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Stereo Photo Series for Quantifying Natural Fuels
Volume VIa: Sand Hill, Sand Pine Scrub, and Hardwoods with White Pine Types in the Southeast United States with Supplemental Sites for Volume VI

PMS 838
NFES 1119

April 2003

This volume, **Volume VIa: Sand Hill, Sand Pine Scrub, and Hardwoods with White Pine Types in the Southeast United States with Supplemental Sites for Volume VI (PMS 838, NFES 1119),** is a continuation of **Volume VI: Longleaf Pine, Pocosin, and Marshgrass Types in the Southeast United States (PMS 835, NFES 2630).** The supplemental Longleaf pine and marshgrass sites contained in this volume should only be considered as additional sites to be used in conjunction with the sites in Volume VI. Ideally, they should be removed and inserted after page 27 for the Longleaf pine series and after pages 52 and 56 for the marshgarss series.

Stereo Photo Series for Quantifying Natural Fuels

Volume VIa: Sand Hill, Sand Pine Scrub, and Hardwoods with White Pine Types in the Southeast United States with Supplemental Sites for Volume VI

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ABSTRACT

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A series of single and stereo photographs display a range of natural conditions and fuel loadings in sand hill, sand pine scrub, and hardwoods ecosystems in the southeastern United States. Each group of photos includes inventory information summarizing vegetation composition, structure and loading, woody material loading and density by size class, forest floor depth and loading, and various site characteristics. The natural fuels photo series is designed to help land managers appraise fuel and vegetation conditions in natural settings.

Keywords: Woody material, biomass, fuel loading, natural fuels, sand hill, sand pine scrub, hardwoods, longleaf pine, *Pinus palustris*, sand pine, *Pinus clausa*, Eastern white pine, *Pinus strobus*.

COOPERATORS

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What Is the Natural Fuels Photo Series?

The first phase of the natural fuels photo series was a collection of six volumes, each representing a region of the United States. Volume I included sites in mixed-conifer, western juniper, sagebrush, and grassland ecosystem types in the interior Pacific Northwest. Volume II included sites in black spruce and white spruce ecosystem types in Alaska. Volume III included sites in lodgepole pine, quaking aspen, and gambel oak ecosystem types in the Rocky Mountains. Volume IV included sites in pinyon-juniper, sagebrush, and chaparral ecosystem types in the Southwest. Volume V included sites in red and white pine, northern tallgrass prairie, and hardwood ecosystem types in the Midwest. Volume VI included sites in longleaf pine, pocosin, and marsh grass ecosystem types in the Southeast.

Generally, sites include wide-angle and stereo-pair photographs supplemented with information on living and dead fuels and vegetation, and where appropriate, stand structure and composition within the area visible in the photographs (fig. 1). This volume (volume VIa) includes sites in sand hill, sand pine scrub, and hardwoods ecosystems. In addition, this volume includes supplemental sites for longleaf pine and marshgrass ecosystems originally reported in Volume VI. The sites in this volume provide a basis for appraising and describing woody material, vegetation, and stand conditions in ecosystems across the southeastern United States.

