provide, design, and implement services and policies that affect forest owners that include government agencies, NGOs, landowner organizations, private-service providers, forest industry companies, and academic researchers. A new cycle of data collection for the NWOS began in 2011. The most recent 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 online with numerous analytical examples published both internally and externally. Field protocols associated with

each indicator are available in the national field guide (USDA Forest Service 2006). Next, we present a brief description of the indicators, followed by an overview of the current direction FIA is taking to improve its functionality.

Crown condition—Tree crowns are an important component of net primary production and 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 centimeter (cm) in diameter at breast height, including uncompacted live crown ratio, crown diameter (for some years), crown density, foliage transparency, crown dieback, crown light exposure, and canopy position. The crown indicator is described in Schomaker et al. (2007).

Lichen communities—Long-term observation of epiphytic (i.e., tree-dwelling) lichen communities indicates changes in air quality, climate, and land use. For this indicator, field crews observe the presence of lichen species, estimate the abundance of each species, and collect specimens for identification by a specialist. Lichen community measurements are made within a 37-meter (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 taller 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.

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

U.S. Department of Agriculture, Forest Service. 2006. Forest Inventory and Analysis national core field guide (Phase 3), version 3.0. Washington, DC: U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis. Available at http://socrates.lv-hrc.nevada.edu/fia/dab/databandindex.html#4.%20%20Current%20National%20Core%20Field. (November 2006).

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

Will-Wolf, S.; Jovan, S. 2008. Lichens, ozone, and forest health—exploring cross-indicator analyses with FIA data. In: McWilliams, W.; Moisen, G.; Czaplewski, R., eds. Forest Inventory and Analysis symposium. October 21–23, 2008. Park City, UT. Proc. RMRS-P-56CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: pp 370–387.

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

Beyond Standing Trees: The Evolution of FIA Forest Health Indicators

For more than a decade, FIA has conducted a P3 inventory program in which a subset of P2 plots were sampled to characterize aspects of the forest other than standing trees using the indicators listed previously. FIA is now in the process of developing revised sampling techniques for these indicators in response to fluctuating budgets, emergent user needs, and evolving forest health science.

Some revised indicators (DWM, understory vegetation, and crown conditions) were implemented in FY 2012 in a "Phase 2 Plus Program/Ecosystem Indicator Program" (included, but not separate, in appendix B-7). The P2 sampling scheme facilitates the collection of a national core set of indicator information on more plots for less cost than the original P3 protocols, with sampling as a systematic subsample of each subpanel that can change in response to budgetary fluctuations (i.e., flexibility) without compromising long-term analytical capabilities. Although the revised protocols collect less detailed information on each sampled plot, substantially more plots are sampled, potentially increasing the statistical power of future forest health analysis.

These changes represent a first step for FIA to take the opportunity to address current budget realities and adapt for the future in order to continue to meet customer needs. FIA will work closely with clients to ensure a successful transition from the current P3 program to a fully integrated Phase 2 Plus/Ecosystem Indicator program that continues to provide a comprehensive survey of forest biomass, carbon pools, and ecosystem health in addition to the "traditional" function of the FIA program.

Program Safety

FIA takes safety very seriously and considers it a high priority, just as the entire Forest Service does. People in FIA cover hundreds of thousands of miles in travel each year while conducting business, and they work under very difficult terrain and interact with all types of communities. FIA vision still remains focused on creating an entire workforce culture that seeks to protect our employees, partners, and the public from daily exposure to hazards that threaten safety and health. Table 6 summarizes the program's safety record for FY 2012. Figures 16 and 17 show program safety trends by incident type for FY 2006 through FY 2012 followed by regional safety highlights for FIA units in FY 2012.

Table 6.—*FIA program Federal employee estimates for hours worked, miles driven, aircraft hours flown, and safety incidents reported for FY 2012.*

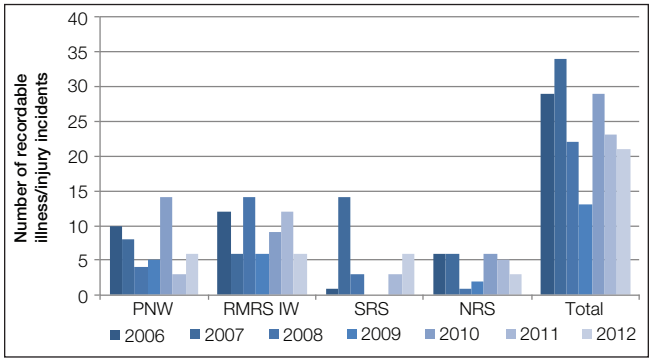
Category	FIA Unit					
	PNW	RMSM IW	SRS	NRS	NO	Total
Base data						
Federal FTE equivalents[a]	88	89	88	103	4	372
Total estimated hours worked[b]	177,713	217,027	176,048	213,200	7,280	791,268
Total vehicle miles driven	363,240	790,326	833,000	895,167	—	2,881,733
Total flight hours logged	187					
Recordable incidents by class						
Time lost illness/injury incidents	6	6	3	6	—	21
Motor vehicle accidents	3	3	2	—	—	8
Aircraft accidents	—	—			—	—
Safety incident frequency rate						
Time lost illness/injury rate per 100 FTEs	6.8	6.7	3.4	5.8	—	5.7
Motor vehicle accidents per million miles driven	8.3	3.8	2.4	—	—	2.8
Aircraft accidents per 100,000 flight hours	—	—				—

FIA = Forest Inventory and Analysis. FTE = full-time equivalent. RMSM IW = Rocky Mountain Research Station, Intermountain West. 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.

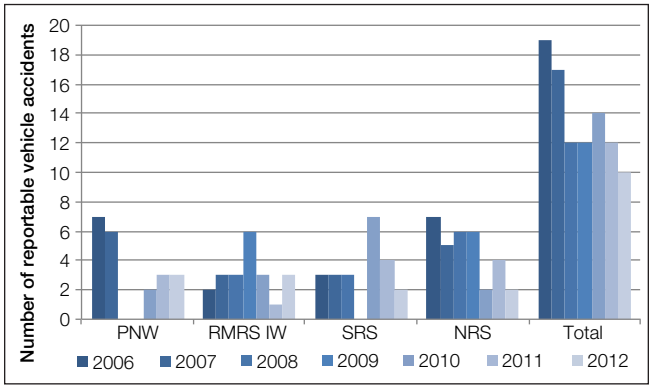
Figure 16.—*Number of recordable illness/injury incidents by FIA unit, FY 2006 through FY 2012.*



FIA = Forest Inventory and Analysis. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. RMRS IW = Rocky Mountain Research Station, Interior West. SRS = Southern Research Station.

Notes: Work-related injury or illness refers to any incident that results 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. The value for SRS for FY 2009 and FY 2010 is zero.

Figure 17.—*Number of reportable motor vehicle accidents by FIA unit, FY 2006 through FY 2012.*



FIA = Forest Inventory and Analysis. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. RMRS IW = Rocky Mountain Research Station, Interior West. SRS = Southern Research Station.

Notes: A vehicle accident refers to 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. The 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 are provided for headquarters offices, field offices, and field crews, including driver training, first aid kits, and cell phones. In regions with special circumstances, such as those that need aircraft, need access to large areas of wilderness, or are exposed to potentially dangerous wildlife or remote difficult-to-access areas, additional training and equipment are provided. Information on specific safety training and criteria is available online at http://fia.fs.fed.us.

Regional Safety Notes

Northern Research Station FIA Safety Highlights for FY 2012

The NRS-FIA unit continues to make safety a priority. Some safety journey highlights for FY 2012 are described in the following paragraphs.

NRS-FIA continues to refine its check-in/check-out protocols and has designated a term employee with primarily dispatch duties, although that employee will continue to work in the field at least one pay period a month to keep up to date with field skills. Having a primary dispatcher enables employees in the unit to be consistent in their approach to the safety program.

NRS-FIA field and office staff continue to participate in safety training. Applicable safety messages and safety tips are regularly sent to unit employees via e-mail.

Leader-to-employee safety sessions are currently being held for the second phase of Safety Engagement. During the summer of 2012, the unit was faced with a unique opportunity to take what was learned in the 2011 Safety Journey and put it into practice. During a field certification training in the summer of 2012, a significant wind event happened, prompting an employee to flash "the yellow card." Although the employee may have been uncomfortable, the training crew took notice and removed the training participants to a sheltered area. This incident allowed for the field crew and, ultimately, the unit to have a safety conversation.

In the summer of 2012, one NRS-FIA field crew office underwent significant flooding, causing water damage to equipment, furniture, and records. The water damage to the drywall promoted mold growth, a potential indoor breathing hazard to the two field crew members. Subsequently, the unit secured a mold assessment and a professional cleaning crew to clean salvageable equipment and furniture. The office is now completely habitable, and the crew members will be returning to the office from temporary quarters. The unit will complete a lessons-learned document and a protocol as a proactive step should flooding occur at another office.

In preparation for the 2012 National Office safety review, the unit had each supervisor complete the Safety and Occupational Health Program Evaluation Checklist, giving the supervisor the opportunity to score the unit. The unit performed safety inspections for each FIA location and recorded and identified needed safety corrections. In addition, the NRS-FIA updated the unit's Safety Charter and the Safety and Health Plan, which mirrors the station's Safety and Health Plan. The NRS-FIA safety Web page continues to highlight updated Job Hazard Analysis, the Safety and Health Plan, and Material Safety Data Sheets. With each monthly project call, a safety message is given a person designated on a rotating basis, and monthly safety committee meetings are e-mailed to everyone in the unit.

Although the number of recordable injuries increased this year by one, bringing the total to six, no work time was lost. Most recordable injuries and illnesses are tick bites. The unit decreased the recordable vehicle accidents from two to zero.

