



United States Department of Agriculture

Office of the Secretary
Washington, D.C. 20250

MAY 19 2010

The Honorable Dianne Feinstein
Chairman
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
United States Senate
131 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Madam Chairman:

Enclosed is the Forest Service report on the Forest Inventory and Analysis program, as requested in the Senate Appropriations Committee report accompanying the 2010 Interior and Related Agencies Appropriations Act.

A similar letter and copy of the report are being sent to Senator Lamar Alexander, Chairman James P. Moran, and Congressman Michael K. Simpson.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Vilsack".

Thomas J. Vilsack
Secretary

Enclosure



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MAY 19 2010

The Honorable Lamar Alexander
Ranking Member
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
United States Senate
1232 Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Alexander:

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The Honorable James P. Moran
Chairman
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
U.S. House of Representatives
B-308 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

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MAY 19 2010

The Honorable Michael K. Simpson
Ranking Member
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
U.S. House of Representatives
1016 Longworth House Office Building
Washington, D.C. 20515

Dear Senator Simpson:

Enclosed is the Forest Service report on the Forest Inventory and Analysis program, as requested in the Senate Appropriations Committee report accompanying the 2010 Interior and Related Agencies Appropriations Act.

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REPORT TO CONGRESS

**FISCAL YEAR 2010 PLAN FOR ADDITIONAL
FOREST INVENTORY AND ANALYSIS (FIA)
FUNDING, INCLUDING INTENSIVE SITE
MONITORING**

FY 2010 Plan for Additional Forest Inventory and Analysis (FIA) Funding, Including Intensive Site Monitoring.

EXECUTIVE SUMMARY

In fiscal year 2010, the Forest Inventory and Analysis (FIA) Program will divide the \$5 million general program increase into two parts. \$3 million will be used to increase the implementation of annualized FIA by fully implementing New Mexico; adding Hawaii, Nevada, and Wyoming to the program, laying plans to enter Interior Alaska, and expanding analytical capacity in the eastern U.S. \$2 million will be used to initiate intensive site monitoring (ISM) for Forest Service Experimental Forests (EF) and Ranges. Five selection criteria have been identified to guide site selection: (A) sites with long-term data; (B) sites where an intensified plot grid could provide data for an early warning system; (C) sites in areas expected to be highly sensitive to climate changes; (D) sites that connect widespread gradients of conditions; and (E) practical or administrative considerations in the current fiscal year that make site selection effective. These criteria were used to rapidly screen 81 Experimental Forests and Ranges and select 16 sites. More thorough screening of other sites may take place in the future. The sites selected for the initial investments in FY 2010 are:

- Bonanza Creek EF, Alaska
 - Fort Valley EF, Arizona
 - Alum Creek and Crossett EFs, Arkansas
 - Fraser EF, Colorado
 - Hawaii Experimental Tropical Forest, Hawaii
 - Priest River EF, Idaho
 - Baltimore Ecosystem Study, Maryland
 - Marcell EF, Minnesota
 - Tallahatchie and Harrison EFs, Mississippi
 - Tenderfoot Creek EF, Montana
 - Bartlett and Hubbard Brook EFs, New Hampshire
 - Silas Little EF, New Jersey
 - Coweeta Hydrological Lab, North Carolina, and Santee EF, South Carolina
 - Luquillo EF and San Juan ULTRA, Puerto Rico
 - Great Basin Experimental Range, Utah
 - Estate Thomas EF, U.S. Virgin Islands
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INTRODUCTION

The Fiscal Year (FY) 2010 Department of the Interior, Environment, and Related Agencies Appropriations Bill (Public Law 111-88, enacted on October 30, 2009), provided a general program increase of \$5 million for the Forest Inventory and Analysis (FIA) program. The Forest Service allocated \$3 million to fully implement New Mexico; to expand the annualized FIA program into Hawaii, Nevada, and Wyoming, to finalize plans to enter Interior Alaska; and, to build analytical capacity. The other \$2 million of the increase was provided to establish intensive monitoring sites on the Agency's Experimental Forests and Ranges and other high-priority research sites across the Nation.

