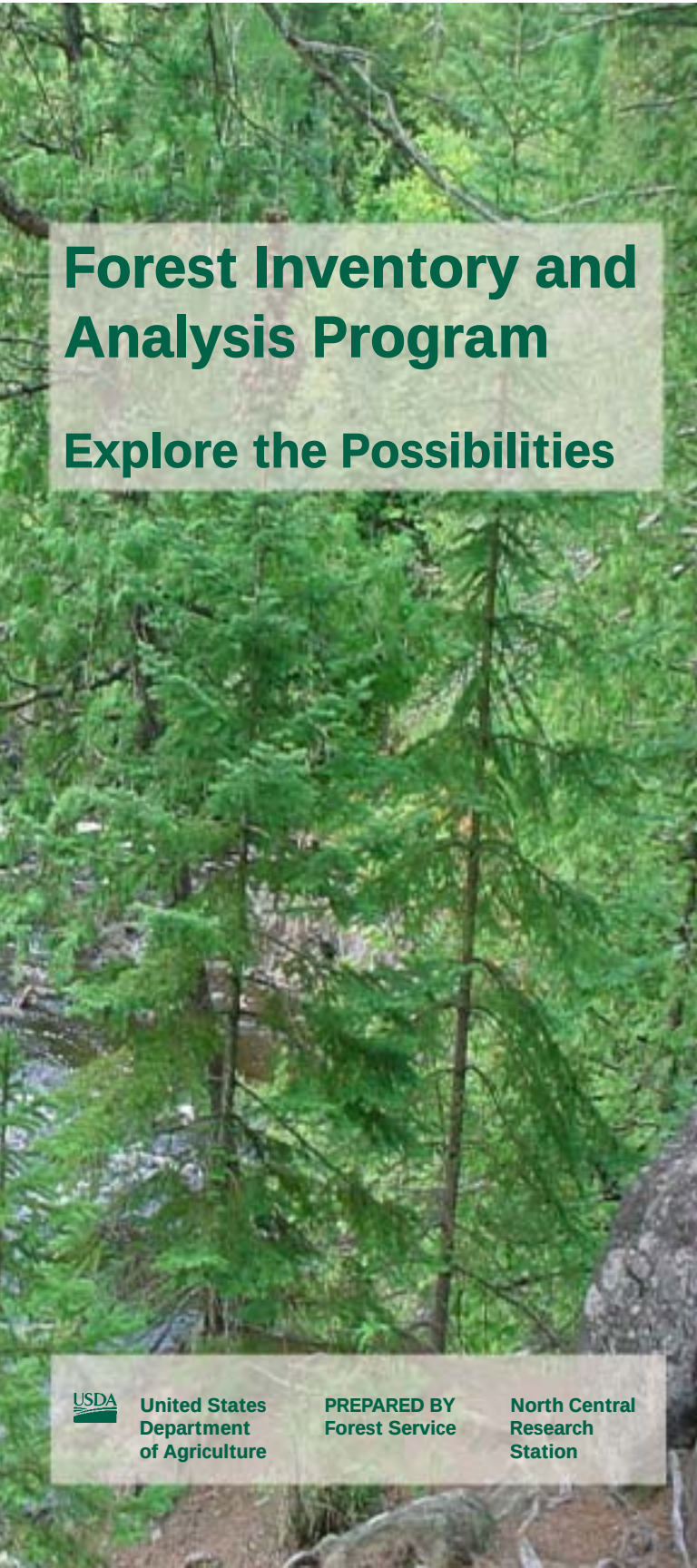
Forest Inventory and Analysis Program

Explore the Possibilities



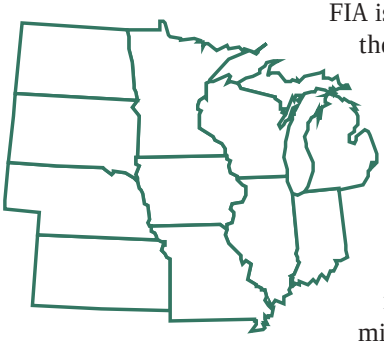
USDA United States Department of Agriculture