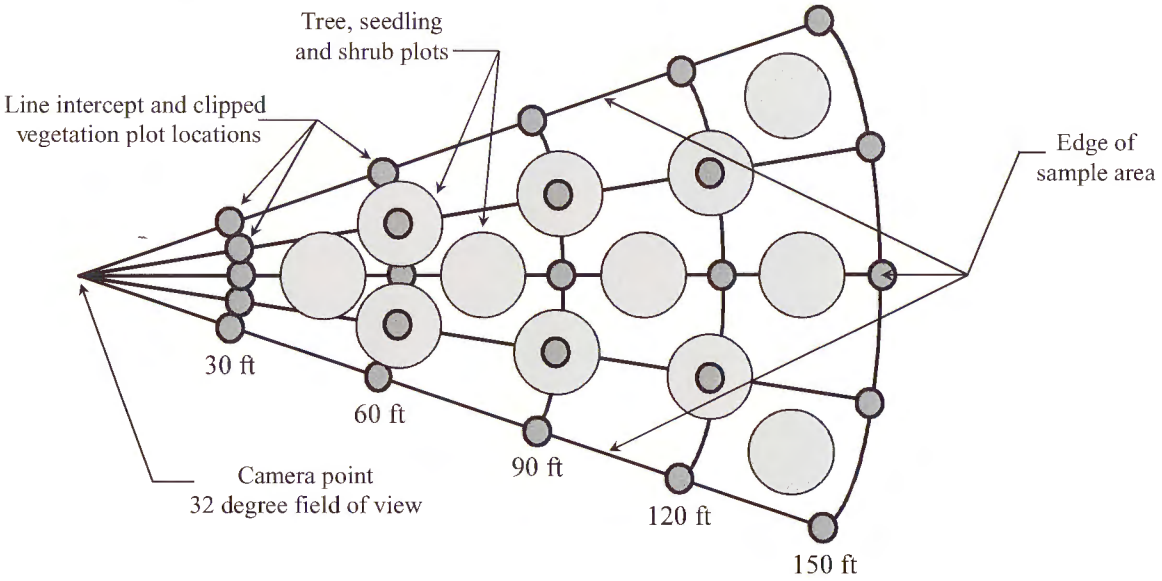

Figure 1--Photo series sample area layout. Forty random azimuth line transects (one at each point on the 30- and 150-foot arcs, and two at each point on the 60-, 90-, and 120-foot arcs) and 12 clipped vegetation plots (two to three per arc) were located within the sample area. Trees, shrubs, and seedlings were inventoried on 12 systematically located sample plots.

Why Is the Photo Series Needed?

These photo series are land management tools that can be used to assess landscapes through appraisal of living and dead woody material and vegetation (i.e., fuels) and stand characteristics. Once an assessment has been completed, stand treatment options, such as prescribed fire or harvesting, can be planned and implemented to better achieve desired effects while minimizing negative impacts on other resources.

The photo series has application in several branches of natural resource science and management. Inventory data such as these can be used as inputs for evaluating animal and insect habitat, nutrient cycling, and microclimate, for example. Fire managers will find these data useful for predicting fuel consumption, smoke production, fire behavior, and fire effects during wildfires and prescribed fires. In addition, the photo series can be used to appraise carbon sequestration, an important factor in predictions of future climate, and to link remotely sensed signatures to live and dead fuels on the ground.

Ground inventory procedures that directly measure site conditions (e.g., fuel loading and arrangement, vegetation structure and composition, etc.) exist for most ecosystem types and are useful when a high degree of accuracy is required. Ground inventory is time-consuming and expensive, however. Photo series can be used to make quick, easy, and inexpensive approximations of fuel quantities and stand conditions when less precise estimates are acceptable.

How Was the Photo Series Developed?

Sites photographed for the series in this volume were selected to show a range of conditions of several site attributes depending on the ecosystem type. The sand hill sites show a range of overstory conditions, with a specific focus on turkey oak (*Quercus laevis*) occurrence as a percentage of the tree composition. The sand pine scrub sites also represent a range of overstory conditions, primarily of the sand pine (*Pinus clausa*) component. The hardwoods sites depict a range of understory development conditions with respect to varying degrees of Eastern white pine (*Pinus strobus*) invasion. The supplemental longleaf pine and marshgrass sites capture high biomass conditions in their respective types. Photographs were taken and fuel loading, stand structure, and composition data were collected by using the procedures of Maxwell and Ward (1980) as a guide.

Photographs

Stereo-pair photographs are included in this guide. The three-dimensional image obtained by viewing the photographs with a stereoscope will improve the ability of the land manager to appraise natural fuel, vegetation, and stand structure conditions. A larger, wide-angle photograph has been included for additional comparisons. Two wide angle photographs, showing leaf-on and leaf-off views, are included for some sites. The marker in these photographs is a 1-foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide scale. The pole is 30 feet from the camera. The summary data relate to the field of view of the stereo-pair photographs but are based on measurements taken in the sample area only (see fig. 1). No sampling occurs in the foreground between the camera and the sign.