Senate Report 111-38 accompanying the bill included language requesting the Forest Service to report to Congress on:

- 1. Program accomplishments expected from the FIA program in FY 2010***
- 2. Sites chosen to establish intensive site monitoring; and***
- 3. The criteria used to select the sites for intensive site monitoring.***

The FIA program's effort to develop a nationwide intensive site monitoring (ISM) program originated in the 1990s¹, and has been used in the National Forest Health Monitoring (FHM) Program². ISM measures key components of forest and grassland ecosystems by taking more field plots, with greater detail and frequency over time. In FIA, ISM has three key objectives:

- 1) To measure similar variables consistently across a concentrated network of sites;
- 2) To identify threshold indicators of ecological change to include in the standard FIA plot network; and
- 3) To collect baseline data to detect patterns that can be quantitatively linked to changes in climate, forest health, nutrient dynamics, and vegetation dynamics over time.

The Forest Service Research and Development system (R&D) of 81 Experimental Forests and Ranges is a unique asset in the Nation's forestry research infrastructure. Experimental Forests and Ranges, many of which were established more than 70 years ago, encompass forest ecosystems from the tundra to the tropics. They are the R&D repository for long-term ecological, silvicultural, and hydrological research; as such, they are magnets for attracting research partnerships. Other R&D assets include the agency's 340 Research Natural Areas (RNAs), devoted to long-term baseline monitoring of flora and fauna. Also, the advances being made by Forest Service R&D cooperatively with the National Science Foundation to establish the National Ecological Observatory Network (NEON), the Urban Long-Term Research Areas (ULTRA), and the U.S. Global Change Research Program's North American Carbon Project provide additional opportunities for ISM applications. In essence, the challenges of responding to ecological and management questions of the 21st century can best be met by integrating the detailed broad-scale inventory information available in the FIA program and its ISM concept with the forest type-based ecological and management experience found in R&D's Experimental Forest and Range network and associated research assets across the Nation.

¹ National Science and Technology Council. 1997. Integrating the Nation's environmental monitoring and research networks and programs: a proposed framework. Washington, DC: Executive Office of the President, Office of Science and Technology Policy. 117 p.

² The 2009 FHP ISM briefing paper is available here: http://fhm.fs.fed.us/fact/pdf_files/fhm_ism_2009.pdf

1. PROGRAM ACCOMPLISHMENTS EXPECTED IN FY2010

FIA Program Accomplishments Planned for FY 2010. Over two dozen planned program accomplishments for FY 2010 are reported in detail in the FY 2009 FIA Annual Business Summary. Highlights include:

- Expand FIA in New Mexico to full implementation.
- Initiate annualized inventory field work in Hawaii, Nevada, and Wyoming.
- Finalize plans for initiating field work in Interior Alaska should funding materialize.
- Publish State reports for Vermont, New Hampshire, Massachusetts, Arkansas, Florida, Texas, Oklahoma (eastern part only), North Carolina, Arizona, and Colorado. Publish periodic reports for the Commonwealth of the Mariana Islands and the Federated States of Micronesia.
- Improve the user interface of the Forest Inventory Data Online (FIDO) database and website so that it is more user-friendly. Add support for new carbon and biomass variables. Enhance the geo-spatial analysis and mapping capabilities of FIDO.
- Continue applied research on ways of using technology to increase program efficiency, lower costs, and develop new products to meet customers' needs.
- Continue planning for the next iteration of the National Woodland Owners Survey (NWOS), pending receipt of final clearance of the questionnaire from the Office of Management and Budget. Continue collaborative analyses with partners of results from the previous NWOS.
- Continue collaboration work with the Natural Resources Conservation Service's Natural Resources Inventory and Bureau of Land Management to deliver consistent indicators of rangeland health and productivity to clients.
- Continue urban forest inventory in Colorado and Tennessee, using funds provided by the state forestry agencies, and publish results of these pilots. Initiate FIA field data collection in selected urban areas in California, Oregon, and Washington, using funds provided to Pacific Northwest-FIA through the American Recovery and Restoration Act of 2009.
- Provide technical assistance to international organizations and countries to help them improve their capacity to inventory and monitor changes in forests in other countries.

