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Forest Inventory and Analysis

Fiscal Year 2014 Business Report

Forest Service FS-1053 July 2015

United States
Department of
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Forest Service

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Cover photo: *Forester Jason Hewitt measures the diameter of a giant yellow-poplar tree on the Joyce Kilmer Memorial Forest near Robbinsville, NC. (Photo courtesy of Marcus Wood, Southern Research Station Forest Inventory and Analysis.)*

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Executive Summary

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

In 1999 (Farm Bill, Public Law [PL] 105-185) and again in 2014 (Farm Bill, PL 113-79), Congress directed the Forest Service, an agency of the U.S. Department of Agriculture (USDA), to reevaluate its statewide inventory mission and to make the transition from an approach in which each State is surveyed periodically to one in which each State is inventoried annually. FIA developed these plans in concert with its partners to carry out the congressional mandate. FIA's *Strategic Plan for Forest Inventory and Analysis* includes a requirement for an annual business report that outlines the status and progress of the national annual inventory program.

This annual business report, our 17th, tells the taxpayers, partners, and clients what the program has accomplished with the financial resources provided and what the program will accomplish in the coming year with budgeted financial resources. This relationship with taxpayers, partners, and clients is integral to FIA's continued success, because accountability is our first priority. Some key findings of this annual report are—

Annualized progress: In fiscal year (FY) 2014, FIA maintained annualized inventory activity in all 50 States (excluding interior Alaska except for the Tanana Valley). Because of travel restrictions and late budget allocations, FIA was not able to maintain annual plot production at efficient levels in FY 2014. The total area currently sampled represents about 90 percent of all U.S. forest lands, with interior Alaska outside the Tanana Valley representing the remaining 10 percent of the Nation's forest area.

Funding: Total funding from all sources for the FIA program in FY 2014 was $77.7 million, a net increase of $1.8 million from FY 2013 (appropriated funding increased $1.2 million). FY 2014 funding consisted of $66.8 million appropriated by Congress plus $1.7 million in net adjustments from the previous fiscal year, special funding of $1.4 million, and $7.8 million in partners' funds. State partners' funds are used to maintain an annual measurement and 5-year State report cycles. In FY 2014, total funding from all sources was 14 percent less than the amount needed for full program implementation.

Partners' support: Partners contributed $7.8 million to the program in FY 2014. Using cost share, 36 States contributed $3.9 million toward buying down their measurement and reporting cycles to 5 years or to intensify their plot network. Overall, partners' contributions increased by $166,000 from FY 2013.

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 $15.8 million was spent in this way in FY 2014. Text table 2 summarizes FIA funding activity to and from States from FY 2007 through FY 2014 for data collection, and appendix table B-5 provides details on all FIA grants.

Data availability: Data for 48 States and coastal Alaska are now on line and less than 2 years old. These data supplied information for 586 spatial data requests and 186,175 online data requests.

Five-year reports: By FY 2014, FIA had completed at least one 5-year report or periodic report for 96 percent of the States and 100 percent of the islands since annualized inventory began in 1999. In all, FIA had 234 publications, 87 of which were peer reviewed in FY 2014.

Quality assurance: FIA field-checked 8 percent of all field plots measured in FY 2014 to ensure that FIA databases comprise only the highest quality data. All plots are further checked for consistency when loaded into the FIA database.

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 its planned objectives. In 2014, FIA held six regional and one national users group meetings to gauge how well it is meeting the goals stated in the strategic plan and the previous year's annual report.

Personnel: FIA, directly and through cooperators, employed 570 people in FY 2014. Cooperators are integral to the efficient delivery of the FIA program, comprising 204 of the 570 employees, or 33 percent of the total workforce. Of the total workforce, 178 were employed in information management, techniques research, or resource analysis; they provided 945 consultations (7,987 hours) to help users and clients effectively use FIA data.

Other program features: Although plot-based field surveys provide most FIA data, additional questionnaires and surveys are conducted to report on timber product output (TPO), logging utilization, fuelwood production, the characteristics and management objectives of the Nation's private woodland owners

through the National Woodland Owners Survey (NWOS), and several indicators of forest health. Since FY 2000, FIA has collected such data from more than 62,500 surveys and questionnaires. This information, in concert with FIA plot data, is critical to monitoring the sustainability of the Nation's forest resources.

New FIA Strategic Plan: On February 7, 2014, Congress passed the 2014 Farm Bill. Section 8301 requires the FIA program to revise its previous strategic plan and submit the new plan to the Committee on Agriculture of the House of Representatives and the Committee on Agriculture, Nutrition, and Forestry of the Senate. The new *Strategic Plan for Forest Inventory and Monitoring* is forward looking and attempts to balance emerging client demands for new information, tools, and values with necessary decisions on priorities and budget constraints. The new strategic plan, like previous FIA strategic plans, was developed in cooperation with partners and stakeholders and identifies the base program, enhancements to the base, priorities for new programs, and areas for increased flexibility in the future, and it addresses 11 specific provisions outlined in the Farm Bill for FIA to consider.

A brief overview of provisions to be addressed in the new plan include (1) complete the transition to a fully annualized forest inventory program; (2) implement an annualized inventory of trees in urban settings; (3) report on renewable biomass supplies and carbon stocks; (4) engage State foresters and other users in evaluating core FIA data; (5) improve the timeliness of the TPO program and database; (6) foster greater cooperation among FIA, research station leaders, and State foresters; (7) promote availability of and access to non-Federal resources to improve information management; (8) collaborate with other agencies to integrate remote sensing, spatial analysis techniques, and new technologies into FIA; (9) understand and report on changes in land cover and use; (10) expand existing programs to promote sustainable forest stewardship through increased understanding of the more than 10 million family forest owners; and (11) implement procedures to improve the statistical precision of estimates at the sub-State level.

The plan elaborates on six potential options for moving the program forward to fully implement the Farm Bill provisions. More detail of the plan is provided in the Long-Term Strategic Direction section at the end of this report.

Looking to 2015: FIA had a productive year in FY 2014 and looks forward to further progress in FY 2015. Important goals for FY 2015 include—

- Continue annualized inventory of 50 States (including the Tanana Valley in interior Alaska).
- Report U.S. forest carbon numbers to the United Nations Intergovernmental Panel on Climate Change.
- Publish the translations of the *U.S. Forest Resource Facts and Historical Trends* brochures in Chinese, French, Portuguese, Russian, and Spanish.
- Prepare a report on the Austin, TX, urban study.
- Complete and print the *Forest Atlas of the United States* (FIAtlas).
- Post on the Web the FIA *Strategic Plan for Forest Inventory and Monitoring* submitted to Congress.
- Complete at least 10 State 5-year reports.
- Publish NWOS report based on 2011 through 2013 survey data.
- Implement the new TPO data-collection system and publish the 2012 National Pulpwood report.
- Work with partners to improve land cover and land use classifications.
- Prepare FIA Database 6.0 User Guide and begin planning *National Core Field Guide* 7.0.
- Maintain and improve the Forest Inventory Data Online system.

For additional detail, see Comparing FY 2013 Plans With FY 2014 Accomplishments and FY 2015 Plans.

Introduction

The Forest Inventory and Analysis (FIA) program of the Forest Service, an agency of the U.S. Department of Agriculture (USDA), provides the information needed to assess the status, trends, and sustainability of America's forests. This business report, which summarizes program activities in fiscal year (FY) 2014 (October 1, 2013, through September 30, 2014), gives our customers and partners a snapshot of past activities, current business practices, and future program direction. It is designed to increase our accountability and foster performance-based management of the FIA program. (Note: This business report does not include statistical information about the forests of the United States. Those who want to obtain such information should contact the appropriate regional or national FIA office listed in appendix A of this report or go to http://www.fia.fs.fed.us.)

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

Changes From Previous Years' Business Reports

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

Loss of State and Private Forestry (S&PF) funding: Because of shifts in funding sources, at the direction of Congress, the program no longer receives an annual segment of base funding from the S&PF Deputy Area of the Forest Service. All current funding is provided by the Research and Development (R&D) Deputy Area of the Forest Service.

Information Resources Direction Board (IRDB) investments: Major FIA investments in information technology and delivery are reviewed and approved by the IRDB. These investments are considered national FIA expenditures because they affect the entire program and are accounted in the National FIA Program Office budget in appendix tables B-2 and B-5.

Fiscal Year 2014 Program Overview

In FY 2014, the FIA program completed the 16th year of implementing the annual inventory system as outlined in the *Strategic Plan for Forest Inventory and Monitoring*, written in response to the Agricultural Research, Extension, and Education Reform Act of 1998 (Public Law 105-185). The FIA program includes two basic sample levels: Phase 1 (P1), which consists of remote sensing for stratification to enhance precision, and Phase 2 (P2), which is based on the original set of FIA forest measurement plots (approximately one plot per 6,000 acres). A subsample of P2 plots may also be measured for a broader set of forest ecosystem indicators. The number of plots with various ecosystem indicators is noted in appendix table B-9. By the end of FY 2003, our goal was to implement an annual FIA program that measures at least 10 percent of all P2 sample locations per year in the Western United States, and 15 percent of P2 sample locations per year in the Eastern United States. Table 1 shows the overall distribution of P1 and P2 elements of the FIA sample for the United States. The numbers in this table are for illustrative purposes only and do not include possible additional plots that may be required because of partially forested sample locations. This process can add 15 to 20 percent more plots that have to be visited to collect data.

The base program includes annual compilations of the most recent year's information, with full State-level reporting at 5-year intervals. All States have the option to contribute the resources necessary to bring the program up to the full sample intensity of 20 percent per year, or to make other value-added contributions, such as funding new measurements or additional sample locations. In FY 2014, the total appropriated funding was $10.8 million below the target level outlined in the FIA strategic plan[1] to complete the transition of the base program to full implementation. The following sections highlight current outputs and products, program resources, and partners' contributions.

Outputs and Products

Appendix table B-1 shows some comparisons across FIA regional units in the rates, costs, and performance of implementing the FIA program. In FY 2014, we were active in 49 States plus coastal Alaska (fig. 1), measuring 36,228 base P2 sample locations (15,395 forest and 20,833 nonforest) from the base grid, or 13 percent of the total. At the end of FY 2014, all States were covered by some level of annual FIA program activity, but only 49 States (98 percent) were fully implemented, with interior Alaska having funding to support only the Tanana Valley. Appropriated funding saw a modest increase of $1.2 million in FY 2014 and partners' support increased $165,000. FIA's congressional mandate, under the Renewable Resources Research Act of 1978 (PL 95-307), states that the Nation's Trust Territories and Freely Associated States are to be treated as States for research purposes. Since 2001, in compliance with this mandate, periodic inventories have been completed in the Commonwealth of Puerto Rico, U.S. Virgin Islands, Federated States of Micronesia, American Samoa, Guam, the Republic of Palau, the Republic of the Marshall

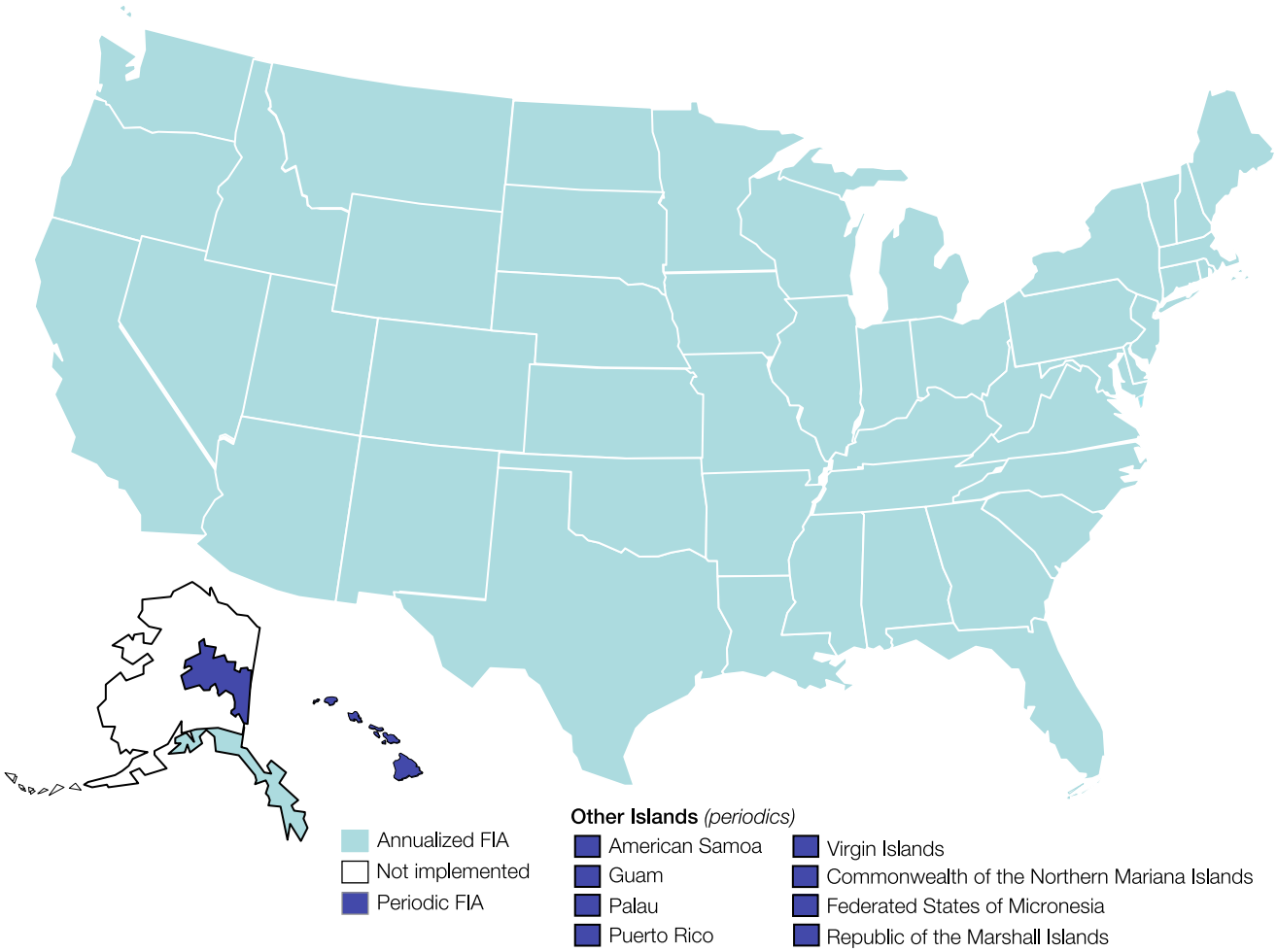
Table 1. Overview of land area, FIADB forest area, RPA forest area, estimated P1 pixels and estimated P2 plots by region in FY 2014.

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

FIADB = Forest Inventory and Analysis Database. FY = fiscal year. P1 = Phase 1. P2 = Phase 2. RPA = Resources Planning Act.
* MODIS 250 million 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. 17 p.

Figure 1. FIA implementation status, FY 2014.



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

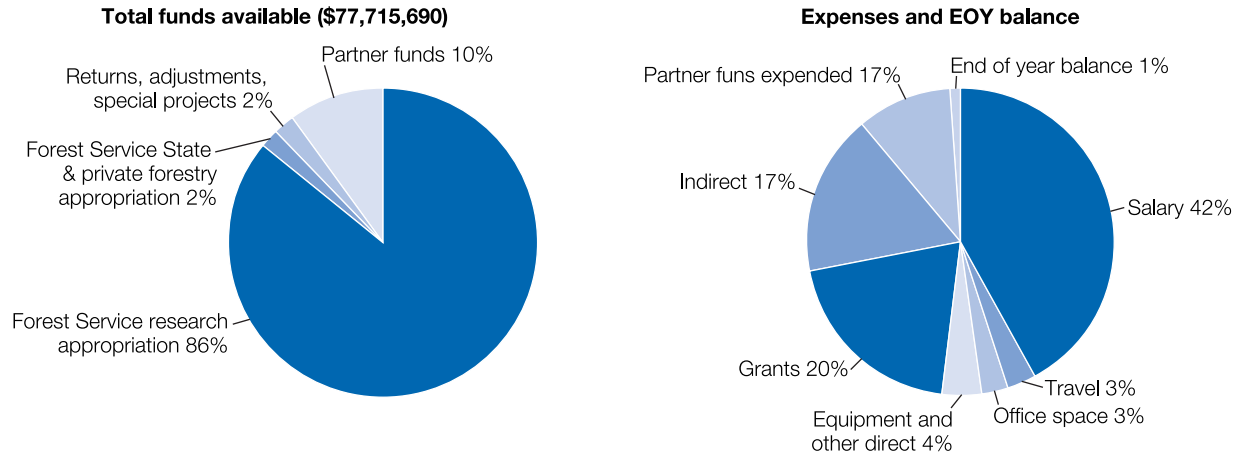
Islands, and the Commonwealth of the Northern Mariana Islands, all of which are exempt from the annualized system and have periodic inventories. Reinventory of the islands continued with work in Palau in 2014.

The FIA program produced 234 reports and publications in FY 2014, just 4 fewer than in FY 2013. Of these publications, 87 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 as required by legislation. FIA also published 87 articles in peer-reviewed journals and 21 articles in proceedings from scientific meetings and conferences. FIA staff participated in 945 significant consultations with FIA customers, requiring 7,987 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 FIA *National Core Field Guide* and enhancement of Internet tools for accessing and analyzing FIA data, including the National Information Management System (NIMS), which provides a single national platform for processing FIA data and posting it on the Web. Our Internet resources processed more than 186,175 data retrievals in which FIA customers obtained user-defined tables, data downloads, and maps of interest. This number was nearly 83,000 more retrievals than in the previous year because the program brought a new interactive timber product output (TPO) tool online. It is expected that online retrievals will continue on their upward track in 2015 and beyond.

Program Resources

Congress appropriated funds for the FIA program in one Forest Service deputy area: R&D, which had $66,805,000 in appropriated funds in FY 2014, a net increase of $1,238,000 from FY 2013 (appendix table B-12). The previous S&PF Forest Resource Inventory and Assessment budget line was permanently zeroed out at the end of FY 2013. In FY 2014, States and other partners provided an additional $7,833,329 for plot intensification and other program enhancements. Total available program funding, including $1,655,594 in preyear adjustments and $522,000 in special funding, was $77,715,690 in FY 2014 (fig. 2).

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



EOY = end of year. FIA = Forest Inventory and Analysis. FY = fiscal year.

In its annual appropriation, Congress intends for FIA to make funds available for cost-sharing with States to help implement the FIA program. In turn, States take advantage of FIA's on-the-ground resources, contracted or dedicated, to contribute funds for additional data collection to meet their local needs. Table 2 demonstrates the financial side of this partnership. Nearly one-third of all FIA fieldwork is accomplished using these partnerships.

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 2014 ranged from 9 to 14 percent across the country (appendix table B-2), reflecting differences in both sources of funding and in research station indirect expense assessment practices. The National FIA Program Office has a 66-percent rate of indirect cost because that budget item includes the USDA overhead and programwide charges to the Albuquerque Service Center ($6,234,000) and expenses related to the IRDB ($2,583,000) in FY 2014. Overall, the program's indirect expenses were 21.5 percent of the total expenses. Figure 3 shows the total appropriated funding for FIA from FY 2001 through FY 2014 and the FY 2015 target. Appendix table B-12 shows the trend data in FIA performance measures for FY 2007 through FY 2014.

In FY 2014, FIA Federal program staffing consisted of 366 Federal person-years of effort (appendix table B-3a), the same as in FY 2013. Cooperators, especially State forestry organizations, using grants and agreements, accomplish much of the work done by FIA, and they added 204 employees for a total workforce of 570. The additional cooperator employees included 158 State field employees, 7 information management specialists, 16 analysts, 20 researchers, and 1 administrative specialist. Cooperator employees constitute 36 percent of the total FIA workforce in FY 2014.

Of all Federal and cooperator FIA employees, approximately 63 percent were involved in data collection and field support,

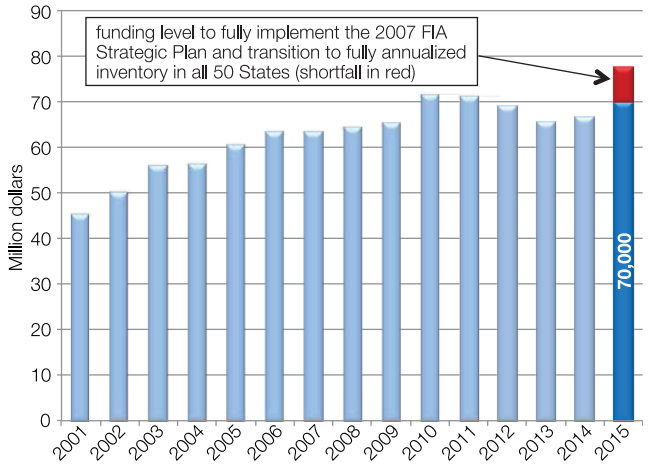
Table 2. Annual FIA appropriations and allocation of FIA-appropriated and State-contributed funds for fieldwork only for FYs 2007–14.

Category	Fiscal year							
	2007	2008	2009	2010	2011	2012	2013	2014
	Thousand dollars							
Total FIA appropriation	63,605	64,641	65,536	71,817	71,452	69,186	65,567	66,805
FIA data collection grants to States	**6,146**	**5,590**	**6,971**	**7,278**	**8,002**	**7,475**	**5,338**	**7,098**
Number of States receiving grants	**18**	**18**	**19**	**20**	**17**	**18**	**16**	**17**
Average grants to participating States	**341**	**311**	**367**	**364**	**471**	**415**	**334**	**418**
Percent of appropriated funding granted to States for data collection	*10%*	*9%*	*11%*	*10%*	*11%*	*11%*	*8%*	*11%*
State contributions for leveraged data collection	**5,824**	**3,783**	**4,594**	**5,039**	**6,192**	**5,567**	**3,962**	**3,919**
Number of States contributing funds	**41**	**41**	**44**	**45**	**40**	**41**	**38**	**36**
Average contribution from States	**142**	**92**	**104**	**112**	**155**	**136**	**104**	**109**

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

22 percent in analysis and information management, 8 percent in techniques research, 5 percent in program management and administration, and 1 percent in P1 production work (fig. 4).

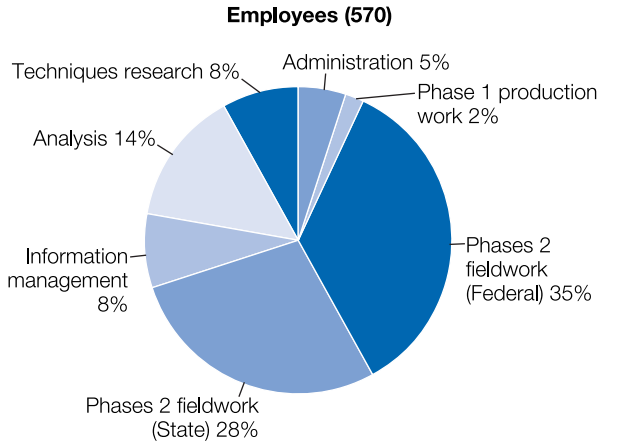
Figure 3. FIA-appropriated funding level, FYs 2001–15 (projected).



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

* Dark blue bar (plus red shortfall bar) is estimated total funding ($77.7 million) required to deliver the full base FIA program in FY 2014 under the 2007 strategic plan.

Figure 4. FIA program employees by job group, FY 2014.



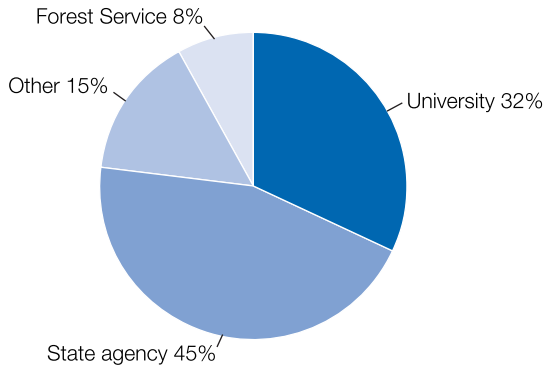
FIA = Forest Inventory and Analysis. FY = fiscal year.

FIA Grants and Partners' Contributions

The complete FIA program envisioned by Congress was to be a Federal-State partnership, in which both Federal and State partners contribute resources to accomplish the work. Congressional guidance indicates 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), annually, with comprehensive, analytical reports for all States produced at 5-year intervals. The following discussion summarizes program grants and partners' contributions.

