Forest Inventory Data: a Valuable Public Resource

By Dan Chappell,
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As you walk around your property, drive down the highway into town, or visit an expanding city, have you ever stopped to wonder about how the forest resource of this state is expanding or contracting? In fact, the Alabama Forestry Commission has a team of dedicated foresters who travel out to the field every day to take a series of measurements that make it possible to answer that very question, plus a whole lot more.

The program that performs this service is known as Forest Inventory & Analysis (FIA). Some of you may have received a letter and a visit from us in the past, as our 'office' covers the entire state. In fact, there is a grid of over 5,600 points evenly spaced across Alabama. We work hard to visit each of these points on a seven-year cycle. To get a statistically accurate sample, we check all of the points, no matter where they fall. Whether in an agricultural setting, an industrial site, a neighborhood, or any other type of land use that is not a forest, we still endeavor to set eyes on the point to confirm its continuation as a non-forest land use. Many of you may be aware of or have even participated in the Conservation Reserve Program, whereby money is made available to favor the conversion of certain agricultural land into forest. Even if we are pretty certain that we know a given point is non-forest, we still take the time to be sure, because the landscape is always changing.

Because the majority of land in Alabama is owned by private individuals, most plots in the state fall on private landowners. Although it is the right of a landowner to deny us access to their property, it is primarily through partnering with our landowners that we are able to provide the truly representative data that makes this survey such a valuable tool. We thank all of our landowners who permit us to take our survey on their property. Although we cannot offer any direct benefit to landowners in exchange for permission to survey on their property, we want them to know that they are providing a great benefit to Alabama by way of their participation.

What is it we are looking for when we visit one of these random points? We carry with us an aerial photograph, a direction sheet left by the last crew who measured the point, and a Global Positioning System (GPS) unit. Unlike in the old days, when the only way to locate a spot on the ground was to start from a known point such as a gatepost or power pole then use a compass and measuring tape to precisely follow a course to plot, today we are able to type the coordinate into a GPS and take 'the path of least resistance' through the woods. This is a great aid to efficiency. Once the GPS puts us close to our point, we can use distance and compass azimuth directions from specific trees to triangulate, or 'cross up' on a very small patch of ground. After a few moments of kicking away the leaf litter, we locate a small metal pin that is stuck in the ground, marking the center point of the 'plot.' This can be challenging in bottomland forests during seasons of heavy rain! Anyone who doesn't like wading in water from time to time might not enjoy this line of work.

Once we have found the center pin, it is time to get to work. We have all sorts of questions that need to be answered. What is the owner class – corporate, individual, national forest, Department of Defense? How dense is the crown cover? Has the property seen any disturbances (fire, insect, weather) or been treated (clear cut, site preparation, artificial or natural regeneration) since the last survey taken seven years previous? Is there any water on the plot? What is the physiographic class (floodplain, rolling upland, dry slope)? Is the plot impacted by invasive exotic species such as Chinese privet or Japanese climbing fern or kudzu, and if so, to what extent? After we have done our best to answer these questions, it is time to begin measuring trees.

From that center point which we relocated, we will measure all trees that fall within 24 feet of the center that are 5.0 inches [or more] in diameter, at a location 4½ feet off the ground. If you are not familiar with diameter sizes, take your two hands, and touch your thumbs together and your middle fingers together. The circle you have made is about equivalent to a 5-inch diameter.

Using a compass and starting from due north (000 degrees), we capture each tree that meets the minimum diameter. We record the species, the compass azimuth and distance (so that we can be sure to measure this exact same tree in the future), a precise diameter, and whether the tree, from a lumber point of view, is a growing stock or a rough cull. We record where the tree's crown is in relation to the other crowns (dominant, intermediate, overtopped), as well as the ratio of the tree's live crown, which is a clue as to the tree's potential for further growth. Does the tree have any rotten or missing sections? Is it suffering from any damage agents or have a broken top? For larger trees that have the potential to be saw logs, we assign a grade based on how well the tree is overgrowing its limb knots. Lastly, we measure the length of the tree to the nearest foot. Once we have done all that, we move on to Tree Number Two, and so on, until we reach 360 degrees of the compass, which is all the way around.

There is a separate protocol we use to capture information on the smaller sapling trees and the young seedling-size trees. Once that is complete, we can say we have completed Subplot One.

From our original center point, we travel 120 feet north, 120 feet southeast, and finally 120 feet southwest to repeat the process at Subplots Two, Three, and Four. Four of these subplots equal one complete plot.

(Continued on page 18)

Forest Inventory

(Continued from page 17)

On a good workday, two complete plot locations can be fully surveyed; but long walks to access plots, high tree tally, thick underbrush, or inclement weather can limit a day to one fully surveyed plot.

