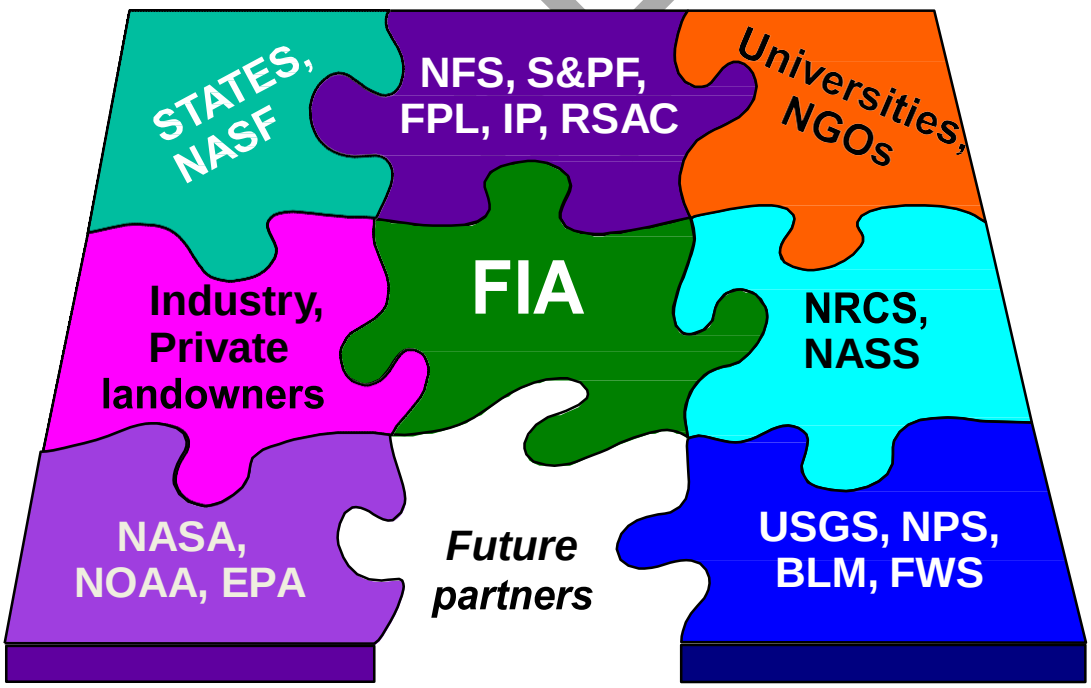
United States Department of Agriculture

Forest Service

Forest Inventory and Analysis

Strategic Plan

A document fulfilling requirements of Section 8301 of the Agriculture Act of 2014



Success Built on Valued Collaborative Partnerships

Description of acronyms on cover puzzle

Acronym	Description
BLM	U.S. Department of the Interior, Bureau of Land Management
EPA	U.S. Environmental Protection Agency
FIA	USDA Forest Service, Forest Inventory and Analysis program
FPL	USDA Forest Service, Forest Products Laboratory
FWS	U.S. Department of the Interior, Fish and Wildlife Service
Industry	The thousands of primary forest industries that participate in FIA's Timber Products Output Studies
IP	USDA Forest Service, International Programs
NASA	National Aeronautics and Space Administration
NASF	National Association of State Foresters
NFS	USDA Forest Service, National Forest System
NASS	USDA National Agricultural Statistics Service
NGOs	Non-governmental Organizations *such as:*
AFPA	*American Forest Products Association*
CBI	*Conservation Biology Institute*
NAFO	*National Alliance of Forest Owners*
NCASI	*National Council for Air and Stream Improvement*
NFF	*National Forest Foundation*
NWOA	*National Woodland Owners Association*
SAF	*Society of American Foresters*
NOAA	National Oceanic and Atmospheric Administration
NPS	U.S. Department of the Interior, National Park Service
NRCS	USDA Natural Resources Conservation Service
Private landowners	Private forest landowners who allow us access to their land and participate in the FIA's National Woodland Owners Studies
RSAC	USDA Forest Service, Remote Sensing Applications Center
S&PF	USDA Forest Service, State and Private Forestry
States	State and Island forestry agencies
Universities	Over 50 public and private universities nationwide since 2001
USGS	U.S. Department of the Interior, U.S. Geological Survey

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A Message from the Chief

The Forest Inventory and Analysis (FIA) program has been reporting on the status, condition, and trends of the Nation's forests for more than 80 years. As a central research component of the U.S. Department of Agriculture's Forest Service, FIA provides information that assists resource managers, policymakers, investors, and the general public in making informed decisions.

The 1998 Farm Bill directed the Forest Service to reevaluate its approach to statewide forest inventories under the FIA program, transitioning from periodic surveys to annual sampling of all States and posting the information on the Internet. In 1998, working with partners, FIA developed a new strategic plan to carry out the new congressional mandate of the 1998 Farm Bill.

The plan presented here meets the requirements of the 2014 Farm Bill to formulate a new strategic plan for FIA and deliver it to Congress. The plan provides an overview of the FIA program and how it addresses the needs of the diverse communities that the program serves. In addition, FIA will continue to use its Annual Business Reports to inform Congress, our partners, and the public of the progress the agency is making toward achieving the strategic goals presented here (http://www.fia.fs.fed.us/library/bus-org-documents/default.asp).

Under this strategic plan, FIA openly embraces new methods and technologies to deliver the program more efficiently. In pursuit of this goal, FIA strongly encourages collaborative partnerships with the States (FIA's primary partners), universities, other public entities, nongovernmental organizations, and interested parties.

The challenges we face today are many: urban development, increased fire risk, invasive threats to native vegetation, and deteriorating soil and water quality, just to name a few. But we also have opportunities, including carbon markets and technologies enabling biofuels usage. The FIA program outlined in this plan is designed to provide the highest quality data and analysis vital to monitoring America's forest ecosystems in order to provide goods and services to the public in a sustainable fashion. Our FIA program also supports my vision of an all-lands monitoring model that works across jurisdictions and land-use types to provide the scientifically sound information that landowners and land managers need to make sound management and policy decisions.

I urge you to study this plan carefully and join me in actively supporting FIA's leadership in monitoring the Nation's forests in pursuit of sustaining our natural resources for future generations.

Tom Tidwell

Chief

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EXECUTIVE SUMMARY

The Forest Inventory and Analysis (FIA) program provides a scorecard on the balance between forest use and forest renewal including measures of forest health, vitality, and sustainability. The long history of scientifically credible FIA data provides critical status and trend information to resource managers, policy makers, investors, and the public through a system of annual resource inventory that covers both public and private forest lands across the United States. This strategic plan, the fifth one for the program, has been developed with input from partners and clients. It lays out a vision for the program for next 5 years.

Program Mandate—The FIA program was initially authorized in the McSweeney-McNary Forestry Research Act of 1928, which directed the Secretary of Agriculture to make and keep current a comprehensive inventory and analysis of the Nation's forest resources. The Forest and Rangeland Renewable Resources Research Act of 1978 (P.L. 95-307) replaced this earlier legislation and maintained the mandate to keep a current inventory of the Nation's forests. In 1998, the Agricultural Research, Extension, and Education Reform Act (P.L. 105-185) amended the 1978 legislation and instructed the FIA program to establish an enhanced program to inventory the forests resources of the United States on an annual basis in every State. On February 7, 2014, the President signed the Agricultural Act of 2014 (Public Law 113-79), also referred to as the 2014 Farm Bill. Section 8301 of this legislation requires the FIA program to revise its previous strategic plan—the revision is presented here—and to submit it to the Committee on Agriculture of the House of Representatives and the Committee on Agriculture, Nutrition, and Forestry of the Senate.

Previous Plan Accomplishments and Current Status—Between 1930 and 1999, FIA conducted over 260 statewide forest inventories and five national assessments—all in close cooperation with States and other partners. Following requirements of the earlier 1998 legislation, FIA began annualized inventories of the States. By 2010, annualized operations existed in all 50 States while periodic surveys continued in all of the associated island territories. This implementation, however, did not include interior Alaska, which constitutes 15 percent of the Nation's total forest area, due to lack of full program funding.

Each year, the FIA program publishes an Annual Business Report that describes basic information about the program's activities as follows: current year's accomplishments, performance measures, financial and staffing data, program changes, and planned accomplishments for the upcoming year. These reports for the last 15 years, as well as virtually all FIA data, are available at http://fia.fs.fed.us. A multi-year performance summary is provided inside the back cover of each year's Annual Report. The current program is funded at $66.8 million annually.

New Base Federal FIA Program Funding and Staffing Options—The 1998 Farm Bill base program included: (1) an annual inventory of 20 percent of the forests plots in each State every year or a five year cycle, (2) an analytical report for each State every 5 years, (3) national standards, definitions, and protocols for collecting data and reporting information, (4) provisions to ensure protection of private property rights, and (5) a process for employing remote sensing,

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global positioning systems, and other advanced technologies. In addition to collecting data on field plots, the program conducted surveys of primary wood-using mills in the United States and sampled the over 10 million private forest landowners in the United States. The only adjustment to this strategic direction in the 1998 legislation was conference report language in a subsequent appropriations bill responding to the 1998 plan that adjusted the annual rate of field plot measurement from 20 percent to 15 percent (7 years) in the East and 10 percent (10 years) in the West. The 2014 Farm Bill does not amend the underlying legislative sampling requirement of 20 percent of plots in each State annually, but it adds 11 elements for consideration. As the organizational changes, implementation tactics, and associated costs of the 11 elements were evaluated by program staff and clients, it became clear and that implementation efficiencies could be created by clustering some of the elements. Four clusters of elements were identified as Options C to F, building upon the current program—Option A—and the program envisioned in the 1998 Farm Bill—Option B. Estimated staffing for the six options, as shown in Table 1, are explained in more detail in the plan. The table also shows the percentage of the required staffing that would be contracted to partners, who in many cases can perform field work to FIA's rigorous quality standards at lower cost. The details about funding and staffing for the 11 elements in the 2014 bill are shown in Appendix B, Table B-1.

TABLE 1.—Staffing for the six implementation options presented in this strategic plan

Option	Label	Total staffing	Federal staffing	Federally funded partner staffing	Partner-funded staffing	Partner staffing
		(*FTEs**)				(*percent*)
A	Current Program	550	368	182		33
B	Full 1998 Farm Bill	598	395	203		34
C	National Core Program	689	420	269		39
D	National Five-Year Cycle	779	444	335		43
E	2014 Farm Bill Top 10 Elements	810	454	356		44
F	National Five-Year Double-Intensity Sample	1,080	454	356	270	58

** FTE = Full Time Equivalent*

Beyond the Basics—Historically, partners have contributed over $7 million annually to enhance the program to meet their needs. Options E and F focus mainly on increased partner participation to leverage the FIA program for additional local needs, whether it is co-funded analysis positions, increased online tools training, increased density of field samples to improve estimates at smaller spatial scales, or more research to build or enhance resource models.

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PROGRAM HISTORY AND OVERVIEW

Importance of the Forest Inventory and Analysis Program

For more than 80 years, the FIA program has been recognized as a world leader in conducting national-scale forest inventories. FIA information is widely used to address local and regional issues related to trends in forest extent, health and productivity; land cover and land use change; and the changing demographics of private forest land owners. FIA information is the most trusted source of forest inventory information for a broad spectrum of interests and communities, including, as follows: forest owners; county, State, Federal, and Tribal leaders; non-governmental interest groups; investors; and private firms. In the 1930s, the issue was whether timber was becoming scarce. In the 1940s and 1950s, it was supporting the war effort and afterwards, growing the economy and providing housing. From the 1960s to the 1990s, the issues shifted toward balancing forest uses among a broader array of interests. In the 21st century, the issues and mission focus have expanded from the primary focus on timber production in the last century to a wider range of goods and services today, including wildlife habitat, clean water and air, and biological diversity.

Today's mission remains focused on providing scientifically credible and consistent information on a broad spectrum of recurring threats to forests and to identify where new threats are emerging. FIA and its research partners do the following: 1) provide annual snapshots of trends in ecological conditions in forests; 2) track changes in production and employment in the forest sector of the economy and the associated effects on communities; and 3) contribute vital information to assessments of risk from wildfire, insects, and diseases to the health and productivity of the Nation's forests. As new policy issues emerge, FIA information is used to understand the context and the options available to decision-makers, such as the recent interest in understanding the role of forests in sequestering atmospheric carbon and options for offsetting carbon emissions. This issue led to fresh analyses that found 16 percent of our country's annual carbon emissions is sequestered by forests, while they support communities by providing over 2.4 million jobs in the forest sector and approximately 6 percent of total manufacturing Gross Domestic Product.

Many issues considered novel and contemporary at the time have been successfully addressed with FIA data, and today those issues are considered routine applications of FIA data and analyses. Examples include the use of FIA information to address spatial and temporal trends in pest outbreaks, such as outbreaks of spruce budworm (a native insect), European gypsy moth, and emerald ash borer (the latter two are alien invasive insects). The spatial and temporal balance of the annual sample design allows for planned collaboration with other Forest Service programs, such as State and Private Forestry's (S&PF) Forest Health Risk Map and Land-Fire model that use forest types and fuel loads to estimate risks, and the preparation of State Forest Action Plans and State Wildlife Action Plans.

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FIA analysts constantly look at resource trends in the context of emerging issues that will require credible data and information to drive sound resource management and policies. FIA program leaders have identified four themes that stand out today and are directly related to the U.S. Department of Agriculture and Forest Service strategic goals:

Forest Resilience—This issue includes such topics as air pollution, the effects of global climate change, deterioration of forest health, and lower forest productivity. As noted by the Convention on Biological Diversity (CBD 2009):

> *"Resilience is the capacity of a forest to withstand (absorb) external pressures and return, over time, to its pre-disturbance state. When viewed over an appropriate time span, a resilient forest ecosystem is able to maintain its 'identity' in terms of taxonomic composition, structure, ecological functions, and process rates. The available scientific evidence strongly supports the conclusion that the capacity of forests to resist change, or recover following disturbance, is dependent on biodiversity at multiple scales."*

Monitoring the diversity of the Nation's forests is at the very heart of FIA's mandate since 1928 to:

> *"…make and keep current a comprehensive survey and analysis of the present and prospective conditions of and requirements for renewable resources of the forests and rangelands of the United States and of the supplies of such other renewable resources, including a determination of the present and potential productivity of the land, and of such other facts as may be necessary and useful in the determination of ways and means needed to balance the demand for and supply of these renewable resources, benefits, and uses in meeting the needs of the people of the United States."* (Section 3.(b)(1) of the Forest and Rangeland Renewable Resources Research Act of 1978, P.L. 95-307)

Forest health, productivity, and diversity are affected by a large number of interacting factors that have increased the need for timely information on the Nation's forests. Addressing resiliency requires efforts from many disciplines to provide new kinds of monitoring data and analyses. A key role will be the establishment of a baseline that can be used to detect loss of forest use and changes in the health and condition of major forest ecosystems over time.