PREPARED BY Forest Service

North Central Research Station

Maybe you're a wildlife biologist trying to locate suitable habitat for black bear in Michigan. Or, maybe you're studying global warming and would like to estimate carbon storage in Lake States forests. Or, possibly you own a small sawmill specializing in products from a specific tree species and would like to know how much volume is available for your operation. A good place to go for answers to these and other questions about forest resources of the Midwest is the Forest Inventory and Analysis (FIA) Unit at the North Central Research Station in St. Paul, Minnesota. Stocked with a large amount of data and information retrieval systems, FIA is a one-stop shop of facts and figures on current status, past changes, and future potential of midwestern forests. Our dedicated staff of field crew personnel, resource analysts, and inventory specialists would like you to know more about who we are, what kinds of data we collect, and how YOU can access these data and start exploring the possibilities for their use.

Background



FIA is a national program of the USDA Forest Service that conducts and maintains comprehensive inventories of the forest resources in the United States. Our FIA Unit in St. Paul is responsible for inventorying more than 80 million acres of forest land spread across 11 Midwestern States.

Originally, the region's forests were inventoried one State at a time, progressing from State to State until all the forests in the region had been surveyed and the cycle began again. These periodic inventories began in the 1930s, and most of our States have been inventoried at least four times since then.

But in 1998, Congress mandated that we switch from periodic to annual inventories. In an annual inventory, about 20 percent of the plots in a State are visited every year and each

plot is revisited every 5 years. This annual inventory system allows for complete regional coverage every year and a 5-year reporting cycle. Concurrent with the switch to annual inventories, we began to assess forest health by incorporating the plot component of the National Forest Health Monitoring Program.

Three-Phase Sample

We inventory the midwestern forests using a three-phase sample. In phase 1 (remote sensing), we use various types of imagery to determine forest area in each State and determine which plots are sent to the field for measurement. In phase 2 (field plots), we visit a selection of the forested acres identified in phase 1 to further describe the forests. In phase 3 (a subset of field plots), we visit 1 out of every 16 phase 2 field plots during the summer and collect additional information on the forest.

On all our field plots, we gather quantitative and qualitative measurements that describe

- Tree diameter, length, damage, amount of rotten or missing wood, and tree quality
- Counts of tree regeneration
- General land use
- General stand characteristics such as forest type, stand age, and disturbance
- Changes in land use and general stand characteristics
- Estimates of growth, mortality, and removals (determined by revisiting plots from the previous time period)

On the phase 3 plots, we collect a more extensive set of data during the summer—June, July, and August. These measures relate to forest ecosystem function, condition, and health. The current measurements collected on the phase 3 plots can be grouped into the following categories:

- *Crown Conditions*—generally, good crown conditions are signs of vigorous trees and poor crown conditions are symptoms of trees under stress.

- *Soil Chemical Analyses*—collection and analysis of soil samples that include estimates of site fertility.

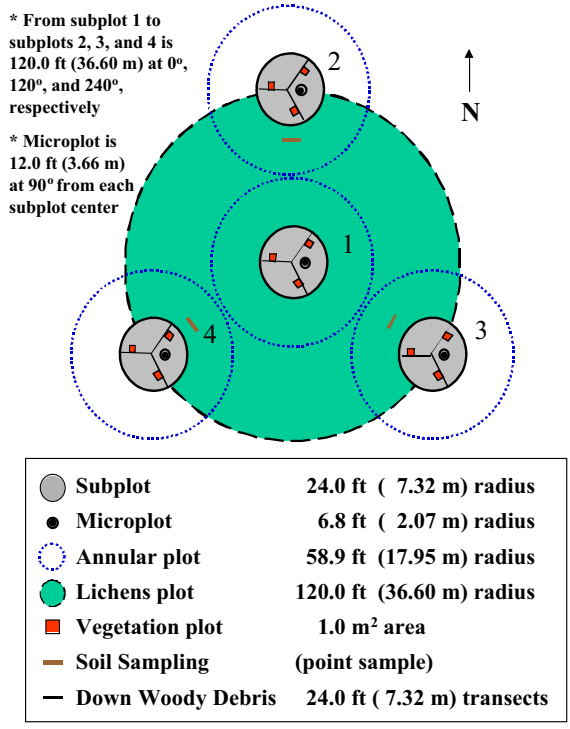
- *Lichen Communities*—the presence or absence of certain lichen species indicates air quality and climate changes.

