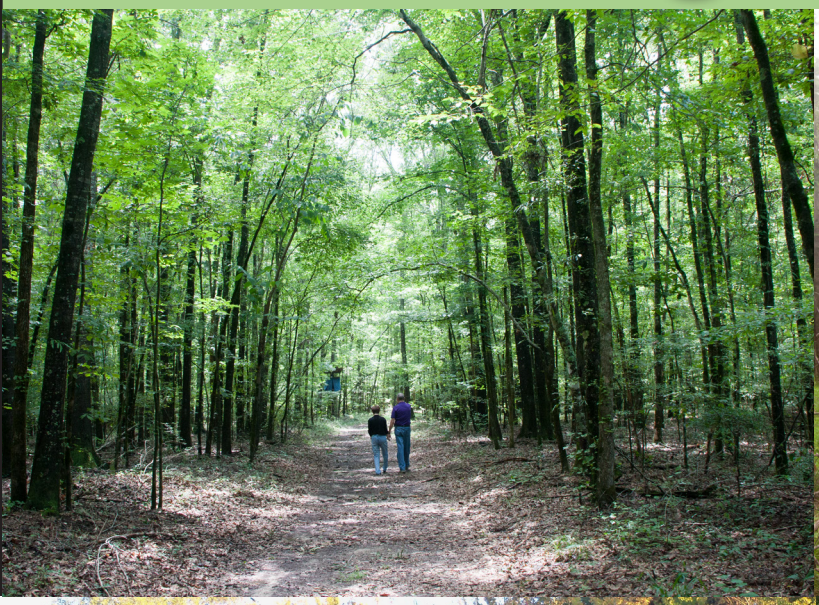
2014 - 2015 Forest Inventory
Central Region, Mississippi



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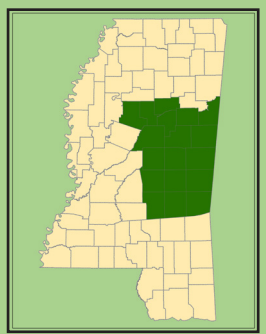

MIFI
MISSISSIPPI INSTITUTE
for FOREST INVENTORY

ACKNOWLEDGMENTS

The Mississippi Institute for Forest Inventory acknowledges the Mississippi Forestry Commission for its role in collecting field data. MIFI also acknowledges the College of Forest Resources and the Forest and Wildlife Research Center at Mississippi State University for assistance with development of the timber inventory methodology and software. The inventory would not be possible without the cooperation of public agencies such as the Mississippi Automated Resource Information System (MARIS) for providing auxiliary data. Thanks to the Mississippi Land Water and Timber Resources Board for providing a grant to complete this inventory project. Finally, MIFI extends a sincere debt of gratitude to private landowners in providing access to measurement plots.

Mississippi Forestry Commission

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TABLE OF CONTENTS

Acknowledgments i

Executive Summary 1

Resilience 2

Remote Sensing 3

Land Cover. 3

Ownership 4

Growth 5

Economic Impact 6

Forces of Change 7

A Brief History of Mississippi's Forests 8

The Continuing Role of Pine Plantations 9

Inventory Methods 10

Reliability of Data 11

District Volume 12

Obtaining Additional Help. 16

Glossary of Terms 17

Photo Credits

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http://www.winstonplywood.com/

About the cover

Sciples Mill (bottom left) has been operating in the same location in Kemper County since 1790. From the day it opened, the fee for grinding corn or wheat has always been 1/8 toll, or 1 gallon of product per bushel milled. Travelling through the big leaf magnolia (magnolia macrophylla) filled woods to the mill (lower right) is like travelling back through time. This unique landmark was featured in Mike Rowe's Dirty Jobs in 2010.

EXECUTIVE SUMMARY

The Mississippi Institute for Forest Inventory (MIFI) was created in 2002 to inventory the state's forest resources and promote the forest-based sectors of Mississippi's economy. While this information is currently provided by the US Forest Service's Forest Inventory and Analysis program, their inventory is only reliable at the state or half state level. In order to formulate sound forest policies and stimulate the forest-based economy in Mississippi, a more frequent and fine-scale inventory of our resources is necessary.

MIFI uses a contemporary inventory methodology that integrates satellite-based remote sensing, stratified random sampling theory, and innovative measurement technology to provide a regular inventory of the forest resources in the state. Emphasis is placed on the need for reliable estimates of the current timber volume and growth potential of the forest resources at the local level. Geographic constraints are incorporated into the inventory design for more precise estimates of smaller areas. The MIFI inventory sampling errors are generally acceptable down to three counties or less.

According to Rusty Booker, Vice President of Procurement for Drax in Gloster, MS, "MIFI data adds a higher level of confidence in any supply analysis used to support plant development that depends on the natural resources in Mississippi. The data is more robust – having a higher level of statistical significance and accuracy for the regions in Mississippi. (He has) used the updated data to validate supply planning and projections for new development opportunities. The data also help add to our position with the UK regulators that the forest in our operating area is robust and sustainable. It is well presented and has value to any existing user or potential wood using facility developments. (He) would like to see adjacent states implement similar programs."

The inventory for each district is delivered both in writing and via the World Wide Web. Our Web site is the primary tool for retrieving inventory information. An interface allows the user to analyze inventory results and query specific geographic locations. To learn more about MIFI or access the inventory interface, visit www.mifi.ms.gov or www.mfc.ms.gov.

Respectfully,

Mississippi Institute for Forest Inventory/Mississippi Forestry Commission

Additional information about any aspect of this survey may be obtained from:
Mississippi Institute for Forest Inventory/Mississippi Forestry Commission
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Resilience

On April 28, 2014, a devastating F4 tornado struck City of Louisville, Mississippi. Ten lives were tragically lost and dozens more from the community were injured. Businesses, including Winston Plywood & Veneer, were also destroyed. Recovery for many continues to this day (http://www.winstonplywood.com/).

Committed to Louisville and the surrounding community, as well as in recognition of the favorable wood supply in the region, Winston Plywood & Veneer broke ground on a new, state-of-the-art plywood mill on January 30, 2015. It is anticipated that this facility will ultimately employ over 300 workers. According to a study conducted by Mississippi State University, the economic impact of this facility will include supporting over 600 jobs and over $28 million in wages in Winston County alone.