Photograph and Information Arrangement

The photographs and accompanying data summaries are presented as single sites organized into three series. Each site is arranged to occupy two facing pages. The upper page contains the wide-angle (50mm) photograph (or photographs) and general site, stand, and forest floor or understory information. The lower page includes the stereo-pair photographs and summaries of overstory structure and composition, understory vegetation structure and composition, or forest floor depth loading and constancy, and dead and down woody material loading and density by size class.

Site Information

The camera point of each site was located with a global positioning system (GPS) receiver using the WGS-84 datum. Aspect and slope were measured with a compass and clinometer, respectively. Community types were designated in the sand hill and sand pine scrub series based on vegetation structure and composition, and successional status (Kindell et al. 1997); "rough" includes understory vegetation and forest floor material, and the age indicates the number of years since the last fire occurred at the site. Society of American Foresters (SAF) cover type was assigned for each site based on descriptions in Eyre (1980). Society of American Foresters cover type is defined by current vegetation composition and locality or environmental factors.

Stand Information

Tree and understory species (shrub, forb, and graminoid species) present at a site are listed in order of abundance.[1] Understory species coverage was estimated using line intercept transects (Canfield 1941); the listing of understory species was not meant to be a complete vegetation inventory and may represent only a portion of the actual species richness of the sampled areas. The percentage of dead standing trees was determined by sampling within the site (fig. 1). Crown closure was measured either with a forest densitometer at 95 systematically located points in the sample area or, for forests with low tree cover or small stature, was estimated by using line intercept transects (Canfield 1941). Live seedling composition, density, and coverage were estimated by using twelve 0.005-acre circular plots representing 43 percent of the sample area; all trees less than 4.5 feet tall were considered seedlings.

Forest Floor Information

Surface material and duff depth were calculated as the average of measurements taken every five feet between the 30- and 150-foot arcs of the three center transects for a total of 75 measurements (fig. 1). The depth of the different forest floor components was calculated as an average of the depth only where that component was encountered during sampling. Therefore, the depths reported for the different forest floor components are not unit-wide averages and do not necessarily sum to total depth. Loading was calculated from bulk density values derived from field measurements or through collection of material in twelve 10.76 square foot plots.[2] Constancy is an indicator of how consistently the various forest floor components occur in the sample area and is expressed as a percentage of the total number of measurements. The amount of exposed mineral soil at each site can be estimated by subtracting the constancy of the total forest floor from 100 percent.

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[1] A list of scientific and common species names used in this volume appears on pages 7 and 8.

[2] Forest floor bulk density values used for each material type appear under "Notes to Users" for each series.

Saplings and Trees

Overstory trees and saplings (i.e., trees ≥ 4.5 feet tall) were sampled in twelve 0.005-acre circular plots located systematically throughout the sample area or within the entire sample area for sites with low tree density (fig. 1). Tree measurement data were summarized by diameter at breast height (d.b.h.) size class and by tree status (all, live, or dead).[3] Height to crown base was defined as the height of the lowest, continuous live or dead branch material of the tree canopy, and height to live crown was defined as the height of the lowest continuous live branches of the tree canopy. Live crown mass values, where reported, (i.e., live branches and foliage) were calculated from species and size-specific allometric equations (Clark et al. 1985, Edwards and McNab 1979, Taras and Phillips 1978).

Understory Vegetation

Understory species coverage was estimated by using line intercept transects (Canfield 1941). Where species-specific coverage is not reported, understory vegetation coverage was estimated by lifeform category (shrub, forb, or graminoid) by using the line intercept transects. Understory vegetation heights were measured at 25 points located systematically throughout the sample area. Typically, understory vegetation biomass was determined by sampling twelve square, clipped vegetation plots (10.76 square feet each) also located systematically throughout the sample area (fig. 1). For the sand pine scrub and supplemental longleaf pine series, understory vegetation biomass was clipped and collected in six to eight plots (43.03 square feet each) and separated by lifeform (seedling, sapling, or shrub), species, and size class. All live and dead understory vegetation (regardless of size) within each square plot was clipped at ground level, separated, and returned to the laboratory for oven drying. Understory vegetation and other collected material were ovendried at a minimum of 158 °F for at least 48 hours before weighing and determination of area loading.