Sustainability—This encompasses lack of regeneration, potential for overharvesting, a loss of biological diversity, and forest ownership fragmentation and tenure change. More and more, the goods Americans purchase are being scrutinized as to whether they were derived from sustainable sources. The United Nations Brundtland Report (UN WCED, 1987) noted:

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"…sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs. We do not pretend that the process is easy or straightforward. Painful choices have to be made. Thus, in the final analysis, sustainable development must rest on political will."

The United States National Report on Sustainable Forests (USDA Forest Service, 2011), which relies heavily on FIA data, stated *"…through sustainable management, forests can contribute to the resilience of ecosystems, societies, and economies while also safeguarding biological diversity and providing a broad range of goods and services for present and future generations."* The extent and condition of forest resources, on which these uses and related jobs depend, need to be thoroughly documented. In-depth analyses are needed to estimate the impact of more diverse uses and activities on the landscape.

Community Stability—Healthy forests promote a wide variety of investments in surrounding communities, not just investments related to timber production, but also investments in tourism, recreation, special products (e.g., maple syrup, mushrooms), quality-of-life, and cultural values. Most importantly, all these investments create and sustain jobs in the local economy. But this is a two-way interaction, with the health of forests in turn relying on healthy communities and a healthy local economy. During the recent economic downturn, it is estimated that 10,000 to 15,000 private forest landowners had to forgo the sale of nearly $3 billion worth of timber sales annually as the Nation's housing market crashed. This disrupted the economies of hundreds of small communities throughout the Nation. The effects will be long lasting in many areas as many businesses forced to close are not resuming operations. But new ventures, like bio-energy production, may lead to new facilities utilizing the now-available resources and help restore economic stability to these communities. The recovery and economic resiliency of all communities is best underpinned by long-term monitoring of natural resources to provide community leaders with information that highlights opportunities and supports sustainable resource management policies and strategies. In many areas of the country, the ability of our forests to supply timber products is declining in response to growing pressures to supply a broader spectrum of commodities and non-market goods and services. To keep pace with dynamic land-use changes, State Foresters, county elected officials, and investors are all calling for shorter inventory measurement cycles and more credible information at sub-State levels to provide a sturdier foundation for local actions. Some calls for more and better information are closely linked to understanding the impacts of urban/suburban area expansion, land clearing, and increased pressure on forests near settled areas to supply necessary goods and services to a growing Nation. All of this will need incorporation of new information management concepts like big data and cloud technology.

Information Proliferation—With so many media outlets burgeoning with information of varying content and quality, FIA must continue to provide accurate, timely, and consistent resource information that is comparable over time and easy to access in both raw data and analytical form while respecting the privacy of those allowing FIA to collect the data on their land.

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Over the past 20 years, all of these issues and others have played an increasing role in the activities and information collected by FIA. This Strategic Plan is about a forest inventory program that goes beyond the mere collection of field data, conducting surveys or publishing reports. This plan looks at natural resources as some of the Nation's greatest treasures that must be monitored and cherished, not just for today, but for posterity. Guarding this great treasure and its trove of benefits hinges on three major factors: community stability, forest resiliency, and resource sustainability. Decades of economic development, billions of dollars of investment, and millions of jobs have relied on the sustainable use of our Nation's forests. The availability and credibility of FIA data are the foundation for jobs and the well-being and quality of life for people and communities. Attesting to the FIA program's history of accountability and delivery on its promises is a report by the Government Accounting Office (GAO) titled *Improvements in Delivery of Research Results Can Help Ensure That Benefits of Research Are Realized* (GAO-11-12). On page 12, GAO echoed the value of FIA in delivering much needed quality data to drive resource management and policy:

> *"Forest Inventory and Analysis program—One of the accomplishments most frequently identified was the FIA program, which has provided decades of data used to assess the status, trends, and future sustainability of America's forests. To date, FIA data collection has been initiated for each State, most recently for Hawaii, Nevada, and Wyoming. According to several stakeholders, these data have been fundamental to understanding the nature and changing condition of forest resources, which in turn has helped Federal, State, and local governments, as well as others, make informed decisions about land use and management. A few stakeholders added that FIA data have been improving and are more useful today than in the recent past because they are more comprehensive and include State-specific summaries and interpretations that help State Foresters better communicate the information to public officials, land managers, and the public at large. Several stakeholders told us that many State Foresters relied on FIA data to prepare reports for State-Wide Assessments and Strategies for Forest Resources, required by the Food, Conservation, and Energy Act of 2008 (P. L. No. 110-234, § 8002). The assessments are designed to, among other things, identify the conditions and trends of forest resources in the State and threats to those resources."*

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FIA Mandate

The FIA mandate is to *"…make and keep current a comprehensive survey and analysis of the present and prospective conditions of and requirements for renewable resources of the forests and rangelands of the United States…"* (Section 3.(b)(1) of the Forest and Rangeland Renewable Resources Research Act of 1978. P.L. 95-307).

To fulfill this legislative requirement, the FIA program has established scientifically rigorous sampling protocols and analytical methods for all the private and public forests of the country. Currently, fresh spatially balanced data are collected each year on a percentage (10 percent Western United States, 15 percent Eastern United States) of all plots in the sampling frame for

each State. FIA makes available to the public a compilation of all data collected for that year as well as any analyses made of the data. Every 5 years, State-level reports are prepared that describe the current forest conditions and recent trends over the past two decades for all forests in the State. About 10 State reports are completed each year in a rotating sequence. The FIA program employs uniform and consistent data definitions and collection protocols to estimate the status of a core set of variables and a standard set of tables that are included in the reports. Field crews obtain permission from property owners prior to collecting data from sample plots located on private property. In addition to collecting data and reporting information on forest conditions, the FIA program also conducts surveys of primary wood-using facilities to track the flow of wood from forests through processing into manufactured products and surveys of private woodland owners to understand how they are managing their land. A partial listing of authorizing and supporting legislation for FIA is included in Appendix D.

FIA Vision

The vision of FIA is to be the preeminent source of information about the extent and conditions of the forests of the United States: the Nation's forest census. FIA information, including certified partner contributions, is complete, current, consistent, and credible. No major decisions, policies, or future outlooks pertaining to forests are made without consulting FIA information to evaluate options and assess outcomes.

To achieve that vision the FIA program has several long-term guiding principles including:

- Providing a full spectrum of forest and range inventory information to support the sustainability of the Nation's forests and grasslands to meet the needs of present and future generations. This may take decades to achieve as the FIA program incrementally grows program funding and support. An example is the program's intent over the next 5 years to build support and obtain new funding for extending inventory work to include forests in urban areas—a high priority of many State Foresters and county officials.
- Creating flexibility in our methodologies to respond to changes in client needs, regional logistics, and budgetary demands. The FIA program will provide a consistent base inventory in all 50 States and the 8 U.S.-associated islands, and maintain high national core standards while enabling regional and periodic adjustments that are responsive to funding opportunities and clients' needs.
- Actively participating in developing inventory methods and techniques that will assist the National Forest System (NFS) in meeting the requirements of the National Forest Management Act of 1976 (P.L. 94-588).
- Maintaining emphasis on statewide forest resources inventories, while conducting a balanced program of research to advance knowledge on multi-resource assessments and forest health.
- Contracting external entities that can meet the FIA program's rigorous quality standards to deliver the program's mission in the most economically efficient means possible.
- Maintaining working relationships with clients, cooperators, and Congress, and publishing annual business reports to provide openness and transparency about program progress and expenditures.

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- Protecting the confidentiality of landowners' and mill operators' information as required by law (Food Security Act of 1985, P.L. 99-198, 7 U.S.C. 2276).
- Preserving legacy data and making it accessible to partners and clients for long-term trend analyses.
- Establishing and following universal protocols that ensure comparability and consistency of statistics with national and international data reporting standards, including the Federal Geographic Data Committee (FGDC), for vegetation protocols and spatial reporting.
- Focusing on serving the people of the Nation, but recognizing that many problems may require a multi-national or global approach.
- Engaging and collaborating with scientists and experts from universities, other agencies, and non-governmental organizations to ensure the highest quality research.
- Recruiting, training, and retaining a competent and highly dedicated, diverse, and inclusive workforce from all segments of the Nation's population, and encouraging creativity and innovation.

FIA Mission

The mission of the Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. Forest Service Research and Development (R&D) delivers this mission through its comprehensive research program that provides the scientific foundation for renewable resource management. A leading component of the R&D mission is the FIA program.

FIA's mission is making and keeping current a comprehensive inventory of the Nation's forests, so that policy makers in Federal, State, local agencies and Tribal governments; land managers, land owners, and investors throughout the forest sector; and other non-governmental groups interested in America's forests have timely and accurate information about the health and productivity of all the forests in the United States. The FIA program uses a scientifically rigorous and peer-reviewed sampling frame of permanent plots that are periodically revisited for re-measurement. The program's computational processes and models (e.g., tree taper and volume equations) have also been thoroughly peer-reviewed by scientists outside the program. The resulting information and analyses enable the program to track how much forest exists, where it exists, who owns it, how is it being managed, and how it is changing, as well as how the trees and other forest vegetation are growing, and how much has died or been removed. Many different clients inside and outside of the Federal Government use the information and analytical results, such as informing investors in natural resources, evaluating wildlife habitat conditions, assessing the sustainability of ecosystem management practices, and supporting planning and decision-making activities undertaken by public and private enterprises.

The FIA program is further guided by the USDA and Forest Service Strategic Plans, which provide direction to guide agency programs in delivering their respective missions. The program directly contributes to achieving USDA's goal to *"Ensure our National Forests, Private Working Lands and conservation areas are conserved, restored and made more resilient to*

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climate change while enhancing our water resources." To this end, some of the program's contributions include, as follows:

- FIA has monitored the status and condition of the Nation's forests and conducted routine surveys of forest industry and the objectives of private forest landowners over the past 80 years. Information from these surveys has helped ensure that our forest resources are conserved, protected, managed, and used in ways that are sustainable and capable of continuing to provide jobs and benefits for generations to come. And, FIA land use and land cover change estimation research provides critical information on the status and trends in open space across the country.
- FIA data confirm that private forests provide over 90 percent of the Nation's timber products, underpin billions of dollars of investment by forest-related industry, and support over 2.5 million jobs related to forestry and forest products (USDA Forest Service, 2014). The program also provides strategic data on the status and trends of the Nation's protected areas that are enjoyed by millions of tourists and recreationists annually and provide critical habitat for wildlife. Routine statewide analytical reports on a 5-year basis ensure that State, county, and community planners have current information upon which to base sound resource policies.
- FIA systematic monitoring across the landscape provides current and reliable data on the status and trends of forests in wildernesses, national parks, and roadless areas to allow comparisons of conditions and trends of these ecosystems to more intensely managed ecosystems. Further, FIA information helps create more interest in outdoor recreation opportunities by describing the conditions of forests and associated wildlife habitats in ways that resonate with a broad spectrum of users, from bird watchers and photographers to hikers, campers, and hunters.
- FIA has a strong partnership with the NFS and provides scientifically sound volume, growth, and mortality data to ensure that NFS resource modeling systems provide the most reliable information possible for land management and project planning.
- FIA continues to pursue opportunities to monitor urban forest cover in concert with local communities to provide consistent, seamless forest trend data across the landscape to accurately track the ecosystem services forests provide, such as the Nation's carbon stocks.
- FIA, as a research program, is constantly exploring new remote sensing and other technologies to improve monitoring efficiency and reduce costs. An example of this is that the 1934-36 forest survey of the Lake States required 125,000 field plots. Today, using a sampling design that efficiently incorporates remote sensing, the entire Nation enjoys data of similar accuracy using just 125,000 plots. Online tools provide public access to virtually all FIA data, with over 100,000 retrievals registered annually. Nearly 80 years of legacy data are being catalogued to provide an accurate historical reference to the Nation's forest resources.

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FIA IS A PARTNERSHIP PROGRAM

FIA has always been a partnership program and works jointly with partners, most notably State Foresters, but there are many others. At the request of partners, FIA holds annual regional and national listening sessions to understand their needs. FIA partners encompass a wide breadth of interests in both the public and private sectors. The following provides a glimpse into the value of FIA data for a diverse group of partners.

- **States** have partnered with FIA for over 80 years to define the base sample, collect data, participate in analyses, and provide critical political support. States currently provide almost 33 percent of field crew staffing and 10 percent of total annual program funding to leverage the program for individual State needs. Since 1930, when earliest FIA field work began, the Federal-State partnership has grown to include all 50 States, and all eight U.S.-affiliated Pacific and Caribbean Island groups (Figure 1).

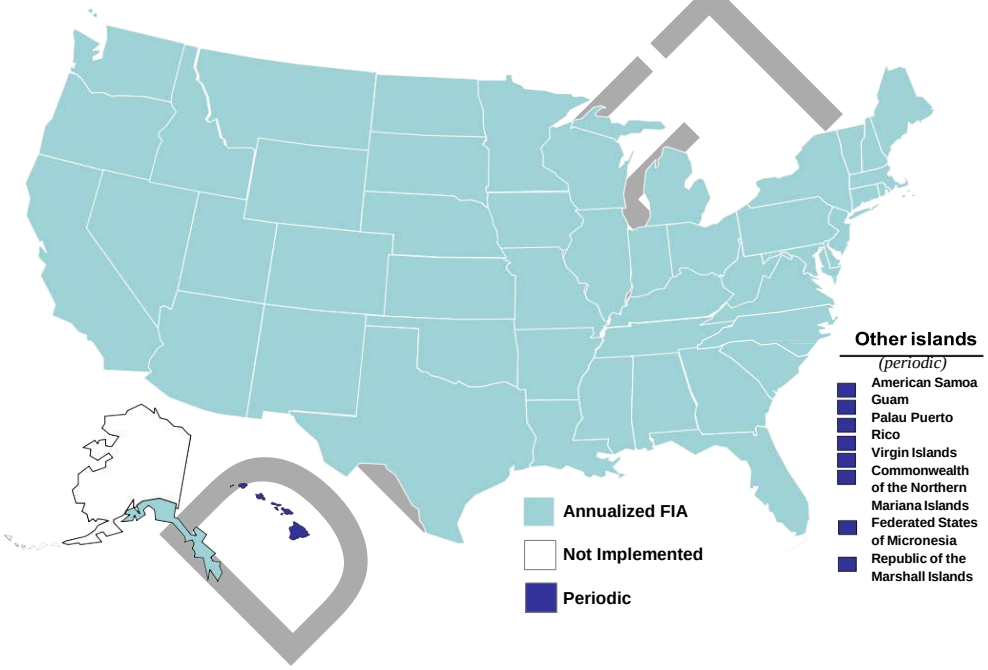

FIGURE 1.—Status of annualized inventory, as of fiscal year 2014

- **National forests** partner with FIA to answer specific questions, intensify sampling, produce forest planning documents, and to produce resource reports for individual forests.