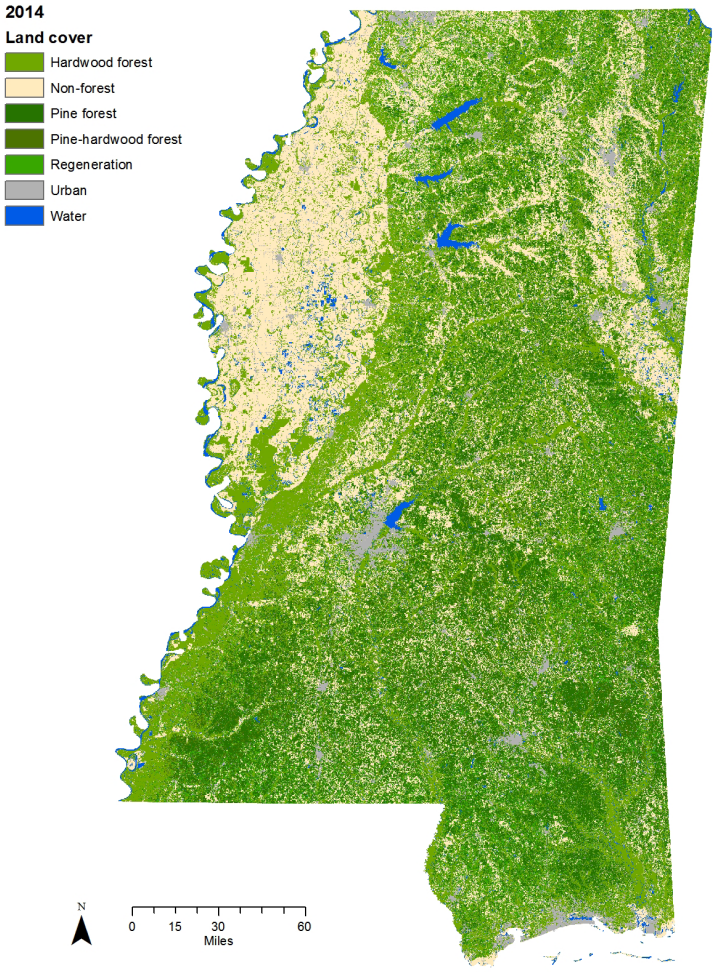
REMOTE SENSING

MIFI represents an advancement of forest inventory philosophy. It is the first statewide production-scale integration of satellite remote sensing and forest inventory. Independently, neither of the technologies can adequately answer the two most important questions posed with forest resource assessment:

- How much volume is present?
- Where is that volume located?

Inventory and remote sensing technologies are brought together through the use of a Geographic Information System (GIS). By combining spatial data derived from satellite imagery classification, and Global Positioning System (GPS) linked attribute data obtained from ground measurements, GIS helps answer these questions.

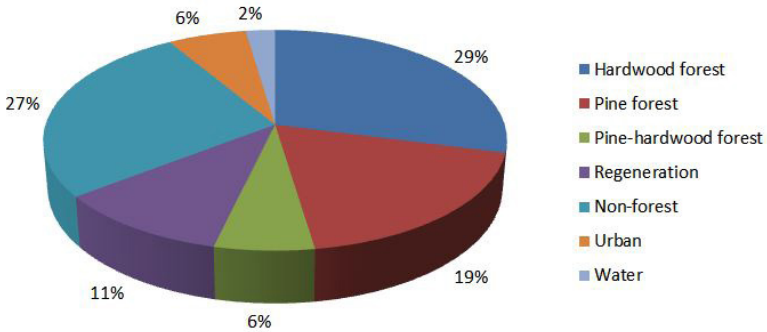
Mississippi Forest Land Cover Classification