Woody Material

Measurement techniques used for inventorying dead and down woody material were patterned after the planar intersect method outlined by Brown (1974) and described by Maxwell and Ward (1980). Forty transects of random azimuth starting at 25 systematically located points within the sample area were used to determine woody material loading and density (fig. 1). Woody material data are reported by size classes that correspond to timelag fuel classes used in fire behavior modeling (see, for example, Burgan and Rothermel 1984).[4] Woody material in 10-hour, and 100-hour and larger size classes was tallied on transects that were 10 feet and 30 feet long, respectively. Woody material loading in the 1-hour size class (and the 10-hour and 100-hour size classes for several of the sites) was determined by collecting, oven drying, and weighing all pieces in twelve 10.76-square-foot sample plots. The decay class and the actual diameter at the point of intersection was measured for all pieces >3 inches in diameter. All woody material <3 inches in diameter was considered sound. Woody material loading and woody material density were calculated from relationships that use number of pieces intersected and transect length (and wood specific gravity for loading), respectively, developed by Brown (1974) and Safranyik and Linton (1987).

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[3] D.b.h. is measured 4.5 feet above the ground.

[4] 1-, 10-, 100- and 1000-hour timelag fuels are defined as woody material ≤ 0.25 inch, 0.26-1.0 inch, 1.1-3.0 inches, and >3.0 inches in diameter, respectively.

USING THE PHOTO SERIES

The natural fuels photo series is a tool for quickly and inexpensively evaluating a variety of fuel and vegetation conditions. Because of its ease of use, however, care must be taken when evaluating field sites to compare only with photo series sites that are appropriate matches. It is acceptable, however, to use the data from more than one site from the photo series when evaluating a site in the field (e.g., woody material loading from one site in the photo series and tree density from another site in the photo series to best match the conditions of a given field site).

Make a visual inventory of the site by observing fuel and stand conditions within the field of view and comparing them with the stereo-pair photographs as follows, remembering that the data tables relate to the area behind the sign in the stereo-pair photographs:

- Observe each characteristic for a specific size class of woody material on the ground (e.g., 3.1- to 9.0-inch woody material loading).
- Select a photo series site (or sites) that nearly matches or brackets the observed characteristics.
- Obtain the quantitative value for the characteristic being estimated from the data summary accompanying the selected photo series site, or interpolate a value between sites.
- Repeat these steps for each size class or stand characteristic of interest.

The total loading or stand condition can then be calculated by summing the estimates. If the site being inventoried has areas with obvious differences in woody material or stand conditions, the user should make separate determinations for each area and then weight and cumulate the loading for the whole site.

Characteristics not distinguishable in the photographs are litter and duff depth, loading and bulk density and proportions of sound and rotten woody material. If values for these characteristics are desired in the inventory, they must be derived from independent sampling or observations.

The 20 National Fire-Danger Rating System (Burgan 1988, Deeming et al. 1977) and the 13 fire behavior (Albini 1976) fuel models are very general in content and broadly applied; consequently, we chose not to assign one of these existing fuel models to individual sites in this photo series. The photo series was designed to provide sufficient fuel and vegetation data from which managers could generate their own customized fuel models.

SUPPLEMENTAL SITES

Following the publication of Volume VI of the natural fuels photo series (Ottmar and Vihnanek 2000) and consultations with experts from the Southeast United States additional sampling was deemed necessary to capture the complete range of conditions that occur in the longleaf pine and marshgrass ecosystem types. Specifically, sites with very high fuel loading were inadvertently omitted from the original publication. Two supplemental sites with very high fuel loading were subsequently sampled in these types and are included in this volume. These pages (pp. 66-69 and 75-77) can be removed from this volume and inserted into their respective series in volume VI as specified in the "Notes to Users" sections for each type.

Species List

Scientific and common species names are from NRCS (2002); *Pinus clausa* (sand pine) taxonomy is from Ward (1963).