Pacific Northwest Research Station FIA Safety Highlights for FY 2012

The PNW Resource Monitoring and Assessment (RMA) program's FIA unit envisions safety and wellness as an ongoing commitment to changing behavior toward safer and healthier lifestyles. A significant new focus for our sedentary office staff includes development and participation in research station wellness challenges and programs. Part of this effort revolves around increasing our fitness levels. Another related effort focuses on improved ergonomics and the testing of standup workstations for the office environments. We have all jointly stressed the importance of healthy diets and are sharing wholesome recipes to encourage improved eating habits. Many of the PNW RMA-FIA office staff were involved in first aid and cardiopulmonary resuscitation (CPR) training as part of raising safety awareness in the office environment and responding to emergencies. Our safety committee continues to emphasize safety recognition with the successful Safe-T-Bucks reward system and the Safety Employee of the Month selection. Toward increasing safety awareness, PNW RMA publishes a quarterly newsletter, the *Careful Chronicle* (since 2006), and conducts and actively discusses the results of the annual safety survey. We collect and analyze near-miss and tailgate safety session reports. RMA explores behaviors in the office and in the field, among and within teams, and with clients and partners, to more effectively summarize and use safety and wellness

information to improve processes and procedures and provide feedback to our people on critical safety issues and trends. RMA has had 100 percent participation in the national Safety Engagement effort, working toward strengthening our safety culture. In 2013, we continue the agency Safety Journey at the team level, selecting, designing, and implementing safety and wellness projects. Other highlights from 2012 include a very successful safety poster contest in which teams competed for Safe-T-Bucks. We continue to document safety-related training attendance by employees, annually review and update job hazard analyses for all work, 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 continue building our common safety vision among the four FIA units.

Rocky Mountain Research Station, Interior West FIA Safety Highlights for FY 2012

The RMRS IW-FIA program is committed to developing a proactive safety culture by modeling and reinforcing safety as its core value. This goal requires building trust; learning from mistakes; understanding human performance; and responding carefully and intentionally to people, situations, and accidents. During the past year, the program has focused extra attention on sharing and learning from our safety stories. In addition to participating in multiple Facilitated Learning Analyses (FLA) within the program and the RMRS, program leadership and employees shared personal safety stories in the program's safety newsletter.

An FLA that was conducted in late FY 2011 revealed vulnerability in employee safety training. Some "common place," yet critical, safety issues had, previously, not been purposefully trained or tracked. To help ensure that new and returning employees have the necessary skills to perform their duties safely and respond appropriately in emergencies, the program's safety committee developed a framework and guide for employees and supervisors conducting training and a checklist of essential skills. The minimum core safety competencies for RMRS IW-FIA field employees also provide expectations for a timeframe for the essential skills. The program will continue to refine the core competencies in the next year.

The RMRS IW-FIA program published its first safety publication, *Safety Analysis Report: A Comparison of Incidents from Safety Years 2006 through 2010, USDA Forest Service, Rocky Mountain Research Station Inventory and Monitoring Program.* Although the report is exclusive to RMRS IW Inventory and Monitoring, there is much that is applicable across FIA and other research units. The report concludes that, although driving is widely perceived as the riskiest duty, most actual injuries and costs are associated with slips, trips, and falls that happen when employees are hiking. The program plans to proactively focus on wellness and fitness activities to help decrease the number of injuries and the severity of those types of injuries.

The program participated in the Great Utah Shake Out, Utah's first statewide earthquake preparedness drill. All employees were encouraged to prepare personal emergency kits for their offices and homes and create an emergency plan for survival and recovery. In addition to providing educational resources on earthquakes, the program conducted several office inspections to ensure that employees' offices were arranged to minimize injuries to employees, ensure safe egress, and minimize damage.

Some additional program safety highlights include ensuring that all field-going employees are issued a communication device, establishing a list of minimum emergency field gear and issuing kits to all field-going employees, revising check-out/in procedures for working alone, participating in the FS "Early Adopters" FLA, and successful station and national FIA safety reviews.

Southern Research Station FIA Safety Highlights for FY 2012

In keeping with the Chief's Safety Initiative, the SRS-FIA unit considers its No. 1 priority to be protecting our most valuable resource—our employees. Unless we do that, we cannot be a world-class leader in natural resource management. In an effort to provide expanded safety information and expertise to employees, SRS-FIA hired a full-time safety and cccupational health specialist in 2012. In designing projects and activities and in developing policies and procedures, we first strive to be aware of any associated hazards and to mitigate them. The SRS-FIA Safety Committee's goal is to incur zero accidents during FY 2013. That is why the committee continues to meet monthly to improve safety, increase awareness, and provide guidelines for all SRS-FIA personnel. The committee also invites input from employees before each meeting. By keeping lines of communication open, we invite participation and involve our employees in solutions to safety issues.

Major investments were made during 2012 to improve safety for our field-going employees. Field crews, QA staff, and management met for a week-long session of training for off-road driving operations. Training included a 2-mile off-highway vehicle course for crews to practice driving through real conditions. SRS-FIA personnel also offered training sessions on vehicle recovery and boating safety and presented other specialized

topics such as methamphetamine lab identification and avoidance and proper procedures for jumpstarting vehicles and temporarily plugging tires.

SRS-FIA began deploying Satellite Emergency Notification Devices (SEND) for field crews late in 2012. These devices have been used successfully to provide employee locations in the event of an emergency in other regions of the Forest Service. Additional safety equipment was issued or replaced, including new hard hats and safety glasses. Hard hats and safety glasses are required Property, Plant, and Equipment (PPE) items when field personnel are conducting field surveys. Working with engineering and fleet personnel at SRS Headquarters, we assisted with risk assessment and policy development for all-terrain tires. The safety benefits of the resulting policy are twofold. First, by requiring that all-terrain tires initially be purchased through the appropriate automobile manufacturer's dealership, we are ensuring that only manufacturer-approved tires are used and any necessary adjustments to the vehicle are made. Second, by enabling field staff to safely purchase all-terrain and puncture-resistant tires, we are reducing the risk of stuck vehicles and flat tires caused by punctures in the sidewall.

SRS-FIA also sought to improve safety at its headquarters location in Knoxville, TN, in 2012. In an effort to reduce response time for emergency defibrillation, we purchased an additional automated external defibrillator (AED) for the Knoxville office. AEDs are now located on the first and third floors of the facility, making this lifesaving technology accessible to everyone in the office. These devices could mean the difference between life and death in a critical medical situation. Also, two training classes on proper AED operation were provided to office and field personnel. CPR (cardiopulmonary resuscitation) and first aid training courses were provided for SRS-FIA personnel in 2012, ensuring that CPR/first aid-certified individuals are always present on field crews and that several office employees maintain current certification. We sought to improve fire preparedness by conducting multiple fire drills in 2012. The Knoxville Fire Marshal witnessed our June fire drill and rated our response as "excellent." Fire extinguisher training was completed in 2012 through an additional collaborative effort with the Knoxville Fire Department. Several individuals participated in fire safety activities as we rotated assignments for fire drill floor wardens for the building. Keeping the 2011 tornado outbreak in mind, we improved severe-weather awareness by purchasing additional National Oceanic and Atmospheric Administration severe-weather radios and deploying them throughout the building. Finally, we upgraded our security camera system and successfully negotiated improvements to our secure parking gate.

We continue to move toward a culture of open communication and information sharing regarding safety. Along those lines, we redesigned our Web page (http://fsweb.fia.srs.fs.fed.us/safety/) to provide easily accessible and meaningful safety information and resources. The new safety and occupational health specialist also included a fillable area on the Web page where employees can submit concerns, ideas, or proposals regarding safety.

Looking ahead, we hope to report on several additional safety goals and concerns in 2013, including (1) winches for field-going vehicles, including use of the Safety and Health Information Portal System to report deployment; (2) consideration of smartphones for field staff; and (3) refinements of reporting processes to make reports more user-friendly and more amenable to analysis. We will continue to pursue novel training opportunities to increase safety, and we will strive to recognize and mitigate hazards in a proactive and preventive manner.

Comparing FY 2011 Plans With FY 2012 Accomplishments and FY 2013 Plans

In the FY 2011 business report for FIA, we included a section stating our plans for FY 2012. The table in this section shows how our actions in FY 2012 matched our plans from FY 2011 and how they align with our plans for FY 2013.