Grants and Agreements: Each year, FIA units enter into various grants and cooperative agreements with partners to accomplish specialized work in support of the FIA mission. In some cases, partners provide expertise that is not available within FIA; in other cases, they share the workload. Appendix table B-5 lists 67 grants and agreements for FY 2014, comprising $15,704,654. This number fluctuates from year to year, but it demonstrates the reliance of the FIA program on collaborations with external partners to efficiently complete the work. Most of these grants and agreements were with State agencies (45 percent) and university partners (32 percent) (fig. 5).

Figure 5. Grants and agreements by recipient group, FY 2014.



FY = fiscal year.

Additional cooperators included other Federal and Forest Service offices (8 percent) and non-Federal partners (15 percent) supporting grant collaboration in data collection, information management, and research in techniques development. We expect to continue to make significant use of grants and agreements to augment FIA staff capacity in the analysis and reporting of annual FIA data for individual States.

Partners' Contributions: At their discretion, partners may contribute the resources that are needed to bring the FIA program up to the full 20-percent measurement per year (5-year cycle) that is described in the authorizing legislation. In addition to that choice, or as an alternative, partners may choose to contribute resources for other purposes that add value to the FIA program from their perspective, such as intensifying the base FIA sample location grid to support analysis at finer spatial resolution, funding additional types of measurements on FIA sample locations, or providing analyses or reporting beyond that provided by FIA. The willingness of partners to contribute resources demonstrates the inherent value of the FIA program as a flexible framework on which to address other issues of interest.

Appendix table B-4 lists 83 partners that have contributed resources to the FIA program in FY 2014, either to achieve the 20-percent level of cost-sharing envisioned by Congress or to add value to FIA in other ways. These resources include

staff time, vehicle use, office space, equipment, travel costs, and other noncash items that support or add value to the FIA program. Contributions are valued for reporting purposes in terms of what it would have cost the Federal FIA staff to provide the same service, which may not necessarily be the same as the actual cost to the partner making the contribution. Overall, partners contributed $3.8 million toward the full 20 percent of target plots measured annually that was envisioned by Congress. Partners also provided another $4.0 million in contributions that add value to the FIA program, for a total of $7.8 million in partners' contributions. These contributions amount to $165,000 more than partners contributed in FY 2013. Experience has shown that as Federal funds decline, partners' contributions tend to follow. The source of partners' contributions depends on the region of the country and the ability of States and partners to contribute. In the West, where forest land ownership is primarily Federal, the major cost-sharing partners tend to be Federal land managers.

Since 2000, FIA has provided grants of nearly $169 million to efficiently carry out annualized inventory and partners have contributed more than $116 million to leverage Federal dollars to reduce inventory cycles and provide for other annual inventory enhancements. Table 3 summarizes FIA grants and partners' contributions by organization.

Table 3. FIA grants and partners' contributions, FYs 2000–14.

Group	Total FIA grants	Average annual grants	Percent of grants	Total partner contibutions	Average annual contributions	Percent of contributions
	Dollars			*Dollars*		
States/islands	93,947,307	6,263,154	56%	83,928,015	5,595,201	72%
Universities	45,873,494	3,058,233	27%	6,696,928	446,462	6%
Forest Service	14,100,069	949,005	8%	22,103,262	1,473,551	19%
Other Federal	1,310,370	87,358	1%	3,490,511	232,701	3%
Other partners	13,614,246	907,616	8%	362,527	24,168	0.3%
Total	**168,980,487**	**11,265,366**	**100%**	**116,581,243**	**7,772,083**	**100%**

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

Note: Percentages may not add to totals because of rounding.

FIA Data Availability

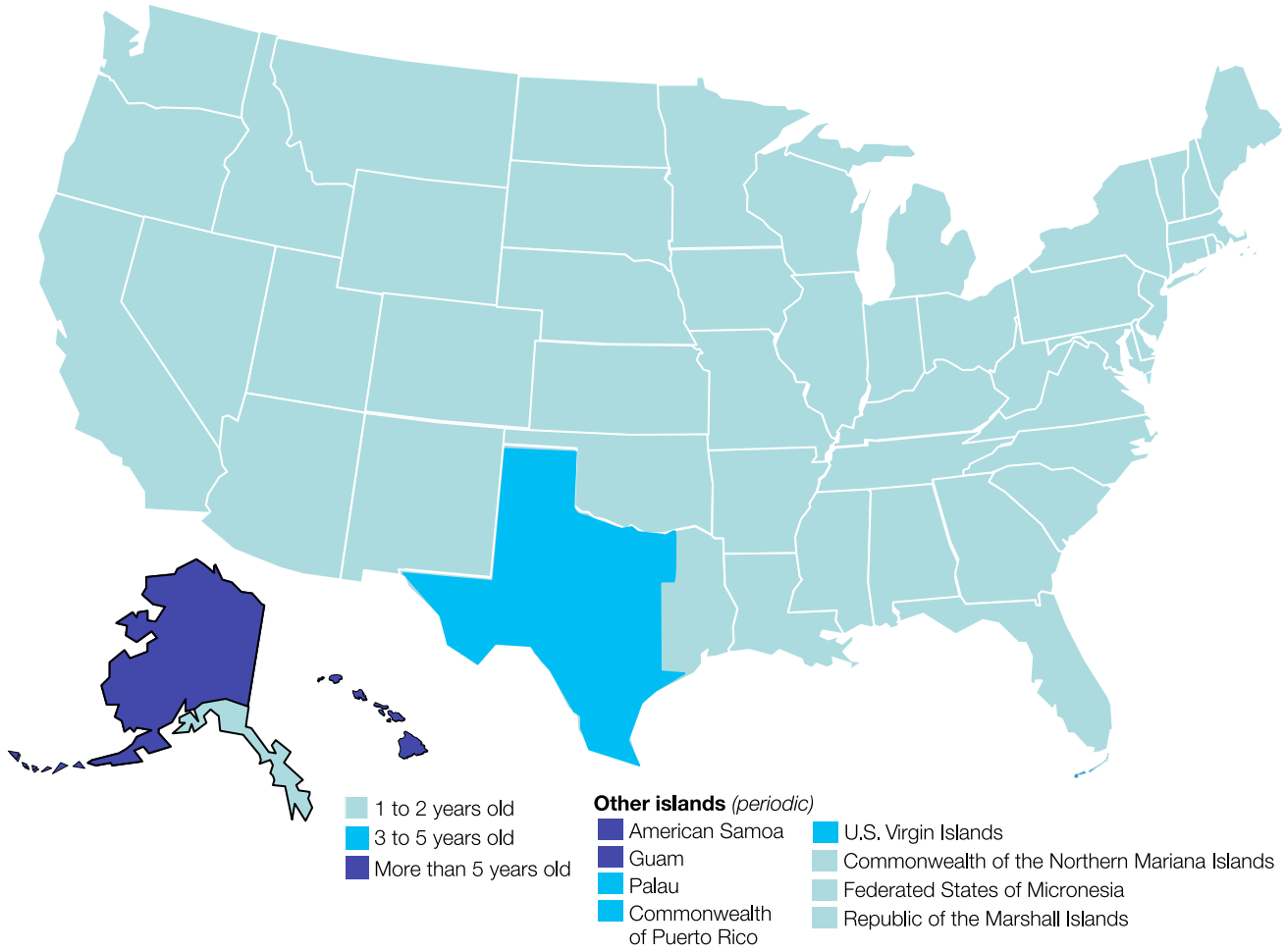
In 2014, FIA completed migrating its data and data-processing procedures to the new Forest Service corporate servers in Kansas City, MO. The overall goal of this migration was to move the Forest Service to a more reliable and modern infrastructure with improved platform tools, better response times, better documentation and, of course, lower total life cycle cost. Using optimized scheduling, the FIA units were able to complete the initial migration with only minor data loading and access delays. Many significant applications' development challenges remain in the new corporate server environment, but the first major hurdle is behind us. FIA has overcome the initial hurdles of the migration, and online data access has begun to return to normal levels that are commensurate with FIA's high customer service standards (appendix B-7).

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

As we move through the transition to full program implementation, one key performance measure is how well we are satisfying program objectives. Figure 6 shows, for each State, the age of FIA data accessible in our public database as of September 30, 2014—the end of FY 2014. Virtually all States now have data that are less than 2 years old available in the database. Interior Alaska remains an outlier because of a continued lack of funding to initiate the field inventory. FIA will experiment with opportunities in Alaska with a project in the Tanana Valley in FY 2014. Some island data will be older because the islands' periodic inventory cycles are predominantly 10 years. Continued improvements in data processing and NIMS are now paying dividends by enabling us to establish a more routine loading schedule.

Figure 7 shows the age of the most recently published statewide FIA report for each State. States with publications based on data that are less than 6 years old—the program objective—are shaded light blue. States with publications 6 to 10 years old are shaded medium blue, and States where the most recent publication reports are based on data more than 10 years old are shaded dark blue. Only four States now have State reports more than 6 years old, excluding interior Alaska (fig. 7). FIA made significant strides in catching up with the backlog of 5-year reports in recent years and should soon complete the process of full compliance with its legislative mandate. As noted earlier, some islands will have reports that are more than 6 years old because of longer inventory cycles.

Figure 6. Availability of online FIA data, FY 2014.



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

The goal, however, is not to exceed 10 years in these areas.

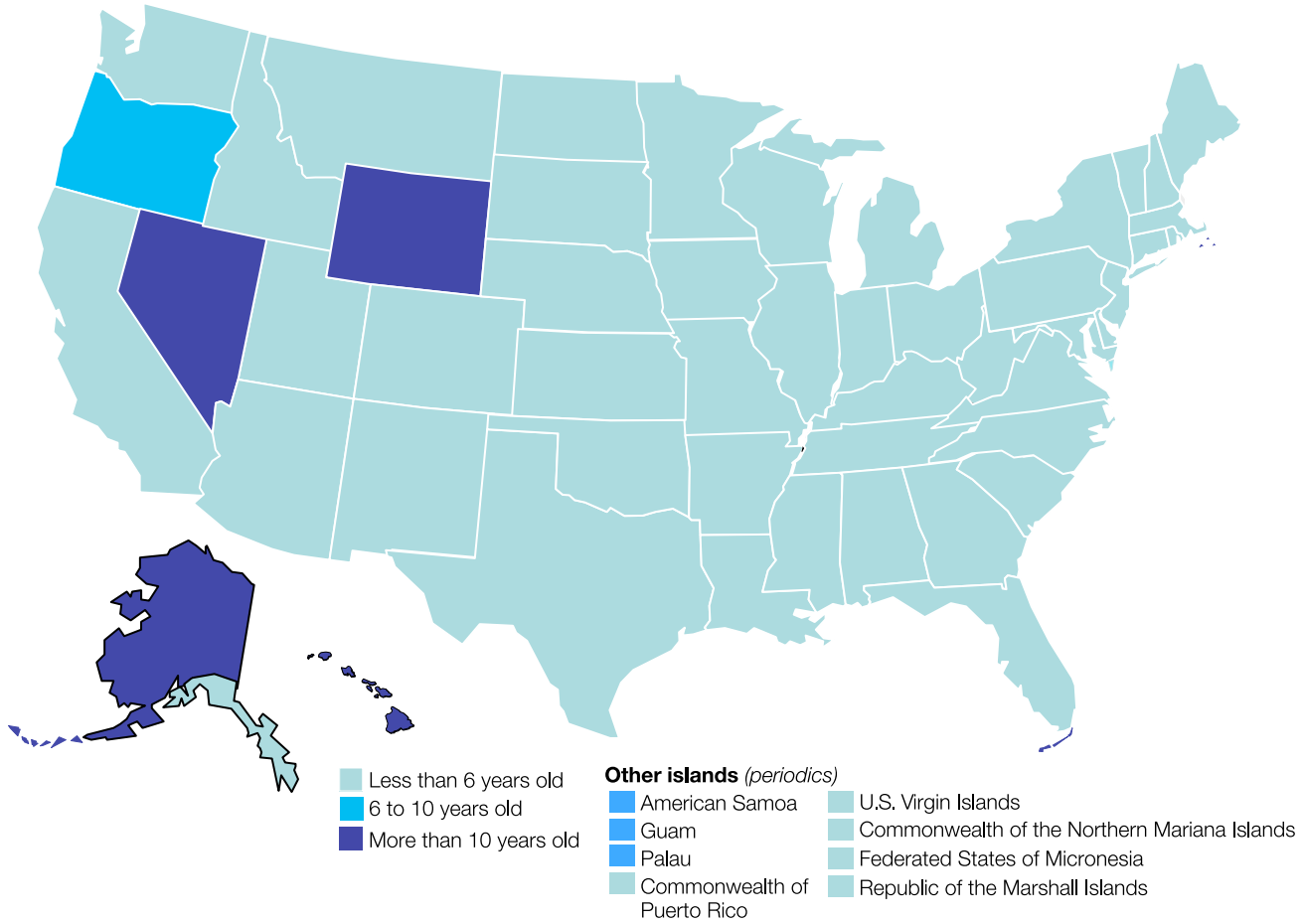
Quality Assurance

FIA is committed to producing and delivering complete, accurate, and unbiased information with known precision, representativeness, comparability, and accuracy. The FIA Quality Assurance (QA) program supports this goal using a framework that promotes consistency during all stages of the national core FIA inventory process. The FIA *National Core Prefield Guide* and *National Core Field Guide* document the protocols, ensuring consistent prefield and field collection of core program data items. FIA's national field data entry program, the Mobile Integrated Data Acquisition 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 NIMS Compilation System (NIMS-CS) provides additional error checks, and consistently calculates a variety of derived variables using estimation equations that are described in general technical reports. The National Quality Assurance Coordinator works with the National FIA Program 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 FIA *National Prefield Guide* and rigorous QA protocols define a nationally consistent process to collect information about FIA plots before field visits.
- Up-to-date FIA *National Core Field Guides* ensure consistent core program data collection.
- The field *QA Check Procedures Guide* promotes field QA consistency from region to region
- *The Forest Inventory and Analysis Database: Database Description and User Guide* provides detailed information to users about published FIA data.
- The Forest Inventory and Analysis Database (FIADB)

Figure 7. Publication status of State reports, FYs 2009–14.



FY = fiscal year.
Dates are dates of publication, not dates of data shown in the publication.

displays standardized output tables and is accompanied by detailed documentation in a recently updated *Database Description and User Guide*.

- The analytical *QA Guide* outlines steps for checking compiled data for accuracy and completeness before releasing them to the public.
- A *National FIA QA Plan* describes the overall QA process.

New and ongoing QA tasks in FY 2015 will be aimed at identifying errors and increasing efficiency and consistency in the national inventory, include—

- Expanding FIA analysts' toolbox by distributing regionally developed analytical QA error checking applications to FIA State analysts nationally.
- Developing systematic edit checks of data before public release, including MIDAS logic checks and NIMS load error checks.
- Defining rigorous national cold check field and scoring procedures to allow for equivalent field crew assessments 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 tables and NIMS-CS, a consolidated FIA data processing system.

Regional Program Accomplishments for FY 2014

This section provides information on FIA results, accomplishments, and outcomes throughout the country by FIA unit. More detailed information is available at either the provided links or from the respective FIA unit. (Contact information for each FIA unit appears in appendix A at the end of this report.)

Northern Research Station FIA Program

Finding: Since remeasurement of the annualized FIA plot system has been completed across the Eastern United States, the Northern Research Station (NRS) FIA program used growth and mortality estimates to evaluate the impacts of two forest pests (beech bark disease and hemlock woolly adelgid) at a regional scale. Before the annualized FIA inventory, assessment of growth and mortality across multi-State scales was limited or not possible because of long and inconsistent remeasurement periods.

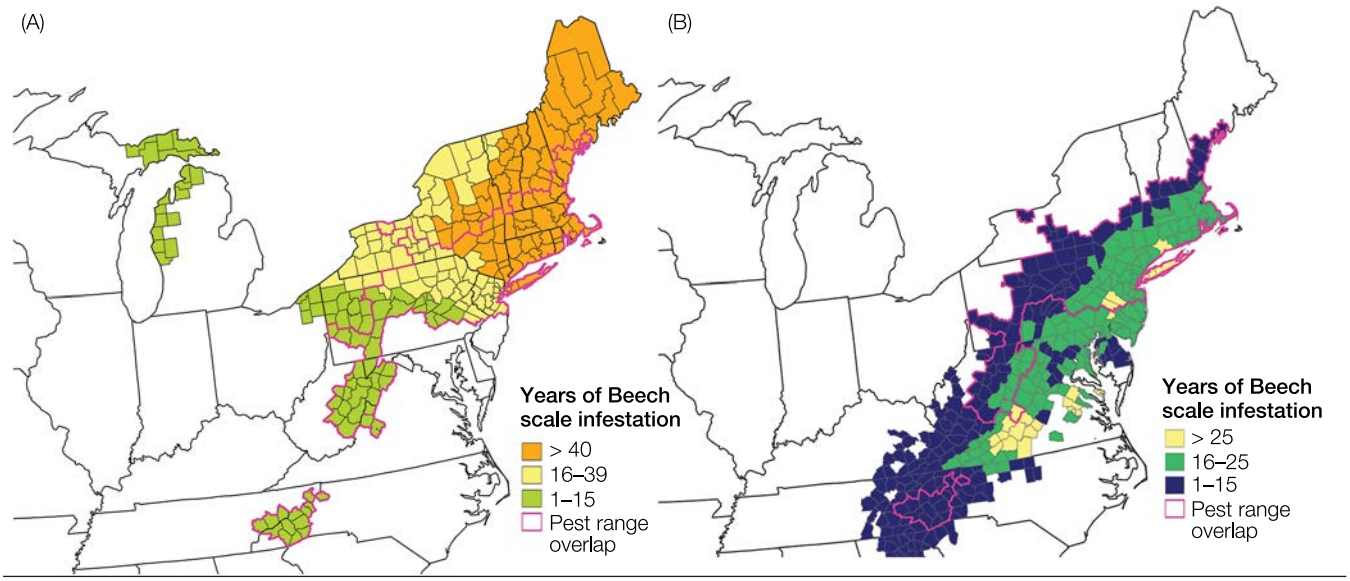
Accomplishment: Given continued accumulation of nonnative insects and diseases in forest ecosystems worldwide, assessing the impacts of these species at the regional level is a serious need. Although an extensive body of literature has been published on the ecological impacts of invasive species in forest ecosystems, most studies have been limited to sampling from individual stands. An approach that uses regional evaluation to quantify individual and combined impacts of invading insect and disease species was employed. Growth and mortality estimates were presented in duration (years) categories for the groups of counties where the infestations of both pests overlap for comparison with the counties that are uninfested or infested only by one pest (fig. 8). The results document that invasions by beech bark disease and hemlock woolly adelgid have altered the trajectory of species composition in forests through their effects on the growth and mortality rates of the two late-successional tree species. Both growth and mortality of host species are substantially different between pest infestation categories. Interestingly, beech net growth appears to increase in response to HWA-induced hemlock mortality. Similarly, hemlock net growth responds favorably to BBD-induced beech mortality (fig. 9).

Outcome: The results of the combined beech bark disease and hemlock woolly adelgid impact analysis are currently in review (Morin et al. 2013). Regional impact studies for other forest pests, including emerald ash borer, gypsy moth, and Dutch elm disease, are currently under way. In addition, the NRS-FIA program is also exploring the use of Tableau Software to enable users to explore inventory in a new and interactive way. A tool for examining the impacts of emerald ash borer on the ash resource is now available online at https://public.tableausoftware.com/views/eab_story/eab_story?:showVizHome=no#0.

Morin, R.S.; Liebhold, A.M. 2013. Two invasions collide: a pair of invasive insects intersect and alter the trajectory of eastern forest composition. Forest Ecology and Management. (Accepted)

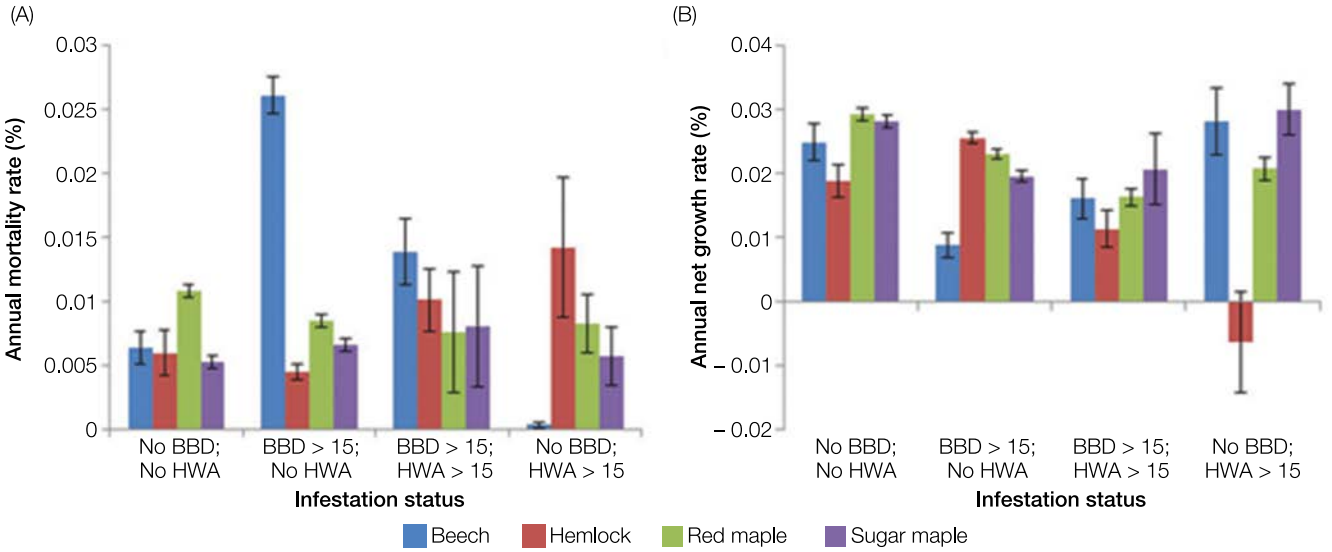
Contact: Randall Morin, rsmorin@fs.fed.us

Figure 8. Maps of (A) historical spread of BBD or beech scale (2006) and (B) historical spread of HWA (2006).



BBD = bark beetle disease. HWA = hemlock wooly adelgid.

Figure 9. Annual percent mortality (A) and net growth (B) of American beech, hemlock, red maple, and sugar maple in overlapping and nonoverlapping HWA- and BBD-infested areas.



BBD = bark beetle disease. HWA = hemlock wooly adelgid.
Note: Error bars represent 68 percent confidence intervals.

Finding: Housing density increases threaten private forest lands on U.S.-affiliated islands and territories.

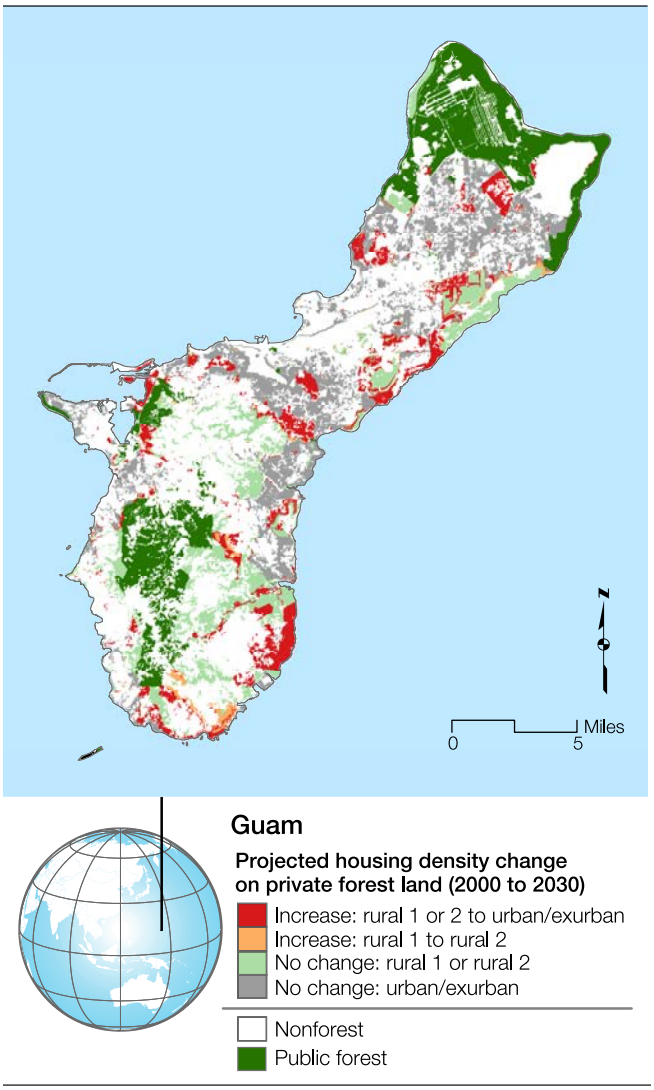
Accomplishment: The Forests on the Edge (FOTE; http://www.fs.fed.us/openspace/fote/) project seeks to document and communicate the impact of housing density changes on private forest land and to place this information in the hands of decisionmakers. The latest FOTE report was a partnership between Forest Service personnel from S&PF and NRS-FIA.