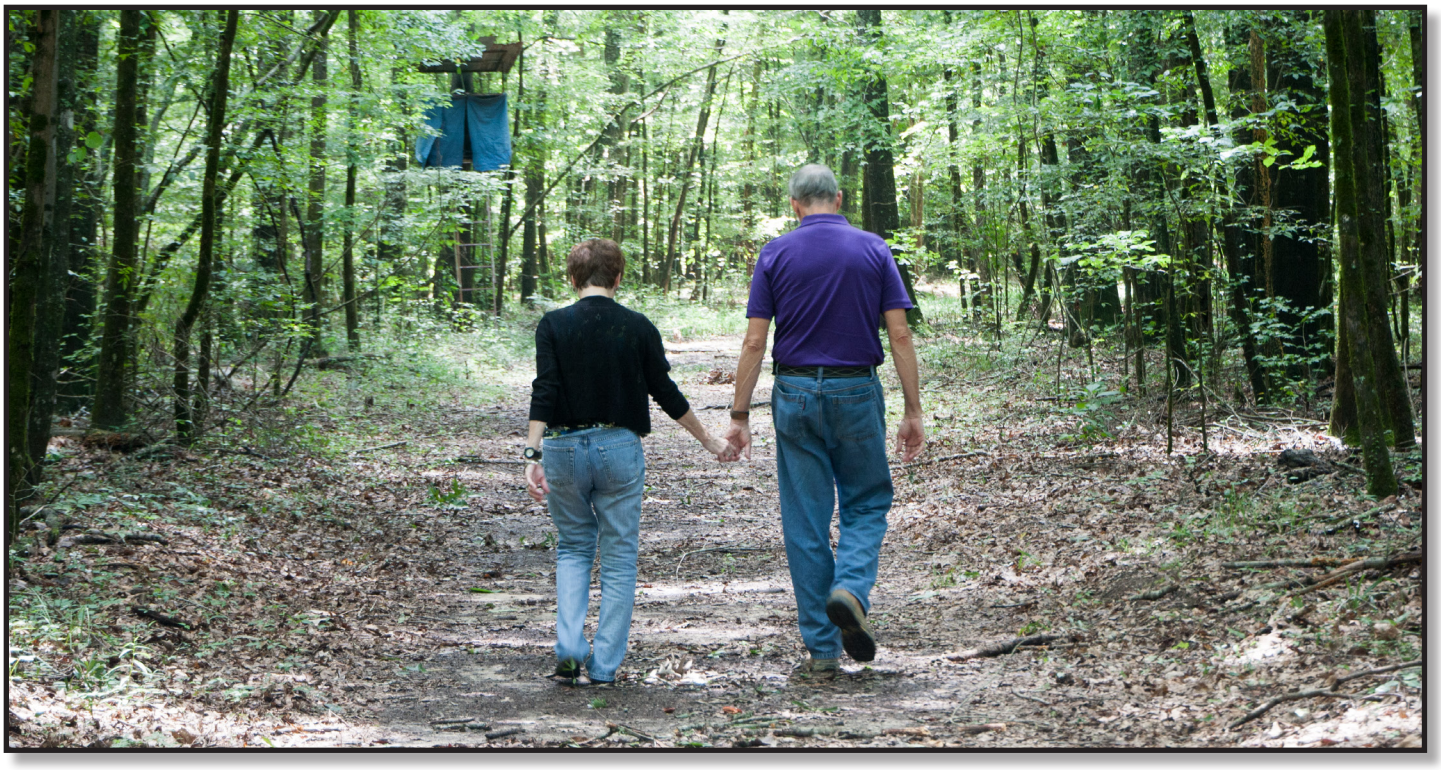


LAND COVER

The total available land base in Mississippi is 30,213,607 acres. Forestland currently occupies 19.51 million acres, or approximately 65% of Mississippi's land base. Of the forested acres, 5.6 million are pine, 8.8 million are hardwood and mixed oak-pine forests occupy 1.8 million acres. Another 3.28 million acres are currently in young forest regeneration that has not yet been classified as to forest cover type.

State Forest Land Cover Classification Percentages





OWNERSHIP

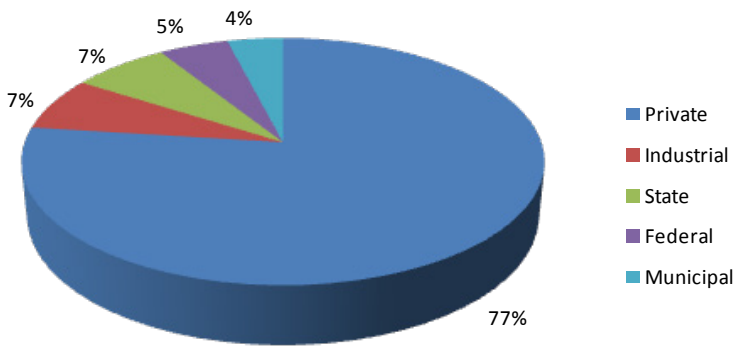
Parcel ownership for land in Mississippi is predominately family owned. Traditional family legacy subdivides large holdings into smaller parcels. In this type of ownership families acknowledge the legal distinction in ownership of the land but continue to manage the parcels as contiguous properties.

Mississippi recently began transitioning to a digital format for property records. However, only corporate and governmental ownership records are available in geo-referenced digital formats. MIFI focuses on the use of these records to create ownership descriptions. By process of elimination, the non-industrial private land ownership patterns can be discerned.

- Industrial timberland currently accounts for 3.1 million acres.
- Publicly owned federal timberland currently accounts for 2.2 million acres.
- Publicly owned state timberland currently accounts for approximately 1 million acres.
- Native American timberland in Mississippi amounts to approximately 25,000 acres.
- Almost 80% of the timberland in Mississippi is owned by private citizens.

Family forest owners dominate the private ownership group with 350,000 landowners who control parcels of 10 acres or greater.

Mississippi Land Ownership



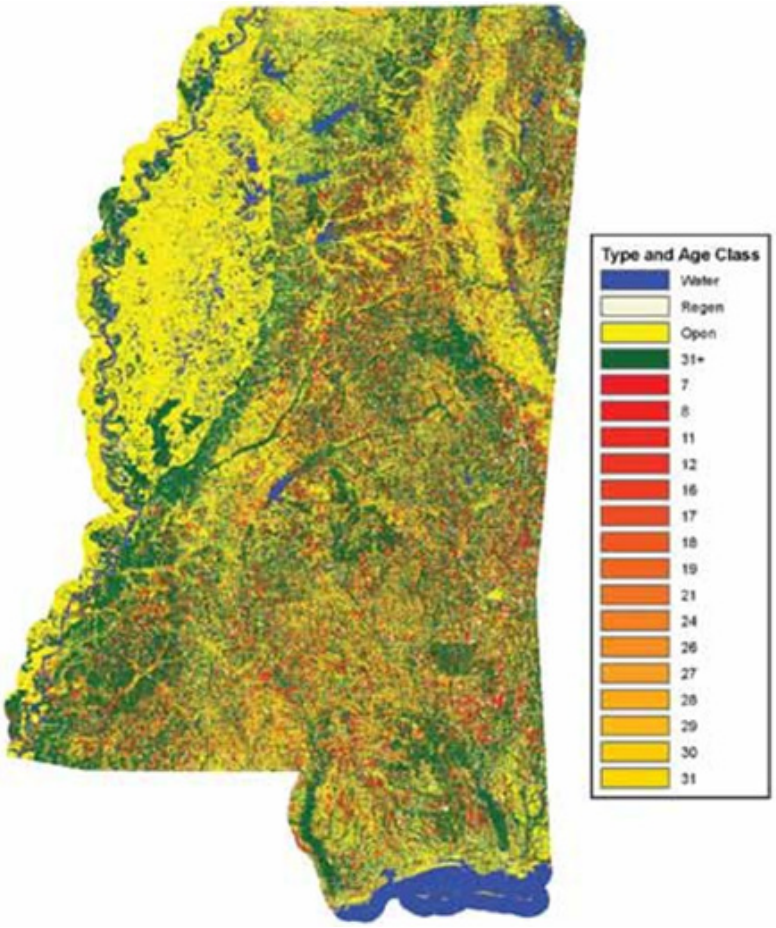
GROWTH

Sustainability of the forest resource is necessary to foster economic viability. Archival satellite imagery is used to assess the trend in resource utilization. The analysis utilizes satellite imagery that is classified into a forest/non-forest map of the state on an approximate five-year cycle dating from 1973 to present.

Softwood growth rates represent a return on investment realized as the increase in volume over a given length of time and reported as an annualized percentage rate. The ability to quickly and repeatedly determine growth rates in pines, coupled with the dominance of pine volume in the market mandate the prevalence of softwood growth rates. This is not to say that hardwood growth rates are of less importance. However, the requirements to measure hardwood annual growth in the field are prohibitive and a legacy of hardwood growth and yield research hinder those measurements.

- Softwood growth rate for the Central MIFI District is 10.0%.
- Hardwood growth rate for the Central MIFI District is 7.9%.