In the FY 2011 business report, we said that in FY 2012 we would—	In FY 2012, we—	In FY 2013, we will—
Base inventory and reporting		
Continue base inventories in 49 States and coastal Alaska if funding remains constant. Travel restrictions will continue to be a challenge.	Continued base inventories in 49 States and coastal Alaska. Travel restrictions continued to be a challenge but production held steady by increased contracting and cooperator support.	Continue base inventories in 49 States and coastal Alaska, although travel restrictions and budget constraints may continue. As of March 2013, a final 2013 budget was still unavailable, making projection of accomplishments for this report difficult.
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.	Completed and published 5-year State reports for 11 States: Kansas, Nebraska, North Dakota, Pennsylvania, Wisconsin, Alabama, Florida, Tennessee, Puerto Rico, Federated States of Micronesia, and Commonwealth of the Northern Mariana Islands. Reports for Illinois, South Dakota, Kentucky, North Carolina, Texas, Arizona, and New Mexico delayed.	Publish 5-year State reports for Illinois, Ohio, South Dakota, Arkansas, Georgia, Kentucky, Louisiana, North Carolina, Texas, Arizona, New Mexico, California, and Oregon. Continue developing cost-effective inventory methods for interior Alaska.
Reinventory U.S.-affiliated Pacific Islands, starting with American Samoa for FY 2012.	Began reinventorying U.S.-affiliated Pacific Islands in American Samoa and work progressed in Hawaii.	Begin reinventory of Guam.
Complete the ARRA inventory project in New Mexico, which will provide more than 80 percent of the State's annual forest inventory plots.	Implemented modified LITE protocols for down wood and vegetation indicators; implemented modified LITE crowns protocols in the East; implemented P3 soils remeasurements in NRS and RMRS IW. Investigated cost-effective methods for interior Alaska for further review.	Complete the ARRA inventory project in New Mexico and develop the first annual inventory report for the State.
Implement Field Manual 6.0 in FY 2012. Begin 10-year review of the FIA P3 forest health indicators to determine State-by-State implementation, data availability, utility, clients' needs, potential for spatial intensification, and potential cost savings via protocol modifications. Propose 18 State and island reports.	Worked with ARRA inventory project in New Mexico, continuing data collection on 80 percent of the inventory with New Mexico State-contracted crews to expedite the update of statewide inventory data. Implemented Field Manual 6.0. Published a report on determining critical loads for air pollution effects in California, using the P3 lichen indicator, and published a report on nonnative plant effects on forest health, using the P3 vegetation indicator.	Release a fully comprehensive database of lichen data (1994 to the present) to the public. Use P3 lichen data to revise critical loads for N for all forested ecoregions of the United States. Develop a comprehensive P3 indicator database for public use; Continue to analyze P3 VEG data to investigate diversity issues (response to N deposition; overstory/understory diversity relationships).

Develop a beta version of a national TPO

In the FY 2011 business report, we said that in FY 2012 we would—	In FY 2012, we—	In FY 2013, we will—
National Woodland Owner and Timber Products Surveys		
data management and processing system that will eventually allow for consistent, nationwide Web delivery of TPO data.	Began developing a new national data entry and processing system for TPO and are currently testing the system. Completed one national report and three regional reports summarizing the impact of the recent economic conditions on the forest industries in the United States.	Deploy the beta version of a national TPO data management and processing system that will eventually allow for consistent, nationwide delivery of TPO data.
Complete processing of the 2011 NWOS data and submit the results for publication.	Processed the 2011 NWOS data, but publication is delayed until the 2012 and 2013 data are available. The combined 2011–2013 data represent a complete survey cycle.	Contact additional private ownerships as part of the final phase of the current cycle of the NWOS.
Contact additional owners to augment the 2011 sample size to reach the State-level target sample sizes. This activity will likely need to be done in 2013 as well.	Contacted approximately 4,000 additional private ownerships as part of the 2012 iteration of the NWOS.	Finish processing the 2011, 2012, and 2013 NWOS data and begin preparing the final products.
Publish the improved ownership map.	Made progress on the ownership map, but it has not yet been published.	Incorporate NWOS data into FIA's NIMS database.
Continue to work with partners to further the analysis of the NWOS.	Worked with a broad array of partnerships and addressed topics ranging from general forest ownership trends to the potential impacts of specific policies.	Begin planning for the 2014 NWOS, including submission of the requisite OMB paperwork. Submit the improved ownership map for publication. Continue to work with partners to further the analysis of the NWOS.
Pilot studies		
Publish Urban FIA report on the urban pilot work in Tennessee. Complete Urban FIA report on the pilot work in Colorado.	Published an Urban FIA report for the Tennessee pilot project.	Process the data and prepare report on Urban FIA pilot work in Colorado.
Continue ARRA project urban inventory work in Oregon, California, and Hawaii.	Completed all data collection and data QA from urban plots in all five Pacific States. Began compiling and analyzing data for California, Oregon, and Washington, working toward implementing iTree Eco to calculate urban tree ecosystem service values.	Prepare GTRs describing the urban inventory results for all five Pacific States.
Complete pilot testing for the NLCD Tree Canopy Cover product. Conduct NLCD Tree Canopy cover project within Washington, Oregon, and California.	Completed pilot test of NLCD tree canopy cover product and published results (Coulston et al. 2012; PE&RS. Completed project implementation preparation for CONUS-wide production.	Complete full production of the NLCD) Tree Canopy Cover data for CONUS. Conduct NLCD Tree Canopy cover project within Washington, Oregon, and California.
Launch activities in support of the MTLCS. (NASA funding pending.)	Completed project preparation activities and implemented full production process for CONUS in late 2012.	Complete and deliver CONUS data in the fourth quarter of 2013.

In the FY 2011 business report, we said that in FY 2012 we would—	In FY 2012, we—	In FY 2013, we will—
Pilot studies (continued)		
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 a report on determining critical loads for air pollution effects in California, using the P3 lichen indicator. Publish a report on nonnative plant effects to forest health, using the P3 vegetation indicator.	In the absence of NASA funding, initiated the LCMS project (the major component of the MTLCS). Science team work on change algorithm research and development progressed and the INA was designed and prepared for interagency distribution. Began a 4-year national implementation of the ForCaMF approach across the NFS. FIA data in the Northern NFS region were used to derive regionally representative carbon dynamics, which were combined with management and disturbance maps to assess drivers of carbon storage. Published a report on determining critical loads for air pollution effects in California, using the P3 lichen indicator. Published a report on nonnative plant effects to forest health, using the P3 vegetation indicator. Estimated the effect on carbon flux of land use, management, and disturbance and compared with changes detected with Landtrender.	Continue science team work on change algorithms, complete the INA process, and initiate an interagency pilot to identify gaps in existing program data and analysis products. Continue implementation across NFS, producing template reports for specific "early adopter" forests. Develop models using Landtrender to estimate carbon flux from remeasured FIA field plots as a function of land use, management, and disturbance. Implement regional ICE project, working with Remote Sensing Applications Center to develop new FIA product lines addressing enhanced land cover and land use objectives in the upcoming strategic plan.
Forest carbon		
Increase the carbon estimate capability of FIA's online tools while exploring possibilities for reporting carbon attributes in expanded outlets (e.g., resource bulletins). Incorporate P3 DWM estimates into the 2013 NGHGI, which will necessitate creating an operational DWM estimation engine in NIMS. Refine managed land delineations in Alaska for the purpose of NGHGI reporting.	Made numerous carbon estimates available via online tools. Made estimates of downed dead carbon based on the P3 DWM inventory available in EVALIDator for many States. Developed a fully functional DWM estimation engine (including carbon estimates) in NIMS. In addition, the Carbon Calculation Tool now disaggregates NGHGI estimates to the county level. Prepared the first national assessment of the biomass and carbon attributes of DWM. Estimates from this work are being incorporated into the 2013 NGHGI.	Explore refined techniques for extrapolating and interpolating between FIA periodic inventories to develop 1990-to-present NGHGI baselines. Explore refined techniques for estimating forest floor and soil organic carbon stocks with the possibility of using P3 DWM and soils data. Conduct research to explore improved belowground and understory carbon models.
Experimental Forests and Ranges		
Funding for EFRs work eliminated in initial budget estimates. Held-over FY 2011 funding will be obligated at PNW.	PNW continued EFRs fieldwork with held-over funds.	No activity funded or planned for FY 2013.

In the FY 2011 business report, we said that in FY 2012 we would—	In FY 2012, we—	In FY 2013, we will—
Information management and distribution—FIDO		
Continue to improve the users' interface with FIDO. Release Web version of FIADB 5.0 documentation to coincide with release of new, improved versions of FIDO, EVALIDator, and the FIA DataMart.	Added the ability to produce ratio estimates in the EVALIDator Web application. For example, the EVALIDator can now produce estimates of: volume per acre and growth as a proportion of current volume. The EVALIDator can also produce shaded county maps of these ratio estimates.	Add the ability to produce KMZ files of ratio estimates to allow shaded county maps with legends to be viewed in GoogleEarth and easily migrated to a Web server for display as a GoogleMap.
Develop online tools and users' guide documentation supporting FIADB 6.0.	Posted version 1.5.1.04 of the FIADB Users Guide to the FIA Library Web page and updated the DataMart to be in sync with this version of FIADB.	Post version 1.5.1.05 of the FIADB Users Guide to the FIA Library Web page and update the DataMart to be in sync with this version of FIADB.
Conduct training Webinars.	Posted updated versions of the FIADB Users Guide to the FIA Library Web page. • Version 1.5.1—Feb. 2012. • Version 1.5.2—Jul. 2012. • Version 1.5.4—Oct. 2012. Conducted training Webinars and other outreach efforts. • FIA Tools and FIDO/EVALIDator/FIADB training, NRS Users Group 10/26/2011. • Webinar for S&PF on 11/9/2011 on FIDO Webinar for Northern Area S&PF on12/14/2011 on GNN layers. • National Users Meeting presentation in Baltimore—March 2012. • FIA Tools and FIDO/EVALIDator/FIADB presentation and training, RMRS IW users group 5/16/2012. • Ecological Society of America FIA booth during the week of 8/6/2012.	Conduct training Webinars. Make necessary changes to implement "growth accounting" for attributes that customarily change between measurements. Continue to update documentation, databases, and tools to support users' changing needs.
Information management and distribution—MIDAS		
Incorporate feature enhancements and new technologies and prepare for version 6.0 of the National Field Guide. (Implement changes by 10/01/2012.) Complete necessary modifications to collect P2-Plus on a subset of P2 plots during the summer months.	Incorporated feature enhancements and new technology, implemented changes necessary to implement version 6.0 of the National Field Guide. Completed the necessary modifications and successfully collected P2-Plus forest health attributes of a subset of P2 plots during the summer months.	Continue implementing National Field Guide version 6.0 for field data collection.