Implementation of FIA ISM. Since enactment of the FY 2010 Interior and Related Agencies Appropriations Bill, the Forest Service has:

- Identified key data gaps related to climate change where ISM could be effective;
- Identified ISM activities that have high potential for filling the most important data gaps;
- Created a set of site selection criteria to screen the upper tier of Experimental Forests and Ranges for ISM; and
- Proposed initial sites where these preliminary ISM activities can be implemented.

Selecting the initial sites required R&D leaders and scientists to identify those Experimental Forests and Ranges and similar national assets where, in essence, a pilot test of several different scientific approaches can be initiated this fiscal year. But it will also require some thoughtful planning and study design during the balance of FY 2010 on how to expand and unite those different approaches into a broader integrated FIA-Experimental Forest and Range strategic investment plan that looks ahead five years, should additional investments be forthcoming.

2. SITES CHOSEN TO ESTABLISH INTENSIVE SITE MONITORING

The Experimental Forest and Range Working Group recommends the following sites for initial ISM implementation activities in FY 2010.

Northern Research Station (NRS):

- Baltimore Ecosystem Study, Maryland
- Bartlett and Hubbard Brook Experimental Forests, New Hampshire
- Marcell Experimental Forest, Minnesota; and
- Silas Little Experimental Forest, New Jersey

Hubbard Brook EF has long had an outstanding watershed and forest ecosystem emphasis and is the highest priority site in the northeastern United States where an intensified FIA plot network can be linked to hydrological data. Hubbard Brook and Baltimore are also sites under the National Science Foundation's Long-Term Ecological Research (LTER) program. The Bartlett, Marcell, and Silas Little EFs are partners in the North American Carbon Program³, where an intensified FIA plot network can be linked to carbon flux tower data. Bartlett EF is also a NEON site. These five sites have existing, long-term data records (from 10 to more than 70 years), research and/or FIA staff on site or in close proximity, and necessary equipment.

Southern Research Station (SRS):

- Coweeta Hydrological Lab, North Carolina, and Santee EF, South Carolina. Coweeta and Santee from the Appalachians to the southeastern Coastal Plain. Both sites have long-term hydrological and vegetation data. Coweeta is internationally known for hydrology and ecosystem research, and is an LTER site and a new site in the North American Carbon Flux network.
- Alum Creek and Crossett EFs, Arkansas. These forests represent a gradient from the Ouachita Mountains to the West Gulf Coastal Plain. Alum Creek EF has historic data on hydrology and vegetation of 15-30 year duration, Crossett has long-term vegetation data in the presence and absence of management, and both sites have long-term climatic data.
- Tallahatchie and Harrison EF, Mississippi. These forests represent a gradient from the upper to lower Gulf Coastal Plain. Both have a history of detailed vegetation measurements and climate records over time. They also offer opportunities to intensively study recovery from disturbances, as the Tallahatchie was severely affected by a tornado in 2008 and the Harrison was hit squarely by Hurricane Katrina in 2005.

Rocky Mountain Research Station (RMRS). Long-term data of up to a century in length are the unique strength of Rocky Mountain Research Station Experimental Forests and Ranges and are a prerequisite for measuring the effects of climate change. Sites identified for ISM in RMRS are:

- Fraser EF, Colorado
- Tenderfoot Creek EF, Montana
- Priest River EF, Idaho
- Great Basin Experimental Range, Utah, and
- Fort Valley EF, Arizona

³ The North American Carbon Project is a network of research sites sponsored by the U.S. Global Change Research Program.

Mountainous areas in the Interior West provide a significant proportion of the water for downstream users. Because the amount and duration of snowmelt runoff is related to forest canopy cover in the upper elevations of the Rocky Mountains, anticipating the relationship of climate change with forest stand composition and dynamics and with stream flow regimes is extremely important to municipal and agricultural water users and to natural resource managers. These sites all have long-term meteorological data. Fraser is a NEON site. Fort Valley was established in 1908 and Priest River in 1911, so they are among the oldest EFs and have the longest data records in the Nation.