Mississippi Land Cover Age Classification



These growth rates can be compared to the interest rate paid upon a savings account and provide useful tools for investment analysis. The average current rate for a five-year certificate of deposit is 2.00%. Pine timber production that is five times as profitable when compared to a savings account represents a competitive alternative for investors.

The forestland cover age classification map shows the age distribution of Mississippi's forests. It also highlights the focus of harvesting activity throughout the years. The majority of harvesting occurs in a band in the center of the state, from north to south and in the lower portion of the state below the I-20 corridor.

ECONOMIC IMPACT

Roundwood production is the mainstay of Mississippi's forest-based economy. Hardwood and softwood production supply the markets for everything from furniture and flooring raw material to construction-grade solid wood products. The latest economic impact analysis available (Henderson, J.E., I.A. Munn. 2013)[1] indicate the contribution of forestry in Mississippi as:

- Forestry, logging, primary wood products, and furniture manufacturing contributes $10.9 billion in product output, and $4.07 billion in value added production; and

- 59,157 individuals are directly employed in logging, forestry and other wood-processing industries generating, a combined wage income of $2.71 billion.

A rapid and reliable measure of sustainability is the growth-to-drain ratio, which is calculated by dividing the total annual volume of growth by the total annual volume of removals. This measure of sustainability is a way of determining if the forest is being utilized to its current maximum potential without creating conditions that will result in reduction or total loss of forest resources in the future. The current growth-to-drain ratio for pine in Central Mississippi is 1.3. This means that this region is producing approximately 30% more pine volume than is being utilized. Implications of pine growth-to-drain ratios greater than 1.5 include greater risks of wildfire, forest health issues related to insect and disease outbreaks, and obvious economic challenges related to reduced industrial utilization. The growth-to-drain ratio for hardwood in this area is 4.0.

For more information regarding utilization or to obtain growth-to-drain ratio estimates for specific portions of Mississippi please contact the Mississippi Forestry Commission.

1. Henderson, J.E., I.A. Munn. 2013. The economic impact of forestry and the forest products industry on Mississippi's Congressional Districts. Forest and Wildlife Research Center, Research Bulletin FO 449, Mississippi State University. 12 pp.

Forces of Change

Mississippi's forestland is dynamic and constantly changing. The primary driving force in change is the human element. Population centers are expanding, and the U.S. Census Bureau estimates Mississippi's 2014 population to be 2.99 million people. The majority of this increase occurred in proximity to established metropolitan areas including DeSoto County near Memphis, TN, the counties surrounding the Jackson metroplex of Hinds, Madison, and Rankin counties, the vicinity of Hattiesburg and the Mississippi Gulf Coast. The resulting landscape is a mixture of forest and urban land cover often within close proximity to each other.

Natural forces typically do not result in loss of forestland. Insects and disease are always present and often influence stand structure throughout all stages of development. Other natural events can reshape the state's forest in a matter of hours. Timber damaged by hurricanes, tornadoes, ice storms, wildfires, or outbreaks of insects or diseases is quickly replaced because of the resilience of the forest and underlying land base maintaining forest sustainability.

As a force of change, people do not always have a detrimental impact on forests. In fact, good forest stewardship can greatly enhance forest resources. In the Central MIFI District, the forested acreage actually increased by nearly 100,000 acres since the last inventory, despite increasing human populations. Similarly, the pine inventory has increased by over 43 million tons and hardwood has increased by almost 40 million tons in this district since 2007.

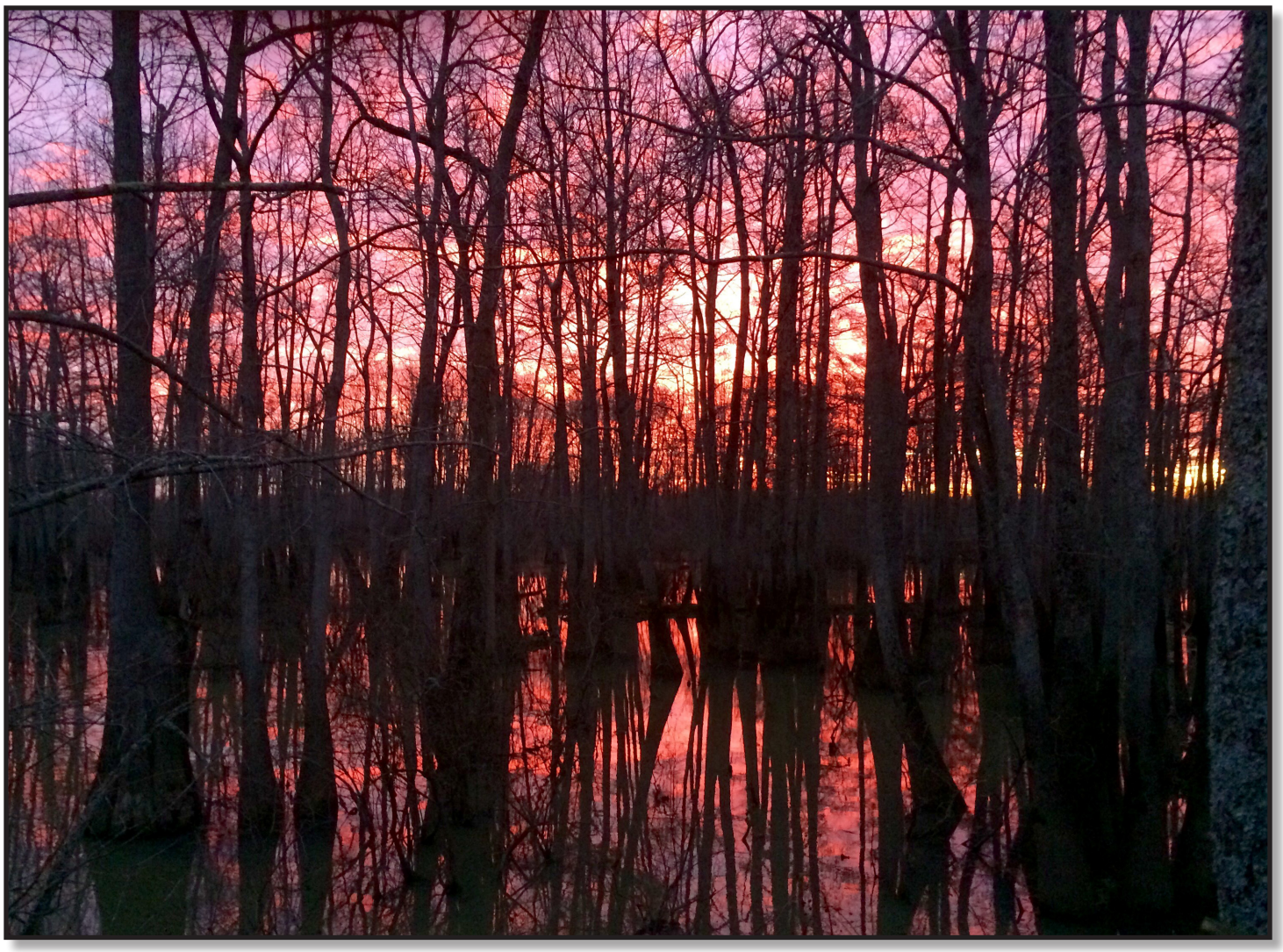
Whether natural or human induced, long-term or short, permanent or temporary, Mississippi's forestlands are constantly changing. These changes are reflected in the current condition of the state's forests as evidenced by trends in land use, stand composition, estimates of wood volume, and rates of net annual growth, removals, and mortality. The effects extend to overall forest health, as well as water quality, recreation potential, future timber availability and other aspects of forestland use and condition.