- *Vegetation Diversity and Structure*—the composition of vegetation (species and growth forms), abundance, and spatial arrangement in the forest can be useful in describing the forest. Also, the presence of exotic and introduced plant species can be determined from the collected data.

- *Down Woody Debris*—this measurement is useful in determining fire fuel potential and, combined with the vegetation structure data, can be used in wildlife habitat models.

Some data are collected in the office and some are collected on the plots. Some of the information is measured, some is observed, some data elements are estimated, and some information is calculated or predicted. Regardless of the source of the data, the information's quality is critical to its eventual use. To ensure quality, the FIA Unit has a quality assurance program that covers all aspects of data collection and calculation.

Phase 2/Phase 3 Plot Design



Forest/Landscape-Level Assessments

This sample of forest vegetation on a portion of forest acres creates a hierarchy of data—a nesting of species within vegetative communities within forest landscapes. This allows users to step from level to level in the hierarchy and assess the interplay of vegetation composition, structure, and function at scales that vary from specific to broad, restrictive to expansive. As a result, the assessment possibilities are constrained only by the inherent bounds of the sample and the user's imagination. In addition, through geographic information systems, users can combine their data with FIA data to conduct integrated analyses. Many of the possibilities go beyond the more traditional timber inventories to include potential items as:

- Wildlife habitat suitability indices
- Carbon sequestration modeling
- Old-growth forest assessments
- Forest fragmentation/ urbanization issues
- Timber availability assessments

- Fire hazard rating/fuel loading models
- Forest insect and disease impact assessments

Beyond Forest Inventory

Because the forest inventory alone may not sufficiently explain the changes in the region's forests over time, FIA also conducts special studies to quantify and characterize several of the major influences shaping the forests and economies of the region:

- Timber product output studies to monitor the composition, size, and locations of the primary wood-using industry; its

use of roundwood (logs) by species, product, and geographic location; and its generation and disposition of mill residues

- Logging utilization studies to characterize the sites logged, the trees cut, the products taken, and the residues left behind

- Land ownership studies to characterize the owners of the region's forests and to determine their ownership objectives, management practices, and future intentions for their forest property

Sorting Through All the Information

Over the years, we have repeatedly measured thousands of trees and ground sample plots in each State, amassing a sizable, somewhat overwhelming amount of data. Plus, the recent addition of the phase 3 data has increased the scope of the information available for the region's forests. To help users assess and make sense of this mountain of data, we're using new technology to expand our analytical tools. In addition, we continue to develop, publish, and distribute our traditional reports.

FIA units from across the country worked together to establish a suite of cooperative data distribution tools that allow access to common forest resource attributes using compatible formats represented by standard or custom sets of forest resource tables. These systems allow users to generate their own analyses for their user-defined areas interactively through the Internet and to download these tables, maps, and data into their favorite spreadsheet or database software packages.

Other tools interface with a national standard set of timber product output data for each State and county in the U.S. This data set consists of 11 data variables that describe for each county the roundwood products harvested, the logging residues left behind, the timber otherwise removed, and the wood and bark residues generated by its primary wood-using mills.

A newly developed software program allows users to produce tables and maps from the national FIA database by entering the following information:

- *Geographic area of interest*—State/county retrieval or radius retrieval

- *Attribute of interest*—timberland area, number of trees, growing-stock volume, etc.