In the FY 2011 business report, we said that in FY 2012 we would—	In FY 2012, we—	In FY 2013, we will—
Information management and distribution—NIMAC		
Process and make all completed panels of data available with EVALIDator and via the Web using FIDO for Wisconsin.	Processed a new panel of data for Indiana and Wisconsin and made the data available using the EVALIDator analytical tools, including some P3 data for Wisconsin. Indiana completed a fifth year of data collection, Wisconsin completed the first panel of the second cycle, and Missouri completed its initial panel. Availability of data for Wisconsin State forests via the Web using FIDO has been delayed because of delays in updating FIA's version of FIDO.	Process and make all completed panels of data available with EVALIDator for Missouri and Wisconsin and complete development of applications for Wisconsin, via the Web, using FIDO.
Install NIMS processing software and train Indiana and Missouri on its use. Instruct them on creating EVALIDator databases and their use.	Installed NIMS processing software and trained Indiana clients on its use, including instructions on creating EVALIDator databases. Missouri decided not to process its own data but to fund NIMAC to do so (similar to Wisconsin).	Assist Indiana as needed with NIMS processing software and creating EVALIDator databases for their use.
Release first versions of the Design and Analytical Tools for testing. Continue to provide technical support to Regions 8 and 9.	Completed the first phase of the design and analytical tools development for NFS spatial tools for use with FIA and NFS data. Regions 8 and 9 funded NIMAC to provide technical support for intensification and use of FIA data.	Release the first versions of the Design and Analytical Tools for use and will begin the second round of software development of P2 protocols.
Provide technical assistance and software tools in three continents (South America, Africa, and Asia) as part of the SilvaCarbon effort.	Met international requirements to resume trade on a national level, a result of the mahogany study in Honduras. Provided technical assistance on monitoring forest carbon to Peru, Colombia, Ecuador, and Gabon as part of the interagency SilvaCarbon effort. Also provided technical assistance to DR Congo, Panama, Mexico, and Brazil.	Continue to provide technical assistance and software tools in three continents (South America, Africa, and Asia) as part of the SilvaCarbon effort.
Information management and distribution—NIMS-CS		
Implement NIMS-CS version 5.1 at the data center and process 2011 data at the data center.	Implemented NIMS-CS version 5.1 and processed data collected in FY 2011 at the data center.	Implement NIMS-CS version 6.0 and process data collected during FY 2012 at the data center.
Implement FIADB 5.1 at the data center and publish 2011 data. FIADB 5.1 includes enhancements for DWM reporting and analysis.	Implemented FIADB 5.1 at the data center, including enhancements for DWM reporting and analysis.	Implement FIADB version 6.0 and publish 2012 data at the data center.
Develop NIMS-CS 6.0 variable collection and processing. Develop FIADB 6.0.	Developed most necessary changes for NIMS-CS 6.0. Implementation of FIADB 6.0 is planned for the middle of FY 2013.	Make necessary changes to provide the detailed components of change in NIMS and FIADB so the online tools can implement the new growth accounting method.

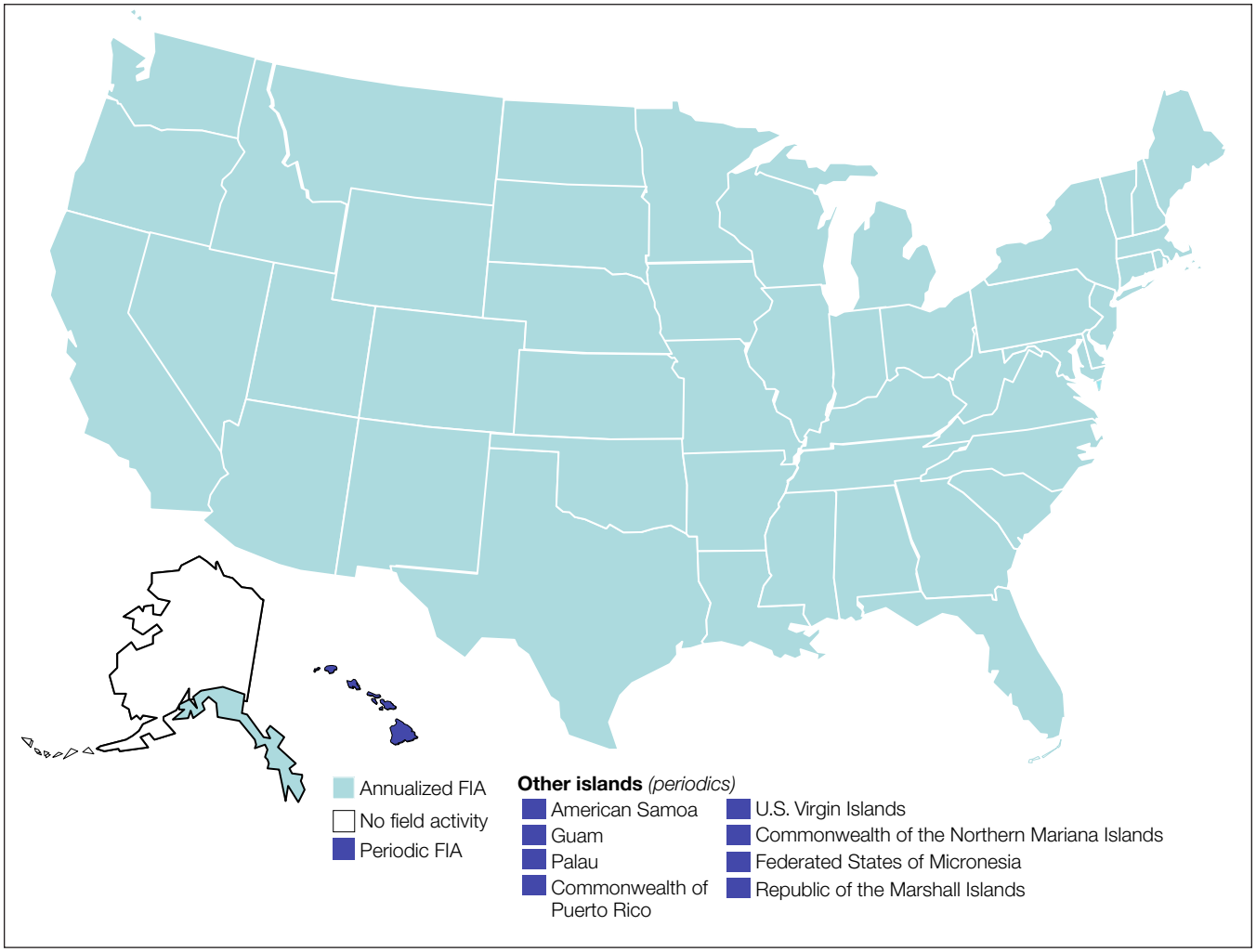
In the FY 2011 business report, we said that in FY 2012 we would—	In FY 2012, we—	In FY 2013, we will—
FIA Atlas project		
Complete final maps and storyboards and prepare features for each chapter with a goal to lay out and print the FIA atlas in 2012.	Continued working on the FIA atlas. Revised story to include more elements from partners outside R&D (e.g., S&PF, NFS). Worked with the National Office and USDA to identify a process for policy and technical review. Completed the transition to a new editorial and cartographic team. Compiled the feature content for design and layout. Moved the rollout date to 2013.	Complete the policy and technical reviews with the National Office and USDA. Complete the design and layout of features. Print the atlas. Prepare content for release in the companion Web site.
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. Make increased use of electronic communications and training Webinars in an effort to balance travel costs while meeting clients' needs.	Held a total of 15 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 users' input and four strategy sessions around the country in 2011 and early 2012. Hold the 2012 FIA Science Symposium.	Began drafting the FIA strategic plan for 2013–2017. Held the 2012 FIA Science Symposium in Baltimore, MD, in December 2012 with more than 100 participants.	Release a draft of the FIA strategic plan for 2013–2017 that includes regional users' input. Plan alternatives for the 2014 FIA Science Symposium.

CONUS = contiguous United States. DWM = down woody material. EFRs = Experimental Forests and Ranges. FIA = Forest Inventory and Analysis. FIADB = Forest Inventory and Analysis Data Base. FIDO = Forest Inventory Data Online. ForCaMF = Forest Carbon Management Framework. FY = fiscal year. ICE = Image-Based Change Estimation. INA = Information Needs Assessment. LCMS = Landscape Change Monitoring System. MIDAS = Mobile Integrated Data Acquisition System. MTLCS = Monitoring Trends in Land Change System. NASA = National Aeronautics and Space Administration. NFS = National Forest System. NIMAC = National Inventory and Monitoring Applications Center. NIMS = National Information Management System. NIMS-CS = NIMS check edit system. NLCD = National Land Cover Dataset. OMB = Office of Management and Budget. R&D = Research and Development. S&PF = State and Private Forestry. TPO = Timber Products Output. USDA = U.S. Department of Agriculture.

FY 2013 FIA Program Direction

As with budgets in recent years, the FY 2013 budget has considerable uncertainties and, although funding was restored to S&PF in FY 2012, funding is currently eliminated in the preliminary FY 2013 budget. A continuing resolution would retain it through 2013. FY 2013 funding currently remains near the FY 2012 level, and the FIA program will continue inventory operations in 49 States and coastal Alaska (fig. 18). Other major activities planned for 2013 include continued full compliance of State 5-year reports, completing the next iteration of the NWOS, modernizing the program's TPO operations and reporting, improving land cover and land use classification, completing the FIA atlas project, and completing a final draft of the program's 2013 through 2017 FIA strategic plan. Current FY 2013 funding continues to eliminate support for FIA-related research at EFRs for long-term monitoring needs.

Figure 18.—*Planned FIA implementation status, FY 2013.*



FIA = Forest Inventory and Analysis.

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 table in this section shows our key goals, performance measures, benchmarks, and targets for the FIA program for 2007 through 2012. In future business reports, we will repeat this table to show how we are progressing toward our goals.