A Brief History of Mississippi's Forests

From the earliest occupation of Mississippi by Native Americans, the forests have been the primary livelihood of its residents. Wood products were used to manufacture dwellings, and wildlife in the forest represented both a source of food and trade goods. If by definition a "virgin forest" is a forest that has been uninfluenced by humans, then virgin forests have not existed in Mississippi since the pre-Colombian era.

Agriculture was the major force that shaped early Mississippi landscapes. The practice of slash-and-burn agriculture of early settlers resulted in a highly fragmented landscape of forests that exhibited all the stages of succession. At the beginning of the 20th century, large lumber manufacturers of the Northeast and Great Lakes regions looked for new resources as the timber resources of those regions were exhausted. The presence of rail networks and largely untapped reserves of timber in the Southeast attracted their attention. Thus, large-scale timber production began in Mississippi.

Until the late 1930s, the primary focus of forestry was the production of timber, with little regard for scientific-based management. Professional foresters began to foster the concept of actively managing pine forestland that could meet the demand for timber related products. As environmental awareness increased, management of forestland began to take a multi-use approach. Aesthetics, recreation, and water quality are principles that professional foresters are now trained to incorporate into their management practices.



The Continuing Role of Pine Plantations

A little more than 40 years ago, planted pine stands occupied fewer than 2 million acres in the South. By the late 1990s pine plantations accounted for nearly half of all pine stands. The dramatic increase in pine plantations has become one of the defining issues in southern forest management and is an issue in Mississippi as well.

Pine stands are often mechanically regenerated after harvest to ensure the site remains in production as a pine forest type. Since the inception of the Conservation Reserve Program (CRP) in 1985, combined with the Forest Resource Development Program (FRDP) and the Forest Incentive Program (FIP) for cost sharing, establishment of plantations in Mississippi has totaled 2,146,254 acres.

This represents 11% of the total timberland area and nearly a third of the pine timber area in Mississippi. Well managed planted pines have substantially lower mortality rates and higher rates of net annual growth, averaging nearly 128 cubic feet of wood growth per acre per year, compared to 76 cubic feet for natural pine stands.

Inventory Methods

The Mississippi Institute for Forest Inventory began the inventory in 2004. The sampling scheme is significantly different than traditional forest surveys, which produce estimates for an entire state. That traditional type of analysis prohibits the estimates of areas equivalent to the size of a county. MIFI directs sampling in a two stage process: analysis of satellite-based remote sensing with statistical validation for depicting the land cover types and subsequent change through time; and intensive ground measurement of the forest timber for a region or district of the state. This information provides statistical precision for county level estimates that can be used for economic development.

The remote sensing effort utilizes the spectral reflectance of vegetation captured in six or seven spectral bands by the Landsat satellite during both active and dormant seasons. Through a combination of band analyses and mathematical modeling, primary classifications of water, non-forest, pine, hardwood, and mixed pine-hardwood classes are obtained. Additional imagery from previous surveys is analyzed and then layered to represent the change in land cover over time. This stacking effect creates another classification: immature forest vegetation, which lacks maturity to allow for assignment in one of the dominant forestland cover classifications.

The ground-based measurements were implemented on a one-fifth acre fixed radius plot located randomly from the forest cover classification of the remotely sensed data. Sawtimber, pole and veneer volume were sampled and characteristics associated with stand dynamics were measured. A one-tenth acre plot was incorporated to measure the volume of product classes used to produce fiber for the pulp industry. Finally, a one-twentieth acre plot was inventoried to measure non-merchantable stems that range from 1.0 to 4.5 inches in diameter at breast height.

In the event there was no merchantable material located on a plot, such as following a harvest, a one-hundredth acre plot was established to measure reproduction material that will develop into a future timber stand. A representative sample of the current forest conditions was obtained at each sample location for all timber species, from the smallest seedling to the largest tree encountered on any of the plots. Individual tree attributes measured include species, product, observable damage, diameter at breast height, total height, height to absolute diameter limits for pulpwood and sawtimber volume, crown length, bark thickness, 5 and 10-year radial growth, and age. Stand level attributes recorded include slope, size class, apparent stand level damages, over story composition with reference to the remote sensing products, logging operability, physiographic position, Society of American Foresters forest cover type designation, litter depth, and USFS fuel model designation.

To avoid statistical confounding, plots were located within a strictly homogenous stand condition. In the event an operational or management activity disrupted the proposed plot site (e.g. the establishment of a right-of-way, property thinning, etc.) the plot was shifted a specified distance to the stand that exhibited the higher heterogeneity in volume. Estimates of timber volume and forest classifications were derived from tree measurements and classifications made at these locations. Volumes for individual tally trees were computed using profile equations for each of the 60 major species in Mississippi.