Scientific name	Common name
Trees:	
Acer rubrum L.	Red maple
Amelanchier arborea (Michx. f.) Fern.	Common serviceberry
Aralia spinosa L.	Devil's walkingstick
Betula papyrifera Marsh.	Paper birch
Carpinus caroliniana Walt.	American hornbeam
Carya alba (L.) Nutt. ex Ell.	Mockernut hickory
Carya glabra (P. Mill.) Sweet	Pignut hickory
Cercis canadensis L.	Eastern redbud
Cornus florida L.	Flowering dogwood
Diospyros virginiana L.	Common persimmon
Fagus grandifolia Ehrh.	American beech
Halesia carolina L.	Carolina silverbell
Ilex opaca Ait.	American holly
Liquidambar styraciflua L.	Sweetgum
Liriodendron tulipifera L.	Tuliptree
Magnolia spp.	Magnolia
Magnolia grandiflora L.	Southern magnolia
Magnolia virginiana L.	Sweetbay
Nyssa sylvatica Marsh.	Blackgum
Oxydendrum arboreum (L.) DC.	Sourwood
Persea spp.	Bay
Persea borbonia (L.) Spreng.	Redbay
Persea humilis Nash	Silk bay
Pinus clausa (Chapman ex Engelm.) Vasey ex Sarg. var. *clausa*	Ocala sand pine
Pinus clausa (Chapman ex Engelm.) Vasey ex Sarg. var. *immuginata* Ward	Choctawhatchee sand pine
Pinus echinata P. Mill.	Shortleaf pine
Pinus elliottii Engelm.	Slash pine
Pinus palustris P. Mill.	Longleaf pine
Pinus strobus L.	Eastern white pine
Pinus virginiana P. Mill.	Virginia pine
Prunus serotina Ehrh.	Black cherry
Quercus spp.	Oak
Quercus alba L.	White oak
Quercus chapmanii Sarg.	Chapman oak
Quercus coccinea Muenchh.	Scarlet oak
Quercus geminata Small	Sand live oak
Quercus hemisphaerica Bartr. Ex Willd.	Darlington or laurel oak
Quercus incana Bartr.	Bluejack oak
Quercus laevis Walt.	Turkey oak
Quercus margarettiae Ashe ex Small	Runner or sand post oak
Quercus myrtifolia Willd.	Myrtle oak
Quercus prinus L.	Chestnut oak
Quercus rubra L.	Northern red oak
Quercus stellata Wangenh.	Post oak
Quercus velutina Lam.	Black oak
Rhus copallinum L. (Jacq.) DC.	Winged sumac
Robinia pseudoacacia L.	Black locust
Sassafras albidum (Nutt.) Nees	Sassafras
Tsuga canadensis (L.) Carr.	Eastern hemlock
Viburnum prunifolium L.	Blackhaw
Shrubs:	
Asimina spp.	Paw paw
Calycanthus floridus L.	Eastern sweetshrub
Ceratiola ericoides Michx.	Sand heath
Chimaphila maculata (L.) Pursh	Striped prince's pine
Chimaphila umbellata (L.) W. Bart.	Pipsissewa
Chrysoma pauciflosculosa (Michx.) Greene	Woody goldenrod
Crataegus spp.	Hawthorn
Euonymus spp.	Spindletree
Garberia heterophylla (Bartr.) Merr. & F.-Harper	Garberia
Hydrangea arborescens L.	Wild hydrangea

Species List (Continued)

Scientific and common species names are from NRCS (2002).