- **Other government agency partnerships** are critical to FIA success. FIA is working with the National Aeronautics and Space Administration (NASA) and the U.S. Geological Survey (USGS) to improve our ability to differentiate and classify tree cover according to major land use classes to explicitly address losses and gains of tree cover, changes in tree density, and to inform resource and sustainability questions along the rural to urban gradient. Major technologies incorporated in this research include various high-altitude imagery sensors (e.g., LIDAR, MODIS, and LANDSAT) along with supporting statistical analysis tools.
- **Universities** partner with FIA to extend our own research to improve resource monitoring and to expand knowledge and insights regarding our forested and other vegetated ecosystems. FIA has partnered with over 50 universities since 2000 to conduct research to enhance monitoring technology. Universities also use FIA information in classroom exercises and assign homework and project assignments requiring students to search for information in the FIA database. This better prepares the next generation of natural resource managers to serve the public interest and interests of their employers through the use the best information about the Nation's forests.
- **Industrial firms** use FIA information to evaluate investments in building new wood processing and power generation facilities or upgrading existing ones. Firms also partner with the FIA program to provide critical information on primary wood production in the United States. FIA in return ensures the privacy of that data on behalf of the industries.
- **Private forest landowners** have been partners with FIA since its inception by allowing us to collect data on their land. FIA in return ensures the privacy of that data on behalf of the private landowners.
- **Non-governmental organizations** partner with FIA to assess opportunities for conservation partnerships and to map forest health risks including insects, disease, pollutants, fire, and animal damage.
- **Investors,** such as Timber Investment Management Organizations (TIMOs), Real Estate Investment Trusts (REITs), and pension funds use FIA information to evaluate opportunities, risks, and returns from investments in forests and provide financial security for retirees.
- **International partners** work with FIA experts to ensure that core national inventory programs are sound and follow internationally accepted monitoring standards and principles.

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PROGRAM ACCOMPLISHMENTS UNDER THE PREVIOUS STRATEGIC PLAN

The key accomplishments of the previous strategic plan will be identified first, and then the organization, procedures, and funding to implement the 11 elements identified in the 2014 Farm Bill will be outlined. A brief recap summarizing progress on the major goals over the past 7 years follows:

- **Complete and report on the first cycle of the new National Woodland Owners Survey (NWOS)** (www.fia.fs.fed.us/nwos), and integrate data into online systems. Data for the latest NWOS were collected between 2002 and 2006 and processed. Results and analysis were published in 2008 (NRS-GTR-27, http://www.treesearch.fs.fed.us/pubs/15758) and include an online data summary tool (NWOS Table Maker; http://apps.fs.fed.us/fia/nwos/tablemaker.jsp). More information about the NWOS can be found at http://www.fia.fs.fed.us/nwos.
- **Annualize the Timber Products Output (TPO) survey and integrate its data into online systems.** TPO accomplishments towards this goal were: (1) create a national TPO program focus, (2) develop a national mill survey form, (3) develop a national TPO database based on the new forms, (4) publish the first national pulpwood report, and (5) beta test online data entry and summary tools for use with national database.
- **Complete a suite of Internet tools to improve client access to FIA data and assist in analysis.** The current generation of online data retrieval programs was developed to produce estimates with associated sampling errors. Forest Inventory Data Online (FIDO) was introduced in 2008, and the EVALIDator web application was introduced in 2010. Based on analysis of Internet protocol addresses, these web applications are used by a variety of users: academia (15 percent), Government (25 percent), commercial (14 percent), non-governmental or international users (1 percent), and indeterminate (45 percent). Over 132,000 requests were made to EVALIDator and FIDO in FY 2011 alone (Figure 2). The FIA DataMart provides access to both raw data files and Microsoft Access™ database files for each State surveyed. The Access databases contain a reporting tool (the EVALIDator-PC) that allows the user to generate reports. In FY 2010, users downloaded 2,014 State databases in Access files. In FY 2011, users downloaded 3,033 State data sets. The sharp access drop in FY 2012 was the result of the transition of FIA database (FIADB) to the new Forest Service centralized servers in Kansas City. Online data access resumed normal levels in 2013 and is expected to continue to increase.

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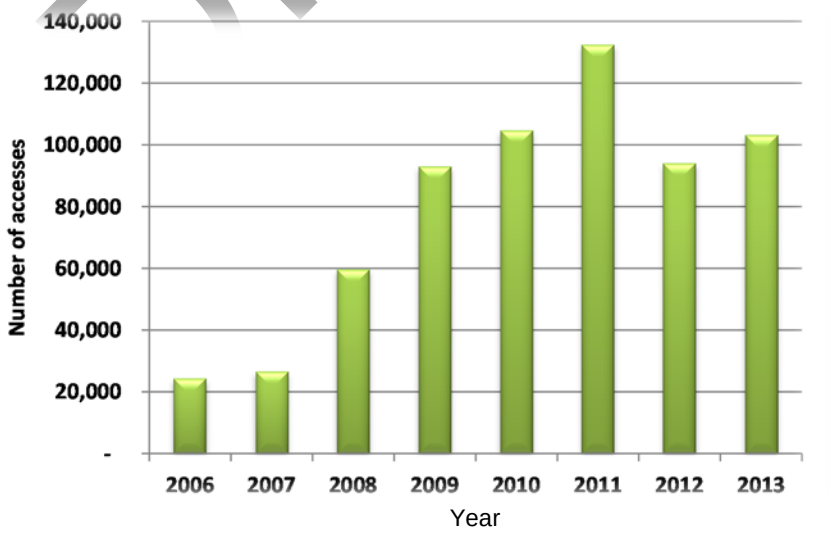

FIGURE 2.—Annual total online accesses of FIA data since 2006.

- Develop and document a suite of spatial tools and products (forest cover maps, volume/biomass maps, fire, and other risk maps). Over the past several years, FIA leaders have worked closely with NFS and S&PF colleagues inside the agency, and researchers with similar interests at NASA, USGS, numerous universities, Canadian and Mexican agencies, and the United Nations Food and Agriculture Organization, to plan and implement several studies that hold high promise for improving our individual and collective abilities to map forest attributes as well as detect, characterize, and forecast land cover changes. A number of national collaborative projects are well underway that illustrate FIA's progress in this arena.
    - The **Monitoring Trends in Burn Severity** project has mapped the severity, size, and other attributes of wildland fires nationwide using LANDSAT data from 1984 to present.
    - The **North American Forest Dynamics** project extends this work to include all disturbance types for the purposes of tracking carbon consequences of historic forest disturbance.
    - The **Land-Fire** project is also updating its nationwide vegetation, fuel, and Fire Regime Condition Class map products in response to forest disturbance agents.
    - The **Landscape Change Monitoring System** ties the activities in the former three projects together to build a comprehensive system meeting Forest Service and partner needs.
    - The **2011 National Land Cover Database, Tree Canopy Cover Project** is producing updated geospatial data for the conterminous United States, coastal Alaska, Hawaii, Virgin Islands, and Puerto Rico.
    - The **Forest Resource Assessment 2010 Remote Sensing Survey** uses satellite remote sensing to improve information on global tree cover and forest land use.
    - The **Forest Carbon Management Framework** system tracks movement of carbon among several pools, including: the atmosphere, ecosystems, forest products, and fossil fuels burned during forest management.
    - The **Image-based Change Estimation** project uses aerial photo interpretation as the data source for a straightforward approach for estimating land cover and land use change information.
    - The **Forest Atlas of the United States** project has resulted in a methodology for dynamically producing a large number of national maps of tree and forest attributes by linking the FIA database of collected and compiled plot information with moderate resolution raster data.

The next items were exploratory and viewed as pilots to make sure we could accurately assess the cost and resources necessary to carry them out if they became part of the FIA mandate. They were not designed to be operational under the budget constraints of the previous plan.

- **Continue to explore urban, rangeland, and other wooded land monitoring opportunities.**
    - ***Urban forest initiatives*—**Five-year pilot studies to sample trees within all urban areas in Colorado and Tennessee were conducted. The Tennessee Department of

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Agriculture, Division of Forestry collaborated with the Forest Service's Southern Research Station FIA unit. The Colorado Forest Service collaborated with the Forest Service's Rocky Mountain Research Station FIA unit. In addition to these primary partnerships, the Urban Forest Research Unit of the Forest Service's Northern Research Station in Syracuse, New York and regional Community Forestry Programs were instrumental in planning and evaluating urban landscape monitoring. Other tests occurred in Indiana and Wisconsin. The Forest Service's Pacific Northwest Research Station FIA program implemented urban inventories in Alaska, California, Hawaii, Oregon, and Washington with grants from the American Recovery and Reinvestment Act.

- ***Rangeland initiatives*—**FIA crews have measured on-grid/on-panel non-forest plots in NFS Region 1 and Region 4. These are plots that would not have been visited for the base FIA sampling. Over the past 5 years, FIA crews have installed plots in the Dakota Grasslands. FIA provides setup, training, and quality control, as well as project management.
- ***Other wooded land activity*—**FIA has expanded its ability to monitor trees and woody vegetation in non-forest areas in several ways. To begin, scientists from FIA's National Inventory and Monitoring Applications Center worked with State forestry agencies in Kansas, Nebraska, North Dakota and South Dakota on a project called the Great Plains Tree and Forest Invasives Initiative. One objective of the Forest Invasives Initiative was to characterize the non-forest tree resource via inventory. FIA's National Inventory and Monitoring Applications Center and other FIA staff helped design the inventory, train and equip field crews, process the data, and create a reporting tool. Results are being used to supplement FIA data from forested areas to get a more holistic view of the tree resource in these predominantly non-forest States.

FIA has expanded its ability to collect vegetation information in non-forest areas by designing, pilot testing, and beginning implementation of a new variable on land cover. This variable will be measured on all plots and is meant to complement existing FIA data, including data on land use. The classification system includes vegetation types such as agricultural, developed, and shrub land and grassland, and thus will provide information on vegetative land cover outside of areas typically measured by FIA. FIA has also developed several new remote sensing tools that will aid in monitoring vegetation on all lands. Tools include a rapid photointerpretation protocol that was pilot tested in Maryland, and will be tested in various locations around the country as part of a land cover monitoring study.

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A STRATEGIC PATH FORWARD

This strategic plan is forward looking and balances emerging client demands for new information, tools, and opportunities, as outlined in the 2014 Farm Bill. This new FIA strategic plan has been developed in cooperation with partners and stakeholders. In this joint effort with our partners and stakeholders, we have:

- Held regional and national meetings to get client input on three successive drafts.
- Reviewed program progress on goals/targets of the previous plan (including pilots and studies of new directions from the previous plan).
- Identified major issues that will affect future resource monitoring, including the legislative language in §8301 of the 2014 Farm Bill.

This plan identifies a new base program to better serve client interests, priorities for new program areas, and areas for increased flexibility. Supporting information regarding the budget and organizational structure are also provided.

Overview of the Next Generation FIA Program

Much of the success of delivering the FIA program rests on five key features.

- ***National Core Program Elements—***Core program elements are broader than core variables and define the basic components of the FIA program. The following is a brief list of the implementation dates of major elements that are considered core to the FIA program.
    - Fieldwork begins 1930
    - State reports begin 1935
    - Aerial photos (remote sensing) 1946
    - TPO 1947
    - NWOS 1953
    - National standard definitions, variables, and outputs 1967
    - Forest health indicators 1989
    - National online data access 1994
    - Annual inventory begins 1999

- ***National Core Variables—***Core variables at various levels—national, regional, and local— ensure that program data are flexible and value-added (Figure 3). The FIA program continuously reviews core variables—including the NWOS and TPO—for consistency and application as part of the base FIA program. Changes in data or procedures are vetted through a rigorous change management process and posted to the FIA national website. All core data, except precise plot coordinates, are available to the public via online access tools developed by FIA. Generic plot coordinates (within 1,000 meters) are included in publicly available data, and this precision is suitable for the vast majority of analyses.

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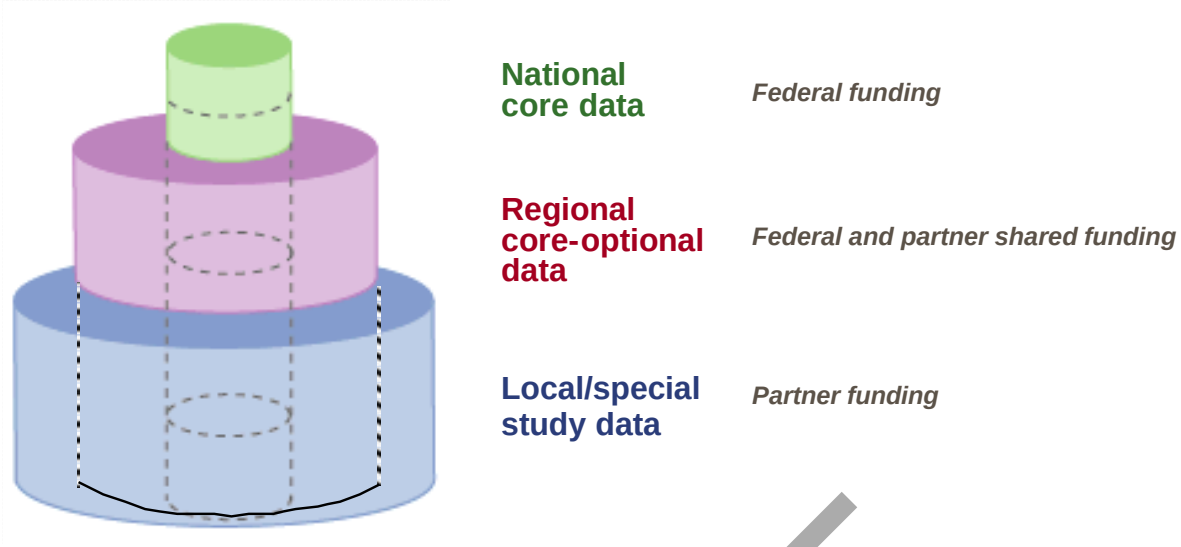

FIGURE 3.—National, regional, and local core variable funding responsibility

- ***Consistency***—The FIA program maintains consistency through well-documented, peer-reviewed, definitions and protocols for data collection, estimation, and reporting methods. FIA also maintains the National Information Management System (NIMS) for managing all field-sampled data and supports a web-based data compilation and analysis engine to enable users to access data and produce results in a consistent manner across the country, including support of regional data to meet the needs of partners and customers.