In 2012, FIA also began developing a new strategic plan to update the current plan that was published in 2007. The new plan will be forward looking and will balance emerging client demands for new information, tools, and values with necessary decisions on priorities and budget constraints. The evolution of the FIA strategy will be developed in cooperation with partners and stakeholders and will identify the base program, enhancements to the base, priorities for new programs, and areas for increased flexibility in the future.

Goal	Performance measure	2007 level	2008 level	2009 level	2010 level	2011 level	2012 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	85	87	90	92	89	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	90	94	94	98	100	100	100
Make data accessible to national forest customers	Percentage of national forest land for which FIA data are loaded into NRIS	90	92	92	100	100	100	100
		Outcomes						
Keep analysis current	Percentage of States with FIA State report less than 6 years old	42	60	76	74	92	88	100
Keep online data current	Percentage of States with FIA online data less than 2 years old	88	90	90	84	92	92	100
Customer satisfaction	Percentage of customers rating service as satisfactory or better	85	85	85	87	87	87	100
Partner participation	Partner financial contributions expressed as percentage of total program funds	10	11	9	10	11	13	20

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

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

Conclusions

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

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

Glossary of Terms Used in Appendixes

base Federal FIA program. A level of FIA program delivery that includes sampling 10 percent of base grid Phase 2 (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 Phase 3 (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.

imagery. Aerial photos, satellite imagery data files.

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

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

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

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

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

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

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

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

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

analysts. Staff who analyze data and write publications.

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.

P1 (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.

P2 (Phase 2). A set of sample locations, approximately 1 for every 6,000 acres of land, measured for basic mensurational forest attributes.

P3 (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 office in the following list.

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

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

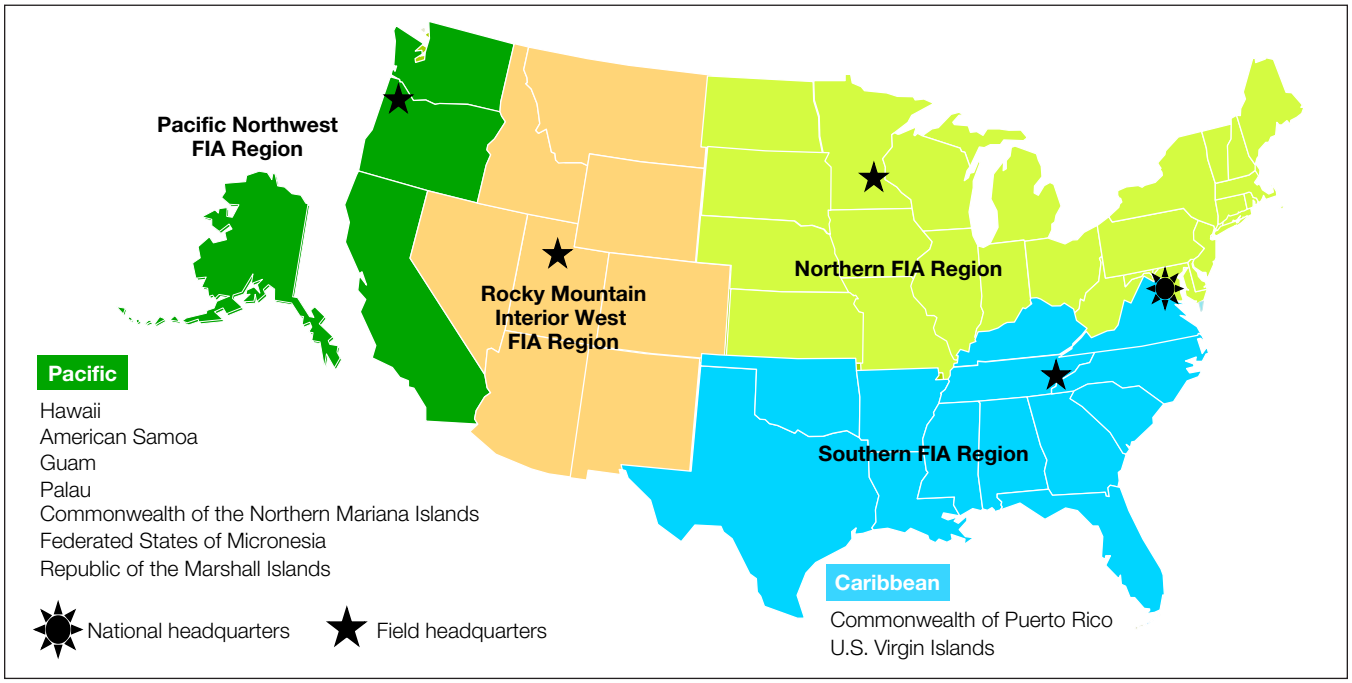
National Office FIA Program
National Program Leader, FIA
USDA Forest Service
1601 North Kent Street, Suite 400
Arlington, VA 22209
703–605–4177

Rocky Mountain Research Station, Interior West FIA Program
Program Manager, FIA
USDA Forest Service
Rocky Mountain Research Station
507 25th Street
Ogden, UT 84401
801–625–5407

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

All regional Internet home pages, as well as 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 2012 FIA program.*

	Pacific Northwest	RMRS Interior West[a]	Southern	Northern	National Office	Total
Total available Federal funds, FY 2012 ($)	13,802,800	14,237,528	16,285,356	16,827,378	8,561,000	69,714,062
Total appropriated Federal funds, FY 2012 ($)	14,013,000	14,228,000	15,701,000	16,683,000	8,561,000	69,186,000
Estimated % of FY 2012 full funding[b]	92/79	93	92	92	77	89
Contributions from partners						
Supporting the 20% FIA program ($)	141,648	1,214,349	1,789,887	1,012,112	0	4,157,996
Value-added contributions ($)	976,731	1,744,421	242,890	3,006,592	0	5,970,634
Total contributions ($)	1,118,379	2,958,770	2,032,777	4,018,704	0	10,128,630
Total all available funds, FY 2012 ($)	**14,921,179**	**17,196,298**	**18,318,133**	**20,846,082**	**8,561,000**	**79,842,692**
Base grid plots sampled (includes buy down)						
Phase 2, forested[c]	1,676	3,427	7,683	5,906		18,692
Phase 2, nonforested	2,439	7,284	2,600	13,385		25,708
Total Phase 2 plots	4,115	10,711	10,283	19,291		44,400
Phase 3, forested[c]	—	130	450	401		981
Phase 3, nonforested	—	369	180	874		1,423
Total Phase 3 plots	—	499	630	1,275		2,404
Total base grid plots	4,115	11,210	10,913	20,566		46,804
Intensification plots sampled						
Phases 2 and 3, forested[c]	1,117	140	463	1,947		3,667
Phases 2 and 3, nonforested	46	18	3	1,886		1,953
Total intensification plots	1,163	158	466	3,833		5,620
Number of QA plots						
Phase 2 (forest + nonforest)	362	551	2,265	1,020		4,198
Phase 3 (forest + nonforest)	—	22	142	55		219
Total QA plots	362	573	2,407	1,075		4,417
Total base grid plots and percent sampled[d]						
Total Phases 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%
Estimated Phases 2 and 3 base forest plots measured	10%	14%	18%	21%		17%
Percentage of States with annual FIA activity[e]	100%	100%	100%	100%		100%
Number of publications						
National forest reports	—	—	1	—	—	1
State/island resource reports	4	2	25	20	—	51
State timber product output reports	—	2	—	2	—	4
Regional reports	2	—	11	6	—	19
National reports	2	—	13	1	1	17
Subtotal—core reports	8	4	50	29	1	92
Peer-reviewed journal articles	22	10	11	47	—	90
Proceedings articles	—	8	10	20	—	38
Other station publications	1	2	29	1	—	33
Other publications	3	1	3	10	2	19
Total, all reports	34	25	103	107	3	272
Number of publications per Federal FTE	0.38	0.28	1.17	1.04	0.86	0.73

Table B-1.—*Performance measures for the FY 2012 FIA program (continued).*

	Pacific Northwest	RMRS Interior West	Southern	Northern	National Office	Total
Consulting activities						
Number of significant consultations	84	208	318	208	30	848
Total hours of significant consultations	657	2,952	1,093	3,957	148	8,807
Meetings						
Users group meetings held	2	2	0	1	1	6
Management meetings held	2	1	4	1	1	9

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

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

[b] *Excludes any supplemental funding provided for Experimental Forests and Ranges. Pacific Northwest Research Station values reflect percentage excluding and including interior Alaska.*

[c] *Includes only plots where trees were measured; excludes denied access and hazardous plots where no trees were measured.*