Outcome: Data from Puerto Rico, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, the U.S. Virgin Islands, and American Samoa were analyzed. Projections of housing density (fig. 10) for the islands for the year 2030 were combined with ownership information and satellite-derived land cover data to analyze potential housing development impacts on private forest land. Urban and exurban housing development frequently advances at the expense of private forest land. This sprawl is particularly impactful on U.S.-affiliated islands in the Pacific and Caribbean Oceans where we found private forest land to comprise anywhere from 46 to 87 percent of all forest land, depending on the island. The shift from rural housing density to urban and exurban housing density is forecast to impact anywhere from 3 to 25 percent of private forest land across the islands.

Stein, S.M.; Carr, M.A.; Liknes, G.C.; Comas, S.J. 2014. Islands on the edge: housing development and other threats to America's Pacific and Caribbean island forests. A Forests on the Edge report. Gen. Tech. Rep. NRS-137. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 55 p.

Contact: Greg Liknes, gliknes@fs.fed.us

Figure 10. Projected housing density change on private forest land in Guam between 2000 and 2030.

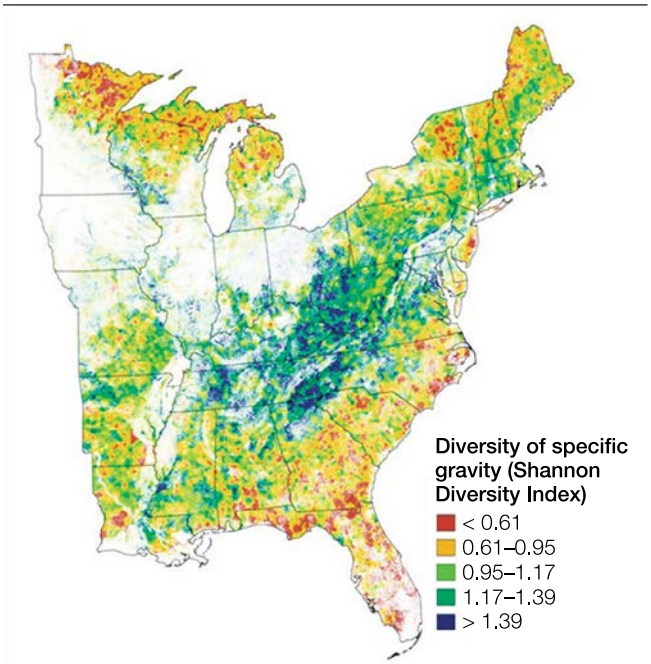


Finding: Functional traits refine understanding of forest stand dynamics across large scales.

Accomplishment: Plant functional traits (PFTs) have increased in popularity in recent years to describe various ecosystems and biological phenomena while advancing general ecological principles. For example, a tree's functional trait of wood density has been used to evaluate hypotheses of forest production such as declining growth and mortality with increasing wood density. Across a series of studies, the distribution and contribution of various PFTs in determining forest structure, live tree production (volume and biomass), and tree mortality across the Eastern United States was examined. In total, 16 metrics representing species specific gravity and their shade, flood, and drought tolerance were used to develop a PFT profile for more than 23,000 permanent sample plots in the region. Beyond investigating simply the mean value of these traits, measures of PFT complexity were evaluated: the standard deviation, Shannon's index (a measure of PFT diversity, fig. 11), and Gini coefficient (a measure of PFT inequality). Results from nonparametric random forest models indicated that variables that formed the PFT profile contributed to explaining broad-scale patterns in the variability in forest structure (volume and biomass of overstory live trees, maximum stand density index, and tree seedling abundance; R^2 ranged from 0.09 to 0.78), production (volume [$R^2 = 0.16$] and biomass accretion [$R^2 = 0.11$]), and to a lesser degree, tree mortality.

Outcome: This study confirmed aspects of the emerging theory of "fast-slow" plant economics spectrums across temperate forest ecosystems. Stands with relatively low wood density appear to occupy sites that have a concomitantly higher rate of tree mortality, but with less biomass accretion relative to volume because of allocating biomass or carbon to a greater tree volume. This work demonstrates the utility of applying PFT profiles for understanding and predicting patterns of forest structure and production and their role in critical ecosystem processes such as carbon sequestration, while demonstrating the potential application of the plant economics spectrum theory in refining our understanding of general patterns of forest stand production during stand development.

Figure 11. Interpolated (inverse distance weighting) Shannon's diversity index of specific gravity (unitless) for forests of the Eastern United States.



Woodall, C.W.; Russell, M.B.; Walters, B.F.; D'Amato, A.W.; Zhu, K.; Saatchi, S.S. [In press]. Forest production dynamics along a wood density spectrum in Eastern U.S. forests. Trees. DOI 10.1007/s00468-014-1083-1.

Russell, M.B.; Woodall, C.W.; D'Amato, A.W.; Domke, G.M.; Saatchi, S.S. 2014. Beyond mean functional traits: influence of functional trait profiles on forest structure, production, and mortality across the Eastern U.S. Forest Ecology and Management. 328: 1–9. http://www.nrs.fs.fed.us/pubs/45970.

Contact: Christopher Woodall, NRS-FIA

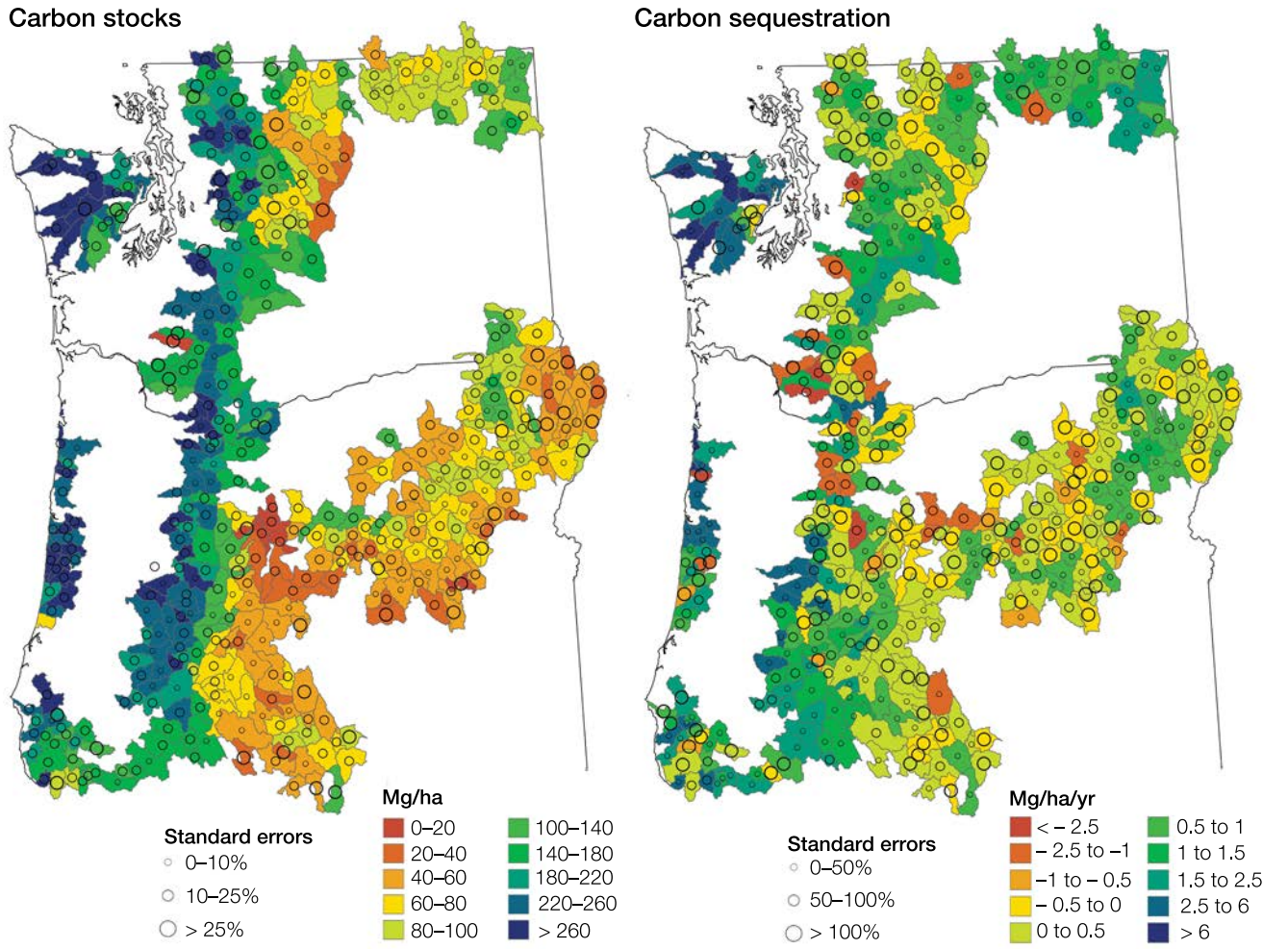
Partners: University of Minnesota; Carnegie Institute; Jet Propulsion Laboratory

Pacific Northwest Research Station FIA Program

Finding: The Pacific Northwest Research Station (PNW) FIA program saw small gains in forest carbon in PNW forests as effects of tree growth and afforestation were offset by fire, insects, cutting, and deforestation.

Accomplishment: A substantial portion of the carbon emitted by human activity is apparently being stored in forest ecosystems in the Northern Hemisphere, but the magnitude and cause are not precisely understood. The goal of these studies was to directly track changes in forest carbon (fig. 12) using repeated inventory measurements of non-Federal lands in Oregon and of national forests in Oregon and Washington. Although net area of forest land increased in Oregon, the net effect on carbon was a decrease because forest gains in low-carbon juniper forests were offset by losses in high-carbon Douglas-fir forests. On non-Federal lands, carbon decreased significantly in eastern Oregon because of the effect of western spruce budworm, but it increased significantly in western Oregon because of growth on non-Federal public lands. On national forest lands, carbon increases were higher on the west side of the Cascades and primarily stayed in the live tree pool compared with lower increases on the east side, where most of the increase was seen in the down wood pool. Carbon stores decreased somewhat in eastside wilderness areas from the effect of fires.

Figure 12. Mean carbon stocks (left) and sequestration (right) on national forest lands by fifth-order watershed in the Pacific Northwest. Carbon in live trees, dead trees, down dead wood, and live understory vegetation on forest and nonforest lands is included.



Note: Only watersheds with at least 5 plots in the sample are shown; the median number of plots per watershed was 23. Circle sizes indicate the standard error of the estimate for each watershed.

Note: Only watersheds with at least 5 plots in the sample are shown; the median number of plots per watershed was 23. Circle sizes indicate the standard error of the estimate for each watershed.

Outcome: The small impact of recent fires on carbon storage on national forests suggests fires may not be a cause for concern, although investigation of longer term effects is warranted. Better understanding of the magnitude of effects of land-use change, management, and disturbance on carbon storage from repeated inventory measurements will improve our ability to predict the effects of future changes in those drivers.

Gray, A.N.; Whittier, T.R.; Azuma, D.L. 2014. Regional estimation of forest carbon flux: adding components of change to stock-difference assessments. Forest Science. 60: 317–326. http://dx.doi.org/10.5849/forsci.12-139.

Gray, A.N.; Whittier, T.R. 2014. Carbon stocks and changes on Pacific Northwest national forests and the role of disturbance, management, and growth. Forest Ecology and Management. 328: 167–178. http://dx.doi.org/10.1016/j.foreco.2014.05.015.

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

Partners: Forest Service, Pacific Northwest Region (NFS Region 6); Oregon State University

Finding: To estimate forest attributes in small areas, composite methods that incorporate information from both the area of interest and the entire population perform better than traditional estimators.

Accomplishment: One challenge often faced in forest inventory is the estimation of forest attributes for smaller areas of interest within a larger population. Small-area estimation

is a set of techniques to estimate forest attributes for small areas in which the existing sample size is small and auxiliary information is available. The technique combines information from direct estimation, using the available plots, and indirect estimation, based on predictions from regional models. We compare the performance of two families of small-area estimators with that of the direct estimator, multiple regression, and imputation, both for stand-level prediction and regional prediction. The predicted variables were total stem volume, basal area, quadratic mean diameter, tree density, and height of the dominant trees.

Outcome: In general, the composite estimators performed better than the indirect estimators in terms of bias, and better than the direct estimators in terms of precision. The best performing estimator was not clear across all variables. The choice of estimator should be evaluated for each particular case, depending on the variable of interest and the available auxiliary information.

Goerndt, M.E.; Monleon, V.J.; Temesgen, H. 2011. Using small area estimation and LiDAR-derived auxiliary variables to estimate attributes for selected forests stands. Canadian Journal of Forest Research. 41: 1189–1201. http://www.treesearch.fs.fed.us/pubs/46164.

Goerndt, M.E.; Monleon, V.J.; Temesgen, H. 2013. Small area estimation of county-level forest attributes using ground data and remote sensed auxiliary information. Forest Science. 59: 536–548. http://www.ingentaconnect.com/content/saf/fs/2013/00000059/00000005/art00004.

Contact: Vicente Monleon, vjmonleon@fs.fed.us

Partner: Oregon State University

Finding: Linked remote-sensing products dramatically reduced variability in vegetation estimates for logistically difficult-to-reach environments in Alaska.

Accomplishment: In this study, we demonstrate that sample strips of LIDAR (Light Detection and Ranging) in combination with Landsat can be used to predict forest attributes more precisely than from Landsat alone. Although LIDAR and Landsat can each be used alone in vegetation mapping, the cost of wall-to-wall LIDAR may exceed users' financial resources, and Landsat may not support the desired level of prediction precision. We compare fitted linear models and k nearest neighbors (kNN) methods to link field measurements, LIDAR, and Landsat. We also compare 900 and 8,100 m^2 resolutions to link LIDAR to Landsat. An approach with LIDAR and Landsat together reduced estimates of residual variability for biomass by up to 36 percent relative to using Landsat alone. Linear models generally performed better than kNN approaches, and when linking LIDAR to Landsat, using 8,100 m^2 resolution performed better than 900 m^2.

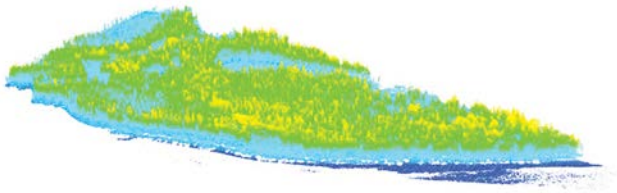
Outcome: Combining remotely sensed data for forest inventory attribute prediction shows great promise for Alaska and will be extended in interior Alaska inventory pilot work in 2014 and 2015. New sensors may include improved LIDAR capability (fig. 13).

Strunk, J.; Temesgen, H.; Andersen, H.E.; Packalen, P. 2014. Prediction of forest attributes with field plots, Landsat, and a sample of LiDAR strips: a case study on the Kenai Peninsula, Alaska. Photogrammetric Engineering and Remote Sensing. 80(2): 143–150.

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

Partners: Oregon State University; University of Eastern Finland

Figure 13. A swath of high-resolution LIDAR 3-D forest canopy measurements acquired near Tok, AK.

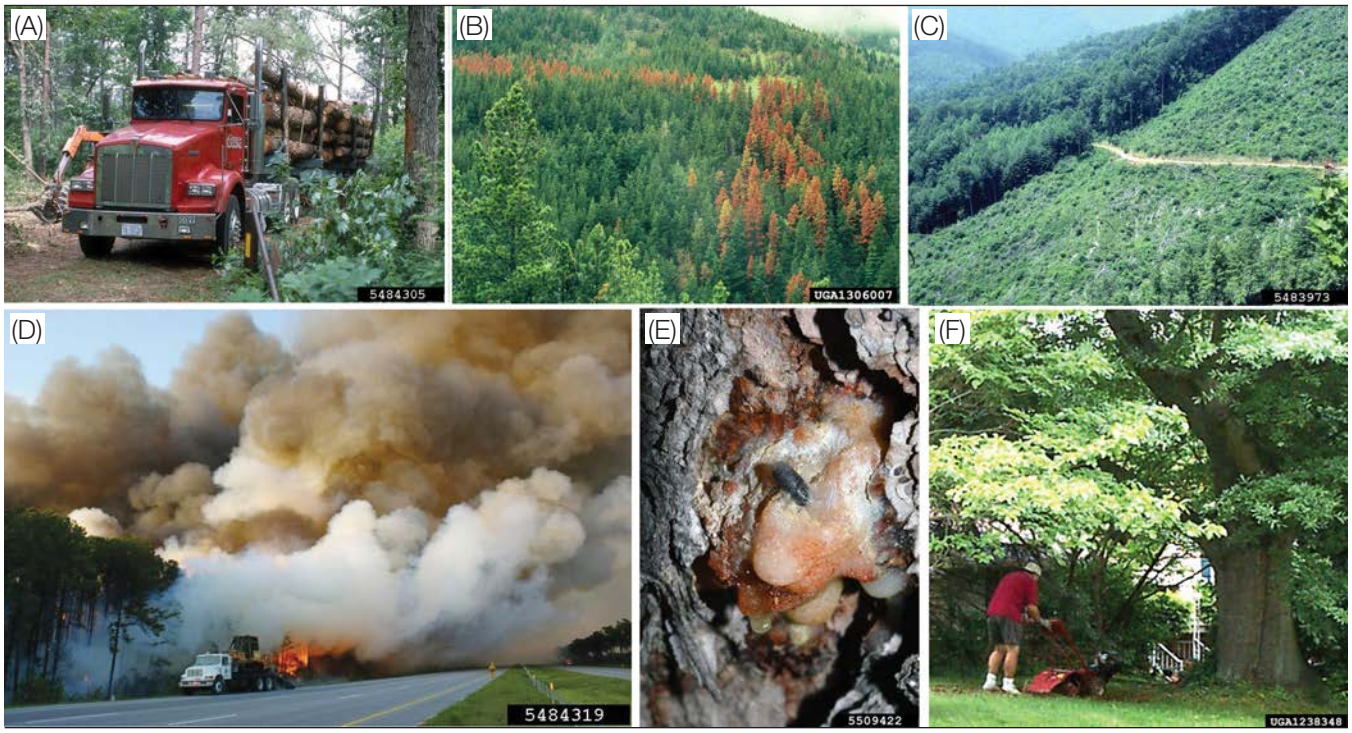


Rocky Mountain Research Station, Interior West FIA Program

Finding: Understanding trends in forest disturbance caused by fire, harvest, stress, weather, and conversion is important for many forest management decisions and for scientific investigations. After a decade of collaborative work among the Forest Service, the National Aeronautics and Space Administration (NASA), University of Maryland, and other partners, the North American Forest Dynamics (NAFD) project has processed historic Landsat data to provide a comprehensive annual, wall-to-wall analysis of U.S. disturbance history during the past 25 or more years. Substantial progress has also been made to identify a specific causal agent through time, and nationwide datasets will soon be available for exploring spatial and temporal patterns in U.S. forests.

Accomplishment: Currently in its third phase, the NAFD project is completing nationwide processing of historic Landsat data to provide a comprehensive annual, wall-to-wall analysis of U.S. disturbance history during the past 25 or more years (fig. 14). Because understanding the cause of disturbance is important to many forest-related applications, the Rocky Mountain Research Station (RMRS) and collaborators have developed methods to map forest disturbance agents through time. Starting with 10 pilot scenes across the United States representing diverse disturbance regimes, annual maps of fire, harvest, conversion, stress and other agents were developed at 30-m resolution.

Figure 14. Examples of forest disturbance agents.



Photos courtesy of and printed by permission:
A: USDA Forest Service Southern Research Station Archive, Bugwood.org (5484305).
B: Daniel Miller, USDA Forest Service, Bugwood.org (1306007).
C: USDA Forest Service Southern Research Station Archive, Bugwood.org (5483973).
D: USDA Forest Service Southern Research Station Archive, Bugwood.org (5484319).
E: William M. Ciesla, Forest Health Management International, Bugwood.org (5509422).
F: Randy Cyr, Greentree, Bugwood.org (1238348).

Outcome: High magnitude disturbances such as clearcuts, land use change, and severe fire could be mapped quite accurately, but the group also experienced success in mapping more subtle and slow disturbances such as insect and disease outbreaks in the Interior West (IW). Annual nationwide maps depicting when and where a forest disturbance occurred during the past 25 years will be distributed shortly from research partners, and causal agent maps and intermediate spatial data layers are being run now by RMRS scientists. These causal disturbance maps will enable extensive analyses of temporal and spatial patterns in disturbance agents across the United States.

http://www.treesearch.fs.fed.us/pubs/44327.
http://www.treesearch.fs.fed.us/pubs/29859.
http://www.treesearch.fs.fed.us/pubs/42672.
http://www.treesearch.fs.fed.us/pubs/42182.
http://www.treesearch.fs.fed.us/pubs/46336.
http://www.treesearch.fs.fed.us/pubs/42693.
http://www.treesearch.fs.fed.us/pubs/42795.
http://www.treesearch.fs.fed.us/pubs/42690.

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

Partners: Warren Cohen, PNW; Sam Goward, University of Maryland; Jeff Masek, NASA Goddard Space Flight Center; Cheng Huang, University of Maryland; Jennifer Dungan, NASA Ames Research Center; Mary Meyer, Colorado State University

Finding: Pinyon-juniper woodlands in the Great Basin are used differently by pinyon jays (fig. 15) based on structure of the stand.

Figure 15. Pinyon jay *(Gymnorhinus cyanocephalus)*. (Photo courtesy of Wallace Keck, National Park Service)

Accomplishment: Increased stand density and widespread encroachment of pinyon-juniper woodlands into adjacent shrubland communities is generating concern from resource managers in the Interior West. Woodland encroachment can compromise shrubland species' habitat and increased stem densities can alter fire behavior, forage availability, and woodland habitat quality. Beginning in 2012, the IW-FIA program partnered with the National Park Service (NPS) and the Great Basin Bird Observatory (GBBO) to investigate pinyon jay (*Gymnorhinus cyanocephalus*) use of pinyon-juniper woodlands in the Great Basin of the United States. Pinyon jays are known to be the main dispersal agents for pinyon pine and closely associated with pinyon-juniper woodlands in general. Pinyon jay populations have been steadily declining during the past half-century, however, even while pinyon-juniper woodland extent has increased. We had three primary goals for this research: (1) to identify habitat preferences of pinyon jays and to assess how the birds' feeding and seed-caching behavior affects the infill and expansion processes of pinyon-juniper woodlands, (2) to quantify suitable habitat for pinyon jays across the Great Basin, and (3) to provide landscape-scale pinyon jay habitat data to resource managers to better inform their woodland management decisions.

Outcome: To better understand how pinyon jays influence in-fill and expansion in pinyon-juniper woodland communities, we measured forest and understory structure at sites used by pinyon jays in southern Idaho and east-central Nevada and compared mean shrub cover, canopy cover, and basal area of dead trees between sites used for nesting, roosting, foraging, and seed caching activities. Mean canopy cover was lowest at seed caching sites while basal area of standing dead trees was higher at these locations than at other activity sites. Mean shrub cover was greater and basal area of dead trees was less at foraging sites than at other locations. Canopy cover was highest and shrub cover lowest at nesting sites. Our results suggest that pinyon jays prefer open, sparsely stocked or recently disturbed areas for seed caching, stands of moderately stocked seed producing trees that have an intact understory shrub layer for foraging, and mature, densely stocked stands for nesting and roosting activities. We found that preferred foraging habitat appears to be limited in pinyon-juniper woodlands found within the portion of the Great Basin found in Nevada. Further data collection and analysis are planned in 2015, including nest productivity, comparisons of biodiversity between activity sites, and physical conditions under which pinyon pine recruitment is occurring.