And now the question that must be answered, "Why?" To be honest, I once talked with a landowner to secure permission to measure a plot on his property, and he answered, "Sure, I don't mind, but this is the stupidest thing I have ever heard of." I have to disagree, although when it is over 98 degrees and you happen to be in a very recently replanted stand with no shade, you wonder if he wasn't on to something. Seriously, though, there are a lot of good reasons why we do what we do.

To begin, this survey was authorized back in 1928 as a response to some of the poor land-use practices that had prevailed and damaged the landscape. It has been performed in the lower 48 states since 1930. What a wealth of information this survey provides! When forest industry is looking to expand and bring jobs to a region, they need to know if the species they want – in the sizes they need, at the quantities they will demand – are available within economic hauling distances. Before you make such multi-million dollar decisions, you have to be sure. That makes this data, which is not only free and available to all, but also consistent across state lines, invaluable.

Also, consider major destruction from natural disasters such as hurricanes and wildfires. Since you know what you had before the event, you can go back in and re-measure after the event, and get a very accurate damage assessment over a large area. I assisted in doing large-scale storm damage assessments in Mississippi in the wake of Hurricane Katrina. A large contingent of us re-measured all the plots in the affected counties at the same time, and took special additional measurements on all of the downed trees.

The academic world, as well, relies upon this work. There is no better tool to track the spread of tree diseases and destructive invasive species nationwide. The survey provides policy makers with the hard data needed to make management decisions that, hopefully, are in the best interests of the land and the people who are dependent upon it.

I hope this article about Forest Inventory & Analysis has been informative. When you work in the field, it is always rewarding to run into people who are aware of what you do and appreciative that you do it. Here in Alabama, we are blessed with a great crew of dedicated professionals who travel to points spread out everywhere, bringing in this accurate data in a timely fashion that is so important to such a broad spectrum of stakeholders.

Working in the office now, I answer requests for data and data analysis. If you have specific questions, anything from, "About how many water oaks are there in Shelby County?" to complex multi-county wood basket analyses, please give me a call or email. My office number is (334) 240-9370, and my email address is james.chappell@forestry.alabama.gov.

Alabama Scores High in the Nation's 'Tree Census'

By Dan Chappell, Forest Inventory & Analysis (FIA) Coordinator, Alabama Forestry Commission

The Alabama Forestry Commission's dedicated staff of full-time Forest Inventory & Analysis ('FIA') crew leaders, and their assistants who come from the agency's county offices around the state, are to be commended for the outstanding service they are providing to the people of Alabama and the wider network of stakeholders in the fields of forest industry, research science, and beyond. Not only are our FIA crews exceeding expectations by setting new state plot production records, we are outperforming all other states in the Southeast. This is truly a group effort, one in which all participants should take a great deal of pride.

From January 1 through June 30, 2017, Alabama FIA can claim 527 plots completed. If this pace is maintained through the latter half of the year, over 1,000 plots could be measured, which will far exceed the levels that we have been able to achieve in years past. Even then, Alabama was one of the region's premier programs. In comparison, Georgia FIA is on pace to complete just over 900 plots by year's end, Florida 780, and Tennessee just 680. If you look at funding levels, all three should be producing at a higher level than Alabama. It goes to prove that it's the people who really make the difference!

The data from Forest Inventory & Analysis is used in countless ways. When researching a site for a new forest products mill, FIA data is crucial in showing potential investors that the species they seek are available in the size classes they need, in the abundance they require, in the quality they demand, and within hauling distances that are economical. Existing mills also consult the data to track long-term trends that might affect their wood procurement strategies into the future. In Alabama, digital access to FIA data goes back to 1972, making it possible to follow land-use trends over a long time frame. Researchers tracking forest health threats such as red bay ambrosia beetle and emerald ash borer can analyze the spread and impact of these pests using FIA data. Likewise, the spread of invasive plants can be tracked, such as Japanese climbing fern and cogongrass. When emerald ash borer was first detected in Alabama, the FIA data was consulted to assess the potential impact to the state's ash resource and to help shape the state's response.

The international focus on carbon emissions and carbon sequestration is another vital area where FIA data proves its worth. Where once upon a time the survey was more strictly a timber inventory, today it could accurately be called a carbon inventory. Through our work, estimates are made for the carbon stored in living trees, standing dead trees, downed and dead trees, fine woody material on the forest floor, and even the carbon stored in the organic layer of the soil. With international trading partners placing an emphasis upon carbon neutral practices and being able to prove the sustainability of their wood sourcing, it has never been more important to provide the hard data that backs up Alabama's claim to having a sustainable, renewable resource that, whether as unprocessed logs or as finished products, is available for export around the world.