- ***Information Availability***—The FIA database (FIADB) contains a full suite of the most recent data for all States. FIA information is also loaded into the National Forest System's Natural Resource Information System to make data readily available to national forest managers. FIA will continue to focus on loading each year's field data within 6 months of the end of the field season, as posted in the *Federal Register* (2005). At the end of FY 2013, information less than 2 years old was available in an online FIA database for 49 States (http://fia.fs.fed.us/tools-data/data/). Ownership survey results and primary forest product information will also be added to the full suite of online data in the coming 5 years. The success of making FIA data available openly and transparently to governmental and non-governmental users since the 1990s significantly pre-dates recent initiatives like Data.gov. Dialog with FIA data users indicates that FIA data now need to migrate to a cloud-based e-library of information layers. The current information architecture of serving data to users from a "server farm" environment inside a Federal agency firewall is preventing users from making the most use of FIA data and preventing the agency from leveraging analytical investments by university, State, and NGO partners in geospatial analyses. This shift from server to cloud is among the very highest priorities for program stakeholders. Surmounting existing administrative barriers to this transition is, therefore, one of the top priorities of FIA program managers over the next year.

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- ***Accountability—***Each year, the FIA program publishes an Annual Business Report that describes in very open and transparent ways basic information about the annual activities of FIA: current year's accomplishments, performance measures, budget and staffing data, program changes, and planned accomplishments for the upcoming year. This report is distributed to all interested customers and partners, and is made available on the FIA website at http://fia.fs.fed.us.

OPTIONS FOR IMPLEMENTING THE 11 ELEMENTS IN THE 2014 FARM BILL

Each of the 11 elements listed in §8301 of the 2014 Farm Bill would require changes to operational procedures, staffing, and funding compared to the FY 2014 program. Analyses of the individual additions revealed that some cost savings and program operational efficiency could be obtained by grouping selected elements together for implementation purposes. Further, §8301 asks the Secretary to revise the previous FIA Strategic Plan prepared in response to the 1998 Farm Bill (16 U.S.C. 1642(e)). That previous bill asks the agency to identify any resources that would be needed in excess of the amounts provided for the FIA program through recent appropriations Acts to implement the elements identified in the plan, so this revision also complies with that 1998 language. It must be noted that the normal channel for developing and evaluating alternative future funding levels for agency programs is the Administration's regular budget development process. The 2014 Farm Bill requests information from the agency outside of that normal budget development process. Identifying the resources to implement any of the elements should not be interpreted as an agency recommendation or a statement of need. A detailed explanation of funding needs will be provided through the regular budget development process.

A summary of the staffing necessary to implement the 11 elements is presented in this section as six options, Tables 2 and 3. Option A, the current FIA program, satisfies none of the elements. Option B partially satisfies the element (1) with a 7-year re-measurement cycle in the East and a 10-year cycle in the West (the target cycles Congress agreed to after a 1999 hearing). In contrast, Option D satisfies element (1) with a 5-year cycle nationwide (the original 1998 Farm Bill target). The other 10 elements are clustered to take most efficient advantage of the program infrastructure and capacity efficiencies created through joint implementation. The incremental staffing estimates presented for Options B-F are only estimates and will be further refined through the Administration's regular budget development process, Table 3.

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TABLE 2.—Crosswalk of 2014 Farm Bill elements to FIA program strategic plan options

Farm Bill §8301 sub-paragraph number	Farm Bill text	FIA Strategic Plan Option
(1)	Complete the transition to a fully annualized forest inventory program and include inventory and analysis of interior Alaska.	B, D
(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.	C
(3)	Report information on renewable biomass supplies and carbon stocks at the local, State, regional, and national level, including by ownership type.	C
(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.	E
(5)	Improve the timeliness of the timber product output program and accessibility of the annualized information on that database.	C
(6)	Foster greater cooperation among the forest inventory and analysis program, research station leaders, and State foresters and other users of information from the forest inventory and analysis.	E
(7)	Promote availability of and access to non-Federal resources to improve information analysis and information management.	E
(8)	Collaborate with the Natural Resources Conservation Service, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, and United States Geological Survey to integrate remote sensing, spatial analysis techniques, and other new technologies in the forest inventory and analysis program.	E
(9)	Understand and report on changes in land cover and use.	C
(10)	Expand existing programs to promote sustainable forest stewardship through increased understanding, in partnership with other Federal agencies, of the over 10,000,000 family forest owners, their demographics, and the barriers to forest stewardship.	C
(11)	Implement procedures to improve the statistical precision of estimates at the sub-State level.	F

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TABLE 3.—Staffing for the six implementation options presented in this strategic plan

Option	Label	Total staffing	Federal staffing	Federally funded partner staffing	Partner funded staffing	Partner staffing
		(FTEs)*				*(percent)*
A	Current Program	550	368	182		33
B	Full 1998 Farm Bill	598	395	203		34
C	National Core Program	689	420	269		39
D	National Five-Year Cycle	779	444	335		43
E	2014 Farm Bill Top 10 Elements	810	454	356		44
F	National Five-Year, Double-Intensity Sample	1,080	454	356	270	58

** FTE = Full Time Equivalent*

The items grouped within these options and the increments in Tables 2 and 3, and described in greater detail in Appendix B, Table B-1, are the result of deliberations and review by over a dozen user groups including the National Association of State Foresters, Society of American Foresters, Southern Group of State Foresters, Western Conference of State Foresters, National Alliance of Forest Owners, American Forest and Paper Association, National Council for Air and Stream Improvement, and Regional User Groups made up of State, University, non-governmental organizations and concerned citizens.

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Option A–Current program

The funding level of $66.8 million was the amount appropriated for FY 2013 and 2014 and also the amount proposed in the President's Budget for FY 2015. The program activities that comprise this option are fully described in the FY 2013 FIA Program Annual Business Summary and the Budget Justification that accompanied the submission of the President's Budget. Highlights are:

- Continuing field surveys of forest lands at 10 to 12 percent of the plots annually in each State in the East (down from the 15 percent target from the 1998 strategic plan) and 8 to10 percent of plots annually in each State in the West (down from the 10 percent target in the 1998 FIA strategic plan), as well as some periodic surveys of Hawaii and the U.S.-associated islands.
- Continuing to provide online data within 8 months of completing field work and preparing scheduled 5-year State reports.

- Testing for one-year inventory field work in interior Alaska in partnership with NASA, and reducing inventory field work in coastal Alaska for one year to free up funds for the interior Alaska pilot. See Option B for full implementation of interior Alaska.
- Continuing monitoring TPO through primary mill surveys.
- Continuing the NWOS to determine the goals and objectives of private forest landowners and to summarize this information to inform policy decisions at the State and county levels.
- Continuing to conduct research in remote sensing and other areas to improve monitoring quality and cost-efficiency.
- Continuing to provide public access to our data and enable customized individual analyses using high-quality, peer-reviewed, online tools.
- Continuing to work with our partners to allow them to leverage the program to get critical local resource information.

Benefits of this option, including testing inventory field work in interior Alaska

This option represents what has been proposed in the FY 2015 Budget Justification and provides contemporary data on forest stocks and condition. The data provide critical information to managers of national forests and national grasslands, State forestry agencies, Federal and State policy makers, corporations, consultants, researchers, environmental organizations, land managers, media, and anyone interested in reliable, current forest data. At this funding level, the emphases of the FIA Program will support policy dialog about estimates of forest carbon stocks, fire risk assessment, planning of bioenergy systems, and analyses of wildlife habitats, particularly for large, migrating ungulates. Other benefits obtained include evaluation of wildlife habitat conditions for selected species (e.g., elk in Montana), assessing sustainability of current and anticipated ecosystem management practices, monitoring forest health, supporting planning and decision-making activities undertaken by public and private enterprises, and anticipating climate change impacts to forests. FIA for interior Alaska has not been implemented beyond FY 2014's pilot test because of the high cost of getting to plots across a vast landscape with few roads. The pilot test gave the State Forester and regional FIA program leaders some experience to develop a more accurate estimate of what it would actually cost to fully implement field work there. If the program were implemented there, it could offer a range of benefits to rural Alaskan communities, including seasonal employment opportunities and information that state, community, and Tribal leaders could use for local resource management to support key wood uses (e.g., biomass energy generation to replace expensive fossil fuels) and habitat management for migrating ungulates important to Native Americans (e.g., woodland caribou).

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Option B–Full implementation of the 1998 Farm Bill's strategic plan

This option completes the commitments of the FIA program strategic plan prepared in response to the 1998 Farm Bill. The cost of Option B is $12 to 16 million above the FY 2014 funding level (Option A). This would maintain the quality and coverage of the current program and include the following:

- Continuing field surveys of forest lands at 20 percent of the plots annually in the East and 10 percent of plots annually in the West in each State, as well as timely periodic surveys of Hawaii and the U.S.-associated islands. It will ensure that online data are current and that State reports are prepared every 5 years.
- Implementing a continuing inventory of both interior Alaska and coastal Alaska.
- Continuing monitoring of TPO through primary mill surveys.
- Continuing the NWOS to determine the goals and objectives of private forest landowners and to summarize this information to inform policy decisions at the State and county levels.
- Continuing to conduct research in remote sensing and other areas to improve monitoring quality and efficiency.
- Continuing to provide public access to our data and enable customized individual analyses using high-quality, peer-reviewed, online tools.
- Continuing to work with our partners to allow them to leverage the program to get critical local resource information.
- Building out analytical capacity at all locations.

Benefits of this option

This option provides benefits similar to Option A, but fully achieves the re-measurement cycle objectives set by Congress in report language following a hearing on the strategic plan created in response to the 1998 Farm Bill (16 U.S.C. 1642 (e)). Those cycles were a 7-year annual inventory cycle in the East (which State partners could buy-down to a 5-year cycle by contributing money or in-kind support as most did) and a 10-year cycle in the West. Benefits of more frequent inventory cycles include more accurate and up-to-date estimates of carbon stocks and fluxes sought by the Administration to inform policy making, more timely and accurate forest biomass and fuel load estimates critical to fire hazard risk ratings (Land-Fire project), and improved estimates of the size, speed, and causes of changes in land uses and forest conditions.

Option C–National Core Program

This option maintains all items in Option B, and adds an additional cost of $17 to $25 million above Option A in total funding. The increase in funding would leverage an increase in partner contributions. Option C adds five elements from the 2014 Farm Bill, Table 2, and captures all the possible efficiencies from implementing them jointly with Options A and B.

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- Adds a strategic urban forest inventory to the FIA program to provide seamless landscape- scale data for the wildland urban interface (element (2)).
- Develops reports on renewable biomass supplies and carbon stocks and multiple spatial scales, including by ownerships category (element (3)).
- Annualizes the TPO monitoring system, better covers the secondary manufacturing industries using wood (e.g., furniture making), and improves online access tools for FIA data (element (5)).
- Expands remote sensing research to improve monitoring of land cover and land use at finer geospatial scales (element (9)).
- Enhances the NWOS to determine the goals and objectives of Timber Investment Management Organizations and Real Estate Investments Trusts and improves online tools for analyzing forest ownership information (element (10)).

Benefits of this option

The stewardship of our Nation's rural forests is supported by a steady stream of comprehensive, consistent, and current information about their health and condition, delivered annually across the Nation by FIA. The lack of cohesive strategic-level coverage that includes forests in urban areas has created an information void that challenges the stewardship of our Nation's overall forest landscape. A particularly vexing problem is estimating and interpreting land use changes—forest to urban—and associated forest cover changes at finer geospatial scales. In discussions with State and community officials and leaders, they believe that the most efficient way to fill the void is to leverage current investments in the FIA Program and extend the FIA sampling frame across urban forests. This expansion would make urban forests—and the State Foresters and community foresters responsible for them—beneficiaries of the same steady flow of strategic-level resource information about current health and condition, past trends, and future potential that rural forests receive, and create a seamless inventory that spans the rural to urban gradient. This new urban monitoring effort would be complementary to existing regional and local urban efforts to provide a cohesive picture of the urban forest conditions in the United States and be particularly responsive to Secretary of Agriculture Thomas J. Vilsack's priority to take an "all lands" approach in USDA programs. Wood harvested in urban areas is also an important contributor to woody biomass energy production and to creating jobs in local secondary wood products manufacturing firms, so implementing these four elements together would enable more comprehensive and complete understanding of changes in land use, landowner attitudes, and wood use than possible with previous options.

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Option D–National Five Year Cycle

The option maintains all items in Option A, B, and C plus the following two elements from the 2014 Act. The cost to implement Option D is estimated at $32 to $37 million above Option A. Option D fully implements the sampling intensity and frequency—20 percent of all plots annually in all 50 States—stated in the 1998 Farm Bill, *"(B) Sample plots.--For purposes of preparing the inventory for a State, the Secretary shall measure annually 20 percent of all sample plots that are included in the inventory program for that State."* (element (1) fully implemented).

Benefits of this option

Expanding the program to re-measure 20 percent of the plots in every State (including islands and territories) would significantly increase the timeliness and specificity of information about forests in the western United States. Although the report language from 1999 provided the flexibility for western State foresters to accept a longer inventory cycle (10-year cycle instead of the 5-year cycle requested in the 1998 Farm Bill), program implementation over the past 14 years has revealed that the pace of changes occurring in western forests is faster than previously thought, leading to growing interest in faster re-measurements. These changes include the frequency and intensity of wildfires, the greater extent of insect mortality, and the frequency and intensity of recent drought events—all of which have made forest health conditions more fragile in many areas. Further, rapid population growth around some western cities and towns has led to faster and larger land use changes (e.g., forest land use to developed land use) that have widespread implications for the ecosystems services provided by forests. Further, policy options under consideration for reducing carbon emissions and expanding reliance on forests to sequester more carbon from the atmosphere are leading clients and stakeholders to want additional, timelier information about forest health and productivity that are fully comparable across the entire country.

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Option E–Implementation of 10 of the Elements Proposed in the 2014 Act

Option E adds four elements from the 2014 Farm Bill to improve collaboration with clients and stakeholders in delivering the program, which together would cost an additional $38 million to $41 million above Option A.

- Engage State Foresters and others in re-evaluating core data needed (element (4)).
- Foster greater cooperation between the FIA program and key clients (element (6)).
- Expand research on emerging technologies with the Natural Resources Conservation Service, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, and the Geological Survey to integrate remote sensing, spatial analysis techniques, and other new technologies into the FIA program (element (8)).
- Improve use of non-Federal resources for information analysis and information management element (7).

Benefits of this option

This option would provide additional funding to the FIA program to expand work with the listed Federal agencies that have program elements that could improve the quality and utility of FIA information. For example, more work with NASA and NOAA would improve the use of remote sensing tools, including the development of new satellite-based and airplane-based sensors that will provide more geo-spatial detail about forest conditions—both in wildland and urban areas. It would also enhance the ability to understand the real-time impacts of fires and droughts on forests. The emphasis on using non-Federal resources to improve information analysis and information management is a call to move FIA data and analytical applications to "the cloud" where clients and stakeholders can gain better access to the information and store information products they develop that use both FIA and non-Federal information. Current Federal information system security policies make it impossible to bring information products developed by FIA clients and stakeholders into Federal computer networks and initiatives such as Data.gov. Core data variables were evaluated several years ago, and this is a lower priority element. Building additional cooperation among clients and prospective partners makes sense in this option because of the increased work with other Federal agencies.