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

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

Table B-2.—*Financial statement for the FY 2012 FIA program Federal funds.*

	Pacific Northwest	RMRS Interior West	Southern	Northern	National Office	Total
	($)	*($)*	*($)*	*($)*	*($)*	*($)*
Available funds						
Previous year EOY balance	97,483	559,712	(285)	623	0	657,533
Postyear adjustments[a]	(307,683)	(550,184)	584,641	143,755	0	(129,471)
Subtotal pre-year adjustments	**(210,200)**	**9,528**	**584,356**	**144,378**	**0**	**528,062**
FY appropriated funds						
Research (base)	13,052,000	13,234,000	14,735,000	16,143,000	7,105,000	64,269,000
S&PF FRIA (base)[b]	961,000	994,000	966,000	540,000	1,456,000	4,917,000
Subtotal appropriated funds	**14,013,000**	**14,228,000**	**15,701,000**	**16,683,000**	**8,561,000**	**69,186,000**
Special project funding	0	0	0	0	0	0
Total available Federal funds	**13,802,800**	**14,237,528**	**16,285,356**	**16,827,378**	**8,561,000**	**69,714,062**
Direct expenses						
Salary—	**7,747,132**	**7,032,335**	**7,743,079**	**9,810,870**	**416,000**	**32,749,416**
Administration	451,973	648,048	518,318	393,183	416,000	2,427,522
Phase 1 production	0	0	217,406	282,581	0	499,987
Field support	1,327,858	680,079	1,054,226	883,832	0	3,945,995
Data collection	2,261,249	2,867,421	773,134	2,233,950	0	8,135,753
QA	495,623	720,110	1,620,296	737,656	0	3,573,685
Information management	1,270,328	833,098	909,052	1,542,836	0	4,555,314
Analysis	1,312,016	729,457	1,870,042	2,658,473	0	6,569,988
Techniques research	628,086	554,122	780,605	1,078,360	0	3,041,172
Travel—	**589,193**	**680,888**	**504,793**	**432,692**	**28,900**	**2,236,467**
Office travel	72,576	56,332	85,924	63,444	28,900	307,176
Field/QA crew travel	516,617	624,556	418,869	369,249	0	1,929,291
Equipment—	**527,700**	**910,405**	**495,368**	**515,381**	**0**	**2,448,854**
Imagery	13,500	755	0	5,177	0	19,432
Vehicles	227,052	505,020	328,706	350,562	0	1,411,340
Field equipment	194,515	46,896	146,399	87,925	0	475,735
Information technology/communications	92,633	272,786	20,263	64,120	0	449,802
Other	0	84,948	0	7,598	0	92,546
Publications	**44,341**	**21,358**	**25,618**	**22,125**	**4,800**	**118,242**
Grants and agreements[c]	**1,431,087**	**2,821,119**	**5,141,965**	**3,170,130**	**973,000**	**13,537,301**
Fieldwork/data	*772,161*	*1,370,058*	*4,796,965*	*1,819,018*	*10,000*	*8,768,203*
Information management		*300,000*	*205,000*	*712,318*	*518,000*	*1,735,318*
Research	*658,926*	*1,151,061*	*140,000*	*638,793*	*445,000*	*3,033,780*
Office space and utilities	**1,191,856**	**486,732**	**437,660**	**533,824**	**0**	**2,650,072**
Other direct expenses	**457,567**	**319,981**	**175,173**	**161,309**	**0**	**1,114,030**
Total direct expenses	**11,988,877**	**12,272,818**	**14,523,656**	**14,646,332**	**1,422,700**	**54,854,383**
Effective indirect expenses						
Total effective indirect[d]	**1,682,723**	**1,777,002**	**1,432,096**	**2,149,670**	**7,138,300**	**14,179,790**
Total effective indirect rate (%)	12.2	12.5	8.8	12.8	83.4	20.3
2011 EOY balance	**131,200**	**187,708**	**329,604**	**31,377**	**0**	**679,889**
Total Federal expense	**13,802,800**	**14,237,528**	**16,285,356**	**16,827,378**	**8,561,000**	**69,714,062**

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

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

[b] *Appropriated funding from S&PF was $5.062 million. Amount shown is net of S&PF overhead charges of $415,000.*

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

[d] *Programwide charges for Albuquerque Service Center (ASC) included in National Office indirect expense, including S&PF charges for ASC.*

Table B-3a.—*Federal staffing (FTEs) for the FY 2012 FIA program.*

	Pacific Northwest	RMRS Interior West	Southern	Northern	National Office	Total
Administration	4.4	6.9	5.0	3.9	2.5	22.7
Phase 1 production work	0.0	0.0	4.0	3.7	0.0	7.7
Field support	15.3	12.2	11.0	8.6	0.0	47.0
Data collection	32.8	45.6	11.0	30.3	0.0	119.7
QA crew	6.1	7.3	21.0	9.6	0.0	44.0
Information management	11.9	7.2	9.0	14.8	0.0	42.9
Analysis	12.3	5.7	20.0	24.0	0.0	62.0
Techniques research	5.7	4.5	7.0	7.7	1.0[a]	25.9
Total	**88.4**	**89.4**	**88.0**	**102.5**	**3.5**	**371.8**

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

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

Table B-3b.—*Estimate of cooperator staffing funded by FIA grants and agreements (FTEs) for the FY 2012 FIA program.*

	Pacific Northwest	RMRS Interior West	Southern	Northern	National Office	Total
Administration		1.6		0.0	0.0	1.6
Phase 1 production work		0.0		1.1	0.0	1.1
Field support	4.9	3.4	10.0	3.3	0.0	21.6
Data collection	2.3	17.8	88.0	32.0	0.0	140.1
QA crew		0.6		0.0	0.0	0.6
Information management	1.0	1.2	1.0	6.9	6.0	16.1
Analysis	2.7	3.1		4.4	3.0	13.2
Techniques research	0.7	1.5		4.4	2.0	8.6
Total	**11.6**	**29.2**	**99.0**	**52.1**	**11.0**	**202.9**

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

Table B-3c.— *Estimate of total federally funded staffing (FTEs) for the FY 2012 FIA program.*

	Pacific Northwest	RMRS Interior West	Southern	Northern	National Office	Total
Administration	4.4	8.5	5.0	3.9	2.5	24.3
Phase 1 production work	0.0	0.0	4.0	4.8	0.0	8.8
Field support	20.2	15.6	21.0	11.9	0.0	68.7
Data collection	35.1	63.4	99.0	62.3	0.0	259.8
QA crew	6.1	7.9	21.0	9.6	0.0	44.6
Information management	12.9	8.4	10.0	21.6	6.0	59.0
Analysis	15.0	8.8	20.0	28.4	3.0	75.2
Techniques research	6.4	6.0	7.0	12.1	3.0	34.5
Total	**100.0**	**118.6**	**187.0**	**154.6**	**14.5**	**574.8**

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

Table B-4.—*Partner contributions toward implementing FIA in FY 2012.*

Unit	Partner	Contributions toward the base program	Contributions that add value
		($)	($)
RMRS Interior West	Colorado State Forest Service		231,522
	Idaho Department of Lands		1,000
	Nevada Division of Forestry		2,974
	New Mexico Forestry Division	1,126,187	
	University of Montana		57,930
	USDA Forest Service Region 1	52,600	
	USDA Forest Service Region 1 (NFS Carbon)		50,000
	USDA Forest Service Region 4	35,562	295,000
	NASA (Change)		239,502
	NASA (Carbon)		358,818
	WO Forest Service (for NFS/FIA Carbon study)		350,000
	WO Forest Service (Tree Canopy)		82,675
	LANDFIRE (WFHF)		75,000
	RMRS Interior West total	**1,214,349**	**1,744,421**
National Office			0
	NO total	**0**	**0**
Northern	Connecticut Department of Conservation	500	0
	NASA	0	100,800
	Delaware Department of Agriculture	7,770	12,719
	EPA/Great Lakes Restoration Initiatives	0	39,064
	Illinois Division of Forest Resources	23,359	0
	Indiana Department of Natural Resources	77,460	159,440
	Iowa Department of Natural Resources	17,645	0
	University of Missouri	0	40,000
	Kansas State Forest Service	34,938	0
	Maine Forest Service	249,409	233,905
	Maryland Department of Natural Resources Forest Service	12,300	0
	Massachusetts Department of Conservation and Recreation	8,200	0
	Michigan Division of Forest Management	40,200	0
	Michigan State University	0	18,750
	Minnesota Department of Natural Resources	161,394	425,575
	University of Georgia/VA Tech	0	10,000
	Missouri Department of Conservation	67,492	2,914
	Nebraska Department of Forestry, Fish, and Wildlife	5,853	0
	New Hampshire Department of Resources & Economic Development	20,400	0
	New Jersey Forest Service	1,667	0
	New York Department of Environmental Conservation	19,890	0
	New York State University	0	10,000
	North Dakota Forest Service	7,200	0
	Ohio Department of Natural Resources	11,345	0
	Pennsylvania Department of Conservation & Natural Resources	43,000	7,574
	Resources Planning Act	$0	25,000
	Rhode Island Department of Environmental Management	3,069	0
	South Dakota Department of Forestry and Nat. Res. Mgmt.	22,752	0
	University of Massachusetts	0	32,251
	University of Minnesota	0	19,496
	University of Nevada Las Vegas	0	119,126
	University of New Hampshire	0	11,250
	USDA Forest Service Research and Development	0	58,000
	USDA Forest Service NFS	1,667	962,047
	USDA Forest Service State & Private Forestry	67,000	217,500
	Vermont Department of Forests, Parks & Recreation	8,600	0
	University of Maine	0	18,750

Table B-4.—*Partner contributions toward implementing FIA in FY 2012 (continued).*

Unit	Partner	Contributions toward the base program	Contributions that add value
		($)	*($)*
Northern (continued)	West Virginia Division of Forestry	49,300	0
	Wisconsin Department of Natural Resources	49,702	482,431
	NRS total	**1,012,112**	**3,006,592**
Pacific Northwest	NASA		17,760
	University of Hawaii	65,201	
	American Samoa Community College	14,000	
	USDA Forest Service Region 10		140,000
	Pacific Southwest Research Station	7,000	
	Summer Crew Housing		5,000
	USDA Forest Service Washington Office		252,721
	USDA Forest Service PNW Directors Office		324,600
	USDA Forest Service, PSW for Bio-Sum		40,000
	USDA Forest Service, RMRS for Lichen Support		25,000
	USDA Forest Service, Western Wildland Environmental Threat Assessment Center for Invasives Project Support		29,000
	USDA Forest Service Region 6		113,250
	USDA Forest Service Region 5 for completion of FIA plots		29,400
	University of Montana	55,447	
	PNW total	**141,648**	**976,731**
Southern	Alabama Forestry Commission	41,635	11,770
	Arkansas Forestry Commission	107,016	
	Florida Department of Agriculture and Consumer Services	139,843	5,830
	Georgia Forestry Commission	190,258	15,400
	International Institute of Tropical Forestry		100,000
	Kentucky Division of Forestry	476,942	24,530
	Mississippi Forestry Commission	119,145	7,480
	North Carolina Division of Forest Resources	102,552	14,850
	Oklahoma Department of Agriculture and Forestry	57,804	
	South Carolina Forestry Commission	98,826	7,700
	Tennessee Department of Agriculture	133,924	28,820
	Texas Forest Service	183,333	10,780
	Virginia Department of Forestry	138,609	15,730
	SRS total	**1,789,887**	**242,890**
Grand total, all FIA units		**4,157,996**	**5,970,634**