Contact: Chris Witt, chriswitt@fs.fed.us

Partners: GBBO; NPS

Finding: In 2014, the FIA program published the first report on New Mexico's forest resources since 2001. Updated information on forest status and trends is critical for forest managers in a variety of public and private organizations. The RMRS WI-FIA program collaborated with New Mexico State Forestry, with support from the American Recovery and Reinvestment Act, to accelerate the implementation of New Mexico's forest inventory and provide the data for this report. The most important forest health trends in New Mexico are increasing tree mortality and declining tree growth.

Accomplishment: The public, forest managers, and scientists now have access to the most comprehensive inventory of forest health trends in New Mexico's history. New Mexico's forest land covers 24.8 million acres of which 44 percent is privately owned and more than one-half consists of piñon and juniper woodlands. New Mexico has nearly 7 billion live trees, with gambel oaks as the most prevalent (1.7 billion). Aspen forests cover more than 380,000 acres in New Mexico, and the area of aspen has not changed in the past decade. For many timber species, growth rates exceed mortality rates, and only ponderosa pines are growing faster than they are dying. The State's most important piñon and juniper species—which may be important for firewood, biomass, and pine nut production—also showed positive net growth. Overall mortality was highest on forests managed by the Forest Service. Most tree mortality in New Mexico can be linked to insects, wildfires, and disease—all of which are related to drought. During the past decade, the volume of wood harvested has decreased by more than one-half throughout the State and by 95 percent on lands managed by the Forest Service.

Outcome: The report *New Mexico's Forest Resources, 2008–2012* summarizes the most recent inventory of New Mexico's forests based on field data collected from more than 3,000 forest areas between 2008 and 2012. The report describes the growth and mortality rates of trees across the State; effects of droughts; status of aspen; impacts of insects, diseases, and other damaging agents; extent of wildfires; and effects of invasive and noxious weeds. The complete report is available at http://www.treesearch.fs.fed.us/pubs/46050. Researchers will continue to study forest health trends and plan to publish updates every 5 years.

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

Partners: John Shaw, Chris Witt, Mike Thompson, Chuck Werstak, RMRS-Inventory and Monitoring Program; Michael Amacher, RMRS-Forest and Woodland Ecosystems Program; Mary Stuever, New Mexico State Forestry; Todd Morgan, Colin Sorenson, Steven Hayes, Chelsea McIver, University of Montana, Bureau of Business and Economic Research

Southern Research Station FIA Program

Finding: Carbon sequestration in forests provides an important offset to carbon dioxide emissions. Over time, southern forests are expected to change because of various biotic and abiotic factors, including land use, weather, insects, disease, and

fire. Projected changes indicate that carbon accumulation in southern forests will continue into the future, but at a slower rate because of the net effects of forest aging and shifts in land use.

Accomplishment: During the past century, forest regrowth in Europe and North America expanded forest carbon (C) sinks and offset carbon emissions, but future carbon accumulation is uncertain because of the effects of land use changes, management, disturbance, and climate change. Dissecting and understanding the complexities around carbon stock change are essential for informing policy (fig. 16). Using a completely remeasured land use and forest inventory, researchers demonstrated that forests in the Southeastern United States yielded a net sink of carbon during a 5-year period (2007 through 2012) because of net land use change (+6.48 TgC yr^{-1}) and net forest accumulation (+75.4 TgC yr^{-1}). Forests disturbed by weather, insects, disease, and fire show positive forest carbon changes (+1.56, +1.4, +5.48 TgC yr^{-1}, respectively). Forest cutting was the only disturbance causing net decreases in carbon (–76.7 TgC yr^{-1}), but those decreases were offset by forest accumulation (+143.77 TgC yr^{-1}). Projected carbon stock changes indicate a gradual slowing of carbon accumulation with forest aging (a reduction of 9.5 percent during the next 5 years) but were highly sensitive to land use change in which small shifts in land use transitions resulted in a 40.6-percent decrease in carbon accumulation.

Outcome: Policymakers need insight into forest carbon dynamics as they anticipate emissions futures and goals. This work highlights the complementary nature of FIA data and the Southern Forest Futures Project and their combined role in addressing timely questions about forests and carbon at a policy-relevant scale.

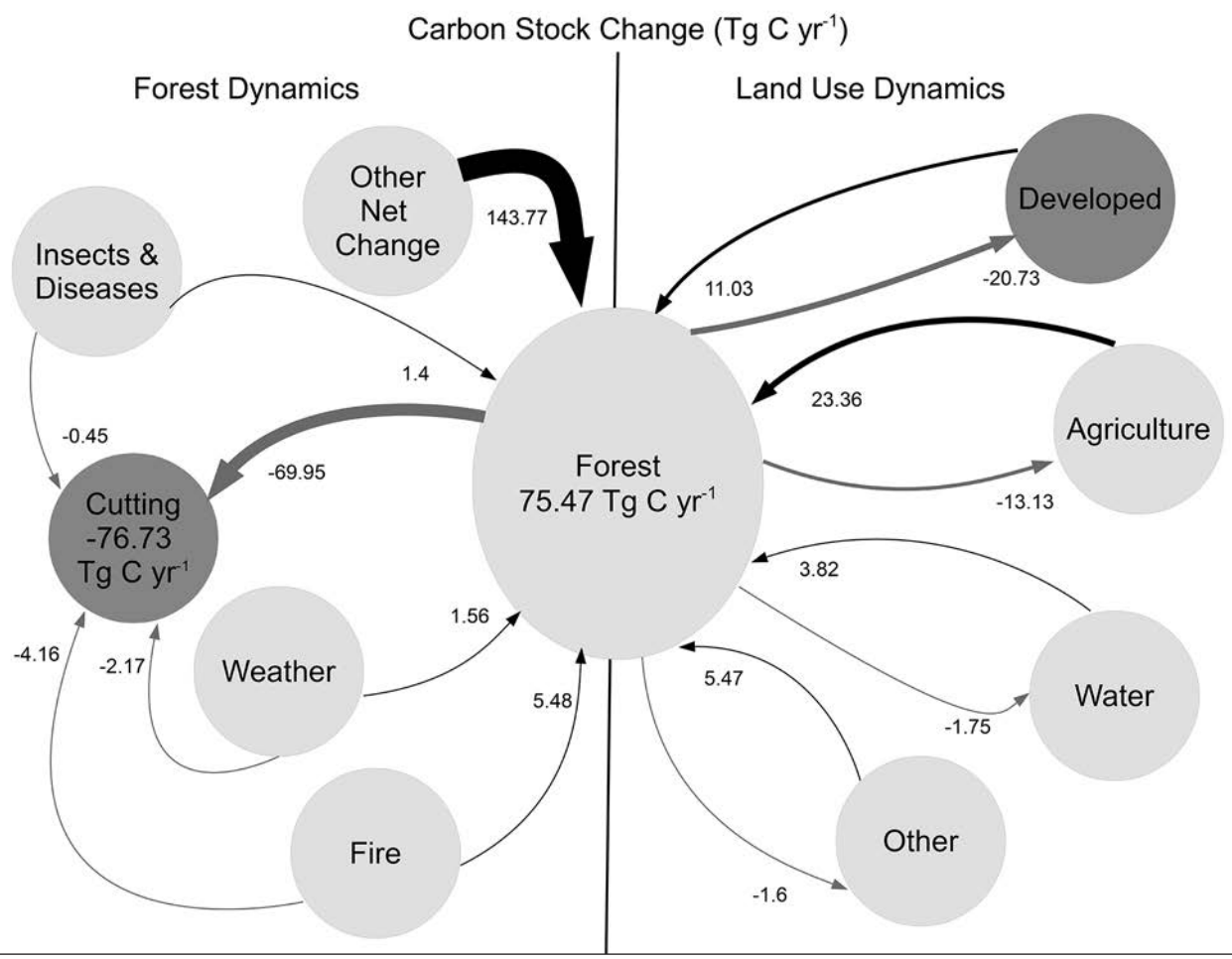
Coulston, J.W.; Wear, D.N.; Vose, J.M. [N.d.]. Complex forest dynamics indicate potential for slowing carbon accumulation. Scientific Reports. Manuscript in review.

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

Partner: Center for Integrated Forest Science and Synthesis

Finding: A method and approach to determine optimum locations for new wood pellet mills have been devised and implemented in forestry consulting work. The initial steps involve identifying

Figure 16. Forest carbon stock changes (TgC yr^{-1}) resulting from land use dynamics (right side) and forest dynamics within forest land uses (left side).



Note: Line thickness is proportional to the flow.

target stands using effective density analysis on stands within 50-, 75- and 100-mile circular polygons. Models are then applied to these data to derive output and sustainability under various economic and mill competition scenarios.

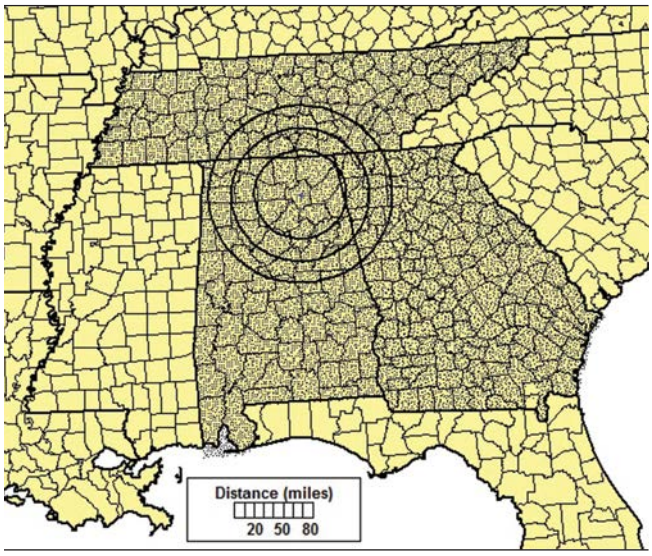
Accomplishment: Where to locate and build wood utilization facilities in the South is an important economic decision for forest industry companies. Recent interest in biomass utilization for products such as wood pellets has created renewed demand for reliable ways to estimate resource availability and sustainability. A process utilizing FIA data has been developed that identifies optimum areas based on current stand volumes inside circular polygons stratified by effective density volume classes for specific species (fig. 17). These classes are further stratified into quadratic mean diameter classes for each sample plot where the quadratic mean diameter serves as a surrogate for age. The classes can then be used in growth and harvesting models that are fine tuned to address various economic and resource scenarios. Finally, further refinement considers competition from nearby mills (based on their capacity) that may overlap into and across the polygons. The result is a system that provides a conservative assessment of resource sustainability that spans the necessary number of years needed for mill operation.

Outcome: To date, application of this methodology has resulted in sizeable investments and has helped create more than 300 forest sector jobs, both directly and indirectly.

Contact: James F. Rosson, Jr., jrosson@fs.fed.us

Finding: Scientists with the Southern Research Station (SRS)-FIA partnered with university collaborators to design and conduct novel analyses using broadscale inventory data to look for changes in the range of tree species. Using these methods, they detected potentially climate-related range shifts for one common tree species.

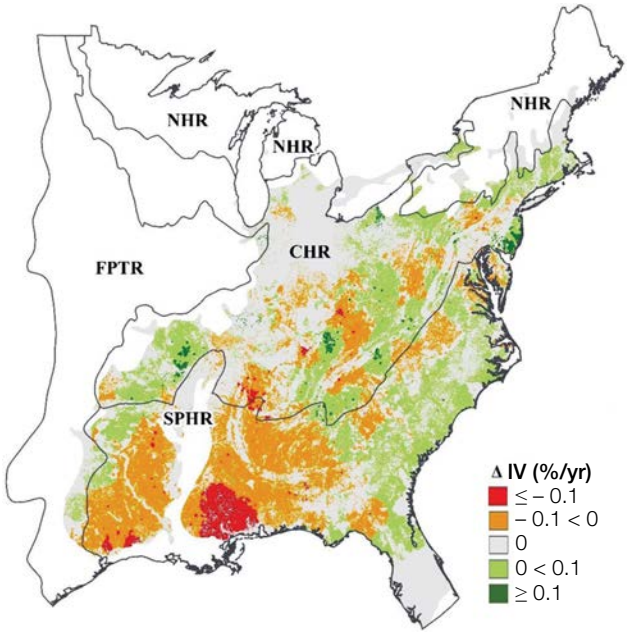
Figure 17. Demonstration map illustrating supply polygons within 50-, 75-, and 100-mile radii for potential mill sites in Marshall County, AL. Plot locations are approximate to protect privacy considerations.



Accomplishment: Range response to projected climate change, based on suitable habitat, has been modeled and mapped for many eastern North American tree species. Model projections reveal drastic shifts in the spatial distribution for many species in response to changing climatic conditions. In an attempt to understand the potential impact of climate change on tree species ranges in the Eastern United States, teams of researchers from the Forest Service FIA program, Purdue University, and the University of Alabama have advanced tree range shift research by using broadscale inventory data. The researchers were interested in documenting current changes in certain tree species populations along range boundaries in the Eastern United States. The population dynamics of two species, sugar maple (*Acer saccharum*) and blackgum (*Nysaa sylvatica*), were examined in detail. No contraction of the southern range of sugar maple was detected; however, blackgum was determined to be undergoing a range-shift, with its southern range contracting and northern range expanding (fig. 18). The work was documented in the journals *Botany* and *Climatic Change*, respectively.

Outcomes: This research yielded an excellent baseline for tree range for specific tree species, in anticipation of future research and potential effects of climate change. In addition, findings

Figure 18. Spatial variability in rate of change of the importance value [ΔIV = (IVsp2 – IVsp1) / number of years between SP1 and SP2] of blackgum across the four ecoregions of the Eastern United States.



CHR = Central Hardwood Region. FPTR = Forest-Prairie Transition Region. NHR = Northern Hardwood Region. SPHR = Southern-Pine Hardwood Region.

related to blackgum range suggest several potentially fruitful areas for future research, including similar studies involving specialist tree species, and more detailed study of factors contributing to range contraction in southern ranges.

Hart, J.L.; Oswalt, C.M.; Turberville, C.M. 2014. Population dynamics of sugar maple through the southern portion of its range: implications for range migration. Botany. 92: 563–569.

Desprez, J.; Iannone, B.V., III; Yang, P. [and others]. Northward migration under a changing climate: a case study of blackgum (*Nyssa sylvatica*). Climatic Change. 126: 151–162.

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

Partners: Purdue University; The University of Alabama

National FIA Program Office Staff

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

Other FY 2014 accomplishments in collaboration with field units—

- Provided budget coordination, briefings, and guidance for FIA field units.
- Facilitated one FIA management team meeting, six conference calls, and dozens of briefings for internal and external partners, customers, collaborators, and supporters.
- Collaborated with the Society of American Foresters and helped organize the ninth national users group meeting for FIA customers, which was held in New Orleans, LA, in March 2014.
- Published the *Forest Inventory and Analysis Fiscal Year 2013 Business Report*.
- Worked with field units and partners to draft a new FIA strategic plan in response to the proposed Farm Bill. Plan drafted on time and delivered to USDA for submission to Congress.
- Completed a memorandum of understanding (MOU) with the NPS guiding FIA operations on NPS lands.
- Worked with global resource data strategy team representing the Forest Service on the Interagency Council on Agricultural and Rural Statistics Land Use Working Group.
- Continued providing support for coding and testing the National Vegetation Classification System algorithm for use with FIA data, in cooperation with FIA by NatureServe.
- Continued to work with the United Nations Food and Agriculture Organization on the global Forest Resources Assessment and oversight of the Global Remote Sensing Project to estimate and monitor area changes of the world's forests.
- Continued to oversee collaborative work with NASA on land cover and land use tracking in the United States.
- Participated in SilvaCarbon, a flagship program under U.S. fast-start financing for Reducing Emissions from Deforestation and Forest Degradation Plus, or REDD+, which is a U.S. contribution to the Forest Carbon Tracking task of the intergovernmental Group on Earth Observations.
- Worked with Mexico to develop a remote field data entry system and proposed a workshop providing an overview of the FIA MIDAS. This collaboration will continue in FY 2015.
- Drafted a report on 10-year activities of the North American Forestry Commission Inventory Working Group.
- Participated in Forest Service Safety Journey training engagement sessions.

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

FIA Data Requests and Access

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

Partners

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

FY 2014 Spatial Data Requests

In FY 2014, 586 requests were active (fig. 19). National or multiregional data requests accounted for 10 percent of the total number of requests. Of the requests received, 99 percent were completed by the end of the fiscal year and 1 percent remain in progress.

Requests are cataloged by type and are nearly evenly divided among knowledge, summary, and spatial types (fig. 21). In FY 2014, public agencies were the largest group of spatial data requestors, with 37 percent of all new requests, followed by academia, with 27 percent and industry with 16 percent.

FY 2014 Web Tools

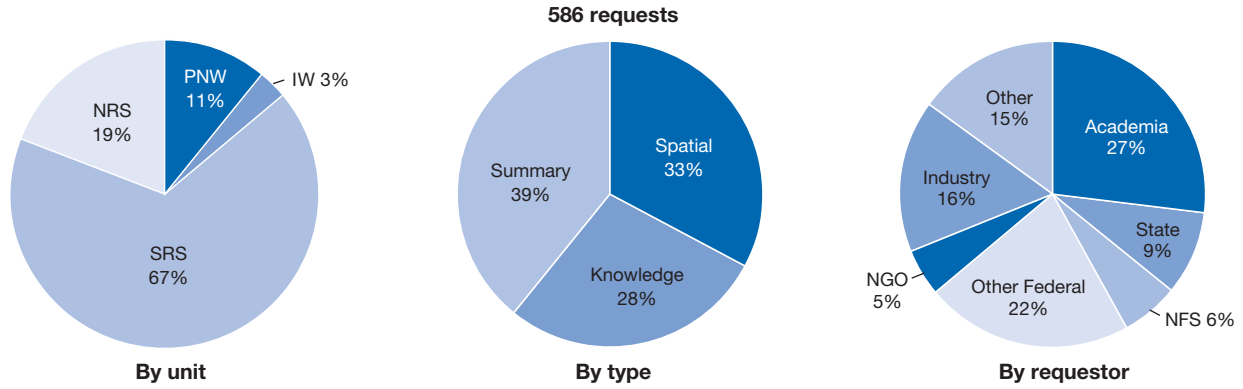
The FIA program has been serving data to the public since 1996 through a variety of Web tools. FY 2014 was particularly challenging because a number of technical issues at the national data center caused the tools to be unreliable and unstable for 47 days; as a result, Web traffic during that time was down about 50 percent.

The first database retrieval program FIA released (1996) was the FIA Data Base Retrieval System (DBRS). The DBRS enabled the public to query regional FIA datasets into Eastwide Forest Inventory Database and Westwide Forest Inventory Database formats. 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. The Forest Inventory Data Online (FIDO) system was introduced in 2008 and the EVALIDator Web application was introduced in 2009.

Based on analysis of the FY 2014 Internet protocol addresses using FIDO, the breakdown of users was academia, 26 percent; corporate, 19 percent; government (State and Federal combined), 17 percent; nongovernmental organizations (NGOs), 1 percent; others from outside the United States, 3 percent; and indeterminate, 34 percent. The total number of FIDO retrievals was 57,567.

The analysis of the FY 2014 Internet protocol addresses using EVALIDator reveals a different breakdown in user categories: academia, 17 percent; corporate, 7 percent; State and Federal governments combined, 49 percent; NGOs, less than 1 percent;

Figure 19. Requests made to the FIA Spatial Data Services Center in FY 2014.



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

external to the United States, 2 percent; and indeterminate, 25 percent. The total number of EVALIDator users was 33,759. A larger percentage of EVALIDator users are from Federal and State agencies.

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

In 2009, a Web application was developed that allowed for querying of the National Woodland Owner Survey (NWOS) database. In FY 2014, 4,502 retrievals were completed. The FIA DataMart was revised in FY 2009 to include the ability to download FIADBs by State as Microsoft Access database files. The Access databases contain a reporting tool (the EVALIDator-PC) that enables the user to generate reports. These reports are not included in table 4 but undoubtedly number in the thousands or tens of thousands. These State databases are included on digital versatile discs, or DVDs, that are distributed with each NRS State's 5-year report.

In FY 2010, users downloaded 18,026 Zip™ files that contained data from one or more FIADB tables. In FY 2011, 24,576 Zip™ files for a single file were downloaded. In FY 2011, users downloaded 2,544 Zip™ files containing the entire set of text files for a given State. In FY 2013, 1,512 Zip™ files were downloaded. In FY 2014 a total of 7,383 files (State and individual files combined) were downloaded from FIA's DataMart.

In 2003, the FIA Mapmaker program added a module that enabled the user to download FIA data in 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 is used to extract data fields from the FIADB into an FVS-ready database. The FIA2FVS program is available for download at http://www.fs.fed.us/fmsc/fvs/software/data.shtml.

The National Reporting and Data Distribution, or NRDD, Team has been providing webinars and in-person trainings on FIA data and Web tools since 2010. Information on training and webinars is available from Liz LaPoint at lpapointe@fs.fed.us.

Consultations by FIA Staff

Consulting with FIA customers is a growing part of our business. Just as we have increased the amount of information (both data and analyses) made available on the Web, our FIA staff are increasingly in demand by customers seeking either to understand more about the FIA program and our results, or seeking to address a specific question not obviously addressed through other means. Questions pertaining to a single administrative unit (e.g., to a single State or national forest) often are referred to partners within that administrative unit (e.g., State foresters and national forest analytical staff) who can often provide better context and who prefer to maintain their contacts with their customers. When questions span multiple administrative units, FIA staff will try to help the customer find an answer. FIA does not compete with private-sector consultants; rather, we answer questions about our methods and help customers (including private consultants) use FIA data to answer their own or their clients' questions. Appendix table B-6 shows the number of significant consultations that FIA staff provided in FY 2013, by unit and by type of customer. A significant consultation is defined as any dialogue with a customer outside of FIA that requires more than 1 hour to address, and which is not part of our normal course of business in collecting, analyzing, and reporting on FIA information.

Combined, FIA staff addressed 934 significant consultations, which required 7,987 staff hours to complete (table 5)—equivalent to 4 full-time staff years. Of the consultations, 412 were conducted with other government agencies, such as State agencies and other Federal agencies, accounting for 53 percent of the time. The staff also had internal discussions within the Forest Service. Other major client groups included academic clients (approximately 22 percent of the consultations and 13 percent of the time), industry (16 percent of the consultations and 10 percent of the time), and NGOs (7 percent of the consultations and 7 percent of the time). The data also show some regional variations. For example, State government organizations are consistently the major clients throughout the country. FIA data indicate that industry and academic customers are the second most prominent clients (appendix table B-6).

Table 5. Number and hours of significant consultations by FIA staff, by customer group, FY 2014.

Customer group	Number	Percent	Hours	Percent
Academic	206	22%	1,068	13%
Government	412	44%	4,223	53%
Industry	145	16%	802	10%
NGO	63	7%	572	7%
NIPF	25	3%	46	1%
Media	23	2%	192	2%
Other	60	6%	1,085	14%
Total	**934**	**100%**	**7,987**	**100%**

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

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

	Fiscal year										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Number of retrievals	26,548	56,475	24,335	26,615	59,609	90,974	101,643	132,413	94,027	103,211	186,175

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

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 on planning, conducting, processing, and analyzing forest inventories to FIA's broad range of customers, which include NFS, other Federal agencies, State governments, and other countries.

National Forest Collaboration

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

NFS continues to fund FIA's NIMAC to develop the Design and Analysis Toolkit for Inventory and Monitoring (DATIM). The design tool helps identify inventory information needs, sampling designs (including intensification of FIA samples), and the development of Monitoring Plans as part of NFS Forest Plans, as required by the new Planning Rule. The analytical tools enable NFS to quickly analyze an enhanced form of existing FIA data that better serves their needs by adding NFS attributes computed using the FVS. These analyses can be localized using a Geographic Information System (GIS) and map attributes can be used in the analysis. DATIM received additional funding to develop online training modules for each of its tools. Version 1.5 was released in 2014, while version 2 is currently in development. These versions are currently available only to Forest Service employees. We hope to make version 4 available to all FIA customers by 2016.