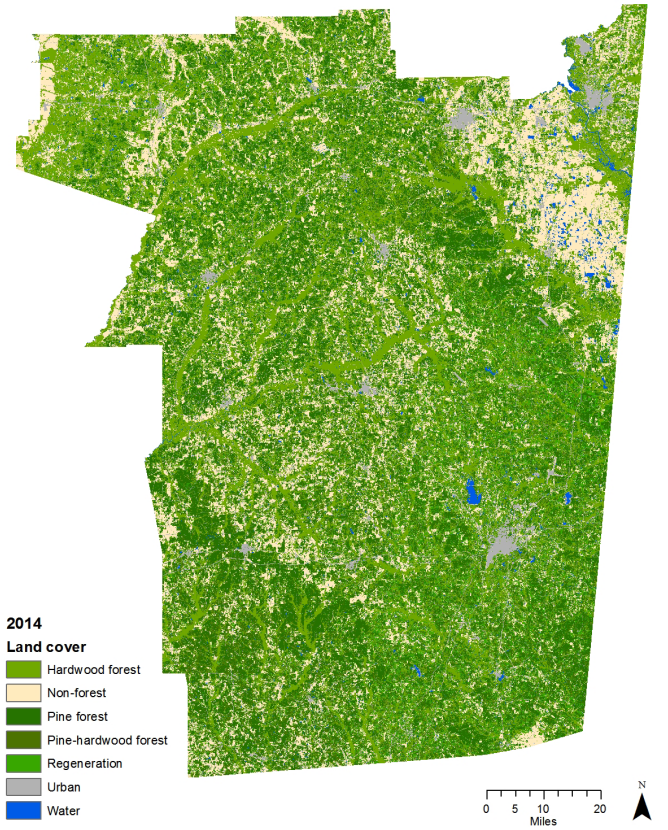
Reliability of Data

The reliability of a forest inventory is measured by the statistical sampling error. Sampling error increases, indicating reduced reliability, when the sample size is decreased. At a 95% confidence level, this inventory has less than 5.0% error for estimates of total cubic-foot volume outside bark at the district level (18 counties). This means that 95 out of 100 times the estimated values will be within 5.0% of the true values when considering the entire district. Reducing the sample size from the district level to five counties increases the sampling error to approximately 9%. When considering only three counties the sampling error increases to approximately 11.5%.

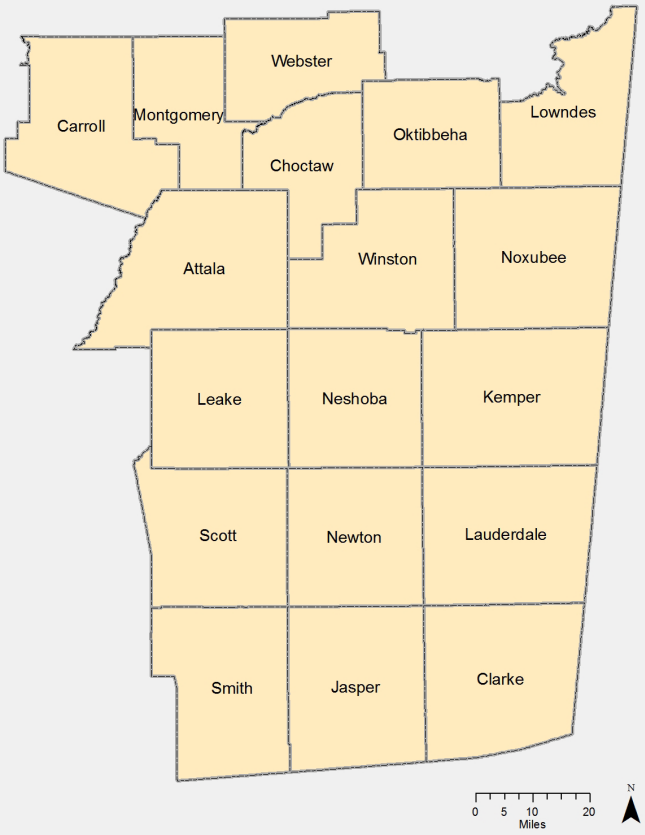
District Volume

Mississippi was divided into five districts based on geography, physiography, economic and political characteristics. The Central District includes 18 counties and over five million acres of forestland. Of the forested acreage, 41% is hardwood, 40% is pine, 16% is mixed pine and hardwood and the remaining 3% is currently in young regeneration that has not yet been classified as to the dominant forest cover type.

Central District Land Cover Classification



Central District Counties



The following tables report the forest cover types, volumes, and acreage sampling errors associated with the 18 counties of the Central MIFI district. Also included are the estimates for pine growth and non-commercial forest regeneration that will provide the future timber supply. All volumes are expressed in 100s of cubic feet outside bark. Stem counts are expressed in 1,000s.

MIFI Central Region Summary				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Non-Forest	1,751,514			
Pine	2,059,264	63,519,155	43,568,211	3.4
Hardwood	2,126,984	50,728,788	31,059,104	4.3
Mixed	793,593	18,780,455	12,624,318	9.9
Reproduction	159,279			
Forested	5,139,121			
Total	6,890,635			

Attala County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	139,745	4,801,495	2,766,806	8.9
Hardwood	117,807	2,705,167	1,401,407	18.8
Forested	284,817	8,150,192	4,317,148	8.8

Carroll County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	59,328	2,081,578	1,258,784	17.4
Hardwood	180,210	5,060,857	3,008,172	6.6
Forested	263,067	7,750,102	4,627,785	5.8

Choctaw County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	82,884	3,341,318	2,305,672	14.1
Hardwood	76,090	2,943,371	2,132,476	15.5
Forested	158,974	6,284,689	4,438,148	10.3

Clarke County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	133,431	3,379,736	2,255,999	20.3
Hardwood	62,479	1,834,894	1,258,575	40.3
Forested	270,639	7,540,726	5,442,180	16.9

Jasper County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	120,556	4,256,370	3,364,228	18.9
Hardwood	93,875	2,568,107	1,805,585	27.2
Forested	258,363	8,301,434	6,303,489	15.9

Kemper County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	134,151	5,005,634	4,018,819	23.2
Hardwood	106,888	3,077,261	1,972,489	23.2
Forested	280,370	9,173,673	6,899,646	16.4

Lauderdale County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	132,233	4,149,863	3,055,396	9.7
Hardwood	100,273	2,802,686	1,826,743	19.8
Forested	304,817	9,728,768	6,541,374	11.3

Leake County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	90,984	2,910,796	2,324,265	12.7
Hardwood	96,186	2,439,269	1,825,213	21.7
Forested	208,341	5,775,284	4,478,855	11.3

Lowndes County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	39,230	1,171,905	587,628	11.4
Hardwood	92,786	2,647,424	954,032	8.5
Forested	158,315	4,695,028	1,892,382	8.3