Option F–Implementation of All 11 Elements Proposed in the 2014 Act

This option implements the final element mentioned in the 2014 Act—improving the statistical precision of estimates at the sub-State level. In dialog with the FIA user community while preparing this strategic plan, their consistent feedback was that the small-area estimation item in the legislation meant—to them—a double-intensity sample (one plot per 3,000 acres instead of the normal one plot per 6,000 acres), so this option was developed to include the funding and staffing requirements to deliver that change. Because the primary beneficiaries of this option are state and local governments, the funding of $25 to $27 million for the final increment proposed in this plan would come almost exclusively from partner contributions.

Benefits of this option

The benefits from this option flow largely to non-Federal users. Therefore, this option proposes that this element be funded 100 percent by FIA program partners and beneficiaries. For example, over the past decade, the State Forester of Minnesota has provided 100 percent of the funding needed for higher intensity sampling there. So, this option mirrors that approach to funding this element. Currently, the State Foresters of Minnesota, Wisconsin, and Michigan, along with the Forest Service Regional Foresters in Regions 8 (Southern Region) and 9 (Eastern Region) are each paying for double-intensity samples across their States and national forests to get better estimates at smaller sub-State scales such as counties and individual national forests.

Implementing this option nationwide would enable all States to improve their natural resource planning activities (e.g., State Forest Action Plans and State Wildlife and Fish Action Plans). It would also empower forward-thinking local governments to develop better

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county-level master plans that support sustainable development and forest preservation programs. An excellent example of this approach is Baltimore County, Maryland, who worked with local FIA experts to develop a sustainable forest plan complying with the "no-net-loss" of forests mandate passed by the Maryland State Legislature.

OPPORTUNITIES WITHIN THE OPTIONS

Embedded within all of the options are opportunities to enhance program capacity to deliver the highest quality service to our clients and the public at the most efficient cost. The amount of integration of the following items will vary depending on appropriation levels and, thus, are not attached to any particular option.

Increase Analytical Capability—This priority underpins the future success of FIA in implementing the Farm Bill requirements. Although FIA currently invests approximately 20 percent of its budget in compiling and analyzing information, clearly more could be done to increase the timeliness and quantity of high-quality analysis. Such an investment will yield specialized reports related to carbon sequestration, forest health, wildlife habitat, customer-specific analyses, and increased numbers of spatial analyses and map products. This work will be accomplished through a combination of in-house analysts and cooperative agreements or contracts with universities, States, and other qualified analysts. The goal is to achieve this increased capacity through efficiencies gained in other areas of the program. Increased analysis and research partnerships would focus on:

- Land use change: where and why forest land is changing to other uses and vice versa.
- Attribution of disturbance and management impacts on carbon storage, forest structure, and composition.
- Species distribution changes related to changes in weather patterns, land management, and disturbances.
- Evaluating alternative management strategies, their costs, and benefits for forests and communities.
- Understanding ecological interconnections among trees, vegetation, soils, down wood, disturbance, pollutants, and other site characteristics.
- Enhanced support for the Resources Planning Act Assessment, which provides periodic national assessments of the Nation's current and predicted future resource conditions (Section 3 of the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378, as amended)).
- Ecosystem services beyond the traditional value of wood harvested.

Invest in new technology—Integrating new technologies is critical to the efficient delivery of the FIA program. Remote sensing technology offers the greatest opportunity to leverage FIA field samples to provide information of significantly greater value than either approach individually. FIA could pursue new opportunities to cooperate with the Forest Service Remote Sensing Applications Center, the National Aeronautics and Space Administration, the National Oceanographic and Atmospheric Administration, the United States Geological Survey and

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others with significant remote sensing investments to deliver higher value products. FIA has a preeminent position in all Federal efforts to inventory and monitor forest resource conditions at the regional and national levels and in innovative uses of remotely sensed data to improve the number of products, the quality and timeliness of those products, and their cost-effectiveness.

Strengthen Partnerships—The FIA program has always been based on partnerships. Within the Forest Service, FIA exists as a partnership among three branches of the Forest Service, including Research and Development, which provides the overall leadership and management of the FIA program; the National Forest System; and State and Private Forestry. Additionally, a variety of external partners provide funding or in-kind support to increase the efficiency and quality of the program. State forestry agencies are the principal partners, taking an active role in data collection, analysis, and facilitating contacts with landowners (Figure 4). Universities provide technical assistance in data analysis, reporting and research aimed at improving FIA operations and scientific relevancy. FIA also has worked closely with NatureServe and the Ecological Society of America to develop the National Vegetation Classification System to provide Federal Geographic Data Committee-compliant classification of field data. FIA works with the Conservation Biology Institute to develop reliable spatial files and maps of protected areas compliant with the International Union for Conservation of Nature's classification. Maintaining and expanding these relationships is critical to FIA credibility and success.

Although these partnerships have been extremely important to the success of the FIA program, we propose to identify additional opportunities to improve relationships. FIA proposes to increase partner analytical capacity. This could include improved and clarified knowledge of FIA documentation, expanding knowledge of FIA on-line database query tools, and increasing the scope and number of FIA training sessions for partners and cooperators, and incorporating cloud technology.

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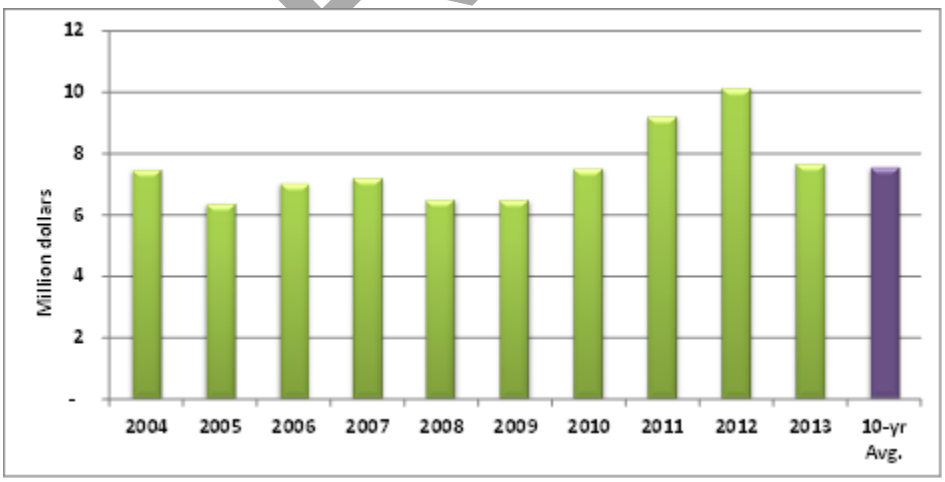

FIGURE 4.—State contributions to support the FIA program, 2003 to 2013

Our National Forest System partners value FIA as the most viable national program to implement a number of their inventory and monitoring needs. Those needs include a strategic vegetation inventory on all NFS lands, regardless of forested status, and additional support for the 2012 Land Management Planning Rule for NFS. We will provide increased spatial or temporal intensification of measurements and the measurement of additional attributes that would help meet NFS information and business needs. And, we will expand our current program through the National Inventory and Monitoring Applications Center to deliver customized data tools and reporting to assist in developing management plans and assessment of progress toward goals.

Improve Techniques Research—FIA will increase its capacity to conduct techniques research to improve how data are collected, analyzed, and disseminated. Potential research areas include improved sampling and estimation procedures, particularly at the sub-State levels; improved growth and yield models, improving and validation of site productivity models, better linkages to small area or tactical assessments, improved geospatial analytical tool development, and better mechanisms for making data and results available to the public.

Expand NWOS—Across the United States, there are over 10 million families, individuals, trusts, estates, family partnerships, and other unincorporated groups who own forest land. Understanding the attitudes, behaviors, and demographics of this important and dynamic group of owners will facilitate the creation and administration of better policies, programs, and services that meet the needs of the owners and help protect this valuable resource that provides multiple benefits to all of society. We propose expanding the capacity of the NWOS program to reach more of these landowners (e.g., TIMOs and REITs), improve the timeliness of the information, and provide more in-depth analyses and interpretation of the results. Full implementation of this item is heavily dependent on Option C funding.

Forest Products Research Center—Wood-using industries are an important component of the U.S. economy. For over 60 years, the FIA Program has been canvassing the primary producers of wood products to quantify the wood use in the United States through the Forest Resource Use component of FIA. The sustainability of forest resources to meet multiple demands (e.g., wood fiber production, carbon storage, and open-space for recreation) is rapidly being impacted by increased pressures from multiple, potentially competing, interests and uses of U.S. forests. Additionally, forests are frequently managed and harvested for a variety of specialty non-timber forest products, such as medicinal plants, traditional foods, and decorative plants (e.g., holly, mistletoe, and fir branches). Current FIA protocols focus on timber products and generally do not measure non-timber products, but sampling protocols could be added to quantify the status and trends in the amount and value of these products. In areas where there have been reductions in the harvest of timber products, increases in harvest of specialty products are often noted. New industries, many of them community-based and small-scale, would benefit from knowledge about the approximate distribution, quantity, value, and sustainability of such products. New jobs are often created through local firms like these. FIA would increase the capacity and national coordination of a new Forest Products Research Center with the goal of consistent, annual, online data availability that will increase our forest products monitoring and reporting capacity and expand the utility and consistency of the collected information. Full implementation of this item is heavily dependent on Option C funding.

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Enhanced carbon/biomass accounting—FIA has implemented an annual inventory in all States to support forest biomass and carbon estimation (excluding interior AK). These data are used in the U.S. National Greenhouse Gas Inventory, an annual estimate of forest carbon stocks and their change according to carbon pools. In addition, FIA data have been used for other non-commercial and commercial biomass supply and carbon stock assessments at local (e.g., county or multi-county), regional (e.g., State or multi-State), and strategic scales (e.g., national). The measurement techniques, estimation procedures, and database architecture have all been documented and made public. These data are publicly available both in raw field tables and are freely available to the public to summarize at State and county scales using on-line data tools.

We propose to expand efforts to improve techniques in monitoring and modeling, and explicitly documenting all U.S. forest carbon pools. This includes increased sampling, improved biomass estimation models for all carbon pools.

Increased Training for Online FIA Data Tools—FIA currently has a variety of on-line tools for the FIA data user to query FIA information such as FIDO, EVALIDATOR, FIA DataMart, and the NWOS and TPO online query tools. Many of these tools have self-guided functionality; however, the more complex queries often require higher levels of database skill. To more effectively serve the public and support higher level users, FIA would expand data user training sessions in classroom settings and through online software to conduct webinars for interested individuals. The goal is to offer more sessions for current and future FIA data-query tools and develop new multi-media training platforms.

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ADDING FLEXIBILITY TO ACHIEVE PROGRAM GOALS

The FIA program has a tiered system of data collection that emphasizes national consistency in core data but allows regional flexibility within sideboards to collect regional or special study data. The program vision for the next 5 years is to streamline and add flexibility to data collection and information management with the goal of providing maximum possible service within the context of available budgets. Increased flexibility will allow us to expand for regional and national initiatives where funded, or contract with budget reductions. To be more efficient, flexible and responsive to clients' needs, FIA is working on several fronts:

- **Information Management Efficiency**—Our national Information Management staff is working toward refactoring and redesigning national databases to improve computational efficiency and usability. At the same time, we are trimming duplication of effort among Information Management staff across four FIA units to allow additional time to meet data processing and posting requirements, implement new protocol flexibility, and to build consistent, better balanced databases and more user-friendly data-access tools. Looking forward, FIA leaders are also developing partnerships with global leaders in geospatial software development and "cloud" service providers to move FIA information into those environments. Leveraging their capacities is much more cost-efficient and will result in much faster transitions than attempting to develop duplicative and

redundant software tools in-house. This focus on expanding FIA program partnerships beyond data collection or techniques development to leading corporations whose business is analytics makes strong strategic sense because it best leverages available Federal investments, creates a broader portfolio of information products, and reaches a much bigger user community in the United States and globally than FIA could accomplish by itself.

- **Cycle Length Flexibility—**A period of static budgets has led to consideration of changing inventory cycle lengths. Current cycle lengths range from 7 years in the eastern United States (with buy-down to 5 years by state partners who contribute funds and people), to 10 years in the West. Clients have repeatedly expressed a preference to lengthen inventory cycles as opposed to reducing sample intensity. This has been FIA policy for over 50 years and will be maintained, absent any increases in funding. However, language in §8301 demonstrates Congressional interest in, and client support for, a 5-year cycle of field plot re-measurements (20 percent of plots annually) throughout the Nation. Should funding be increased over several years, FIA program managers would quickly ramp up field work through agreements with State partners and new contracts to both increase field work and to build additional information processing and analytical capacity.
- **Sub-setting Measurements**—FIA will continue to engage State foresters and our vast community of information users in reevaluating the list of core data variables collected on FIA plots, ensuring the data provide value-added information. Research will continue to investigate potential models for sub-setting measurements on trees, subplots, and plots. Evaluation of trade-offs between measurement error, estimation error, and the costs of measuring subsets of variables to determine the best course of action in sub-setting measurements will be ongoing.
- **Ecosystem Health Indicators**—The FIA Ecosystem Indicators are based on data collected on a sub-sample of plots on the standard FIA grid. The indicators provide information about soil characteristics, down wood volumes, understory vegetation composition, crown condition, ozone impacts, and lichen community composition, the latter an important response to air quality. Formerly, these were sampled on one plot of every 16 in the base inventory. In this new plan, FIA will evolve the Ecosystem Indicators suite to establish a minimum national core set of indicators for national reporting and provide each unit with the flexibility to maintain continuity of prior data collection efforts where needed, initiate streamlined protocols, or select from a minimum core set of *a la carte* national protocols that accomplish a mix of continuity, flexibility, and efficiency. Over the past 12 years, FIA units and clients across the Nation have collected these data at the same spatial and temporal intensity. Now, they are evaluating the information and its significance for making decisions and policies specific to local and regional needs. Because of the high unit cost of measuring some of these indicators, FIA regional program managers need greater flexibility to balance costs and benefits of continuing to collect some of these data. FIA leaders are working with partners and analysts to evolve a system of indicators that would allow each region to choose the spatial and temporal intensity of future data collection. Considerations include:

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- A minimum, national core set of Ecosystem Indicator protocols for regional and national scale analyses.
- Choice among current or reduced protocol sets for soils, down wood, crowns, lichens, ozone, and understory vegetation (including invasive species).
- Variable protocol levels, spatial intensities, and temporal intensities that are more adaptable to client needs and regional issues.
    - The choice to re-measure valued indicators to maintain continuity.
    - Flexibility to select indicator spatial intensities to allow enhanced response to regional client interest and budget.
    - Abbreviated protocols may offer the possibility of increased spatial plot intensity in exchange for reduced protocol detail or different indicator information.