With support from NIMAC, the Southern Region used the design tool to determine intensification plans for about one-half of the national forests in the region. SRS-FIA has supported the region with these intensifications through agreements with State partners. Funding has limited further intensification at this time. The design tool will be used for evaluating existing inventories and planning additional intensifications. The Southern and Eastern Regions are interested in working with the existing and intensified FIA data to develop status and trend reports for all national forests. A contractor worked with the NRS and SRS to load intensification data to FIADB and to validate NFS estimation units.

In 2013, PNW-FIA Information Management and Reporting staffs worked with the Pacific Northwest Region to conduct extensive quality assurance and load regional intensification data into FSVeg. The Pacific Southwest Region has expressed strong interest and support for an FIADB load and the project will be evaluated as a priority in 2015. The Pacific Northwest and Pacific Southwest Regions continue to work with PNW to collaborate in crew training, contract administration, data collection and data processing. The Northern and Intermountain Regions have collaborated with IW-FIA and the Alaska Region has collaborated with PNW-FIA to further expand current FIA protocols to include collecting information on all land types, not just the forested portion. Both regions are using an intensification system that integrates with the IW-FIA base data yet enables the regions to use NFS applications to collect intensified data and store them in the NFS vegetation database, FSVeg.

FIA is collaborating on an agencywide effort to improve inventory, monitoring, and assessment, such as developing National Management Questions, which will be used to drive information needs. 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. In collaboration with NASA and R&D Climate Change, FIA has provided the Scorecard results for all forests.

Based on feedback from the nine NFS regions, FIA is meeting many of the needs of NFS partners. The development of streamlined vegetation and down woody material (DWM) 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 their needs. More effort is needed 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. The DATIM developers are working to help automate this process and to create a more comprehensive and accessible datamart. FIA will continue to work on these issues in FY 2015. 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 requirements beyond the core FIA program, would be needed.

NFS has participated in the process to help define the updated FIA strategic plan.

The NFS inventory specialists continue to have the following priorities for the FIA program:

- 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.
- Transfer data from the National Information Management System into FSVEG within 1 year from the end of the data collection season.
- Follow standard protocols across all NFS lands.
- Allow for a la carte protocols with local and regional funding support.
- Allow for increasing the intensity of the core grid as needed.
- Provide an inventory compilation and analysis package that meet NFS business needs.

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 TPO, fuelwood production, and characteristics and management objectives of the Nation's private woodland owners. The number of surveys is listed in appendix table B-8, followed by a brief overview of each survey type.

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

Logging utilization studies: Logging utilization studies provide the information to convert TPO volumes to inventory volume. Utilization factors developed from the data translate a standard unit of product (1,000 board feet of sawlogs, one cord of pulpwood, etc.) into a common volume unit and type of tree harvested. Estimates are made of how much product came from sawtimber growing stock, poletimber growing stock, and nongrowing stock sources such as cull trees, dead trees, saplings, and limbwood. The overall process provides a cross-section of logging operations to characterize the sites logged, trees cut, products taken, and residues left behind. More detailed information on 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://www.fia.fs.fed.us.

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

National Woodland Owner Survey: The NWOS, the social complement to FIA's biophysical forest inventory, has been busy processing the latest data, working on publications and other products, and planning for the future. This work is made possible through our joint venture with the University of Massachusetts Amherst, which has enabled us to create the Family Forest Research Center (http://www.familyforestresearchcenter.org) and through which most NWOS personnel are employed.

The data from the latest (2011 through 2013) iteration of the NWOS have been fully processed. During this last iteration, we received responses from nearly 11,000 ownerships and had a cooperation rate of close to 50 percent. Data entries, along with logic checks and quality assurance measures, have been completed and a final dataset has been generated. We are now working to build new tables in the FIA NIMS to permanently store this information.

With completion of data processing, attention is being turned to generating and disseminating the results. A general technical report that fully documents the design, implementation, and estimation techniques will soon be published. An estimation engine and automated tools for generating tables and summary documents have been created. The final tables, including rerunning of the 2006 NWOS data for better comparisons, will be completed soon and a peer-reviewed journal article summarizing the results will be submitted. Other products being worked on are a revamped NWOS Table Maker program, a short brochure summarizing the results for landowners, a one-page document summarizing the results for policymakers, two-page State-level summaries aimed at forestry agencies and other conservation professionals, and a series of peer-reviewed journal articles examining specific topics, such as landowner engagement.

Planning for the next iteration of NWOS is also progressing with the Office of Management and Budget, or OMB, approval package recently submitted. The proposal for the next iteration of the NWOS includes strong trend data in addition to using science modules to explore new topics, such as climate change, wildfire, and invasive species, and expanding to new populations, such as urban forest owners. We expect to begin collecting ownership survey data for the next cycle in 2017.

For updates and more information about NWOS, visit http://www.fia.fs.fed.us/nwos.

Other feature references:

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

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

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

Ecosystem Health Indicator Surveys

FIA began implementing a nationwide, field-based forest ecosystem health indicator monitoring effort in the 1990s, and it currently collects forest health measures in 47 States. Most indicators are well documented in terms of sampling protocols, data management structures, and estimation procedures (Bechtold and Patterson 2005). Field data and indicators from most sample years are available on line with numerous analytical examples published both internally and externally. Field protocols associated with each indicator are available in the *National Core Field Guide* (USDA Forest Service 2006). Next, we briefly describe the indicators and follow that with an overview of the current direction FIA is taking to improve their functionality.

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

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

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

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

Down woody material: The 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.

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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.

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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. 2013. Forest Inventory and Analysis national core field guide (Phase 3), version 6.0. Washington, DC: U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis. http://www.fia.fs.fed.us/library/field-guides-methods-proc/. (October 2013).

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

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

Beyond Standing Trees: The Evolution of FIA Ecosystem Health Indicators

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

Some revised indicators (DWM, understory vegetation, and crown conditions) were implemented in FY 2013 in a "Phase 2 Plus Program/Ecosystem Indicator Program" (included, but not separate, in appendix B-7). The P2 sampling scheme facilitates the collection of a national core set of indicator information on more plots for less cost than the original Phase 3 protocols, with sampling as a systematic subsample of each subpanel that can change in response to budgetary fluctuations (i.e., flexibility) without compromising long-term analytical capabilities. Although the revised protocols collect less detailed information on each sampled plot, substantially more plots are sampled, potentially increasing the statistical power of future forest health analysis.

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

The next FIA strategic plan, finalized in FY 2014, continues to promote the evolution of more efficient ecosystem indicator implementation strategies.

Special Partnerships Spanning Cultures

There are an estimated 18 million acres of tribal forest lands located on 305 reservations across 24 States, based on FIA data and reported in the 2013 report "Assessment of Indian Forests and Forest Management in the United States" (http://www.fs.fed.us/spf/tribalrelations/pubs_reports/). For management, tribes need a broad spectrum of information, from timber to fuel loading to wildlife habitat to surveys of forest stewardship objectives. Tribes realize these needs have environmental, social and economic consequences related to forest sustainability and the unique place of forests in tribal life.

FIA is committed to developing partnerships with tribes and has assisted many tribes in assessing resource status, historical conditions, resource availability, and regional context for tribal forests. Recent efforts have included:

- Partnering with the Alaskan Native Tanana Chiefs to begin implementation of a forest inventory in the Tanana Valley.
- Partnering with native Pacific Islanders to conduct inventory and monitoring work in the tropical Pacific Islands.
- Partnering with Ojibwa Tribes of the Great Lakes to assess the supply and quality of paper birch within the in the territories ceded in the treaties of 1836, 1837, 1842 and 1854.

- Creating custom databases for the Quinault Indian Nation and Sealaska Corporation in Alaska and Tribal Lands in Nevada.
- Providing data to quantify woodland resources for the San Carlos Apache Tribe allowing managers to make informed decisions about tree-cutting regulations.
- Partnering with the Eastern Band of Cherokee Reservation to conduct a timber cruise following the Red Tail fire to locate hot spots where the wildfire resulted in significant damage to the timber.

FIA will continue to explore partnerships with tribes to better serve this community of users.

Program Safety

FIA takes safety very seriously and considers it a top priority. People in FIA cover hundreds of thousands of miles in travel each year while conducting business, and they work in very difficult terrain across all types of plant and forest communities. FIA remains focused on creating an entire workforce culture that seeks to protect FIA and our partner employees from daily exposure to hazards that threaten safety and health. Table 6 summarizes the program's safety record for FY 2014. Figures 20 and 21 show program safety trends by incident type for FY 2008 through FY 2014 followed by regional safety highlights for FIA units in FY 2014.

Standard safety training is mandatory and is conducted at each field unit. Safety training and equipment are provided for headquarters offices, field offices, and field crews, including driver training, first aid kits, cell phones, etc. In regions with special circumstances, such as the need for aircraft, access to large

Table 6. Base safety reference data, recordable incidents, and incident frequency by FIA unit, FY 2014.

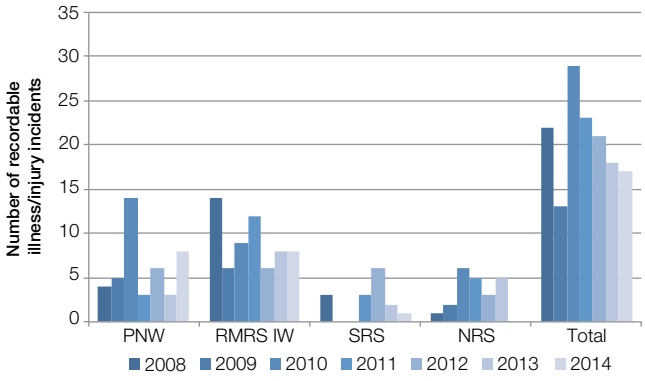
Category	FIA Unit					
	PNW	RMSM IW	SRS	NRS	NO	Total
Base data						
Federal FTE equivalents[a]	88	95	83	97	4	366
Total estimated hours worked[b]	183,664	197,787	171,808	200,928	7,280	761,467
Total vehicle miles driven	316,144	618,223	697,000	743,292	—	2,374,659
Total flight hours logged	149	25	—	—	—	174
Recordable incidents by class						
Time lost illness/injury incidents	8	8	1	—	—	17
Motor vehicle accidents	—	1	9	—	—	10
Aircraft accidents	—	—	—	—	—	—
Safety incident frequency rate						
Time lost illness/injury rate per 100 FTEs	9.1	8.4	1.2	—	—	4.6
Motor vehicle accidents per million miles driven	—	1.6	12.9	—	—	4.2
Aircraft accidents per 100,000 flight hours	—	—	—	—	—	—

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

[a] Based on appendix table B-3 number of Federal employees estimated full-time equivalents (FTEs).

[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.

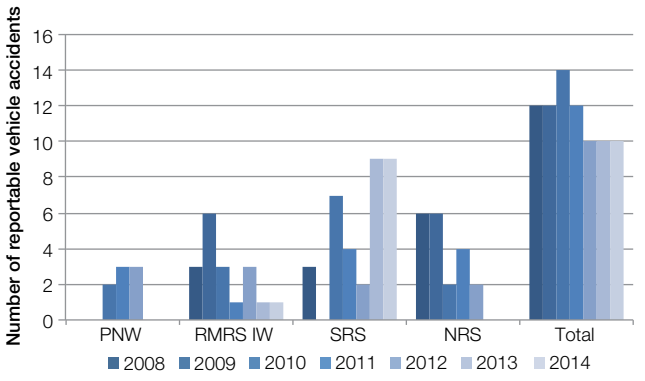
Figure 20. Number of recordable illness and injury incidents by FIA unit, FYs 2008–14.



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

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

Figure 21. Number of reportable motor vehicle accidents by FIA unit, FYs 2008–14.



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

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

areas of wilderness, or exposure to potentially dangerous wildlife or remote difficult-to-access areas, additional training and equipment are provided. Information on specific safety training and criteria are available on line at http://www.fia.fs.fed.us.

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

Regional Safety Highlights for FY 2014

Northern Research Station FIA Safety Highlights

NRS-FIA entered 2014 with the field Data Collection group winning the NRS Director's Safety Culture award, a worthy highlight for a unit committed to safety awareness. NRS-FIA was able to hire a full-time dispatcher that accommodated pre-landowner contact and post-landowner contact check-ins to provide increased safety during face-to-face contacts and decreased response time during emergencies. Six successful SPOT drills were conducted during 2014.

The NRS-FIA Safety team continues to pursue the possibility of deploying aerosol defense sprays to field employees for defense against wild and domesticated animals. NRS-FIA had another black bear incident with a threatening charge lasting for an extended period of time in FY 2014.

The St. Paul Wellness Committee continues with active NRS-FIA involvement, with many employees involved in the weekly walking club and many participating in the health assessment. Many employees take wellness seriously as can be evidenced through the many fitness facility memberships. The Newtown Square Safety Committee purchased LED (light-emitting diode) signage to highlight safety tips and important messages.

NRS-FIA continues to promote wellness by encouraging sedentary employees to get up and move throughout the day, providing one employee with yellow-tinted computer glasses to prevent additional eye strain, responding to employees' requests for wireless mice, acquiring ergonomically friendly keyboards, and securing a standup station for one employee.

Safety training continues at all levels of NRS-FIA with completion of the annual cardiopulmonary resuscitation (CPR)/first aid/driver's training. Self-defense training is being scheduled for field employees in preparation for upcoming urban field data collection. NRS-FIA continues to have staff involved in safety committees at the unit and station levels.

Job hazard analyses (JHAs) were updated and included on the NRS-FIA Web site. In anticipation of conducting wood utilization studies, a new JHA was created, approved, and posted on the NRS-FIA Web site. The general driving JHA was revised to reflect that fire extinguishers are no longer carried in Government vehicles. As part of the JHA-required personal protection equipment (PPE), steel-toed safety boots will be made available to field employees as a proactive measure to prevent foot and ankle injuries on active logging sites.

Pacific Northwest Research Station FIA Safety Highlights

The PNW Resource Monitoring and Assessment Program's FIA unit continues its commitment to a culture of safety and wellness to improve the lives of employees by strengthening our program of work. This year, empowered and engaged employees provided valuable input to refine our existing safety systems using annual safety surveys, improved near-miss reporting, and using the Safety Program Evaluation Checklist (SPEC) review. Ideas shared by team members have led to creative work improvement projects and our dedicated safety committee members and management team help bring ideas to fruition using analysis and action.

Preparation and Learning: Our group has a full scope of safety training, but, as a response to employees' requests for additional training, several courses have been added permanently or piloted. Along with first aid and CPR, hands-on defensive-driving training has been incorporated as part of our intern orientation, and wilderness survival training was offered as a pilot for some of our employees. Our field crews in Alaska have at least one certified Wilderness Emergency Medical Technician per crew, setting a precedent for additional employees to be trained in advanced medical response. Staff in northern Washington participated in Forest Service-sponsored safety training related to riding and handling stock animals.

We refined near-miss reporting systems by improving the questions and moving the anonymous employee submission to our Safety SharePoint site. This venue enables employees to view all submitted near misses and has created a more user-friendly format for analyses. We recognized that most near misses take place while driving, followed by hiking and then encounters with wildlife (including insects). The new categories that were recently added to the near-miss report helped identify that incidents occurring while collecting data in the field are most likely to occur while measuring downed woody material transects, followed closely by measuring tree lengths. These discoveries help increase situational awareness while employees complete their daily tasks.

Strategic Risk and Awareness: We conducted a "What-If" Scenario Challenge, stimulating field staff to consider potential actions given a hazardous situation and typical resources. The "winning" field crew of this contest analyzed how they would react to a fire in the backcountry on that given day, providing a realistic (but hypothetical) scenario for which to practice their communication and backcountry safety training.

We continue to update our JHAs annually. This year, we worked with the PNW Station Safety and Health Manager, Tammy Verhunc, on a pilot template JHA that includes risk analysis; we explored the hazards of working in areas where wildfire may become active. Our team also created a new JHA for canoe travel on flat water.

We reformatted our field notes to include dedicated space for a crew to document information regarding worksite hazards. This format was developed to ensure future crews are aware of these situations when planning reentry either this season or at the next cycle.

Agreements: Our check-in and check-out system for all staff was further refined, incorporating input from both office and field employees for streamlining the process and closing perceived gaps. This refinement sparked an initiative to improve communication between remote field staff and NFS units where they may be working or passing through while conducting the inventory. Now crews have points of contact at each NFS unit and notify them while working in the area to help improve response times if an emergency arises.

Our crews in Alaska face unique challenges when traveling by helicopter. We have mitigated safety issues by implementing a dedicated flight follower for helicopter operations while conducting fieldwork in interior Alaska instead of relying on a remote dispatch unit hundreds of miles away in Anchorage. We also outfitted a significant mobile emergency/trauma kit for use at the base of helicopter operations. Our helicopter contract was amended to include an onsite, on-duty helicopter mechanic for daily maintenance and safety inspections at our remote base locations.

Alaska office staff stay current on safety issues in urban situations by working with Anchorage municipality to try to install crosswalks across the busy street between the office building and the parking lots.

The Anchorage Lab conducted an analysis of egress routes from the Lab building in the event of an emergency that requires exiting to higher ground. The analysis included an assessment of access feasibility and hazards of all available routes that one could follow to get out of the low-lying area where the Anchorage Lab is located. We also participate in the "Great Alaska Shakeout" earthquake drill and awareness, which takes place annually in October. The Anchorage Lab also updated its phone tree list to be kept in emergency kits.

The safer we are, the more successful we are: The concept of wellness and safety going hand in hand has become commonly accepted, and, in FY 2014, many of our employees successfully completed the third annual PNW Station Wellness Challenge, which takes place in the late winter and spring. Our wellness plan is becoming more consistently used as employees and managers have come to value wellness and work-life balance as integral pieces of a productive and healthy workforce.

Finally, this experience was our first using the new "conversation- and discussion-based SPEC review," and we piloted an approach for electronically filing our documentation. This project engaged a representative from all teams in our program, and not only did we score an "Outstanding" rating, but we also received kudos from the Station Safety and Health Manager for "the best SPEC binder assembled by a program since [she] started conducting these reviews." This review process gives a baseline of the success of our safety program. It enables us to identify areas in which we are excelling (like providing and evaluating safety training) and areas that could be improved (such as safety training attendance tracking). Reflecting on the SPEC review, learning from other FIA units around the country, compiling results from the most recent safety survey and continuing to focus on near-miss reports will help direct our efforts toward an even safer and healthier FY 2015.

Rocky Mountain Research Station, Interior West FIA Safety Highlights

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

As the agency continued on its safety journey, the unit focused on five work improvement projects: (1) improving building access, (2) office ergonomics, (3) plot planning, (4) field equipment, and (5) fitness and wellness in the field. The teams, composed of leadership and employees, have made great progress. The two office-related projects and one field-related project have been completed. The building access team reviewed the safety of employees and guests accessing the building. Upon full review, the team initiated the extension of the building guards' hours, added electronic access to the most direct entrance, added emergency information cards at all egress points, improved lighting at exit doors, replaced a solid door with a door with a window so that people can maintain situational awareness when exiting, and installed a monitor for the closed-circuit surveillance at the door. The ergonomics team collected research findings and tested new ergonomic equipment, such as standup and adjustable-height desks. The team developed an infographic, combining proper workstation setup, recommended stretches and exercises, and refined the process by which employees can request ergonomic equipment. The field equipment team was tasked with improving field equipment, including communications tools. The team developed a spreadsheet of all field equipment that included the weight of the equipment to allow for more precise planning and packing. The team researched available

communications equipment and purchased new satellite phones and tracking devices with text messaging capabilities. In addition, the team focused on reducing the weight of field equipment and packs by researching the possibility of e-readers. After a field trial, the team is planning to provide an e-reader to crew leaders that will help eliminate the need for crews to carry hard-copy manuals, identification books, reference materials, and cameras. Two additional field projects focused on improving employee fitness and plot planning are in process, and the field equipment project team decided to continue work as the need arises.

The unit also worked diligently to reduce vehicle-backing accidents and associated costs. The unit developed window stickers for not only FIA employees, but also for the entire RMRS, to serve as a visual reminder for vehicle operators every time they get behind the wheel. The stickers include four short but important messages: (1) Backing—Use a spotter or GOAL (Get Out And Look), (2) Seatbelts, (3) No distractions, and (4) Slow down. Some of the unit's older field vehicles were equipped with aftermarket rearview cameras as well. The unit did not have any vehicle-backing accidents reported during the fiscal year.

In addition to reviewing accident trends, learning summaries, and required safety training, spring field training included additional information about health and fitness, extreme nutrition, preventing falls, communication, and long workdays. Although driving remains our highest risk activity, most injuries are associated with slips, trips, and falls that happen while employees are hiking. Proper conditioning, cross-training muscle groups, stretching, varying workloads, and proper equipment (good quality hiking boots and hiking poles) are key to preventing these injuries. Injury-free FIA field work requires much more than just skill, strength, and proper equipment. It takes attention to aerobic fitness, core strength, balance, flexibility, endurance, and rest. We plan to focus on our FIA athletes' total fitness and well-being throughout the next year. Employees are our most successful defense against accidents and injuries. We must make sure we are physically and mentally prepared for the risks in which we are exposed.

Southern Research Station FIA Safety Highlights

The SRS-FIA unit remains committed to developing a proactive safety culture and ensuring the safety of our employees. We continue to promote training, trust, and building a model that reinforces safety during everyday operations.

The past year brought four new members and a new chair to our Safety Committee. Safety Committee charter modifications included adding a second standing seat on the committee reserved for a Data Acquisition Section employee, to better represent field-related concerns, and a standing seat for a representative of the National Federation of Federal Employees. Although we went through normal changes and challenges associated with a change in personnel, the addition of these members will add to the strength of the committee during the new 2 years.

Looking at our goals for 2014, which included scheduling another field meeting, deploying smartphones, certifying trainers for CPR/first aid, and continuing to make our reporting processes more efficient, we made progress in some areas but work remains in others. Because of budget issues, we were not able to schedule another field meeting; however, the Safety Engagements planned for early 2015 will bring our field personnel together again. We were able to deploy smartphones to our field supervisors and crews. In doing so, we made available in real time to our field-going personnel a tremendous amount of safety-related information, such as weather alerts and tidal information for our employees working on the coast. Our Safety and Occupational Health Specialist has obtained certification as a CPR/first aid trainer, and we have identified a backup who will also receive certification. The SRS-FIA Safety Committee has been looking at safety reporting procedures within the unit and ways to reduce potential pitfalls. In 2015, to achieve more consistency and structure, we are going to adopt a Safety Management Systems (SMS) approach and make training available to everyone to familiarize them with this approach.

During the year, we updated our SPOT procedure to bring us in line with SRS policy that was released early in the year. In the future, we are very hopeful that the next generation of SPOT devices will provide a texting capability or the ability to work with our smartphones to provide expanded functionality. In the absence of texting capability, we have opted to include employees' cell phones for notifications, so that employees that deploy their SPOT device have confirmation those messages have been sent.

The tick research project that we are jointly running with the University of Tennessee's (UT) Department of Entomology and Plant Pathology began producing samples as soon as it hit the field. Our field crews have done an excellent job of pulling ticks, storing them, and shipping them to our office for processing before sending them to UT researchers. This project has tremendous mutual benefit for the Forest Service and for UT—(1) limited screening of ticks may provide field personnel with important information related to their risk of disease, and (2) a better understanding of seasonal abundance and distribution of ticks will benefit UT and, ultimately, everyone who is at risk of disease from tick bites.

Our field crews drove nearly 700,000 miles with no major accidents this year. We could not be more pleased with the safety of our drivers. Although we did have a vehicle incident increase from one to nine, most of these were because of chipped windshields caused by rocks. This increased incident count should not detract from the fact our field crews covered more acres of land that any other FIA unit without a major accident.

Two SRS-FIA employees produced safety videos, which were shown at the fall SRS Leadership Team meeting and then made available on line at the SRS intranet Web site. One dealt with PPE and other suggestions for preventing tick bites, and one detailed the safety checks one should always conduct before driving a vehicle. Other highlights from 2014 include updating our JHAs and adding them to the SRS-FIA Web site, revising our Safety Committee charter, and conducting an inventory of boating safety equipment. In the office environment, we obtained megaphones to alert occupants in the case of emergency because our new telephone system does not have public announcement capability.