Montgomery County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	58,201	2,159,662	1,028,862	0.0*
Hardwood	87,364	2,299,263	1,127,299	10.4
Forested	161,110	4,988,208	2,505,182	5.6

Neshoba County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	94,876	4,227,830	1,200,393	9.2
Hardwood	98,457	4,573,178	1,715,822	18.1
Forested	220,909	9,639,467	3,235,991	8.8

Newton County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	111,236	3,921,096	3,006,020	7.5
Hardwood	84,152	2,480,914	1,482,966	21.2
Forested	243,161	8,130,164	5,715,175	9.5

Noxubee County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	104,083	2,977,252	1,882,330	16.2
Hardwood	90,947	3,253,531	2,395,473	17.2
Forested	231,498	716,517	4,755,807	10.6

Oktibbeha County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	72,701	2,161,460	1,580,422	0.0*
Hardwood	76,435	2,073,717	1,411,246	13.0
Forested	162,524	4,426,104	3,129,506	8.3

Scott County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	129,286	4,828,837	3,975,540	9.7
Hardwood	83,158	2,747,687	2,240,701	19.9
Forested	238,620	8,477,535	6,977,865	8.5

Smith County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	144,582	4,935,082	3,703,992	11.3
Hardwood	91,744	2,145,781	1,332,958	20.9
Forested	268,952	8,871,770	6,525,983	9.1

Webster County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	61,871	2,164,254	1,402,943	8.8
Hardwood	80,899	2,037,209	1,166,383	13.2
Forested	158,760	4,827,788	3,015,798	7.4

Winston County				
Strata	Acres	Pulpwood Volume	Sawtimber Volume	Sampling Error %
Pine	119,851	5,044,989	3,850,113	15.2
Hardwood	102,334	3,038,472	2,001,562	16.7
Forested	247,738	9,102,290	6,449,320	9.9

*Note: If the plot sample equals the total plots, the sampling error % is zero. If either the sample or total plot count is zero, the sampling error % is zero.

	Number of Stems by Diameter Class				5-yr Projected Pine Volume		Annual Growth Rate (%)	
County	1-inch	2-inch	3-inch	4-inch	Pulpwood	Sawtimber	Pulpwood	Sawtimber
Attala	79,088	65,827	37,478	27,251	7,470,369	5,515,565	9.2%	14.8%
Carroll	51,516	39,782	26,824	14,075	2,612,272	1,957,088	4.6%	9.2%
Choctaw	29,317	27,581	19,824	14,148	5,122,296	3,678,907	8.9%	9.8%
Clarke	44,426	38,725	33,331	25,467	5,441,179	3,997,359	10.0%	12.1%
Jasper	41,264	39,556	33,278	20,386	6,503,361	5,287,998	8.8%	9.5%
Kemper	100,325	81,116	46,944	23,355	8,293,743	6,717,504	10.6%	10.8%
Lauderdale	21,956	28,831	26,861	9,656	5,973,423	4,942,617	7.6%	10.1%
Leake	91,636	48,349	20,509	9,827	4,074,719	3,510,268	7.0%	8.6%
Lowndes	48,326	28,059	18,184	8,934	1,643,530	1,201,628	7.0%	15.4%
Montgomery	43,237	29,975	20,569	10,346	3,177,088	2,078,921	8.0%	15.1%
Neshoba	44,118	50,488	29,714	21,408	5,965,042	4,398,027	7.1%	29.7%
Newton	27,071	26,807	22,032	14,405	5,523,400	4,602,165	7.1%	8.9%
Noxubee	41,265	41,459	21,248	15,415	4,572,731	3,288,850	9.0%	11.8%
Oktibbeha	27,784	39,575	16,074	10,359	3,133,717	2,423,072	7.7%	8.9%
Scott	32,370	28,781	15,477	11,042	6,679,561	5,800,057	6.7%	7.8%
Smith	42,177	45,862	26,631	25,366	7,151,970	5,910,960	7.7%	9.8%
Webster	47,061	44,524	24,265	15,510	3,145,261	2,404,531	7.8%	11.4%
Winston	71,031	58,292	33,251	26,263	7,849,331	5,943,056	9.2%	9.1%
Total	883,968	763,589	472,494	303,213	94,332,993	73,658,573	8.0%	11.8%

Obtaining Additional Information

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Glossary of Terms

Basal area. The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand, usually expressed in square feet per acre.

Commercial species. Tree species currently or potentially suitable for industrial wood products.

CRP. The Conservation Reserve Program, a major Federal afforestation program authorized by the 1985 Farm Bill.

D.b.h. Tree diameter in inches (outside bark) at breast height (4.5 feet above ground).

Diameter Class. A classification of trees based on tree d.b.h. One-inch diameter classes are commonly used. For example, the 6-inch class includes trees 5.6 through 6.5 inches d.b.h.

D.o.b. (diameter outside bark) Stem diameter including bark.

Forest Land. Land at least 10 percent stocked by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use. The minimum area considered for classification is 1 acre.

Forest management type. A classification of timberland based on forest type and stand origin.

Forest type. A classification of forest land based on the species forming a plurality of live-tree stocking. Major Mississippi forest-type groups are:

Longleaf-slash pine. Forests in which longleaf or slash pine, singly or in combination, constitute a plurality of the stocking. (Common associates include oak, hickory, and gum)

Loblolly-shortleaf pine. Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, constitute a plurality of the stocking. (Common associates include oak, hickory and gum)

Oak-pine. Forests in which hardwoods (usually upland oaks) constitute a plurality of the stocking but in which pines account for 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow- poplar)

Oak-hickory. Forests in which upland oaks or hickory, singly or in combination, constitutes a plurality of the stocking, except where pines account for 25 to 50 percent, in which case the stand would be classified oak- pine. (Common associates include yellow-poplar elm, maple, and black walnut)

Oak-gum-cypress. Bottom-land forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, constitutes a plurality of the stocking, except where pines account for 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple)

Elm-ash-cottonwood. Forests in which elm, ash, or cottonwood, singly or in combination, constitutes a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple)

Maple-beech-birch. Forests in which maple, beech, or yellow birch, singly or in combination, constitute a plurality of the stocking. (Common associates include hemlock, elm, basswood, and white pine)

Nonstocked stands. Stands less than 10 percent stocked with live trees.