- Improved data access tools that better tie past and current Ecosystem Indicator information to the entire FIA plot network.

LOOKING TO THE FUTURE–ALL LANDS MONITORING

The mission of the Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. FIA sees its role in this vision as providing the data and information on a full range of non-agricultural vegetated landscapes. We are realizing that our previous focus on forestland use is too narrow for today's resource management needs. Addressing many of today's complex natural resource issues requires a much broader landscape-level approach. No longer is it sufficient to just understand forestland use and its component parts, but we must now understand the juxtaposition of forestlands relative to neighboring land cover/use and the changes occurring across them to provide a realistic picture of what is happening on forestlands in both rural and urban settings. The expansion of our mission into these areas would provide the first comprehensive look at the Nation's non-agricultural vegetation cover in its entirety for the country, increasing our understanding of the interactions between component parts.

New opportunities for the program are those that are deemed consistent with the overall strategic goals of a resource monitoring program but not part of the current scope. These areas will require additional funding sources and client champions to accomplish if they are deemed appropriate for FIA. As part of a research organization, this is fundamental to the broader vision of FIA to be constantly looking to the horizon to be prepared for the future.

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We have already enhanced our all-lands perspective with remote sensing techniques that produce better estimates of land use and land cover beyond forests. This success is fully aligned with both Forest Service and U.S. Department of Agriculture strategic goals and objectives. With this new information, we now understand a more resolute picture of forest land losses or gains; we have improved our ability to project land cover/use change from past land cover/use and the consequences for forest land. We are better able to understand where carbon sequestration rates change most dramatically, and can better describe the spatial distribution of forests on the landscape at much finer scales than from the plots designated as forest use alone.

Looking to the future, just tracking land cover/use and changes in forest land area remotely is likely to be insufficient to account for the vast tree resources located outside of forestland that provide ecosystem services and societal benefits. Trees on non-forest lands still sequester carbon, clean the air, stabilize soil, filter water, supply wood, and provide habitat for a variety of creatures. Because of their intrinsic value, non-forest land trees need to be monitored and their contributions counted. The FIA sampling frame provides a marginal-cost opportunity to monitor these trees.

Expanding coverage to non-forest land use vegetation without negatively impacting coverage of the forestland inventory will require additional funding sources. The vegetation on non-forest lands can be clustered into constituencies of interest (e.g., urban, riparian, rangeland). These interest groups would benefit from and hopefully support an expansion of resource assessment. In time, through staged implementation, FIA would move from being a forest land inventory to being an "all lands" inventory (exclusive of agricultural land, which properly remains the responsibility of the NASS) that can provide a comprehensive assessment of the benefits and services of trees across a broad range of non-agricultural land covers and uses.

Below are other potential vegetation inventories envisioned for approximately 5 years out and beyond:

- ***USDA All-Lands Inventory***—There are two agencies in the U.S. Department of Agriculture with complementary visions and missions for reporting on the health and productivity of the Nation's agricultural assets—NASS and the Forest Service. Dialog between the national experts in NASS and FIA have concluded that it is possible to create an integrated set of regular inventories of the Nation's agricultural and forest lands that has no redundancy or duplication. Through such an integrated program between NASS and FIA, both agencies could report more clearly and consistently on transitions in land uses among agriculture and forest uses and with developed uses than either of us can report alone. Further, the integrated information that a USDA All-Lands Inventory could provide would be a boon to policy makers throughout the Federal and State departments of agriculture as well as State forestry and wildlife agencies. Although NASS and FIA are funded through two different appropriations bills, coordinated leadership amongst USDA officials and requisite funding and staffing support could make such an integrated All-Lands Inventory a practical reality by FY 2016.

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- ***All Non-Agricultural Lands Inventory***—The FIA program has considerable experience in data collection for other lands with trees and natural vegetation that do not fall into the traditional forest use definition. Knowledge of these lands and their cover are of critical importance to managers concerned with wildfire and fuel conditions. The new base program includes urban areas with tree cover that might otherwise be classified as forest, but does not fully cover the additional vegetated areas that would not be classified as forest. Examples of these additional areas include rangeland with its combination of sparse trees, shrubs, and grasses; shrub lands; wooded narrow riparian areas; windrows and shelterbelts; and other trees and natural vegetation that exist in situations that do not currently meet the definition of forest and that, therefore, are not currently fully sampled or only sampled in pilot situations. This strategic-level monitoring of these areas could track health, biodiversity, carbon sequestration, wildlife corridors and habitat, and fuel buildup. There would no longer be gaps in the nationwide monitoring of natural vegetation and their various associated ecosystems. This new inventory could be designed based on lessons learned from recent efforts such as the Great Plains Initiative inventory, Pacific Rim inventory, and years of monitoring areas of woody vegetation in the interior West that is particularly prone to wildland fire. An all-vegetation inventory and monitoring program is critical for NFS, BLM, and other agency planning and monitoring, as well as for providing a complete picture for national carbon and other resource assessments. The 2002 House Interior Appropriations Committee report included language directing the Secretaries of Agriculture and the Interior to collaborate in implementing a rangeland monitoring system. Several NFS Regions are already supporting some level of rangeland inventory through collaborative arrangements, and FIA has sampled perhaps 10 to 20 percent of the other wooded landscape. And, since 2001, FIA has collected valuable vegetation information on millions of acres of non-forest land with woody vegetation from west Texas to the Cascades. Much of this land was recently re-classified as non-forest as part of a more robust and inclusive classification system.

- ***Expanded National Forest Inventories***—National forests currently receive information from a single intensity sample of FIA plots as part of the core national program (a 7-year cycle in the East and a 10-year cycle in the West). To provide data of reliable accuracy at the forest scale for forest planning under the new Planning Rule would require a double sample. Having a double sample would significantly increase the value-added of data for national forests and offer increased opportunities to leverage special add-on studies at the forest level. By Congressional intent, all intensification such as that already implemented by more than 30 States, is partner-funded and partner-supported. And, partners are extended full participation in the inventory planning and implementation process. So, moving to a double-intensity sample on national forests would require specific direction in budgetary reports and bulls and supplemental funding from the appropriate NFS budget line item.

These areas have been proposed in previous strategic plans and monitored in pilot situations. But, they remain in the pilot stage pending broader support and funding. By mentioning them in this strategic plan, we reiterate their importance to a fuller understanding of how landscape-scale

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ecosystems interact. The missing ingredient is not technological, it is merely "champions" willing to support and provide the resources needed to fully accomplish the task. Perhaps one of the most significant drivers for this expansion relates to wildland fire and the need for timely information on fuel buildup and the ability to more accurately summarize the impacts effects of wildland fire on the landscape and resource.

CLOSING COMMENTARY

Periodic requests to prepare new strategic plans are welcomed by Forest Service R&D and FIA program leaders. Requests with deadlines create opportunities for focused and intensive dialog within the program and especially with partners, clients, and other stakeholders. The openness and transparency of this thorough review and exploration of future options contributes to program health and vitality. It also helps everyone understand the ramifications of alternative levels of investment in the FIA program and the expected outcomes associated with those alternative investment levels.

The opportunity to share this plan with others in the agency, Department, and with Congressional leaders is also welcomed in the spirit of openness and transparency about the possibilities envisioned by the legislative language and what the options mean to partners, clients, and stakeholders. May it be a catalyst for further dialogue about the future of the FIA program.

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Appendix A–Agricultural Act of 2014 (Farm Bill) Section 8301

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 Forest Inventory and Analysis 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 within 180 days of the passage of the law or before August 7, 2014.

AN ACT

To reauthorize agricultural programs through 2018.

113TH CONGRESS, 2nd SESSION (H.R. 2642)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) IN GENERAL.— SHORT TITLE.—This Act may be cited as the ''Agricultural Act of 2014''.

SEC. 8301. REVISION OF STRATEGIC PLAN FOR FOREST INVENTORY AND ANALYSIS.

(a) **REVISION REQUIRED.—**Not later than 180 days after the date of enactment of this Act, the Secretary shall revise the strategic plan for forest inventory and analysis initially prepared pursuant to section 3(e) of the Forest and Rangeland Renewable Resources Research Act of 1978 (16 U.S.C. 1642(e)) to address the requirements imposed by subsection (b).

(b) **ELEMENTS OF REVISED STRATEGIC PLAN.—**In revising the strategic plan, the Secretary shall describe in detail the organization, procedures, and funding needed to achieve each of the following:

(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 level, 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 timber product output program and accessibility of the annualized information on that database.
(6) Foster greater cooperation among the forest inventory and analysis 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, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, and United States Geological Survey to integrate remote sensing, spatial analysis techniques, and other new technologies in the forest inventory and analysis 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 over 10,000,000 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.

(c) **SUBMISSION OF REVISED STRATEGIC PLAN**.— The Secretary shall submit the revised strategic plan to the Committee on Agriculture of the House of Representatives and the Committee on Agriculture, Nutrition, and Forestry of the Senate.

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Appendix B–Farm Bill Implementation Funding and Staffing

Historic Funding

During the last 15 years, Federal appropriations for the FIA program increased incrementally to a high point of $71.8 million in FY 2010 (Figure B-1). In general, partner contributions to enhance the program have kept pace with Federal appropriations. And, in FY 2012 as Federal appropriations began to fall, declining partner contributions followed in FY 2013 (Figure B-2). Recent discussions with State partners indicate that the final tally of FY 2014 contributions will be below the FY 2013 level.

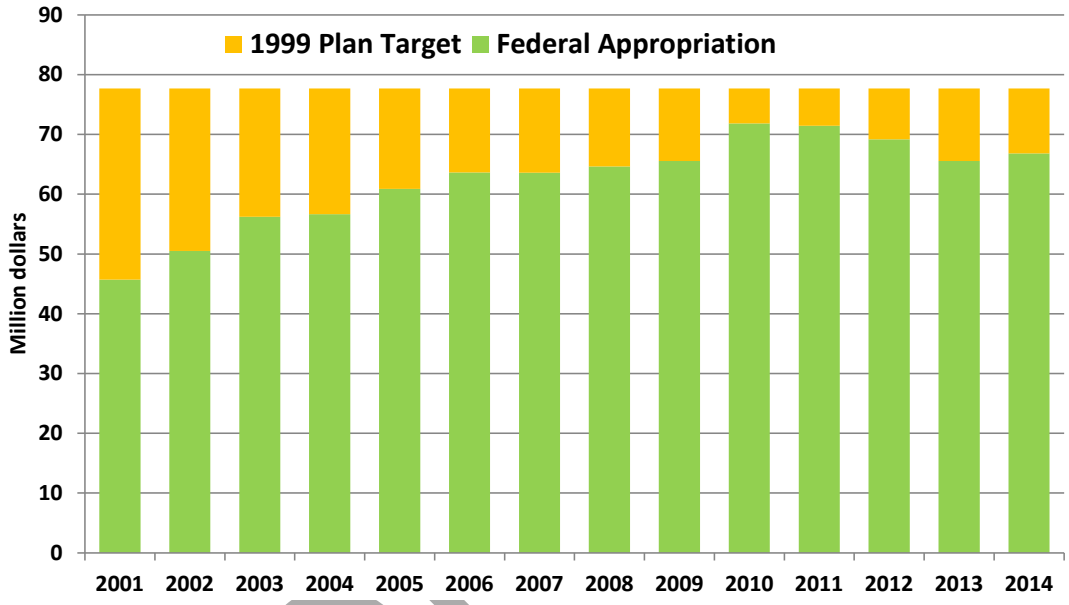

FIGURE B-1.—Appropriated Federal funds and funding target ($78 million) to deliver the 1999 FIA Strategic Plan's objectives.

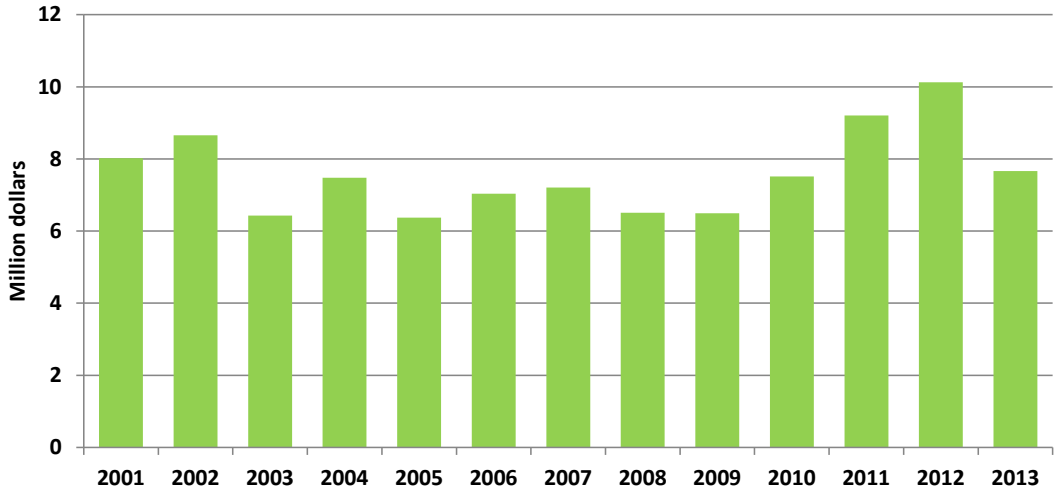

FIGURE B-2.—Partner contributed funds to support the FIA program.

The table on the following pages presents the detailed options for implementing the Farm Bill and the associated staffing needs (Table B-1). It further shows the portion of staffing that would be contracted through partners with Federal dollars to deliver the program as efficiently as possible.