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

Table B-5.—*Grants and agreements entered into by FIA units, FY 2012.*

Unit	Amount ($)	Recipient	Purpose
RMRS Interior West	352,414	Private Contractors (multiple)	Field data collection
	85,000	TEAMS—Forest Service Enterprise unit	Field data collection
	42,175	FIA Caribbean Contract	Field data collection
	890,469	Colorado State Forest Service	Implementation of annual FIA
	104,000	Rocky Mountain Research Station, RWU 4301	FIA Soils Indicator Lead and Sampling
	30,000	Rocky Mountain Research Station	NFS Carbon Project
	5,133	Rocky Mountain Research Station	FIA/Experimental Forests and Range Study
	150,000	University of Montana	FIA Biomass Study
	100,000	University of Nevada Las Vegas	Timber Products Output Systems Development
	200,000	University of Nevada Las Vegas	Information Management Systems Refactoring Development
	40,000	Forest Service Management Center	Forest Vegetation Simulator Development
	205,785	University of Montana Bureau of Business and Economics Research	Timber Product Output for Interior West States
	180,000	University of Montana Bureau of Business and Economics Research	SW States Utilization Study
	123,000	University of Washington	FIA Plot Climate Analysis (W/RMRS Forest and Woodlands Ecosystems program)
	200,000	Utah State University	National Forest Carbon Analyses (should not count in App2 total)
	50,028	Utah State University	Tree Core archiving
	43,115	University of Utah	Long-Term Disturbance Patterns Study
	20,000	Great Basin Bird Observatory	Pinyon-juniper Habitat study
RMRS IW total	**2,821,119**		
National Office	400,000	University of Nevada in Las Vegas	Information Management support
	30,000	Northern Research Station, St. Paul	FIA Biomass Study
	18,000	Society of American Foresters	National User Group support
	75,000	Redcastle Resources, Inc.	RSAC FIA projects
	100,000	Ecological Society of America & NVCS	National Vegetation Classification System
	10,000	Auburn University	Tree planting data
	40,000	University of Wisconsin	Lichens research
	50,000	Oregon State University	FIA Biomass Study
	250,000	Research Triangle Park FHM Unit	National FHM support
NO total	**973,000**		
Northern	75,750	Northern Research Station Grand Rapids	Soil analyses
	58,025	Daniel Huberty	Iowa Plots
	58,280	Chestnut Ridge Forestry	Illinois Missouri Plots
	135,592	Daniel Huberty	Kansas Plots
	24,917	Daniel Huberty	North Dakota Plots
	37,525	Glen Summers	West Virginia Plots
	34,450	Wilfred Previant	Michigan Plots
	41,745	Joel Fyock	New York Plots
	71,708	Quercus Consultations, Inc.	Nebraska Plots
	1,400	Morris Arboretum	FIA P2/P3 Plant Specimen Identification
	23,400	Redcastle Resources	FIA Atlas
	211,013	Defense Information Technology Contracting	Senior Developer for FIDO
	159,440	Indiana Department of Natural Resources	Implementation of annual FIA
	614,011	Maine Forest Service	Implementation of annual FIA
	425,575	Minnesota Department of Natural Resources	Implementation of annual FIA
	62,000	South Dakota Department of Forestry & Natural Resource Management	Implementation of annual FIA
	40,000	University of Georgia/Virginia Tech	FIA Biomass Study
	75,536	University of Maine	FIA Biomass Study
	125,986	University of Massachusetts	NWOS/Family Forest Research Center
	75,536	Michigan State University	FIA Biomass Study
	17,985	University of Minnesota	FIA Biomass Estimation Data Access
	60,000	University of Minnesota	Carbon Effux from Woody Debris
	70,000	University of Missouri	Agent Based Modeling of Private Land

Table B-5.—*Grants and agreements entered into by FIA units, FY 2012.*

Unit	Amount ($)	Recipient	Purpose
	40,000	University of Missouri	Spatial Estimation of Forest
	48,750	University of Missouri	Analysis of Northern Forest Futures
	45,000	University of New Hampshire	Stand Density Index
	40,000	University of New York	Corporate Forest Ownership Dynamics
	476,505	University of Nevada Las Vegas	Information Management support
	20,000	USDA NASS	NWOS Telephone Follow Up
NRS total	**3,170,130**		
Pacific	287,834	Student Conservation Association	FIA FY 2012, 9 Interns, 24 weeks
Northwest	32,000	Oregon State University	Lichen and Bryophyte Indicators and roles in forests
	17,000	Oregon State University	Status and Trends of Whitebark Pine Distribution and Health in California, Oregon, and Washington
	37,000	University of Alaska, Fairbanks	Monitoring with FIA in Bonanza Creek Experimental Forest
	4,000	State University of New York	U.S. Forest Disturbance History from Landsat
	243,000	University of Hawaii at Hilo	Monitoring with FIA in Hawaii Experimental Tropical Forest
	45,926	Oregon State University	Regional Carbon Models from Linking Field Measurements and Satellite Changes Detection
	260,000	University of Montana	Ongoing Pacific States Forests Industry and Timber Harvast Anaylsis
	20,000	Oregon State University	National Imputed Database: Building a Project Plan in Cooperation with a National Team
	484,327	Alaska Contract	Alaska Data Collection
PNW total	**1,431,087**		
Southern	75,000	International Institute of Tropical Forestry	Experimental Forest Study
	440,000	Alabama Forestry Commission	Implementation of Annual FIA
	425,328	Arkansas Forestry Commission	Implementation of Annual FIA
	439,581	Florida Forest Service	Implementation of Annual FIA
	589,294	Georgia Forestry Commission	Implementation of Annual FIA
	331,440	Kentucky Division of Forestry	Implementation of Annual FIA
	50,000	National Association of State Foresters	Support International Reporting
	443,161	North Carolina Department of Environment & Natural Resource	Implementation of Annual FIA
	309,810	Oklahoma Division of Forestry	Implementation of Annual FIA
	370,119	South Carolina Forestry Commission	Implementation of Annual FIA
	384,776	Tennessee Division of Forestry	Implementation of Annual FIA
	634,600	Texas Forest Service	Implementation of Annual FIA
	428,856	Virginia Department of Forestry	Implementation of Annual FIA
	5,000	University of Florida	Carribean Tree Species Database
	65,000	University of Georgia	Biomass Equation Project
	85,000	University of Tennessee	Information Management
	65,000	Virginia Tech University	Biomass Equation Project
SRS total	**5,141,965**		
Grand total	**13,537,301**		

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

Table B-6.—*Number and hours of significant consultations by FIA staff by customer group, FY 2012.*

Customer group	Pacific Northwest		RMSM Interior West		Southern		Northern		National Office		Total	
	No.	*Hrs.*	*No.*	*Hrs.*	*No.*	*Hrs.*	*No.*	*Hrs.*	*No.*	*Hrs.*	*No.*	*Hrs.*
Academic	15	39	57	336	102	417	53	198	3	20	230	1,010
Government	27	99	128	2,153	71	220	86	3,390	10	50	322	5,912
Industry	6	7	3	122	50	173	18	109	5	25	82	436
NGO	17	74	11	104	26	174	9	201	6	25	69	578
NIPF	—	—	2	24	11	33	14	24	1	4	28	85
Media	—	—			5	8	13	23	3	16	21	47
Other	19	438	7	213	53	68	15	12	2	8	96	739
	84	**657**	**208**	**2,952**	**318**	**1,093**	**208**	**3,957**	**30**	**148**	**848**	**8,807**

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

Table B-7.—*FIA data access by online tools and spatial data center requests, 2004–2012.*

Indicator	Number of annual accesses									Total 2004–2012
	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Online tools										
MapMaker	26,034	55,062	22,906	24,073	20,834	25,000	—	—	—	173,909
Forest Veg Simulator (FVS)	514	763	566	497	683	—	—	—	—	3,023
Fuel Treatment Evaluator		650	863	1,995	50	—	—	—	—	3,558
Forest Inventory Data Online (FIDO)					38,092	55,494	70,943	72,946	52,099	289,574
National Woodland Owners Survey (NWOS)						6,560	1,700	2,070	5,515	15,845
EVALIDator						3,920	29,000	55,468	34,901	123,289
DATA downloads						2,014	3,033	1,929	1,512	8,488
Total	**26,548**	**56,475**	**24,335**	**26,565**	**59,659**	**92,988**	**104,676**	**132,413**	**94,027**	**617,686**
Spatial data requests										
Academia	40	50	104	138	140	109	114	121	168	984
State	20	31	31	44	48	49	47	36	45	351
NFS	3	—	11	15	29	16	32	17	46	169
Other Federal	50	71	174	182	135	105	116	92	169	1,094
NGO	6	6	10	21	34	41	31	23	41	213
Industry	10	13	14	39	29	28	35	34	61	263
Other	15	20	3	54	68	57	48	91	75	431
Total	**144**	**191**	**347**	**493**	**483**	**405**	**423**	**414**	**605**	**3,505**