In addition, many office employees have begun using various desk and table configurations to allow for some time standing while at work, and the Unit Wellness Committee successfully competed for SRS funds to purchase exercise equipment, which is now housed at our Knoxville headquarters.

Looking ahead to FY 2015, we hope to (1) integrate the SMS approach throughout our unit, (2) continue the safety journey with the next Chief's Safety Engagement meeting in January 2015, and (3) review and update our check-in/check-out policy.

Comparing FY 2013 Plans With FY 2014 Accomplishments and FY 2015 Plans

In the FY 2013 business report for FIA, we included a section stating our plans for FY 2014. In the following table, we show how our actions in FY 2014 matched our plans from FY 2013 and our plans for FY 2015.

In the FY 2013 business report, we said that in FY 2014 we would—	In FY 2014, we—	In FY 2015, we will—
Base Inventory and Reporting		
Continue base inventories in 49 States and coastal Alaska, contingent on FY 2014 budget.	Continued base inventories in 49 States and initiated inventory in Tanana Valley, Alaska.	Continue base inventories in 49 States, coastal Alaska, and Tanana Valley inventory in interior Alaska as budget allows.
Publish 5-year State reports for Arizona, Arkansas, California, Georgia, Nevada, New Hampshire, New Mexico, North Carolina, Ohio, Oregon, Texas, Utah, and Washington; publish a status update for American Samoa.	Published 5-year State reports for California, Kentucky, New Hampshire/Vermont (combined), New Mexico, Ohio, Texas, and Virginia. Delayed reports are for Arizona, Arkansas, Nevada, North Carolina, Oregon, Utah, and Washington and for American Samoa.	Publish 5-year State reports for Arizona, Arkansas, Colorado, Connecticut/ Rhode Island/ Massachusetts (combined), Florida, Georgia, Indiana, Iowa, Louisiana, Maine, Minnesota, Mississippi, Missouri, Nevada, New York, North Carolina, Oregon, South Carolina, Utah, and Washington, and for American Samoa.
Conduct 2014 interior Alaska, Tanana Valley inventory pilot.	The interior Alaska pilot tested protocols on 100 plots for the Tanana Valley. The work was conducted under partnerships with the State of Alaska and NASA Goddard.	Continue the interior Alaska inventory pilot on a smaller scale in 2015. Approximately 30 to 40 plots are planned.
Continue remeasuring U.S.-affiliated Pacific Islands, finishing Guam in late 2013 and the Republic of Palau in early 2014.	Completed remeasurements in Guam and the Republic of Palau.	Remeasure the Commonwealth of the Northern Mariana Islands in 2015.
Continue implementing modified protocols for down wood, vegetation, and crowns in the East.	Continued implementing modified protocols for down wood, vegetation, and crowns in the East.	Propose recommendations for incorporating modified protocols nationally and submit change proposals as needed.
Continue implementing protocols for remeasuring soils in NRS.	Continued implementing protocols for remeasuring soils in NRS.	Continue implementing modified protocols for soils in the North.
Continue working on comprehensive, user-friendly ecosystem indicator database. Develop, refine, and test modified ecosystem indicator protocols.	Developed three levels of protocols at varying levels of plot intensity and circulated them among clients for feedback.	Use client feedback to work up recommendations on ecosystem indicators.
Implement the "national standard FIA reporting templates" for all annual reporting.	Published annual State reports using the national standard FIA reporting template.	Initiate standard FIA reporting templates for 5-year reports to be used nationally.
With the passage of the Farm Bill, complete a new strategic plan for FIA in full collaboration with partners and users.	Completed draft and submitted the revised strategic plan to the Office of Budget and Program Analysis office on time.	Respond to questions from Congress and stakeholders regarding the new strategic plan.
National Woodland Owner Surveys and Timber Products Surveys		
Implement and thoroughly test the national TPO data management and processing system nationally.	Data for the South, Alaska, California, Idaho, and Nevada have been successfully processed and incorporated into the national TPO structure.	Continue to load and process all regional TPO data into the national TPO data management and processing system.
Publish a national pulpwood report and begin work on national TPO data query system.	Published 2010 National Pulpwood Report.	Publish 2012 National Pulpwood Report; begin work on 2013 National Pulpwood Report. Deploy the national TPO data query system.
Deploy beta version of a large corporate forest ownership questionnaire survey.	Formalized the beta version of the large corporate forest ownership survey for testing.	Implement the beta version of the large corporate forest ownership survey.
Complete processing of the 2012–13 NWOS data and submit products that summarize the data.	Completed processing of all 2011 through 2013 NWOS data, peer reviews for tables, documentation, and a brochure submitted for publication.	Publish the NWOS tables, documents, and other basic materials.

In the FY 2013 business report, we said that in FY 2014 we would—	In FY 2014, we—	In FY 2015, we will—
National Woodland Owner Surveys and Timber Products Surveys (continued)		
Incorporate NWOS data into FIA's NIMS database and online access tools.	Initiated the process for incorporating NWOS data into NIMS and loaded test tables.	Launch the revised NWOS online data access tool and incorporate NWOS data into FIA's NIMS.
Begin planning for the next (FY 2015) NWOS, including commencement of the OMB review process.	Completed planning for next NWOS survey. It includes new modules for urban, public, and corporate forest owners; climate change; invasive species; wildfire; landowner values; and decisionmaking.	Submit NWOS review package to OMB.
Continue to work with partners to further the analysis of NWOS.	Worked with multiple partners to create new TIMO and REIT variables that will soon be added to NIMS.	Continue to work with partners to further the analysis of NWOS.
Pilot Studies		
Continue to implement regional ICE project working with RSAC to develop new FIA product lines addressing enhanced land cover/land use objectives in upcoming strategic plan.	In collaboration with RSAC, SRS-FIA aligned the ICE land classification system to be compatible with FIA land use definitions, IPCC land use definitions, and other land cover-based classification systems. FIA worked with RSAC on tool and database development and on a training system for ICE.	Implement the ICE project in California, Maryland, New Hampshire, Texas, Vermont, and Utah.
Publish report on Colorado urban inventory pilot.	Because of processing delays in handling the iTree analysis, urban analysis for Colorado has been temporarily removed from the RMRS-IW FIA work plan until an agreement for timely iTree analysis can be developed.	Determine cause for Colorado delays processing iTree data and move to get preliminary data to RMRS-IW FIA unit. Process the data and prepare report on Urban FIA pilot work in Colorado.
	Implemented Urban FIA in Austin, TX, and Baltimore, MD.	Publish an urban report for Austin, TX, and continue urban activity in Austin, TX, and Baltimore, MD. Expand monitoring to Milwaukee, WI; Providence, RI; and Houston, TX.
Finish iTree compilation and finalize Urban FIA report for PNW region that includes all five States.	Prepared General Technical Reports describing the urban inventory results for all five Pacific States.	Project complete.
	Published GNN maps on line that cover all of California, Oregon, and Washington, for a time-series 1984–2012. The maps are used for Northwest Forest Plan Effectiveness Monitoring, carbon monitoring, and many other applications.	Develop new uncertainty measures for GNN imputation maps based on bootstrapping, which can help guide map users.
Extend Landtrender analyses to the rest of Oregon and all of Washington.	Developed models using Landtrender to estimate carbon flux from remeasured FIA field plots as a function of land use, management, and disturbance. Completed and delivered CONUS data in early FY 2014.	Complete full production of NLCD Tree Canopy Cover data for CONUS and conduct NLCD Tree Canopy Cover project within California, Oregon, and Washington.
Pilot height subsampling to model tree heights based on diameter class.	Demonstrated efficiencies would be achieved by subsampling crowns in addition to the tree height measurements.	Pilot complete.
Extend RMRS-IW FIA tree core collection and processing to PNW for spatiotemporal patterns of growth related to climate.	Exceeded 20,000 catalogued samples in the RMRS-IW FIA tree core collection. Collected (PNW-FIA) approximately 500 Douglas-fir cores. Published several climate-/water-related papers. Implemented pilot study in California, Oregon, and Washington. Collected more than 500 samples from P2 plots for inclusion in the RMRS-IW-FIA study.	Prepare tree ring samples for lab processing and climate sensitivity analysis. Continue to sample during the 2015 field season in California, Oregon, and Washington. Continue development of the tree-ring database, with continuing growth and climate analysis and internal testing of an FIA database extension in which all ring records will be accessible by plot, species, growth year, etc.

In the FY 2013 business report, we said that in FY 2014 we would—	In FY 2014, we—	In FY 2015, we will—
Pilot Studies (Continued)		
Pilot submeter accuracy GPS coordinate collection.	Collected GPS coordinates (submeter accuracy) on every subplot visited in PNW for 2014. Postprocessing will take place in the office after the field season concludes.	The GPS protocol will continue with some minor adjustments to clarify offset from subplot center when necessary. **NEW:** Complete publications and datasets resulting from the collaborative NAFD project, mapping annual forest disturbance and cause during the past 25 years (RMRS). **NEW:** Continue collaborative work under the LCMS, an interagency effort to integrate disturbance data (RMRS, PNW).
Forest Carbon		
Initiate pilot project (with NASA, etc.) to test the utility of airborne LIDAR/hyperspectral/thermal remote-sensing data for estimating aboveground carbon stocks in the Tanana Valley of interior Alaska.	Initiated the interior Alaska pilot project in the Tanana Valley State Forest and Tetlin NWR. Partnered with NASA-Goddard to collect high-resolution, airborne LIDAR-hyperspectral-thermal imagery as a strip sample (9-km spacing between strips) covering the entire Tanana watershed (135,000 km^2).	Compile and analyze the field remote-sensing data collected in the Tanana Valley in 2014. Statistical estimators for a multilevel sampling design—using both field and remote-sensing data—will be developed and used to report status of forest resources.
Initiate development of a prototype MRV (monitoring, reporting, and verification) system—using a combination of FIA plot data, airborne LIDAR sampling, and Landsat time series data—to retrospectively estimate carbon stocks back to a 1990 baseline.	Contracted to collect LIDAR (as a strip sample) over 6 different sites distributed throughout the lower 48 (Colorado, Maine, Minnesota, New Jersey, Oregon, and South Carolina).	In cooperation with the University of Washington, establish 250 to 300 (total) specialized plots within the LIDAR strips that will be used to develop LIDAR-biomass predictive models.
Evaluate the impacts of a refined woodland delineation on the National Greenhouse Gas Inventory of forest carbon stocks. Complete evaluation of a forest floor carbon estimation approach using P3 soils information and explore potential application to the National Greenhouse Gas Inventory. Evaluate the implications of a refined "managed land" delineation of U.S. forests and implications regarding the National Greenhouse Gas Inventory. Initiate research exploring potential use of Landsat imagery to stratify forest inventories across the 1990s for greenhouse gas inventories per a NASA-CMS grant.	Contributed to the adoption of a series of refinements in the 2015 National Greenhouse Gas Inventory: 1. A definition of forest land consistent with FAO FRA and RPA, which required developing a maximum in situ height model based on FIA plots and climate information. 2. A new approach for "imputing" P3 measurements so that forest floor carbon estimates derived from the P3 soils inventory could be seamlessly included in the national inventory. 3. A refined "managed land" delineation following IPCC good practice guidance that was developed in cooperation with EPA and university cooperator. Continued research relevant to forest carbon baselines throughout the FIA program both within USDA and with partner Federal agencies. Notably, a number of FIA scientists continued multiyear NASA research projects. Led an effort that included White House CEQ, State Department, EPA, USGS, and NOAA on disturbance attribution for carbon reporting.	**NEW:** Continue implementing the ForCaMF, helping NFS include carbon assessment in the planning process as mandated by the Climate Change Performance Scorecard and the new Planning Rule. **NEW:** Initiate collaborative project translating forest change to carbon emissions/removals linking disturbance products, biomass maps, and carbon cycle modeling in a comprehensive carbon monitoring framework. Contribute to a number of expected improvements for the 2016 National Greenhouse Gas Inventory.

In the FY 2013 business report, we said that in FY 2014 we would—	In FY 2014, we—	In FY 2015, we will—
Forest Carbon (continued)		
	Co-led the carbon projections for the United States for— 1. Adoption of a refined forest carbon accounting framework that focuses more on annual inventory data within a "backcasting" and "forecasting" model driven by changes in stand age, forest area, and carbon densities. 2. Ability to estimate the effect of land use change on our forest carbon baselines. 3. Ability to attribute changes in forest carbon to disturbances. 4. Incorporation of P3 soils carbon information. 5. Refinement of live tree biomass estimates through development of new belowground biomass equations that incorporate climatic variables. 6. Increased flexibility to include emerging data from the ICE program and P2+ efforts. Delivery to USDA, White House CEQ, and EPA. Documentation is in two papers (scientific reports paper listed previously, and Wear and Coulston—submitted to PNAS).	
Experimental Forests and Ranges		
Limited activity on select forests regionally may be conducted in FY 2014 as part of ongoing studies.	Installed approximately 150 plots on 3 southern experimental forests; examined their representativeness to the broader southern landscape; examined methods to extend knowledge gained to the broader southern landscape. Published two peer-reviewed papers on this effort.	Continue projects on an ad hoc basis.
Information Management and Distribution—FIDO		
Develop automated QA scoring system and reporting to document FIA data quality. Conduct training webinars.	Thoroughly documented field and analytical QA check procedures. Provided detailed scoring application specifications to Information Management. Developed SRS prototype system but it has not been deployed nationally.	Complete FIA process documentation for distribution. Developers will design check-scoring application and analytical QA tools. Initiate a beta version in FY 2015.
Make necessary changes to implement "growth accounting" for attributes that customarily change between measurements.	Completed necessary changes.	Implement growth accounting; enhance GRMs by adding macroplot remeasurement, biomass estimates, and carbon estimates.
Continue to update documentation, databases, and tools to support users' changing needs.	Conducted national training webinars and locally focused on FIA.edu data workshops.	Conduct data outreach via Web, tools, and hands-on workshops. Conduct training webinars as needed.
Complete and post an addendum to *FIADB User Guide* 1.5.1.06.	Completed and posted an addendum to *FIADB User Guide* 1.5.1.06.	
Begin work on *FIADB User Guide* based on version 6.0 of the *National Core Field Guide*.	Completed and posted *FIADB 6.0.1 User Guide* based on version 6.0 of the *National Field Guide*.	Begin work on *FIADB User Guide* based on version 7.0 of the *National Field Guide*.
Implement EVALIDator general online tool improvements.	Modified EVALIDator to use growth accounting for ratio estimates using net growth, removals, or mortality.	Continue to implement EVALIDator general online tool improvements.
Information Management and Distribution—MIDAS		
Continue implementing *National Core Field Guide* version 6.0 for field data collection (modify as necessary).	Implemented *National Core Field Guide* version 6.0 for field data collection.	Prepare for implementing more complete ownership information.
Assess user needs and upcoming changes for implementation in *National Core Field Guide* version 7.0.	Continued work with the CIO to update MIDAS to improve data error and anomaly checks.	Begin programming MIDAS for changes to be implemented in version 7.0 of the *National Core Field Guide*.
Prepare for implementing more complete ownership information.	Continued work on a national information system for plot ownership information.	

In the FY 2013 business report, we said that in FY 2014 we would—	In FY 2014, we—	In FY 2015, we will—
Information Management and Distribution—NIMAC		
Conduct FIA field training in Vietnam for representatives from Vietnam. Conduct FIA portable-data recorder programming training for representatives from Canada and Mexico in Houston, TX.	Provided technical assistance on monitoring and processing forest carbon data to Bangladesh (new), Columbia, Ecuador, Peru, and Vietnam and in regional workshops in Asia and Latin America as part of the interagency Silva-Carbon effort. Provided technical assistance to Honduras and Mexico.	Conduct post-training review with representatives in Mexico.
Process and make completed panels of data available with EVALIDator for Missouri and Wisconsin and complete the Web applications using FIDO for Wisconsin.	*Completed December 2013*. Processed and made the second remeasured panel of data available to Wisconsin DNR.	Process and make completed panels of data available with EVALIDator for Missouri and Wisconsin and continue to provide assistance to Indiana DNR on an as-needed basis.
NIMAC will continue to assist Indiana as needed with data processing software and creating EVALIDator databases for their use.	NIMAC continued to provide assistance to Indiana DNR on an as-needed basis.	NIMAC will deliver Massachusetts inventory data in PC EVALIDator and will train them on how to load new data and analyze the database using PC EVALIDator.
NIMAC will release the second versions of DATIM for use and will begin developing version 3 for use within the Forest Service.	Version 1.5 of DATIM was installed on Forest Service servers. Version was nearly complete and is being installed now. NFS continues to fund its development and restored some of the reduced funding.	Release the second and third versions of DATIM for use within the Forest Service and will begin developing version 4 for all FIA customers.
NIMAC will continue to provide technical assistance and software tools in three continents (Africa, Asia, and South Americas) as part of the SilvaCarbon effort.	Made data available in PC EVALIDator. Because of continued delays in FIDO, agreed to drop FIDO. Provided Missouri with their first three panels of data in PC EVALIDator.	NIMAC will complete the information needs and sampling and plot designs for the U.S. Fish & Wildlife Service in the Northeastern Region.
Conduct FIA training for representatives from Honduras in Knoxville, TN.	NIMAC established two new agreements: (1) Massachusetts DCR is funding NIMAC to make its permanent plot data from the 1950s to the present available for analysis in PC EVALIDator, and (2) the Northeastern Region of the U.S. Fish & Wildlife Service is having NIMAC develop an intensive forest inventory system for the 500,000+ acres of refuges. In collaboration with the FAO of the U.N., developed data collection and data processing software for international use.	NIMAC will continue to provide technical assistance and software tools in three continents (Africa, Asia, and South America) as part of the SilvaCarbon effort.
Information Management and Distribution—NIMS-CS		
Continue implementing NIMS-CS and FIADB version 6.0 at the data center.	Implemented NIMS-CS and FIADB version 6.0 at the national data center. Began detailed documentation of NIMS-CS data tables.	Continue implementing NIMS-CS and FIADB version 6.0 at the national data center. Continue the effort to document NIMS-CS data tables. Begin work to implement NIMS-Cs and FIADB version 7.0.
FIA Atlas Project		
Complete new policy and technical reviews with WO and USDA.	Delivered briefings to WO and USDA leadership, including the Under Secretary and his Deputy.	Complete new policy and technical reviews with WO and USDA.
Complete design and layout of remaining features.	Completed design and layout of three-fourths of the features matching new WO standards.	Complete design and layout of remaining features.
Print FIAtlas for release at IUFRO World Congress in Salt Lake City, UT.	Released Web portal at IUFRO World Congress.	Print FIAtlas.
Develop prototype Web delivery tools.	Selected ESRI as online data delivery solution and developed three features in partnership.	Complete development and delivery of companion Web content through increased collaboration with ESRI.

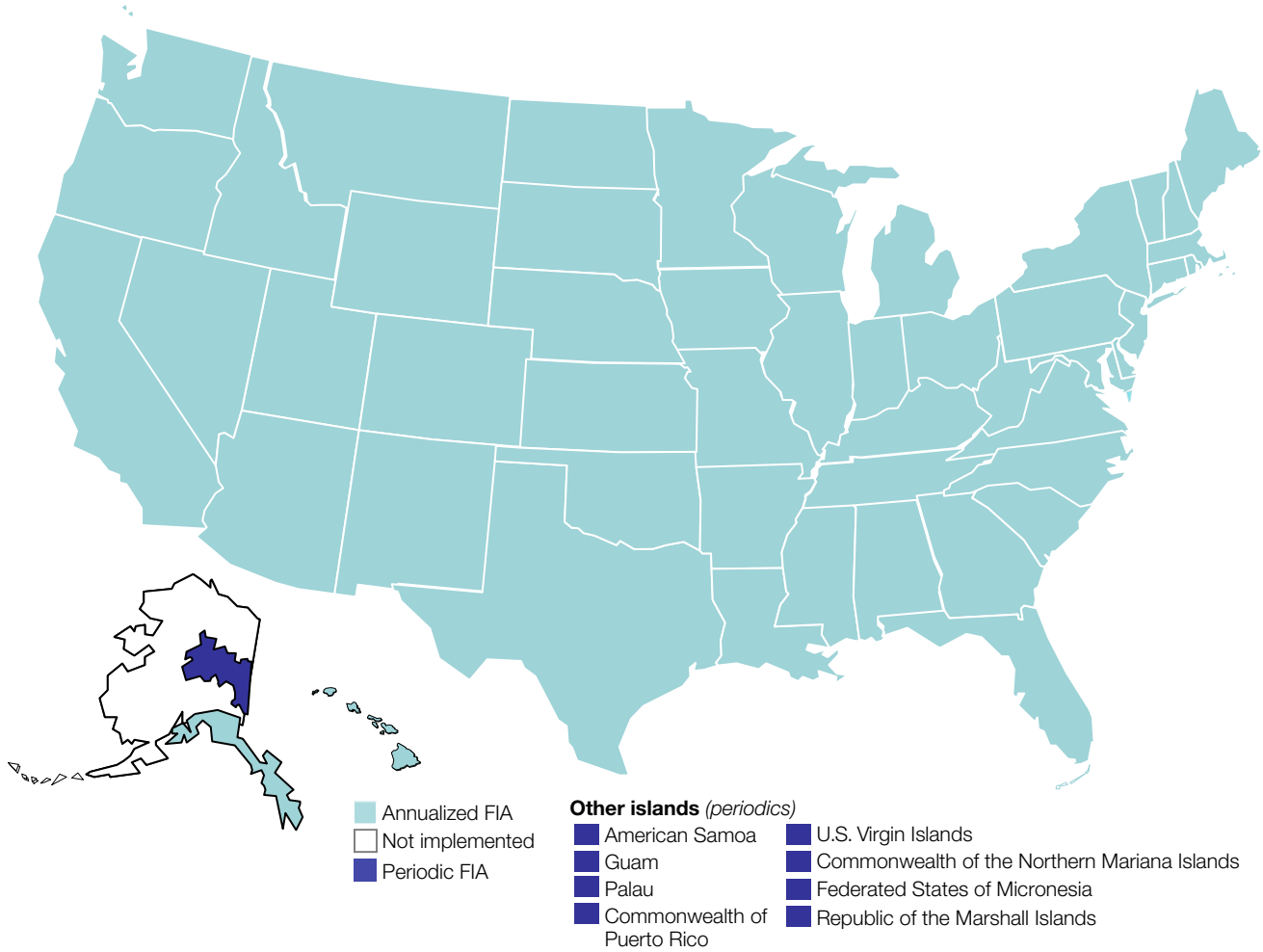
In the FY 2013 business report, we said that in FY 2014 we would—	In FY 2014, we—	In FY 2015, we will—
Collaboration and Partnerships		
Continue collaborative stewardship of the FIA program by holding users group meetings in all regions of the country and at the national level and holding regional management team meetings in all regions of the country.	Held a total of two users group and management team meetings in all regions of the country. NRS held a regional management team meeting in 2014.	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.
Pending final Farm Bill legislation, release final FIA strategic plan with regional user input in March 2014.	Completed the new FIA strategic plan with regional user input and delivered to agency and USDA on time.	Answer questions regarding the strategic plan for Congress and stakeholders.
Begin planning for FIA Science Symposium in 2015.	Organized the steering committee, identified potential venues and dates, and developed draft agenda for FIA Science Symposium.	Finalize FIA Science Symposium arrangements, organize invited and proposed sessions and papers, publish proceedings, prepare to host meeting in early FY 2016.