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TABLE B-1.—FIA Implementation Options Based on 2014 Farm Bill Section 8301 Elements

Option	FB Ref.	Farm Bill Text	FIA Program Organization and Procedures	Proposed FIA Organization and Procedures	Cycle/Sample Intensity[1]	All staff	Federal staff	Partner staff	Added Federal staff	Added Partner staff	Partner staff
						(FTEs)					*(percent)*
A	**1**	Current Program	Implemented in 49 States plus coastal Alaska with basic analysis package at 90 percent of desired cycle due to budget cuts.	FY 2014 funding providing 10 percent reduced field level for 49 states and coastal Alaska plus basic products, ownership, and remote sensing work.	7 years East, 10 years West 1X intensity	**550**	366	184			**33**
A	**1**	Current Program+	Implement in 49 States plus coastal Alaska with basic analysis package at 100 percent of desired cycle.	Funding to bring program back to full operation on current cycle targets excluding interior Alaska.	7 years East, 10 years West, 1X intensity	**598**	397	201	31	17	**34**
B	**1**	Complete the transition to a fully annualized forest inventory program and include inventory and analysis of interior Alaska.	In 1999, FIA transitioned from a program that delivered periodic statewide inventories for 70 years to an annualized system that monitors every state every year. The annualized inventory is a two-phase design including remote sensing for stratification and mapping (Phase 1 or P1) and a sample of ground plots measured for basic forest data (Phase 2 or P2). Some P2 ground sample locations include integrated measures or indicators of ecosystem health (further details are available in the "added flexibility" section of this plan). Currently, FIA operates in all regions of the country and associated islands except interior Alaska.	FIA will add funding and staff to accomplish the baseline inventory work throughout Interior Alaska. FIA will work with other agencies and cooperators to explore the most efficient technologies to accomplish this inventory. FIA will add the funding and staff required to fully fund the analysis capacity originally envisioned in the first (1998) and updated (2007) FIA strategic plans. This additional capacity will enable us to reliably fund partners and contractors collaborating on field data collection, meet information management requirements, provide additional analyses sought by partners and stakeholders, and achieve performance targets for issuing State reports and making data available to the public. FIA will also enhance its suite of online applications and delivery tools to better serve users.	7 years East, 10 years West, 1X intensity **NOTE:** Periodic inventory designs are allowed for interior Alaska the Caribbean, and Pacific Islands and are to be developed in collaboration with these regions to better accommodate logistic and financial constraints.	**618**	402	216	5	15	**35**

[1] A sample intensity of 1X is one plot per 6,000 acres. A sampling intensity of 2X is one plot per 3,000 acres. All options except F have 1X intensity; F has 2X.

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TABLE B-1.—FIA Implementation Options Based on 2014 Farm Bill Section 8301 Elements

Option	FB Ref.	Farm Bill Text	FIA Program Organization and Procedures	Proposed FIA Organization and Procedures	Cycle/Sample Intensity	All staff	Federal staff	Partner staff	Added Federal staff	Added Partner staff	Partner staff
						(FTEs)					*(percent)*
C	**5**	Improve the timeliness of the timber product output program and accessibility of the annualized information on that database.	FIA has conducted Timber Products Output (TPO) surveys since 1947 on a periodic basis. But products such as pellets and renewable biomass are creating new monitoring challenges.	This new mandate would involve creation of a research staff within FIA to coordinate a more efficient monitoring and critical analysis of the timber as well as general forest products sector. Outcomes would include a regular survey of the forest products sector within each state with an annually updated database and user access tools to better understand the sustainability of renewable forest resource supplies and U.S. global competitive status. This effort will include collaborative research with universities and other partners to understand forest products life-cycle dynamics and relationships to the carbon cycle.	7 years East, 10 years West, 1X intensity	**623**	405	218	3	2	**35**
C	**3**	Report information on renewable biomass supplies and carbon stocks at the local, State, regional, and national level, including by ownership type.	Basic data collected in a consistent manner across all U.S. forested lands by FIA, coupled with new efforts to improve biomass estimation will allow FIA to report more precise forest carbon data annually to the Intergovernmental Panel on Climate Change (IPCC) and track both status and trends in carbon sequestration. Initial, but limited, work has begun with seven universities throughout the Nation.	Initial biomass estimation research studies to produce second-generation individual tree estimates are underway and will be accelerated in collaboration with several universities across the Nation and other partners. This intensive research will be the first such work in decades and will be critical to providing scientifically sound data to underpin national, regional and local estimates of biomass and carbon-including trends. The additional funding will accelerate completion 2 years sooner, broaden the coverage to more species, and improve the precision of the estimates and associated models.	7 years East, 10 years West, 1X intensity	**633**	407	226	2	8	**36**

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TABLE B-1. - FIA Implementation Options Based on 2014 Farm Bill Section 8301 Elements

Option	FB Ref.	Farm Bill Text	FIA Program Organization and Procedures	Proposed FIA Organization and Procedures	Cycle/Sample Intensity	All staff	Federal staff	Partner staff	Added Federal staff	Added Partner staff	Partner staff
						(FTEs)					*(percent)*
C	**10**	Expand existing programs to promote sustainable forest stewardship through increased understanding, in partnership with other Federal agencies, of the over 10,000,000 family forest owners, their demographics, and the barriers to forest stewardship.	The National Woodland Owners Survey (NWOS) to increase our understanding of private woodland owner's goals and objectives to underpin sound forest sustainability policies.	Plans to expand and improve information on TIMOs, REITs, and other corporate ownerships are part of this effort, increase sample size, and improve timeliness of reporting. Expand analysis of how to develop sound policies that ensure the sustainability of our Nation's private forest lands.	7 years East, 10 years West, 1X intensity	**636**	408	228	1	2	**36**
C	**9**	Understand and report on changes in land cover and use.	The ability to consistently track changes in land cover and land use across all landscapes is critical to resource reporting, projections, and analysis that underpin sound land management decisions.	FIA is implementing an image-based change estimation (ICE) protocol as a straightforward approach for monitoring land cover and land use change based on classification of National Agriculture Imagery Program (NAIP) imagery and field plots to determine where and how forests and other land covers/uses are changing over time. The process has been completed for Georgia, Colorado, and Washington. This collaboration with the Forest Service Remote Sensing Applications Center (RSAC) involves application of the protocol to all states, providing both status and trend information. This work will be critical to accurately tracking the carbon cycle and validating the many models currently used without adequate ground truth over large geographic areas.	7 years East, 10 years West, 1X intensity	**639**	410	229	2	1	**36**

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TABLE B-1. - FIA Implementation Options Based on 2014 Farm Bill Section 8301 Elements

Option	FB Ref.	Farm Bill Text	FIA Program Organization and Procedures	Proposed FIA Organization and Procedures	Cycle/Sample Intensity	All staff	Federal staff	Partner staff	Added Federal staff	Added Partner staff	Partner staff
						(FTEs)					*(percent)*
C	**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.	A strategic survey of the Nation's urban forest areas including data collection using standard protocols, compilation and analysis on a 5-year basis has been piloted in Colorado and Tennessee.	FIA will build upon its previous successes with pilot-scale work in Colorado and Tennessee—100 percent funded by the States—to implement a baseline inventory in all urban areas consistent and compatible with existing inventories in rural areas. Work will begin in FY 2014 with assessments in the Baltimore, MD, and Austin, TX, metropolitan areas and national expansion based on rigorous user evaluation of data and comments. This includes developing a seamless integration protocol with i-Tree to 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. i-Tree is a free public- domain model that uses sample or inventory data to assess urban forests.	7 years East, 10 years West, 1X intensity	**689**	420	269	10	40	**39**
D	**1**	Complete the transition to a fully annualized forest inventory program and include inventory and analysis of interior Alaska.	FIA currently implements a program of 15 percent of plots in the East and 10 percent of plots in the West annually based on available funding.	Increment to implement 20 percent of all plots in each state annually as per 1978 Research Act (PL 95- 307), Section 3 (e)(2)(B)	5 year nationwide, 1X Intensity	**779**	443	336	23	67	**43**

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TABLE B-1. - FIA Implementation Options Based on 2014 Farm Bill Section 8301 Elements

Option	FB Ref.	Farm Bill Text	FIA Program Organization and Procedures	Proposed FIA Organization and Procedures	Cycle/Sample Intensity	All staff	Federal staff	Partner staff	Added Federal staff	Added Partner staff	Partner staff
						(FTEs)					*(percent)*
E	**8**	Collaborate with the Natural Resources Conservation Service, National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), and U.S. Geological Survey to integrate remote sensing, spatial analysis techniques, and other new technologies in the forest inventory and analysis program	FIA continues to encourage research partnerships to improve resource monitoring methodologies that utilize FIA data to interpret and report on where and how forests are changing.	Projects within this arena include collaborations with NASA to inventory interior Alaska and work in the interior west to map historical disturbances. NOAA offers an opportunity to develop post-disaster damage estimates and evaluate opportunities for rapid resource assessments following weather events. FIA has also worked with USGS to improve LANDFIRE classifications and monitoring including the National Vegetation Classification System (NVCS). This research would include investigations of scientifically sound methods for conducting rapid assessments following disasters such as hurricanes.	5-year nationwide, 1X Intensity	**787**	445	342	2	6	**43**

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TABLE B-1. - FIA Implementation Options Based on 2014 Farm Bill Section 8301 Elements

Option	FB Ref.	Farm Bill Text	FIA Program Organization and Procedures	Proposed FIA Organization and Procedures	Cycle/Sample Intensity	All staff	Federal staff	Partner staff	Added Federal staff	Added Partner staff	Partner staff
						(FTEs)					*(percent)*
E	**7**	Promote availability of and access to non-Federal resources to improve information analysis and information management.	FIA provides compilation of all field data on an annual basis, made available on-line within 6 months of the end of the data collection for each year's data collection.	Meeting this mandate includes development of web-based tools to efficiently deliver data and information to the public in a timely manner. These tools are frequently more efficiently developed through contracting of Universities or other development entities within the private sector. When contracting with outside entities, FIA will meet the requirements of the Forest Service Information Resources Distribution Board (IRDB).	5-year nationwide, 1X Intensity	**796**	447	349	2	7	**44**
E	**6**	Foster greater cooperation among the forest inventory and analysis program, research station leaders, and State foresters, and other users of information from the forest inventory and analysis.	FIA continuously encourages cooperative analysis through State Forestry Agencies and other partners on a limited basis.	Support and work with State Forestry Agencies on cooperative analysis as part of the base program by leveraging State resources for additional dedicated analysis most relevant to individual States. Support and work with non-FIA scientists within the Research Stations as part of enterprise teams to collaborate and find new uses for FIA data and resource information. Support and work with NGOs and other organizations to improve resource monitoring and reporting for wilderness and other environmentally sensitive areas.	5-year nationwide, 1X Intensity	**808**	451	357	4	8	**44**

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Table B1 - FIA Implementation Options Based on 2014 Farm Bill Section 8301 Elements

Option	FB Ref.	Farm Bill Text	FIA Program Organization and Procedures	Proposed FIA Organization and Procedures	Cycle/Sample Intensity	All staff	Federal staff	Partner staff	Added Federal staff	Added Partner staff	Partner staff
						(FTEs)					*(percent)*
E	**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.	Core field measurements are collected in a consistent manner across all U.S.- forested lands and documented in official field guides on the FIA website. Changes are made through a formal change management process developed by FIA.	Core variables will be reviewed over the coming every 2 years as part of the field guide update and formal FIA change management process. Partners will be invited to participate and comment on these updates through the program's Management Team, technical bands, and regional user groups. The first phase of the review will focus on identifying demonstrated needs, including the successes that current stakeholders are having in using the information created by the core variables. During the second phase of the review, improved guidelines and protocols will be developed for the next field manual. This process will be critical as FIA expands into new areas and evaluates new variables and indicators that are relevant to analysis at the strategic scale. As FIA scope broadens toward all non-agricultural vegetation monitoring, the additional funding required will accelerate this process and extend the outreach and engagement to a broader spectrum of other users of FIA information.	5-year nationwide, 1X Intensity	**810**	452	358	1	1	**44**
F	**11**	Implement procedures to improve the statistical precision of estimates at the sub-State level.	Partners can leverage the FIA program to increase sample size to improve small area estimation for local planning. Research offers great promise to further enhance precision and improve the efficiency and delivery of sub-state estimates without incurring the additional cost of measuring more field plots beyond a 2X sample intensity.	The Lake States and several National Forests currently leverage FIA in this manner (currently over $2 million annually). This is only four to five cents per forest acre to double the sample. The base program and infrastructure averages 13 cents per forest acre, thus a leverage factor of more than 2 to 1 for intensification. ***This option is at full partner expense and the total noted is based on all states opting to intensify to a 2X sample.***	5-year nationwide, 2X Intensity	**1,114**	456	658	4	300	**59**

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Appendix C–Organizational Structure

Operational implementation of the FIA program occurs through four FIA research work units at the Southern, Northern, Rocky Mountain, and Pacific Northwest Research Stations. Beyond this, FIA has developed a "virtual" organizational structure designed to provide opportunities for collaborative decision-making among program partners, while respecting the decentralized nature of formal USDA Forest Service organizational structures. The national structure consists of the following three levels:

1. A Core Management Team (Figure C-1) is composed of four FIA research station program managers, plus the National FIA Program Manager and the NIMAC Program Manager.
2. A Management Team that is composed of four FIA regional Program Managers and Associates, the FIA National Program Leader and Associate, a national representative from Forest Health Monitoring, a national representative from NFS, a regional representative from NFS and three State representatives (one representative each from the North, South and West). The FIA National Program Leader chairs this team.
3. Four technical groups or "bands" (analysis, information management, data acquisition, and methods and techniques). Task groups are organized on an as-needed basis to resolve technical FIA issues.

Each level meets as needed to share expertise and develop and implement solutions across all program units. Further, regional management teams provide opportunities for communication and coordination within each FIA region.

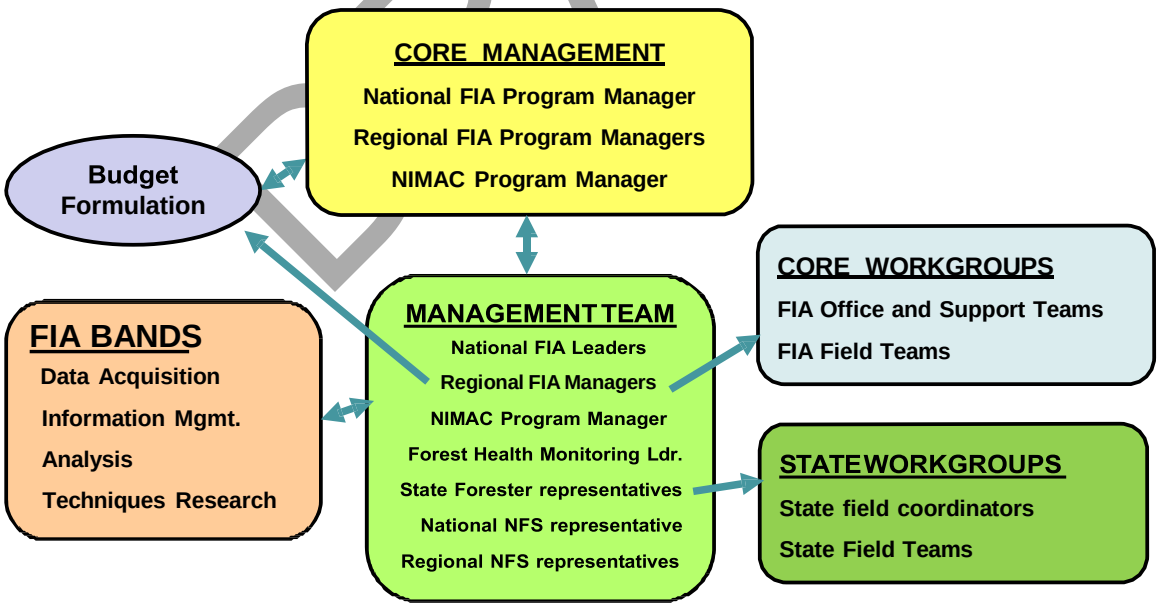

FIGURE C-1.–FIA management structure overview

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- **Distribution of National Roles to the Regional Units**—This Strategic Plan assumes that a nominal level of national staff provide support for national functions. In practice, FIA has found it practical to locate these resources wherever possible within field FIA units, and each FIA field unit accepts one or more national functions. Currently, the FIA program contains 11 major national activities: (1) FIADB, (2) NIMS, (3) the NWOS, (4) NRIS with NFS, (5) the National Assessment and RPA database, (6) national indicator advisors, (7) quality assurance coordinator, (8) FIA and CIO liaison, (9) a national FIA technical band coordinator, (10) a national TPO coordinator, and (11) a carbon accounting leader. These commitments are supported by an annual national allocation of funds that provides flexibility and allows for adjustment of commitments.
- **Efficient Staffing**—Over time, each FIA unit reassesses its needs and develops updated staffing plans based on the best current understanding of needs, and on an assessment of opportunities for using State and Federal partnerships throughout the program. Annually, between 10 and 15 percent of the FIA program is funded through partnerships, and 33 percent of the work is accomplished.