Pacific Northwest and Pacific Southwest Research Stations:

- Hawaii Experimental Tropical Forest, Hawaii; and
- Bonanza Creek EF, Alaska

These two sites are envisioned as the anchor points of a long-distance transect along the eastern rim of the Pacific Ocean from a tropical island environment to a boreal environment in interior Alaska north of Fairbanks. The major focus of the work is to evaluate how climate change effects carbon cycling, and other ecosystem processes along temperate coastal-interior and tropical-boreal gradients around the Pacific Rim. These are among the most sensitive to early climate change impacts, they both are well-positioned to add data where existing information is almost totally lacking, and they are also both connected to the NEON program. The Hawaii site is envisioned as a key node in the scientific monitoring community for the western Pacific islands and agency partners including the Center for International Forestry Research headquartered in Indonesia and the International Tropical Timber Organization, headquartered in Japan.

International Institute for Tropical Forestry:

- Luquillo Experimental Forest. Luquillo is the largest Forest Service EF and has been in the public domain since 1876. Research has been conducted in Luquillo for more than 100 years. The forest is an LTER site and part of many other national and global cooperative studies on carbon dynamics, nutrient cycling, forest dynamics, hurricane response, and land use change.
- Estate Thomas Experimental Forest. Research at Estate Thomas began in 1930. It is a subtropical dry forest - a life zone not found in Luquillo. Dry forests are highly sensitive to climate change, as drought is the driver of most forest processes in this life zone.
- San Juan ULTRA. This site anchors an urban-rural gradient with Luquillo. The ULTRA includes long term sampling plots in urban forests and botanical gardens.

3. CRITERIA USED TO SELECT SITES FOR INTENSIVE MONITORING

Key Questions Related to Climate Change. Four climate change research areas are outlined in the Forest Service Global Change Research Strategy⁴ issued in FY 2009—adaptation, mitigation, decision support, and shared research needs and partnerships. Important data gaps exist where additional data collected through ISM can make important contributions to detecting and understanding climate change impacts on forests and rangelands. Those data gaps include changes in forest vegetation and stand dynamics⁵, effects on the Nation's forested watersheds, effects on nutrient cycles, and specifically on carbon cycle processes that are thought to represent the harbinger of changing climate.

Identifying Site Selection Criteria. The first step is to identify criteria for selecting areas in which to implement the first year of ISM on Experimental Forests and Ranges. The following criteria constituted the initial screening criteria used to distinguish the high-priority research sites for initial investments from other sites.

- **Locations which have long-term data on forest stand dynamics, hydrology, nutrient dynamics, and/or carbon flux.** The opportunity to link ISM to Experimental Forests and Ranges and related national research assets that have an abundance of data on hydrology, vegetation, nutrient cycling, and carbon dynamics will be important to determine whether the concept of ISM can add value to those data.
- **The absence of any existing quantitative vegetation data across forested landscapes, and where an intensified plot grid could serve as a 'canary in the coal mine'.** There is a scientific opportunity to link ISM on new, remote, or dormant Experimental Forests and Ranges where fundamental vegetation data are outdated or incomplete, and where scientific evidence suggests forests might be ecological sensitive in the face of changing climate.
- **Install ISM sites in areas that are sensitive to climate changes.** Some sites (such as arctic and tropical ecosystems, or forest types at the limit of their natural range) may be more sensitive to changing climatic conditions than others. Implementing ISM in these areas may document climate change impacts earlier and more clearly than elsewhere.
- **Assure broad-scale coverage across widespread gradients of conditions.** Several research studies advocate for using long-distance transects (150 to 1000 km, or more) to provide information about how ecological rates of change along landscape gradients.
- **Practical or administrative considerations in the current FY that influence where this initial effort could be conducted.** Such factors include the availability of experienced FIA field crews, whether FIA crews are located near Experimental Forests and Ranges, or if a State Forester or other partners are highly supportive of ISM in their domain.

⁴ See <http://www.fs.fed.us/climatechange/documents/global-change-strategy.pdf>

⁵ See, for example, Anderson, H. and Neilson, R.P. 1999. Projected ecosystem change for the United States under a climate warming. U.S. Global Change Research program Seminar 18 March 1999.