CEQ = Council on Environmental Quality. CIO = chief information officer. CMS = Change Monitoring System. CONUS = contiguous United States. DATIM = Design and Analytical Tools for Inventory and Monitoring. DCR = Department of Conservation and Recreation. DNR = Department of Natural Resources. EPA = Environmental Protection Agency. FAO =Food and Agriculture Organization of the United Nations. FIA = Forest Inventory and Analysis. FIADB = Forest Inventory and Analysis Database. FIDO = Forest Inventory Data Online. ForCaMF = Forest Carbon Management Framework. FRA = Forest Resources Assessment. FY = fiscal year. GNN = Global Nearest Neighbor. GPS = Global Positioning System. GRM = Growth, Removals, Mortality. ICE = Image-Based Change Estimation. IPCC = Intergovernmental Panel on Climate Change. IUFRO = International Union of Forest Research Organizations. IW = Interior West. Landsat = a remote sensing platform. LCMS = Landscape Change Monitoring System. NAFD = North American Forest Dynamics. NASA = National Aeronautics and Space Administration. NCLD = National Landcover Dataset. NFS = National Forest System. NIMAC = National Inventory and Monitoring Applications Center. NIMS = National Information Management System. NIMS-CS = NIMS Compilation System. NLCD = National Land Cover Dataset. NOAA = National Oceanic and Atmospheric Administration. NRS = Northern Research Station. NWOS = National Woodland Owner Survey. OMB = Office of Management and Budget. OPBA = Office of Planning and Budget Analysis. P1 = Phase one. P2 = Phase two. P3 = Phase three. PNAS = Proceedings of the National Academy of Sciences. PNW = Pacific Northwest Research Station. QA = quality assurance. REIS = Regional Economic Information System. RMRS = Rocky Mountain Research Station. RPA = Resources Planning Act. RSAC = Remote Sensing Applications Center. TIMO = Timberland Investment Management Organization. TPO = timber product output. USDA = U.S. Department of Agriculture. USGS = U.S. Geological Survey. WO = Washington Office.

Fiscal Year 2015 FIA Program Direction

The FY 2015 budget, as in many recent years, has considerable uncertainties. The FY 2015 budget totals $70.0 million, all in R&D, which approximates the FIA budget high-water mark in FY 2010 of $71.8 million. The FIA program will continue inventory operations in 49 States, coastal Alaska, and the Tanana Valley of interior Alaska (fig. 22). Other major activity planned for 2015 includes full compliance of State 5-year reports, completing publication of the recent iteration of the NWOS, modernizing the program's TPO operations and reporting, continued implementation of the Image-Based Change Estimation, or ICE, project for improving land cover and land use classification, and publishing the FIAtlas. FY 2015 funding also continues to eliminate all but ad hoc support for FIA-related research at experimental forests and ranges for long-term monitoring needs.

Figure 22. Planned FIA implementation status, FY 2015.



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

Long-Term Strategic Direction

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

The Government Performance and Results Act (GPRA) of 1993 directs Federal entities to develop long-term goals and performance measures to monitor progress toward those goals. Although intended for application at the agency level, the GPRA framework also provides an excellent tool for guiding progress at the project level. The following table shows our key goals, performance measures, and benchmarks for the FIA program for 2008 through 2014 and targets for a fully implemented program. In future business reports, we will repeat this table to show how we are progressing toward our goals.

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

Passage of the 2014 Farm Bill and FIA Requirements: On February 7, 2014, Congress passed the Agricultural Act of 2014 (Public Law 113-79), also referred to as the 2014 Farm Bill. Section 8301of this legislation requires the FIA program to revise its previous Strategic plan, approved by Congress in 1999, and submit the new plan to the Committee on Agriculture of the House of Representatives and the Committee on Agriculture, Nutrition, and Forestry of the Senate within 180 days of the passage of the law.

Farm Bill provisions to be addressed in the revised strategic plan:

1. Complete the transition to a fully annualized forest inventory program and include inventory and analysis of interior Alaska.
2. Implement an annualized inventory of trees in urban settings, including the status and trends of trees and forests, and assessments of their ecosystem services, values, health, and risk to pests and diseases.
3. Report information on renewable biomass supplies and carbon stocks at the local, State, regional, and national levels, including by ownership type.
4. Engage State foresters and other users of information from the forest inventory and analysis in reevaluating the list of core data variables collected on forest inventory and analysis plots with an emphasis on demonstrated need.
5. Improve the timeliness of the TPO program and accessibility of the annualized information on that database.
6. Foster greater cooperation among the FIA program, research station leaders, and State foresters and other users of information from the forest inventory and analysis.
7. Promote availability of and access to non-Federal resources to improve information analysis and information management.
8. Collaborate with the Natural Resources Conservation Service, NASA, National Oceanic and Atmospheric Administration, and U.S. Geological Survey to integrate remote sensing, spatial analysis techniques, and other new technologies in the FIA program.
9. Understand and report on changes in land cover and use.
10. Expand existing programs to promote sustainable forest stewardship through increased understanding, in partnership with other Federal agencies, of the more than 10 million family forest owners, their demographics, and the barriers to forest stewardship.
11. Implement procedures to improve the statistical precision of estimates at the sub-State level.

FIA Backdrop: During its entire history of more than 80 years, FIA has cost the U.S. taxpayers a grand total of about $1 billion. During that time, billions of dollars have been invested by forest industries and tens of thousands of jobs created from logging;

primary wood processing; and manufacturing, construction, and retail sales of wood-based products. Since 2000, FIA has provided grants totaling in excess of $168 million to partners, including States, dozens of universities, and NGOs, to collect data, conduct research, and perform analyses to improve program efficiency and support client information needs. Since 2000, FIA partners have contributed more than $116 million to leverage the program to collect and process more data and information to meet local needs. FIA is a proven, cost-efficient partnership program that has consistently delivered significant value added to the taxpayers for more than eight decades. The following summaries outline the range of implementation opportunities provided in the new strategic plan. In the coming year, Congress will review these options, ask questions, and suggest adjustments that will determine its future support for the FIA program.

OPTIONS A and B, Status quo Option: This option maintains the 7-year East (15 percent), 10-year West (10 percent) paradigm for measurement, and these combined options place the program at the previous strategic plan target funding level.

OPTION C, National Core Option: This option maintains the 7-year East (15 percent), 10-year West (10 percent) paradigm for measuring base plots with improved remote-sensing support plus continuing the timber product output and ownership studies with enhancements and urban forest survey.

OPTIONS D and E, Full Farm Bill Option: This option implements the full 5-year (20 percent) measurement program nationally for base plots with improved remote sensing, continued timber product output and ownership studies with enhancements, and all the other items except small-area estimation based on sample intensification.

OPTION F, Leveraged Partner Option: This option is a partner opportunity. Currently States and other partners contribute more than $7 million annually to intensify data collection, research, and analyses to improve estimates for smaller planning areas. FIA processes, maintains, and distributes the enhanced data and information.

Goal	Performance measure	2009 level (%)	2010 level (%)	2011 level (%)	2012 level (%)	2013 level (%)	2014 level (%)	Target level (%)
	Inputs							
Maintain sufficient funding to support the base Federal FIA program[1]	Percentage of total Federal funding necessary for annualized inventory received	87	90	92	89	85		100
	Outputs							
Include 100 percent of U.S. forest lands in the FIA sample population	Percentage of Nation's forest land included in the target FIA sample population	100	100	100	100	100	100	100
Keep fieldwork current	Percentage of States actively engaged in the annualized inventory program	94	98	100	100	100		100
Make data accessible to national forest customers	Percentage of national forest land for which FIA data are loaded into NRIS	92	100	100	100	100		100
	Outcomes							
Keep analysis current	Percentage of States with FIA State report less than 6 years old	76	74	92	88	90		100
Keep online data current	Percentage of States with FIA online data less than 2 years old	90	84	92	92	96		100
Customer satisfaction	Percentage of customers rating service as satisfactory or better	85	87	87	87	87		100
Partners' participation	Partners' financial contributions expressed as percentage of total program funds	9	10	11	13	10		20

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

[1] Revised percentages based on new congressional target of $77,761,000 (prior to 2014 Farm Bill).

Conclusions

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

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

Glossary of Terms Used in Appendixes

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

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

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

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

direct expenses. All expenses directly attributable to the FIA unit incurred as a part of doing FIA business. Excludes indirect business costs (such as rent, telephones, and administrative overhead outside the FIA unit staff), which are included in the "effective indirect expenses" definition. 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 previous 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 previous categories, including training costs, unemployment, office supplies, postage, awards, moving expenses, and other expenses related to delivering the FIA program.

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

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

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

analysts. Staff who analyze data and write publications.

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

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

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

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

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

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

travel. Broken into the following categories:

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

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

effective indirect expenses. Indirect expenses include items such as research station management and administrative salaries, operating expenses, research station budget shortfalls, and other items for which the FIA unit is assessed by 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, which is not necessarily the same as the standard station overhead rate; instead this rate reflects the total indirect cost as a fraction of the total funds available to FIA.

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

FRIA (Forest Resource Inventory and Assessment). An account created by Congress within the State and Private Forestry portion of the Forest Service budget to provide funds to support forest inventory and analysis collaboration with States. This account was permanently zeroed out in FY 2013.

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

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

management meetings held. Number of national or regional management team meetings held by each Forest Inventory and Analysis (FIA) unit. A management team for each FIA region consists of partners who share in funding and implementing 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 that own forest land for purposes other than industrial operations.

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

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

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

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

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

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

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

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

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 previous categories, such as abstracts, books, or other government publications.

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

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

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

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

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

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

Appendix A. Contacts

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

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

Southern FIA Program
(includes Commonwealth of Puerto Rico and the U.S. Virgin Islands)
Program Manager, FIA
USDA Forest Service
Southern Research Station
4700 Old Kingston Pike
Knoxville, TN 37919
865–862–2000

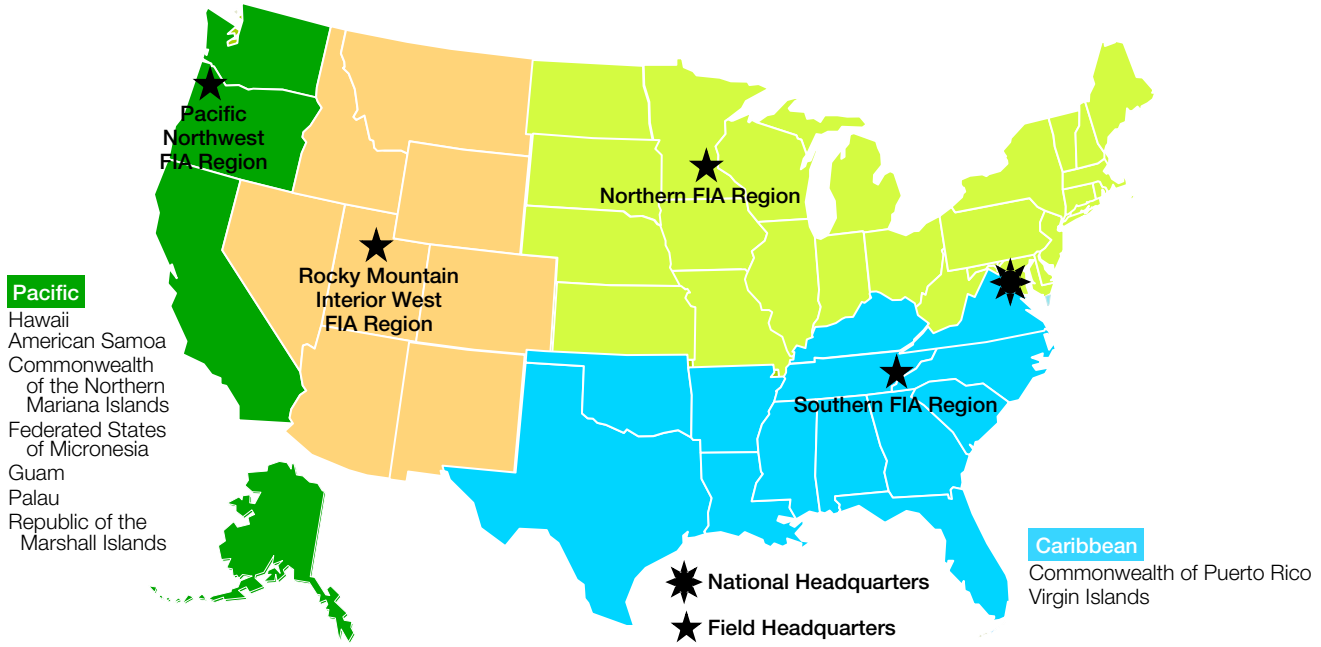
National FIA Program Office
National Program Leader, FIA
USDA Forest Service
201 14th Street, SW
Washington, DC 20250
703–605–4177

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

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

Figure A-1. FIA regions and headquarters.



FIA = Forest Inventory and Analysis.

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Table B-1. Performance measures for the FY 2014 FIA program.

	Pacific Northwest	Interior West[a]	Southern	Northern	National Office	Total
Total available Federal funds, FY 2014	$13,291,460	$14,206,767	$16,408,134	$15,723,000	$10,253,000	$69,882,361
Total appropriated Federal funds, FY 2014	$13,280,000	$13,316,000	$14,428,000	$15,528,000	$10,253,000	$66,805,000
Estimated percent of FY 2014 full funding	89%/76%	89%	86%	89%	92%	86%
Contributions from partners:						
Supporting the 20% FIA program	$670,000	$294,695	$1,844,842	$1,014,485	$0	$3,824,022
Value-added contributions	$360,508	$775,802	$571,523	$2,301,474	$0	$4,009,307
Total contributions	$1,030,508	$1,070,497	$2,416,365	$3,315,959	$0	$7,833,329
Total all available funds, FY 2014	**$14,321,968**	**$15,277,264**	**$18,824,499**	**$19,038,959**	**$10,253,000**	**$77,715,690**
Base grid plots sampled (Federal 7/10 cycle):						
Forest[b]	2,193	2,377	5,534	5,291	—	15,395
Nonforest	2,359	6,495	4,302	7,677	—	20,833
Total base plots	**4,552**	**8,872**	**9,836**	**12,968**	**—**	**36,228**
Spatial and temporal intensification plots sampled:						
Forest[b]	1,147	—	1,476	1,771	—	4,394
Nonforest	44	—	705	2,512	—	3,261
Total intensification plots	**1,191**	**—**	**2,181**	**4,283**	**—**	**7,655**
Base grid plots sampled (Federal and partner):						
Forest[b]	***3,340***	***2,377***	***7,010***	***7,062***	**—**	***19,789***
Nonforest	***2,403***	***6,495***	***5,007***	***10,189***	**—**	***24,094***
Total base grid plots	**5,743**	**8,872**	**12,017**	**17,251**	**—**	**43,883**
Forest plots with one or more health indicators	3,299	2,416	1,115	396		7,226
Number of quality assurance plots (field checked)						
Forest	160	227	702	440	—	1,529
Nonforest	2	19	277	485	—	783
Total quality assurance plots	**162**	**246**	**979**	**925**	**—**	**2,312**
Percent forested quality assurance plots	5%	10%	10%	6%		8%
Special Study plots sampled:						
Forest[b]	156	95	160	39	—	450
Nonforest	5	12	4	2	—	23
Total Special Study plots	**161**	**107**	**164**	**41**	**—**	**473**
Total base grid plots and percent sampled[c]:						
Total base grid plots	41,463	91,341	89,205	101,342		323,351
Average percent of land with forest cover	37%	23%	46%	30%		36%
Estimated percent of base grid sampled	14%	11%	13%	17%		13%
Percentage of States with annual FIA activity[c]	100%	100%	100%	100%		100%
Number of publications:						
National forest reports	—	9		—	—	9
State/island resource reports	—	—	12	23	—	35
State timber product output reports	—	3	13	2	—	18
Regional reports	—	—	4	1	—	5
National reports	1	—	10	1	1	13
5-Year State reports	—	1	3	3	—	7
Subtotal—core reports	1	13	42	30	1	87
Peer-reviewed journal articles	15	15	23	34	—	87
Proceedings articles	—	8	6	7	—	21
Other station publications	8	5	—	4	—	17
Other publications	3	3	—	15	1	22
Total, all reports	27	44	71	90	2	234
Number of publications per Federal FTE	0.31	0.46	0.86	0.93	0.57	0.64
Consulting activities:						
Number of significant consultations	101	224	450	208	33	1,016
Total hours of significant consultations	810	1,561	2,349	3,102	166	7,987
Meetings:						
User-group meetings held	2	3	0	1	1	7
Management meetings held	2	1	2	1	1	7

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

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

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

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

Table B-2. Financial statement for the FY 2014 FIA program Federal funds.

	Pacific Northwest	Interior West	Southern	Northern	National Office	Total
	($)	($)	($)	($)	($)	($)
Available funds:						
Previous year end-of-year balance	(100,716)	185,500	263,134	59,500	0	407,418
Post-year adjustments[a]	112,176	(185,500)	1,186,000	135,500	0	1,248,176
Subtotal pre-year adjustments	11,460	0	1,449,134	195,000	0	1,655,594
FY appropriated funds						
Research (base)	13,107,000	13,142,000	14,253,000	15,528,000	10,253,000	66,283,000
R&D funds added to base[b]	173,000	174,000	175,000			522,000
Subtotal appropriated funds	**13,280,000**	**13,316,000**	**14,428,000**	**15,528,000**	**10,253,000**	**66,805,000**
Special project funding[c]	0	890,767	531,000	0	0	1,421,767
Total available Federal funds	**13,291,460**	**14,206,767**	**16,408,134**	**15,723,000**	**10,253,000**	**69,882,361**
Direct expenses:						
Salary—	**6,764,894**	**7,820,403**	**7,815,757**	**9,742,459**	**416,000**	**32,559,513**
Administration	555,220	724,242	580,262	432,950	416,000	2,708,674
Phase 1 production	16,758	0	223,450	319,288	0	559,496
Field support	1,112,189	902,952	1,048,567	1,018,103	0	4,081,811
Data collection	1,893,056	2,530,270	611,351	2,288,648	0	7,323,325
Quality assurance	352,446	733,606	1,595,709	610,483	0	3,292,244
Information management	1,011,917	942,084	857,382	1,553,283	0	4,364,666
Analysis	1,245,810	1,194,048	2,011,963	2,606,659	0	7,058,480
Techniques research	577,498	793,201	887,073	913,045	0	3,170,817
Travel—	**583,533**	**565,881**	**563,037**	**452,106**	**25,000**	**2,189,557**
Office travel	111,548	43,109	78,043	69,743	25,000	327,443
Field/quality assurance crew travel	471,985	522,772	484,994	382,363	0	1,862,114
Equipment—	**484,138**	**737,590**	**319,380**	**512,104**	**0**	**2,053,212**
Imagery	0	25,401	0	12,487	0	37,888
Vehicles	208,731	457,931	243,770	261,747	0	1,172,179
Field equipment	133,939	31,458	0	58,569	0	223,966
Information technology/communications	141,468	72,541	0	70,948	0	284,957
Other	0	150,259	75,610	108,353	0	334,222
Publications	**2,253**	**5,287**	**7,526**	**14,510**	**6,000**	**35,576**
Grants and agreements[d]	**2,203,123**	**2,222,736**	**5,760,296**	**2,482,499**	**3,036,000**	**15,704,654**
Field work/data	*1,542,617*	*1,363,954*	*5,075,296*	*1,713,844*	*20,000*	*9,715,711*
Information management			*125,000*	*21,392*	*1,941,000*	*2,087,392*
Research	*660,506*	*858,782*	*560,000*	*747,263*	*1,075,000*	*3,901,551*
Office space and utilities	**829,389**	**554,431**	**521,653**	**561,347**	**0**	**2,466,820**
Other direct expenses	**565,315**	**271,007**	**136,648**	**54,675**	**0**	**1,027,645**
Total direct expenses	**11,432,645**	**12,177,335**	**15,124,297**	**13,819,700**	**3,483,000**	**56,036,977**
Effective indirect expenses						
Total effective indirect[e]	**1,871,478**	**1,641,672**	**1,278,134**	**1,900,000**	**6,770,000**	**13,461,284**
Total effective indirect rate	14.1%	11.6%	7.8%	12.1%	66.0%	19.3%
End of year (EOY) balance	**(12,663)**	**387,760**	**5,703**	**3,300**	**0**	**384,100**
Total Federal expense	**13,291,460**	**14,206,767**	**16,408,134**	**15,723,000**	**10,253,000**	**69,882,361**

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

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

[b] Mid-year additions to base funding from FIA Washington Office account.

[c] Incudes special funding from NASA and other Federal partners to support FIA monitoring projects.

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

[e] Program-wide charges for Albuquerque Service Center included in National Office indirect expense.

Table B-3a. Federal staffing (FTEs) for the FY 2014 FIA program.

	Pacific Northwest	Interior West	Southern	Northern	National Office*	Total
Administration	5.9	7.1	6.0	4.0	2.5	25.5
Phase 1 production work	0.2	0.0	3.6	4.0	0.0	7.8
Field support	14.9	12.6	9.8	9.5	0.0	46.8
Data collection	34.7	38.5	8.6	28.8	0.0	110.6
Quality assurance	5.0	8.8	19.6	7.6	0.0	41.0
Information management	10.4	8.4	7.9	14.5	0.0	41.2
Analysis	11.7	12.9	19.4	22.5	0.0	66.5
Techniques research	5.5	6.8	7.7	5.7	1.0	26.7
Total	**88.3**	**95.1**	**82.6**	**96.6**	**3.5**	**366.1**

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

* 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 2014 FIA program.

	Pacific Northwest	Interior West	Southern	Northern	National Office*	Total
Administration	0.1	1.0		0.0	0.0	1.1
Phase 1 production work	0.0	0.0		0.7	0.0	0.7
Field support	0.9	1.7	12.0	3.1	0.0	17.7
Data collection	10.7	21.9	77.0	30.2	0.0	139.8
Quality assurance	0.0	0.2		0.3	0.0	0.5
Information management	0.0	0.0	1.0	0.2	6.0	7.2
Analysis	2.5	5.6		5.0	3.0	16.1
Techniques research	5.0	8.5		5.0	2.0	20.5
Total	**19.2**	**38.9**	**90.0**	**44.5**	**11.0**	**203.6**

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

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

Table B-3c. Estimate of total federally funded staffing (FTEs) for the FY 2014 FIA program.

	Pacific Northwest	Interior West	Southern	Northern	National Office*	Total
Administration	6.0	8.1	6.0	4.0	2.5	26.6
Phase 1 production work	0.2	0.0	3.6	4.7	0.0	8.5
Field support	15.8	14.3	21.8	12.6	0.0	64.5
Data collection	45.4	60.4	85.6	59.0	0.0	250.4
Quality assurance crew	5.0	9.0	19.6	7.9	0.0	41.5
Information management	10.4	8.4	8.9	14.7	6.0	48.4
Analysis	14.2	18.5	19.4	27.5	3.0	82.6
Techniques research	10.5	15.3	7.7	10.7	3.0	47.2
Total	**107.5**	**134.0**	**172.6**	**141.1**	**14.5**	**569.7**

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

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

Table B-4. Partners' contributions toward implementing FIA in FY 2014.

Unit	Partner	Contributions toward the base program ($)	Contributions that add value ($)
Interior West	Colorado State Forest Service	195,510	0
	USDA Forest Service Region 1	0	73,800
	USDA Forest Service Region 2	0	0
	USDA Forest Service Region 3	0	0
	USDA Forest Service Region 4	0	25,628
	NASA (North American Forest Dynamics Project)	0	149,198
	WO Forest Service (for NFS/FIA Carbon study)	0	390,500
	WO Forest Service (LANDFIRE)	0	96,000
	Utah Department of Natural Resources	0	1,502
	University of Montana, Bureau of Business and Economics Research	99,185	0
	North Carolina State		39,174
	IW total	**294,695**	**775,802**
National Office			0
	NO total	**0**	**0**
Northern	Connecticut Dept of Cons.	500	0
	Delaware Department of Agriculture	7,770	0
	Illinois Division of Forest Resources	23,359	0
	Indiana Department of Natural Resources	59,019	0
	Iowa Department of Natural Resources	17,645	0
	Kansas State Forest Service	34,938	0
	Maine Forest Service	284,819	233,905
	Maryland Department of Natural Resources Forest Service	12,300	0
	Massachusetts Department of Conservation and Recreation	8,200	15,000
	Michigan Division of Forest Management	40,200	0
	Michigan State University	0	18,750
	Minnesota Department of Natural Resources	148,724	398,041
	Missouri Department of Conservation	67,492	0
	NASA	0	61,790
	Nebraska Department of Forestry, Fish, and Wildlife	5,853	0
	New Hampshire Department of Resources & Economic Development	20,400	0
	New Jersey Forest Service	3,667	0
	New York Department of Environmental Conservation	19,890	0
	North Dakota Forest Service	7,200	0
	Ohio Department of Natural Resources	11,345	0
	Pennsylvania Department of Conservation & Natural Resources	43,000	5,035
	Resources Planning Act	0	20,000
	Rhode Island Department of Environmental Management	3,069	0
	South Dakota Department of Forestry and Nat. Res. Mgmt.	18,826	0
	University of Massachusetts	0	53,750
	University of Missouri	0	18,037
	University of Minnesota	0	50,321
	University of Nevada Las Vegas	0	5,348
	USDA Forest Service Research and Development	0	300,000
	USDA Forest Service National Forest System	1,667	399,079
	USDA Forest Service State & Private Forestry	67,000	16,000
	Vermont Department of Forests, Parks & Recreation	8,600	0
	University of Maine	0	18,750
	West Virginia Division of Forestry	49,300	0
	American Forest Foundation	0	49,991
	U.S. Fish and Wildlife Services	0	68,219
	Enviormental Protection Acency	0	37,626
	Wisconsin Department of Natural Resources	49,702	515,582
	Appalachian State	0	10,000
	University of New Hampshire	0	6,250
	NRS total	**1,014,485**	**2,301,474**

Table B-4. Partners' contributions toward implementing FIA in FY 2014 (continued).