Pine plantation. Stands that (a) have been artificially regenerated by planting or direct seeding, (b) are classed as a pine or other softwood forest type, and (c) have at least 10 percent stocking.

Natural pine. Stands that (a) have not been artificially regenerated, (b) are classed as a pine or other softwood forest type, and (c) have at least 10 percent stocking.

Oak-pine. Stands that have at least 10 percent stocking and classed as a forest type of oak-pine.

Upland hardwood. Stands that have at least 10 percent stocking and classified as an oak-hickory or maple-beech-birch forest type.

Lowland hardwood. Stands that have at least 10 percent stocking with a forest type of oak-gum-cypress, elm-ash- cottonwood, palm, or other tropical.

Nonstocked stand. Stands less than 10 percent stocked with live trees.

GIS - Acronym for geographic information system. An integrated collection of computer software and data used to view and manage information about places, analyze spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed and analyzed.

Hardwoods. Dicotyledonous trees, usually broadleaf and deciduous.

Hard hardwoods. Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maples, hickories, and beech.

Soft hardwoods. Hardwood species with an average specific gravity of .50 or less, such as gums, yellow poplar, cottonwoods, red maple, basswoods, and willows.

Industrial wood. All roundwood products except fuelwood.

Land area. The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river floodplains (omitting tidal flats below mean high tide), streams sloughs, estuaries, and canals less than 200 feet wide, and lakes, reservoirs, and ponds less than 4.5 acres in area.

Live trees. All living trees, all size classes, all tree classes, and both commercial and noncommercial species are included.

Log Grade. A classification of logs based on external characteristics indicating quality or value.

Logging residues. The unused merchantable portion of growing-stock trees cut or destroyed during logging operations.

Noncommercial species. Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land. Land that has never supported forests and land formerly forested where timber production is precluded by development for other uses.

Nonstocked stands. Stands less than 10 percent stocked with live trees.

Ownership. The property owned by one ownership unit, including all parcels of land in the United States.

National forest land. Forest land that has been legally designated as national forests or purchase units, and other land under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III land.

Forest industry land. Land owned by companies or individuals operating primary wood-using plants.

Nonindustrial private forest (NIPF) land.
Privately owned land excluding forest industry land or forest industry-leased land. Corporate. Owned by corporations, including incorporated farm ownerships.

State, county, and municipal land. Land owned by states, counties, and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Primary wood-using plants. Industries receiving roundwood or chips from roundwood for the manufacture of products, such as veneer, pulp, and lumber.

Reforestation. Area of land previously classified as forest that is regenerated by planting trees or natural regeneration.

Remote Sensing. The use of aircraft or satellite imagery to identify and describe the land cover and land use.

Roundwood (roundwood logs). Logs, bolts, or other round sections cut from trees for industrial or consumer uses.

Roundwood chipped. Any timber cut primarily for pulpwood, delivered to non- pulp mills, chipped, and then sold to pulp mills as residues, including chipped tops, jump sections, whole trees, and pulpwood sticks.

Roundwood products. Any primary product such as lumber, poles, pilings, pulp, or fuelwood, that is produced from roundwood.

Saw-Log. A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, with a minimum diameter inside bark for softwoods of six inches (8 inches for hardwoods).

Saw-log portion. The part of the bole of sawtimber trees between a 1-foot stump and the saw-log top.

Saw-log top. The point on the bole of sawtimber trees above which a conventional saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b for hardwoods.

Sawtimber-size trees. Softwoods 8.0 inches d.b.h and larger and hardwoods 11.0 inches d.b.h. and larger.

Sawtimber volume. Growing-stock volume in the saw-log portion of sawtimber-size trees in board feet.

Seedlings. Trees less than 1.0 inch d.b.h. and greater than 1 foot tall for hardwoods, greater than 6 inches tall for softwood, and greater than .5 inch in diameter at ground level for longleaf pine.

Select red oaks. A group of several red oak species composed of cherrybark, Shumard, and northern red oaks. Other red oak species are included in the "other red oaks" group.

Select white oaks. A group of several white oak species composed of white, swamp chestnut, swamp white, chinkapin, Durand, and bur oaks. Other white oak species are included in the "other white oaks" group.

Site class. A classification of forest land in terms of potential capacity to grow crops of industrial wood based on fully stocked natural stands.

Softwoods. Coniferous trees, usually evergreen, having leaves that are needles or scalelike.

Yellow pines. Loblolly, longleaf, slash, pond, shortleaf pitch, Virginia, sand, spruce, and Table Mountain pines.

Other softwoods. Cypress, eastern red-cedar, white-cedar, eastern white pine, eastern hemlock, spruce and fir

Spectral reflectance. Sunlight reflected from the ground or canopy of the forest that is recorded by the sensor in the satellite or aircraft that is separated into small classes (bands).

Stand age. The average age of dominant and co-dominant trees in the stand.

Stand origin. A classification of forest stands describing their means of origin.

Planted. Planted or artificially seeded.

Natural. No evidence of artificial regeneration.

Stand-size class. A classification of forestland based on the diameter class distribution of live trees in the stand.

Statistical Precision. The ability to achieve the same results with repeated measurements.

Sawtimber stands. Stands at least 10 percent stocked with live trees, with half or more of total stocking in sawtimber and poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Stocking. The degree of occupancy of land by trees, measured by basal area or the number of trees in a stand and spacing in the stand, compared with a minimum standard, depending on tree size, required to fully utilize the growth potential of the land.

Thematic map. Displays complex map data using classes that combine similar data.

Timberland. Forest land capable of producing 20 cubic feet of industrial wood per acre per year and not withdrawn from timber utilization.

Timber products. Roundwood products and byproducts.

Tree. Woody plants having one erect perennial stem or trunk at least 3-inches d.b.h. a more or less definitely formed crown for foliage and a height of at least 13 feet (at maturity).

Tree Grade. A classification of the saw-log portion of sawtimber trees based on: (1) the grade of the butt log or (2) the ability to produce at least one 12-foot or two 8- foot logs in the upper section of the saw- log portion. Tree grade is an indicator of quality. Grade 1 is the best quality.

Upper-stem portion. The part of the main stem or fork of sawtimber trees above the saw-log top to minimum top diameter 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

Volume of live trees. The cubic-foot volume of sound wood in live trees at least 4.6 inches d.b.h from a 1-foot stump to a minimum 3.0 inch top d.o.b of the central stem for softwood or 4.0 inches for hardwoods.

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