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, 2000–2012.*

Survey or site	Year initiated	Number of annual survey questionnaires or sites									Total 2000–2012
		2000–2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Timber products	1947	7,034	1,356	2,530	1,382	2,473	1,131	2,657	1,727	3,521	1,375	25,186
Fuelwood	1947	1,400	—	—	—	1,519	—	—	—	—	—	2,919
Ownership surveys	1978	7,169	3,662	—	6,450	—	—	—	—	7,960	4,028	29,269
Utilization sites	1947	132	142	252	99	147	486	17	66	58	162	1,561

Table B-9.—*Forest health indicator, year of initiation, and number of samples collected 2000–2012.*

Indicator	Year initiated	Number of annual samples									Total 2000–2012
		2000–2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Crowns	1991	2,708	1,317	1,310	964	1,006	962	1,177	761		1,510	11,715
Lichens	1998	1,904	252	217	123	182	127	150	167		33	3,155
Soils	1999	2,538	1,294	1,317	289	227	349	201	266	2	595	7,078
Veg	2001	5,370	1,841	1,871	1,778	2,386	2,100	2,125	2,097	1624	7,145	28,337
Ozone	1994	4,054	1,151	984	957	958	948	1,003	1,018	107		11,180
DWM	2001	3,285	3,851	4,036	3,429	4,288	1,448	2,152	1,392	1414	6,263	31,558
Mortality[a]	2001	7,317	6,315	9,791	10,646	12,122	12,594	13,892	15,293	15,858	20,275	124,103

DWM = down woody material.

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

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

Region and area	Land area in inventory	Forest area	Percent forest	Number of major islands	Year(s) of current inventory	Year(s) of published report	Total Phase 2 plots[a]	Total Phase 3 plots	Available online data
	Acres	*Acres*							
Pacific (PNW)									
American Samoa	48,434	43,631	90	4	2012	2004	26		No
Guam	135,660	63,833	47	1	2002	2004	71		Yes
Palau	110,028	90,685	82	10	2003	2007	63		Yes
Commonwealth of the Northern Mariana Islands	75,546	51,009	68	3	2004	2011	38		Yes
Federated States of Micronesia	161,917	143,466	89	10	2005-2006	2011	79		Yes
Marshall Islands	33,182	23,230	70	10	2008	2011	61		Yes
Hawaii[b]	4,141,469	1,990,000	48	8	2010-2019	1988	685		No
Atlantic (SRS)									
Commonwealth of Puerto Rico	2,191,815	1,260,625	57	3	2003	2007	287	182	Yes
U.S. Virgin Islands	85,590	52,478	61	3	2004	2007	48	62	Yes
Total	**6,983,641**	**3,718,957**	**612**	**52**			**1,358**	**244**	

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

[a] *Partial suite of Phase 3 data collected on all plots in PNW.*

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

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

Region and State	Land area	Forest area	Entry date	Annualized in 2013
	Thousand acres	*Thousand acres*		
Northern	***606,802***	***182,325***		***24***
Connecticut	3,099	1,712	2003	Yes
Delaware	1,247	340	2004	Yes
Illinois	35,532	4,848	2001	Yes
Indiana	22,929	4,830	1999	Yes
Iowa	35,749	3,014	1999	Yes
Kansas	52,326	2,502	2001	Yes
Maine	19,739	17,660	1999	Yes
Maryland	6,213	2,461	2004	Yes
Massachusetts	4,992	3,024	2003	Yes
Michigan	36,185	20,127	2000	Yes
Minnesota	50,961	17,371	1999	Yes

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

Region and State	Land area	Forest area	Entry date	Annualized in 2013
	Thousand acres	*Thousand acres*		
Northern (continued)				
Missouri	43,995	15,472	1999	Yes
Nebraska	49,167	1,576	2001	Yes
New Hampshire	5,730	4,832	2002	Yes
New Jersey	4,707	1,964	2004	Yes
New York	30,161	18,966	2002	Yes
North Dakota	44,161	760	2001	Yes
Ohio	26,151	8,088	2001	Yes
Pennsylvania	28,635	16,782	2000	Yes
Rhode Island	662	360	2003	Yes
South Dakota	48,519	1,911	2001	Yes
Vermont	5,899	4,591	2003	Yes
West Virginia	15,384	12,155	2004	Yes
Wisconsin	34,661	16,980	2000	Yes
Southern	***532,904***	***267,042***		***13***
Alabama	32,413	22,877	2001	Yes
Arkansas	33,303	18,755	2000	Yes
Florida	34,320	17,461	2001	Yes
Georgia	36,809	24,768	1998	Yes
Kentucky	25,271	12,472	1999	Yes
Louisiana	27,650	14,540	2000	Yes
Mississippi	30,031	19,541	2007	Yes
North Carolina	31,115	18,588	2003	Yes
Oklahoma	43,901	12,646	2008	Yes
South Carolina	19,239	13,120	1998	Yes
Tennessee	26,390	13,942	1999	Yes
Texas	167,188	62,425	2000	Yes
Virginia	25,274	15,907	1998	Yes
RMRS Interior West	***547,691***	***154,092***		***8***
Arizona	72,700	18,643	2001	Yes
Colorado	66,331	22,837	2002	Yes
Idaho	52,892	21,448	2004	Yes
Montana	93,149	25,573	2003	Yes
Nevada	70,260	11,169	2010	Yes
New Mexico	77,631	24,839	2008	Yes
Utah	52,589	18,135	2000	Yes
Wyoming	62,140	11,448	2010	Yes
Pacific Northwest	***572,983***	***215,182***		***5***
Alaska, Coastal	39,041	14,426	2004	Yes
Alaska, Interior	326,169	114,151		
California	99,699	32,618	2001	Yes
Hawaii	4,110	1,748	2010	Yes
Oregon	61,432	29,804	2001	Yes
Washington	42,532	22,435	2002	Yes
Total	**2,260,380**	**818,641**	**—**	**50**
Forest area performance measure, excluding interior Alaska (%)				100%
Forest area performance measure, including interior Alaska (%)				86%
State activity performance measure, including all active States (%)				**100%**

FIA = Forest Inventory and Analysis. FY = fiscal year. RMRS = Rocky Mountain Research Station.

[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, 2006–2012.*

	2006	2007	2008	2009	2010	2011	2012
Available program funds							
Apropriated funds[a]	63,641	63,605	64,641	65,536	71,817	71,452	69,186
Other Federal funds[b]	1,775	1,272	1,559	3,320	930	856	528
Total Federal funds	**65,416**	**64,877**	**66,200**	**68,856**	**72,747**	**72,308**	**69,714**
Total partner funds	7,034	7,204	6,505	6,494	7,516	9,109	10,129
Total available funds	**72,450**	**72,081**	**72,705**	**75,350**	**80,263**	**81,417**	**79,843**
% full Federal appropriated funding	**84**	**84**	**85**	**87**	**92**	**92**	**89**
Program expenses and balances							
Administration	3,104	3,031	2,785	2,999	3,262	3,233	2,735
Image processing	919	1,300	1,198	1,102	916	724	519
Field support	3,287	3,175	3,357	3,003	3,594	3,917	3,946
Data collection[c]	25,106	23,630	22,989	25,243	26,162	27,057	24,387
Information management[c]	6,890	7,431	6,108	7,623	7,476	6,794	6,740
Analysis	4,499	4,518	5,147	5,354	5,357	6,105	6,570
Research[c]	3,422	4,799	5,033	5,881	6,903	5,444	6,075
Miscellaneous/other	5,231	3,454	3,406	3,909	4,473	4,417	3,882
Total direct expense	**52,458**	**51,338**	**50,023**	**55,115**	**58,143**	**57,692**	**54,854**
Total indirect expenses	**12,587**	**13,194**	**13,586**	**12,653**	**14,189**	**13,958**	**14,180**
Indirect rate	*19.8%*	*20.7%*	*21.0%*	*19.3%*	*19.8%*	*19.5%*	*20.5%*
Total Federal expense	**65,045**	**64,532**	**63,609**	**67,768**	**72,332**	**71,650**	**69,034**
Fire transfer[d]			2,318				
Total EOY balance	**371**	**345**	**273**	**1,089**	**415**	**658**	**680**
Total Federal funds	**65,416**	**64,877**	**66,200**	**68,856**	**72,747**	**72,308**	**69,714**
Other measures							
% States with annual activity	88	90	94	94	100	100	100
% States with FIADB 1–2 years old	84	90	90	90	88	94	94
Federal employees	410	387	389	381	392	397	372
Other employees	171	179	173	201	205	201	203
Total employees	**581**	**566**	**562**	**582**	**596**	**598**	**575**
Phase 2/3 base forest plots	18,245	19,880	18,208	21,545	19,272	21,233	19,673
Phase 2/3 base nonforest plots	24,190	24,757	29,351	21,996	25,238	27,568	27,131
Total plots	**42,435**	**44,637**	**47,559**	**43,541**	**44,510**	**48,801**	**46,804**
All QA plots	3,382	3,664	4,860	3,597	4,020	4,550	4,417
% QA plots	8%	8%	10%	8%	9%	9%	9%
All publications	182	135	172	206	203	204	272
Journal publications	45	37	65	38	74	62	90
% journal publications	25%	27%	38%	18%	36%	30%	33%
Consultations, number	1,608	1,571	1,659	1,399	991	1,753	848
Consultations, hours	5,527	5,767	6,656	8,603	10,381	8,584	8,807
User/mangement meetings	16	16	10	11	10	14	15
Spatial data requests filled	347	493	483	405	423	414	605
Online accesses	24,335	26,565	59,659	92,988	104,676	132,413	94,027

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

[a] *Net of rescissions.*

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

[c] *Includes Federal grants and agreements.*

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