Unit	Partner	Contributions toward the base program ($)	Contributions that add value ($)
Pacific Northwest	USDA Forest Service Region 5 State and Private Forestry for Palau Forest Inventory		12,000
	Palau Forestry Department, Palau Bureau of Agriculture		12,000
	USDA Forest Service PSW Research Station Grant Award from State and Private Forest Health Program Toward Re-measurement of Hawaii FIA plots for Koa Moth Research		60,027
	USDA Forest Service, PNW Research Directors Office for the Civil Rights Advisory Group Research Grant		20,500
	University of Guam contributions towards Intensified Grid Plots for Guam Micronesia Challenge		10,000
	USDA Forest Service, Region 5 State and Private Forestry Forest Health Program, towards Intensified Grid Plots for Guam Micronesia Challenge		30,000
	USDA Forest Service Region 6 for Region Add On Project		45,841
	USDA Forest Service Region 5 for Region Add On Project		30,140
	USDA Forest Service, Region 10, Non-forest FIA plot measurements		140,000
	USDA Forest Service, Washington Office, Alaska interior pilot inventory	670,000	
	PNW total	**670,000**	**360,508**
Southern	Alabama Forestry Commission	130,113	40,000
	Arkansas Forestry Commission	111,678	122,937
	Carpenter's Elementary School - signage outdoor learning center		59,600
	Florida Department of Agriculture and Consumer Services	119,772	0
	Georgia Forestry Commission	162,069	0
	International Institute of Tropical Forestry (IITF)	0	100,000
	Kentucky Division of Forestry	87,867	0
	Mississippi Forestry Commission	128,891	0
	North Carolina Dept of Agriculture and Consumer Services	0	40,000
	Oklahoma Department of Agriculture and Forestry	125,862	11,328
	South Carolina Forestry Commission	101,597	28,762
	Tennessee Department of Agriculture	0	0
	Texas A&M Forest Service	396,530	68,896
	University of Georgia—Biomass Equation Project	0	0
	University of Tennessee—"C" Carbon Project modeling	20,387	0
	University of Tennessee—Information Mgt.—Cooperative Research	0	100,000
	Virginia Department of Forestry	117,405	0
	VPI—Assessing NFTP Inventory using FIA Forest Inventory Data	2,500	0
	VPI—FIA Biomass & Carbon Data Base	63,000	0
	VPI—Knowledge Synthesis & Systems Integration Volume & Biomass	249,029	0
	VPI—Legacy Data Project	0	0
	VPI—RPA Land Use Modeling	28,142	0
	SRS total	**1,844,842**	**571,523**
Grand total, all FIA units		**3,824,022**	**4,009,307**

EPA = Environmental Protection Agency. FIA = Forest Inventory and Analysis. FY = fiscal year. NASA = National Aeronautics and Space Administration. NFS = National Forest System. NO = National Office. NRS = Northern Research Station. PNW = Pacific Northwest Research Station. PSW = Pacific Southwest Research Station. SRS = Southern Research Station. USDA = U.S. Department of Agriculture.

Table B-5. Grants and agreements entered into by FIA units, FY 2014.

Unit	Amount ($)	Recipient	Purpose
Interior West	753,626	Colorado State Forest Service	Implementation of annual FIA
	150,000	North Carolina State University	FVS Processing for the Forest Carbon Mgt Framework
	215,618	University of Montana	Timber Product Output (various studies)
	380,007	Utah State University	Forest Carbon Framework (multiple studies)
	45,000	Utah State University	Increment Core Analysis
	427,098	Private Contractors (multiple)	Implementation of annual FIA
	10,650	Student Conservation Association	Implementation of annual FIA
	37,580	USFS TEAMS	Implementation of annual FIA
	135,000	RMRS, Forest and Woodland Ecosystems	FIA Soils Indicator Lead and sampling (incl. equip replacement)

Table B-5. Grants and agreements entered into by FIA units, FY 2014 (continued).

Unit	Amount ($)	Recipient	Purpose
Interior West (continued)	47,000	RMRS, Forest and Woodland Ecosystems	Metegenomics/FIA Study
	21,157	WO FIA	IUFRO
IW total	**2,222,736**		
National Office	20,000	Auburn University	Tree planting data
	125,000	Redcastle Resources Inc	RSAC FIA projects
	200,000	Eastern Forest Environmental Threat Center	SRS 4854 EFETAC ISA
	15,000	Conservation Biology Institute	Protected Areas Database
	50,000	Society of American Foresters	Diversity Logic - Carbon Workshop & Silviculture Publication
	18,000	Society of American Foresters	National Users Group
	1,858,000	University of Nevada Las Vegas	UNLV database agreement
	400,000	Virginia Tech University	Knowledge Synthesis & Systems Integration Volume, Biomass, Carbon
	325,000	Remote Sensing Aplication Center	FIA Atlas support
	25,000	Virginia Tech University	Forest Inventory & Analysis Report Simulator Phase II
NO total	**3,036,000**		
Northern	17,680	Access Ability Inc.	Prefield document imaging services
	40,000	Appalachian State	Carbon Pool Science Understory
	3,825	Chestnut Ridge Forestry	Illinois Missouri Plots
	24,169	Chestnut Ridge Forestry	New York Plots
	55,834	Chestnut Ridge Forestry	West Virginia Plots
	30,103	Daniel Huberty	North Dakota Plots
	98,724	Daniel Huberty	Kansas Plots
	37,900	Glenn Summers	West Virginia Plots
	43,000	Government Printing Office	Atlas Project
	85,675	Indiana Department of Natural Resources	Implementation of annual FIA
	755,653	Maine Forest Service	Implementation of annual FIA
	21,045	Mark Webb	Ohio Plots
	75,000	Michigan State University	FIA Biomass Study
	374,897	Minnesota Department of Natural Resources	Implementation of annual FIA
	76,000	Northern Research Station Grand Rapids	Soil analyses
	52,234	Quercus Consultations Inc	Nebraska Plots
	15,300	Rocky Mountain Research	Lichen Chemestry Model
	46,295	South Dakota Dept. of Forestry & Nat. Res. Mgmt.	Implementation of annual FIA
	27,997	University of Maine	Evaluation for Assessing Current and Future Carbon Stock
	75,000	University of Maine	FIA Biomass Study
	128,452	University of Massachusetts	NWOS/Family Forest Research Center
	14,913	University of Minnesota	JAVA Script Visualization Student
	45,910	University of Minnesota	FIA Biomass Estimation Data Access
	83,900	University of Minnesota	Carbon Pool Science (mineral) and Test P3 Remeasurements
	36,051	University of Missouri	Agent Based Modeling
	36,073	University of Missouri	Small Area Estimates
	21,392	University of Nevada Las Vegas	Information Management Support
	25,667	University of New Hampshire	Maximum Stand Density Biomass Carbon at National Scale
	100,000	University of New York Syracuse	Enhancing ITREE Spatial Simulation
	33,810	Wilfred Previant	Implementation of annual FIA, Michigan
NRS total	**2,482,499**		
Pacific Northwest	1,287,187	Alaska Boat/Helicopter Contract	Implementation of FIA, Alaska
	6,828	Oregon Department of Forestry	Land use, development zone study
	223,000	University of Montana	Implementation of FIA, Timber Product Output studies
	11,800	E.R. Analytical Inc. (2 contracts)	Forest health elemental analyses
	1,800	Various contractors (Stone)	Alaska forest health implementation
	7,080	Rick Shory	Lichen Database development
	5,000	University of AK	Vegetation Database development (AKEPIC)
	15,000	Oregon State University	Lichen and bryophyte indicators and roles in forests
	1,215	Utah State University	Forest carbon management framework for the national forest system
	19,964	University of Alaska	Growth, mortaility, and climatic impacts via tree ring analysis

Table B-5. Grants and agreements entered into by FIA units, FY 2014 (continued).

Unit	Amount ($)	Recipient	Purpose
Pacific Northwest (continued)	52,218	University of Guam	Guam's forest inventory and analysis (FIA) program and Micronesia challenge's terrestrial monitoring program's forest inventory
	32,519	University of Hawaii	FVS-OPCOST: user-friendly FVS simulator to estimate costs of all types of forest fuels management
	31,950	Arctic Wild LLC	Implementation of FIA, Alaska
	4,378	Sound Telecomm Contract	Implementation of FIA, Safety check-in services
	15,000	Student Conservation Alliance	Implementation of FIA
	1,431	USFS Regional Horse Packing	Implementation of FIA
	3,451	SPOT LLC	Implementation of FIA, Safety check-in services, SPOT devices
	3,000	Satcom Global	Implementation of FIA, Safety check-in services, satellite phones
	255,998	Oregon State University	National Biomass Study
	144,002	University of Hawaii	Implementation of FIA, Fieldwork and Forest Products Output study
	18,000	University of Washington	Carbon monitoring systems integrating field and remote sensing data
	37,520	Oregon State University	Support for the landscape change monitoring system
	24,782	Oregon State University	Spatial monitoring of forestconditions over regional landscapes
	30,000	USDA Forest Service, RMRS	Growth and mortality responses to climate via tree ring analysis
PNW total	**2,203,123**		
Southern	390,338	Alabama Forestry Commission	Implementation of Annual FIA
	335,035	Arkansas Forestry Commission	Implementation of Annual FIA
	20,000	Auburn, Purdue, Idaho	Tree seedling planting survey
	25,000	Carpenter's Elementary School	signage - outdoor learning center
	245,000	Coweeta Hydrologic laboratory	SRS 4353 ISA
	359,316	Florida Department of Agriculture and Consumer Services	Implementation of Annual FIA
	487,985	Georgia Forestry Commission	Implementation of Annual FIA
	65,000	International Institute of Tropical Forestry (IITF)	Experimental Forest Study
	263,603	Kentucky Division of Forestry	Implementation of Annual FIA
	386,709	Mississippi Forestry Commission	Implementation of Annual FIA
	361,739	North Carolina Dept of Agric. and Consumer Services	Implementation of Annual FIA
	314,736	Oklahoma Dept of Agriculture Food and Forestry	Implementation of Annual FIA
	304,790	South Carolina Forestry Commission	Implementation of Annual FIA
	327,890	Tennessee Department of Agriculture	Implementation of Annual FIA
	1,189,477	Texas A&M Forest Service	Implementation of Annual FIA & Urban Forestry
	50,000	University of Tennessee	"C" Carbon Project Modeling
	100,000	University of Tennessee	Information Management - Cooperative research
	10,000	Virginia Tech University	Assessing NFTP Inventory using FIA Forest Inventory Data
	140,000	Virginia Tech University	FIA Biomass & Carbon Data Base
	353,678	Virginia Tech University	Implementation of Annual FIA
	30,000	Virginia Tech University	RPA Land Use Modeling
SRS total	**5,760,296**		
Grand total	**15,704,654**		

FIA = Forest Inventory and Analysis. FVS = Forest Vegetation Simulator. FY = fiscal year. IW = Interior West. NO = National Office. NRS = Northern Research Station. NWOS = National Woodland Owner Survey. RMRS = Rocky Mountain Research Station. RSAC = Remote Sensing Applications Center. RWU = Research Work Unit. TEAMS = a Forest Service Enterprise Unit. USDA = U.S. Department of Agriculture.

Table B-6. Number and hours of significant consultations by FIA staff by customer group, FY 2014.

Customer group	Pacific Northwest		Interior West		Southern		Northern		National Office		Total	
	No.	*Hours*	*No.*	*Hours*	*No.*	*Hours*	*No.*	*Hours*	*No.*	*Hours*	*No.*	*Hours*
Academic	19	73	59	408	89	448	36	120	3	20	206	1,068
Government	44	538	107	901	168	698	82	2,021	11	65	412	4,223
Industry	7	27	13	123	75	523	45	105	5	25	145	802
NGO	11	123	7	75	24	208	24	131	8	35	74	572
NIPF	6	4			13	36	5	3	1	3	25	46
Media	4	10	1	1	12	167	3	4	3	10	23	192
Other	10	35	37	53	69	270	13	719	2	8	60	1,085
	101	**810**	**224**	**1,561**	**450**	**2,349**	**208**	**3,102**	**33**	**166**	**945**	**7,987**

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

Table B-7. FIA data access by online tools and Spatial Data Services Center requests, FYs 2003–14.

Indicator	Number of annual accesses									Total 2006-2014
	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Online tools										
MapMaker	22,906	24,073	20,834	25,000	—	—	—	—		92,813
Forest Veg Simulator (FVS)	566	497	683	—	—	—	—	—		1,746
Fuel Treatment Evaluator (FTE)	863	1,995	50	—	—	—	—	—		2,908
Forest Inventory Data Online (FIDO)			38,092	55,494	70,943	72,946	52,099	57,567	57,974	405,115
National Woodland Owners Survey (NWOS)				6,560	1,700	2,070	5,515	4,502	2,994	23,341
EVALIDator				3,920	29,000	55,468	34,901	33,759	35,839	192,887
National Timber Products Output Tool (TPO)									69,600	69,600
DATA downloads				2,014	3,033	1,929	1,512	7,383	19,768	35,639
Total	**24,335**	**26,565**	**59,659**	**92,988**	**104,676**	**132,413**	**94,027**	**103,211**	**186,175**	**824,049**
Spatial data requests										
Academia	104	138	140	109	114	121	168	143	155	1,192
State	31	44	48	49	47	36	45	29	55	384
NFS	11	15	29	16	32	17	46	31	32	229
Other Federal	174	182	135	105	116	92	169	175	131	1,279
NGO	10	21	34	41	31	23	41	35	31	267
Industry	14	39	29	28	35	34	61	41	94	375
Other	3	54	68	57	48	91	75	67	88	551
Total	**347**	**493**	**483**	**405**	**423**	**414**	**605**	**521**	**586**	**4,277**

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

Table B-8. Mill, fuelwood, and ownership surveys processed and utilization sites visited, FYs 2000–14.

Survey or site	Year initiated	Number of annual survey questionnaires or sites										Total 2000-2014
		2000-2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Timber products	1947	10,920	1,382	2,473	1,131	2,657	1,727	3,521	1,375	2,675	1,142	20,559
Fuelwood	1947	1,400	—	1,519	—	—	—	—	—	2,360	—	3,155
Ownership surveys	1978	10,831	6,450	—	—	—	—	7,960	4,028	5,262	—	8,082
Utilization sites	1947	526	99	147	486	17	66	58	162	189	105	42,138

FY = fiscal year.

Table B-9. Forest health indicator, year of initiation, and number of samples collected, FYs 2000–14.

Survey or site	Year initiated	Number of annual samples										Total 2000-2014
		2000-2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Crowns	1991	5,335	964	1,006	962	1,177	761		1,510	5,031	3,813	20,559
Lichens	1998	2,373	123	182	127	150	167		33	—	—	3,155
Soils	1999	5,149	289	227	349	201	266	2	595	565	439	8,082
Veg	2001	9,082	1,778	2,386	2,100	2,125	2,097	1,624	7,145	6,703	7,098	42,138
Ozone	1994	6,189	957	958	948	1,003	1,018	107	—	—	—	11,180
DWM	2001	11,172	3,429	4,288	1,448	2,152	1,392	1,414	6,263	8,271	8,635	48,464
Mortality[a]	2001	23,423	10,646	12,122	12,594	13,892	15,293	15,858	20,275	13,859	17,308	155,270

DWM = down woody material. FY = fiscal year.

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

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

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

[b] Hawaii plans to implement annualized design.

Table B-11. Land and forest area and FIA annualized implementation status by State and region, FYs 2007–14.[a]

Region and State	Bureau of the Census land area	Forest land area defined by current FIADB	Forest land area defined by 2012 RPA Assessment	Annual inventory entry date	State annualized as of 2013
	Thousand acres			*Year*	
Northern	**606,841**	**182,325**	**182,299**		**24**
Connecticut	3,099	1,712	1,712	2003	Yes
Delaware	1,247	340	340	2004	Yes
Illinois	35,532	4,848	4,848	2001	Yes
Indiana	22,929	4,830	4,830	1999	Yes
Iowa	35,749	3,014	3,014	1999	Yes
Kansas	52,326	2,502	2,502	2001	Yes
Maine	19,739	17,660	17,660	1999	Yes
Maryland	6,252	2,461	2,461	2004	Yes
Massachusetts	4,992	3,024	3,024	2003	Yes
Michigan	36,185	20,127	20,127	2000	Yes
Minnesota	50,961	17,371	17,371	1999	Yes
Missouri	43,995	15,472	15,472	1999	Yes
Nebraska	49,167	1,576	1,576	2001	Yes
New Hampshire	5,730	4,832	4,832	2002	Yes
New Jersey	4,707	1,964	1,964	2004	Yes
New York	30,161	18,966	18,966	2002	Yes
North Dakota	44,161	760	734	2001	Yes
Ohio	26,151	8,088	8,088	2001	Yes
Pennsylvania	28,635	16,782	16,782	2000	Yes
Rhode Island	662	360	360	2003	Yes

Table B-11. Land and forest area and FIA annualized implementation status by State and region, FYs 2007–14[a] (continued).

Region and State	Bureau of the Census land area	Forest land area defined by current FIADB	Forest land area defined by 2012 RPA Assessment	Annual inventory entry date	State annualized as of 2013
	Thousand acres			*Year*	
South Dakota	48,519	1,911	1,911	2001	Yes
Northern (continued)					
Vermont	5,899	4,591	4,591	2003	Yes
West Virginia	15,384	12,155	12,155	2004	Yes
Wisconsin	34,661	16,980	16,980	2000	Yes
Southern	**533,031**	**267,214**	**244,716**		**13**
Alabama	32,413	22,877	22,877	2001	Yes
Arkansas	33,303	18,755	18,755	2000	Yes
Florida	34,447	17,461	17,461	2001	Yes
Georgia	36,809	24,768	24,768	1998	Yes
Kentucky	25,271	12,472	12,472	1999	Yes
Louisiana	27,650	14,712	14,712	2000	Yes
Mississippi	30,031	19,542	19,542	2007	Yes
North Carolina	31,115	18,588	18,588	2003	Yes
Oklahoma	43,901	12,646	12,256	2008	Yes
South Carolina	19,239	13,120	13,120	1998	Yes
Tennessee	26,390	13,942	13,942	1999	Yes
Texas	167,188	62,425	40,318	2000	Yes
Virginia	25,274	15,907	15,907	1998	Yes
Interior West	**547,691**	**154,093**	**124,614**		**8**
Arizona	72,700	18,643	10,795	2001	Yes
Colorado	66,331	22,837	19,995	2002	Yes
Idaho	52,892	21,448	21,247	2004	Yes
Montana	93,149	25,573	25,169	2003	Yes
Nevada	70,260	11,169	8,121	2010	Yes
New Mexico	77,631	24,840	16,615	2008	Yes
Utah	52,589	18,135	11,866	2000	Yes
Wyoming	62,140	11,448	10,807	2010	Yes
Pacific Northwest	**573,389**	**215,182**	**214,605**		**5**
Alaska, Coast	39,041	14,426	14,426	2004	Yes
Alaska, Int.	326,575	114,151	114,151		
California	99,699	32,618	32,057	2001	Yes
Hawaii	4,110	1,748	1,748	2010	Yes
Oregon	61,432	29,804	29,787	2001	Yes
Washington	42,532	22,435	22,435	2002	Yes
Total	**2,260,953**	**818,814**	**766,234**	**—**	**50**
Forest area performance measure, excluding interior AK					100%
Forest area performance measure, including interior AK					86%
State activity performance measure, includes all active States					**100%**

AK = Alaska. FIA = Forest Inventory and Analysis. FIADB = Forest Inventory and Analysis Database. FY = fiscal year.

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

Table B-12. FIA summary statistics and performance measures, FYs 2007–14.

	2007	2008	2009	2010	2011	2012	2013	2014
Available program funds								
Apropriated funds[1]	63,605	64,641	65,536	71,817	71,452	69,186	65,567	66,805
Other Federal funds[2]	1,272	1,559	3,320	930	856	528	2,668	1,422
Total Federal funds	**64,877**	**66,200**	**68,856**	**72,747**	**72,308**	**69,714**	**68,235**	**68,227**
Total partner funds	7,204	6,505	6,494	7,516	9,109	10,129	7,772	7,833
Total available funds	**72,081**	**72,705**	**75,350**	**80,263**	**81,417**	**79,843**	**76,007**	**76,060**
% Full federal appropriated funding	**82%**	**83%**	**84%**	**92%**	**92%**	**89%**	**84%**	**86%**
Program expenses and balances								
Administration	3,031	2,785	2,999	3,262	3,233	2,735	2,854	3,036
Image processing	1,300	1,198	1,102	916	724	519	589	597
Field support	3,175	3,357	3,003	3,594	3,917	3,946	4,151	4,082
Data collection[3]	23,630	22,989	25,243	26,162	27,057	24,387	22,559	23,590
Information management[3]	7,431	6,108	7,623	7,476	6,794	6,740	5,933	6,737
Analysis	4,518	5,147	5,354	5,357	6,105	6,570	6,695	7,058
Research[3]	4,799	5,033	5,881	6,903	5,444	6,075	6,690	7,072
Miscellaneous/other	3,454	3,406	3,909	4,473	4,417	3,882	3,652	3,864
Total direct expense	**51,338**	**50,023**	**55,115**	**58,143**	**57,692**	**54,854**	**53,124**	**56,037**
Total Indirect expenses	**13,194**	**13,586**	**12,653**	**14,189**	**13,958**	**14,180**	**14,704**	**13,461**
Indirect rate	*20.7%*	*21.0%*	*19.3%*	*19.8%*	*19.5%*	*20.5%*	*22.4%*	*20.2%*
Total Federal expense	**64,532**	**63,609**	**67,768**	**72,332**	**71,650**	**69,034**	**67,828**	**69,498**
Fire Transfer[4]		2,318						
Total EOY balance	**345**	**273**	**1,089**	**415**	**658**	**680**	**407**	**384**
Total Federal funds	**64,877**	**66,200**	**68,856**	**72,747**	**72,308**	**69,714**	**68,235**	**69,882**
Other measures								
Percent of States with annual activity	90	94	94	100	100	100	100	100
Percent of States with FIADB 1-2 yrs old	90	90	90	88	94	94	94	96
Federal employees	387	389	381	392	397	372	366	366
Other employees	179	173	201	205	201	203	184	204
Total employees	**566**	**562**	**582**	**596**	**598**	**575**	**550**	**570**
P2/3 base forest plots	19,880	18,208	21,545	19,272	21,233	19,673	21,263	19,789
P2/3 base nonforest plots	24,757	29,351	21,996	25,238	27,568	27,131	27,683	24,094
Total plots	**44,637**	**47,559**	**43,541**	**44,510**	**48,801**	**46,804**	**48,946**	**43,883**
All QA plots	3,664	4,860	3,597	4,020	4,550	4,417	5,465	2,312
Percent QA plots	8%	10%	8%	9%	9%	9%	11%	5%
All publications	135	172	206	203	204	272	238	234
Journal publications	37	65	38	74	62	90	90	87
Percent journal publications	27%	38%	18%	36%	30%	33%	38%	37%
Consultations, number	1,571	1,659	1,399	991	1,753	848	824	945
Consultations, hours	5,767	6,656	8,603	10,381	8,584	8,807	8,124	7,987
User/mangement meetings	16	10	11	10	14	15	12	14
Spatial data requests filled	493	483	405	423	414	605	605	586
Online accesses	26,565	59,659	92,988	104,676	132,413	94,027	94,027	186,175

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

[1] Net of rescissions.

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

[3] Includes Federal grants and agreements.

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