In establishing the base program, critical functions are necessary that include managerial and technical experts to produce a core set of nationally consistent compilation procedures, continuously updated databases available on the Internet, 5-year analytical reports, and a variety of other technology transfer assets, as follows:

- Maintenance, continuous improvement, and documentation of FIA web tools.
- Production of State-level analytical reports every 5 years, and periodic reports for the U.S.-affiliated Pacific and Caribbean islands that align with their sampling schedules.
- Maintenance and continuous improvement of population estimation approaches.
- Outreach to clients and partners to ensure timely delivery of needed products.
- Partnership investments to leverage FIA skills and resources.
- Researching and incorporating efficiencies from technological advancements.

The "bands" noted in the organization graphic are composed of both FIA and partner professionals who review and evaluate alternative strategies to resolve problems and make recommendations that support efficient solutions. Examples of specific goals and priorities for the bands include:

- **Techniques Research Band**—This band develops, tests, and documents sampling and estimation methods. These professionals routinely study fieldwork as part of a cost/benefit analysis to identify ways to improve efficiency and effectiveness.
- **Analysis Band**—This band produces the 5-year report template and compares core table requirements with the core manual variables for consistency. They review the implementation of the NWOS, develop options for integrating remote sensing products that add value, and provide a focal point for the addition of new attributes and indicators.
- **Information Management and Compilation Band**—This band is divided into three major subgroups:
    1) **Portable Data Recorder Team** to develop and maintain PDR software to meet core national needs.
    2) **Data Distribution Team** to develop the next generation of FIA data distribution tools.

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3) **Development Team** to develop and coordinate strategies for updates to NIMS, accommodate the operational use of remote sensing, and develop data distribution strategies.

- **Data Acquisition Band**—This band maintains documentation annually for our nationally consistent core field procedures through National Field Manuals http://fia.fs.fed.us/library/field-guides-methods-proc/.

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Appendix D–Brief History of FIA Legislation and Strategic Planning

The Organic Act of 1897 (16 U.S.C. 473), which established the national forests, included provisions for the inventory and management of these lands. Later legislation and strategic plans would create and guide what is now the FIA program of the USDA Forest Service. Some highlights of historic FIA legislation and national strategic planning follow.

1928 McSweeney-McNary Forest Research Act (P.L. 70-466)
Congress enacted the McSweeney-McNary Forest Research Act on May 22, 1928 to authorize a broad program of forest research by the Forest Service including a nationwide forest survey across all land ownerships *"make and keep current a comprehensive inventory and analysis of the present and prospective conditions of and requirements for the renewable resources of the forest and rangelands of the United States."* This was the birth of FIA, and the first survey fieldwork began in 1930. This Act was replaced by the Forest and Rangeland Renewable Resources Research Act of 1978.

1967 Forest Survey Handbook 4809.1, FIA's first national strategic plan

- Outlined the national inventory program mandate and legislative authorities
- Outlined program management structure and guidelines for internal reviews
- Established core definitions, variables, and State reporting tables
- Established minimum inventory accuracy standards and desired measurement cycles
- Established general rules for allocating constrained budgets with the basic rule that during constrained budget periods, the program would increase measurement cycle length rather than reduce sample intensity/accuracy.

1974 Forest and Rangeland Renewable Resources Planning Act (P.L. 93-378)
This Act directed the Secretary of Agriculture to *"…make and keep current a comprehensive inventory and analysis of the present and prospective conditions of and requirements for the renewable resources of the forest and rangelands of the United States."* This repeats the mandate of the 1928 Forest Research Act as a forest resource information foundation for national assessments.

1978 Forest and Rangeland Renewable Resources Research Act (P.L. 95-307)
This legislation replaced the earlier forestry research legislation of 1928, repeated the amendment contained in the 1928 and 1974 legislation to *"make and keep current a comprehensive inventory and analysis of the present and prospective conditions of and requirements for the renewable resources of the forest and rangelands of the United States"*... This Act was amended in 1999 with the addition of Section 3(e), specifically requiring FIA to implement an annualized inventory including (1) a proportionate annual inventory of each State every year; (2) a 5-year report for each State; (3) national standards and definitions for reporting; (4) provisions to ensure protection of private property rights; and (5) a process for employing new technologies, global positioning systems, and other advanced technologies.

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1992, 1998 Blue Ribbon Panels I and II on FIA (national panels convened by clients)
Intense interest in FIA raised questions about inventory methods and policies. In 1991, the American Forest Council (AFC, 1992) and in 1998, the American Forest Products Association's (AFPA, 1998) Forest Resources Research Committee discussed many key issues regarding FIA with the Chief of the Forest Service. The committee formed a panel of high-level leaders from across the forestry community, including Federal and State agencies, industry, academia, environmental organizations, and other user groups. The mission was to develop a national vision and strategy, as well as goals and objectives, for meeting the present and future needs for forest resource inventory information. The panel evaluated the FIA program to:

- Determine the future needs of all user groups;
- Identify how FIA can better serve the public and the various user groups;
- Identify the scientifically valid uses of FIA data;
- Increase recognition that FIA provides basic information needed by society; and
- Generate Congressional and Administration funding support for the FIA program.

1993 A Blueprint for Forest Inventory and Analysis and Vision for the Future
FIA's second strategic plan:

- Identified major issues affecting future resource monitoring;
- Identified major FIA partners and research areas;
- Recommended maintaining a maximum 10-year cycle in all inventory regions and expanding field plot coverage to all forest land;
- Recommended developing and maintaining electronic databases and interactive data delivery systems, and;
- Established guiding principles for achieving strategic program goals.

1999 Strategic Plan for Forest Inventory and Monitoring
FIA's third strategic plan, prepared in response to the 1998 Farm Bill:

- Established a new program management structure and relationships;
- Identified major non-FIA partners;
- Established revised core variables and regional add-ons to meet customer needs;
- Established 5-year State analytical report cycle for all States;
- Established staffing and financial needs for Congressionally approved cycles (7 years East, 10 years West);
- Recommended maintaining Forest Landowner and Timber Products Output studies;
- Established mandatory annual accountability reporting (Annual Business Report); and
- Established data privacy guidelines.

2007 Forest Inventory and Analysis Strategic Plan: A History of Success, a Dynamic Future
FIA's fourth strategic plan:

- Identified major issues affecting future resource monitoring;
- Identified current program focus and major non-FIA partners;
- Outlined program management structure and relationships;

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- Identified core program emphasis shifts from previous plan (synchronize Phase 1 and Phase 2 samples and add more analytical and remote sensing capacity);
- Recommended annualizing Ownership and Timber Products Output studies;
- Established strategic program goals, 5-year targets and guiding principles;
- Reviewed and revised core variables and definitions; and
- Identified new directions of client interest.

Excerpt from the 1998 Farm Bill, which amended the **Forest and Rangeland Renewable Resources Research Act of 1978** (P.L. 95-307, 16 U.S.C. 1642(e))

SEC 3. (e) Forest Inventory and Analysis.--

(1) Program required.--In compliance with other applicable provisions of law, the Secretary shall establish a program to inventory and analyze, in a timely manner, public and private forests and their resources in the United States.

(2) Annual State inventory.--

(A) In general.--Not later than the end of each full fiscal year beginning after the date of enactment of this subsection, the Secretary shall prepare for each State, in cooperation with the State forester for the State, an inventory of forests and their resources in the State.

(B) Sample plots.--For purposes of preparing the inventory for a State, the Secretary shall measure annually 20 percent of all sample plots that are included in the inventory program for that State.

(C) Compilation of inventory.--On completion of the inventory for a year, the Secretary shall make available to the public a compilation of all data collected for that year from measurements of sample plots as well as any analysis made of the samples.

(3) 5 -year reports.--Not more often than every 5 full fiscal years after the date of enactment of this subsection, the Secretary shall prepare, publish, and make available to the public a report, prepared in cooperation with State foresters, that--

(A) contains a description of each State inventory of forests and their resources, incorporating all sample plot measurements conducted during the 5 years covered by the report;

(B) displays and analyzes on a nationwide basis the results of the annual reports required by paragraph (2); and

(C) contains an analysis of forest health conditions and trends over the previous 2 decades, with an emphasis on such conditions and trends during the period subsequent to the immediately preceding report under this paragraph.

(4) National standards and definitions.--To ensure uniform and consistent data collection for all forest land that is publicly or privately owned and for each State, the Secretary shall develop, in consultation with State foresters and Federal land management agencies not under the jurisdiction of the Secretary, and publish national standards and definitions to be applied in inventorying and analyzing forests and their resources under this subsection. The standards shall include a core set of variables to be measured on all sample plots under paragraph (2) and a standard set of tables to be included in the reports under paragraph (3).

(5) Protection for private property rights.--The Secretary shall obtain authorization from property owners prior to collecting data from sample plots located on private property pursuant to paragraphs (2) and (3).

(6) **Strategic plan**.--Not later than 180 days after the date of enactment of this subsection, the Secretary shall prepare and submit to Congress a strategic plan to implement and carry out this subsection, including the annual updates required by paragraph (2) and the reports required by paragraph (3), that shall describe in detail--

(A) the financial resources required to implement and carry out this subsection,

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including the identification of any resources required in excess of the amounts provided for forest inventorying and analysis in recent appropriations Acts;

(B) the personnel necessary to implement and carry out this subsection, including any personnel in addition to personnel currently performing inventorying and analysis functions;

(C) the organization and procedures necessary to implement and carry out this subsection, including proposed coordination with Federal land management agencies and State foresters;

(D) the schedules for annual sample plot measurements in each State inventory required by paragraph (2) within the first 5-year interval after the date of enactment of this subsection;

(E) the core set of variables to be measured in each sample plot under paragraph (2) and the standard set of tables to be used in each State and national report under paragraph (3); and

(F) the process for employing, in coordination with the Secretary of Energy and the Administrator of the National Aeronautics and Space Administration, remote sensing, global positioning systems, and other advanced technologies to carry out this subsection, and the subsequent use of the technologies.

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Appendix E–FIA Base Program Minimum Core Data

The following are an example of national core variables for the Base Program. A complete current list is found in FIA program field manuals, including Timber Products Output and National Woodland Owners surveys, posted on the Internet at http://fia.fs.fed.us .

PLOT LEVEL DATA:
PLOT NUMBER
SAMPLE KIND
STATE
COUNTY
YEAR
MONTH
DAY
GPS
DISTANCE TO IMPROVED ROAD

TREE AND SAPLING DATA:
TREE RECORD NUMBER
SUBPLOT NUMBER
CONDITION CLASS
AZIMUTH
HORIZONTAL DISTANCE
TREE STATUS
SPECIES
DIAMETER AT BREAST HEIGHT
DIAMETER AT ROOT COLLAR
PERCENT ROTTEN/MISSING CULL
TOTAL LENGTH
ACTUAL HEIGHT
HEIGHT METHOD
CROWN CLASS
COMPACTED CROWN RATIO
UNCOMPACTED CROWN RATIO
DAMAGE TYPE
DAMAGE LOCATION
DAMAGE SEVERITY
CAUSE OF DEATH
DECAY CLASS
HEIGHT TO DIAMETER
PERCENT ROUGH CULL

TREE AND SAPLING DATA:
MORTALITY YEAR
CAUSE OF DEATH
CROWN EXPOSURE
CROWN POSITION
CROWN DIAMETER WIDE
CROWN DIAMETER 90 DEGREES
LIVE CROWN RATIO
CROWN DENSITY
CROWN DIEBACK
FOLIAGE TRANSPARENCY
FOLIAGE DAMAGE TYPE
FOLIAGE DAMAGE SEVERITY
FOLIAGE DAMAGE LOCATION

CONDITION CLASS DATA:
CONDITION CLASS NUMBER
CONDITION STATUS
OWNER CLASS
OWNER GROUP
PRIVATE OWNER INDUSTRIAL STATUS
FOREST TYPE
STAND-SIZE
STAND DENSITY
STAND ORIGIN STAND AGE
STAND SPECIES ORIGIN
STAND STRUCTURE
RESERVE STATUS
DISTURBANCE
DISTURBANCE YEAR
TREATMENT
TREATMENT YEAR
SLOPE
ASPECT
GROUND COVER
PHYSIOGRAPHIC CLASS
PRESENT NONFOREST LAND USE

REGENERATION DATA:
SPECIES
CONDITION CLASS
SEEDLING COUNT

Variables subject to differential plot intensity

FULL VEGETATIVE PROFILE DATA:
STRATA
PERCENT COVER
SPECIES

OZONE DAMAGE SYMPTOM DATA:
SPECIES
DAMAGE SEVERITY

LICHEN COMMUNITY DATA:
LICHEN SPECIES
RELATIVE ABUNDANCE

SOIL DATA:
O HORIZON THICKNESS
A HORIZON THICKNESS
RESULTS FROM ELEMENTARY LAB ANALYSIS: pH, N, C

COARSE WOODY DEBRIS DATA:
TRANSECT SEGMENT
TYPE
DEBRIS SIZE
DECAY CLASS

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Appendix F–Contacts

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

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

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

South
Program Manager, FIA USDA
Forest Service Southern
Research Station 4700 Old
Kingston Pike Knoxville, TN
37919
865–862–2000

Pacific Northwest
Program Manager, FIA
USDA Forest Service
Pacific Northwest Research Station 620
SW Main St., Suite 400
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National Office
National Program Leader, FIA
USDA Forest Service, Research & Development, Mailstop 1155
201 14th Street, SW
Washington, DC 20024
703–605–4177

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

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