- *Optional filters*—to restrict the query to a specific ownership, species, etc.

- *Classification variables*—to be used for columns and rows

The interactive program generates the requested table. Selecting county or congressional district as the row variable generates a shaded county map.

For More Information on FIA

To learn more about FIA in general or the utility of these tools for your application, please contact us at:

USDA - Forest Service
Forest Inventory and Analysis Program
North Central Research Station
1992 Folwell Ave.
St. Paul, MN 55108

Telephone: (651) 649-5139

E-mail (via our home page):
http://www.ncrs.fs.fed.us/4801/

You may also visit our national Forest Inventory and Analysis Web page at:

http://www.fia.fs.fed.us

September 2002

Landowner Information

A network of forest inventory plots has been established across the United States. These plots are selected by position on a nationwide grid, regardless of ownership or current land use. One of these plots is located on property you manage or own. We would like to explain what we do and ask permission to obtain measurements from the trees on the plot.

What is a plot? A plot (known as a phase 2 plot) covers about 1 acre and consists of four subplots. Nationally, there is one phase 2 plot for every 6,000 acres. The center of each subplot is marked with a wire pin and referenced (with distance and compass direction) to trees to help us relocate this plot in the future. All trees on the plot will also be marked at 4-1/2 feet above the ground where they are measured for growth. The trees will not be damaged by the marks.

How often will the plot be visited? A field crew will visit the plot once every 5 years. In addition, a subset of the entire system of phase 2 plots (1 out of every 16) will be visited each summer. Some additional measurements and samples will be collected on this subset of plots, known as phase 3 plots. It usually takes less than a day for the crews to complete their work, but occasionally they may need a second day. Also, as a part of our data quality program on about 5 percent of our plots, a second crew may re-measure the plot shortly after the first crew finish their work.

What measurements are collected on these plots? On all phase 2 plots, we gather tree and forest measurements. Measurements include:

- Tree diameter, length, damage, amount of rotten or missing wood, and tree quality
- Counts of tree regeneration
- General land use
- General stand characteristics such as forest type, stand age, and disturbance
- Changes in land use and general stand characteristics
- Estimates of growth, mortality, and removals (determined by revisiting plots from the previous time period)

On the phase 3 plots, we collect a more extensive set of data about forest ecosystem health, function, and condition. The current measurements on these plots can be grouped into the following categories:

- Crown conditions
- Soil chemical analyses
- Lichen communities
- Vegetation diversity and structure
- Down woody debris

Will the plot data collection damage my trees or land? Our activities will not have any noticeable impact on the site. On a small set of plots (phase 3), we will collect soil samples using hand tools. Also, if the field crew cannot identify a plant for the vegetation diversity measurements, they will collect a plant specimen for identification in the laboratory.

Will this affect the way I use my land? The presence of this plot should not hinder or annoy you in using and managing your land. In fact, it is critical that the presence of this plot **not** alter your plans for the property. Land use and management patterns are as important as insects and diseases in determining the amount, health, and productivity of the forest.

Who will have access to the plot location information? Although we collect information on the location of this plot, we share this information only with the individuals or organizations that we work with. These partners are required to sign a non-disclosure document that guarantees that they will not release any plot location information.

What will happen with the data collected about my forests? Data collected from your property will be merged with data from thousands of other sites to produce State and regional reports. These reports are used to describe the current conditions of forests and monitor the changes. If you would like a copy of your State and/or regional report, please let us know.

Who is involved in this program? This is a cooperative program between the USDA Forest Service and your State forestry agency.

Where can I get more information on the Forest Inventory and Analysis program? Please contact us at the following address:

USDA - Forest Service
Forest Inventory and Analysis Program
North Central Research Station
1992 Folwell Ave.
St. Paul, MN 55108

Telephone: (651) 649-5139
E-mail (via our home page): http://www.ncrs.fs.fed.us/4801/

Or, contact your State forestry agency.

Or, visit our national Forest Inventory and Analysis Web page at:
http://www.fia.fs.fed.us