Scientific name	Common name
Shrubs:	
Ilex coriacea (Pursh) Chapman	Large gallberry
Ilex vomitoria Ait.	Yaupon
Kalmia latifolia L.	Mountain laurel
Leucothoe spp.	Doghobble
Licania michauxii Prance	Gopher apple
Lyonia spp.	Staggerbush
Opuntia spp.	Prickly pear
Rhododendron spp.	Rhododendron or azalea
Rhododendron canescens (Michx.) Sweet	Mountain azalea
Rhus glabra L.	Smooth sumac
Rubus spp.	Blackberry
Sabal etonia Swingle ex Nash	Scrub palmetto
Serenoa repens (Bartr.) Small	Saw Palmetto
Smilax spp.	Greenbrier
Smilax glauca Walt.	Cat greenbrier
Smilax rotundifolia L.	Roundleaf greenbrier
Toxicodendron radicans (L.) Kuntze	Eastern poison ivy
Vaccinium spp.	Blueberry
Vaccinium arboreum Marsh.	Farkleberry
Vaccinium myrsinites Lam.	Shiny blueberry
Vaccinium pallidum Ait.	Blue Ridge blueberry
Vaccinium stamineum L.	Deerberry
Vitex spp.	Chastetree
Vitis spp.	Grape
Vitis rotundifolia Michx.	Muscadine (grape)
Yucca spp.	Yucca

Scientific name	Common name
Forbs:	
Asarum spp.	Ginger
Aster spp.	Aster
Erigeron spp.	Fleabane
Galax urceolata (Poir.)	Brummitt beetleweed
Hepatica nobilis Schreb. var. *obtusa* (Pursh) Steyermark	Roundlobe hepatica
Hieracium spp.	Hawkweed
Hypericum spp.	St. Johnswort
Mentha spp.	Mint
Mitchella repens L.	Partridgeberry
Pityopsis spp.	Silkgrass
Polystichum acrostichoides (Michx.) Schott	Christmas fern
Potentilla spp.	Cinquefoil
Pteridium aquilinum (L.) Kuhn	Western brackenfern
Viola spp.	Violet
Graminoids:	
Andropogon virginicus L	Broomsedge bluestem
Aristida stricta Michx.	Pineland threeawn
Carex spp.	Sedge
Cladium spp.	Sawgrass
Juncus spp.	Rush
Panicum spp.	Panicgrass
Schizachyrium scoparium (Michx.) Nash	Little bluestem
Spartina spp.	Cordgrass

Metric Conversions

1 inch = 2.54 centimeters
1 foot = 0.3048 meter
1 square foot = 0.0929 square meter
1 acre = 4,046.9 square meters
1 acre = 0.4047 hectare

1 pound = 0.4536 kilogram
1 ton = 907.2 kilograms
1 ton = 0.9072 metric ton
1 pound/acre = 1.1209E-04 kilogram/square meter
1 pound/acre = 1.1209 kilograms/hectare

1 ton/acre = 0.2242 kilogram/square meter
1 ton/acre = 2,241.7023 kilograms/hectare
1 ton · acre^{-1} · inch^{-1} = 8.8256 kilograms/cubic meter
1 ton · acre^{-1} · inch^{-1} = 8.8256E-03 grams/cubic centimeter
1 ton · acre^{-1} · inch^{-1} = 8825.6 grams/cubic meter

SOUTHEAST UNITED STATES SAND HILL PHOTO SERIES

A SERIES OF 11 SITES
SH 01 THROUGH SH 11

SOUTHEAST U.S. SAND HILL

NOTES TO USERS:

1. The sites in this series are ordered from lowest to highest relative density (percentage of stems) of *Quercus laevis*.
2. A list of scientific and common species names can be found on pages 7 and 8.
3. Photographs were taken before the appearance of new leaves in February 2001 for SH 09 and SH 10 and February 2002 for SH 11 and prior to leaf drop in November 2002. All sampling occurred in January or February.
4. Site SH 02 was burned and then treated with herbicide 3 years prior to sampling and photography resulting in the standing dead trees in the >9-inch size class.
5. The marker in these photographs is a 1-foot square, and the pole is painted in contrasting colors at 1-foot intervals. The pole is 30 feet from the camera.
6. Bulk density values used for calculating forest floor loading from depth:

Surface Material Type	Bulk Density	Duff Type	Bulk Density
	$tons \cdot acre^{-1} \cdot inch^{-1}$		$tons \cdot acre^{-1} \cdot inch^{-1}$
Longleaf pine litter	3.65	Longleaf pine duff	8.20
Longleaf pine bark slough	8.66	Longleaf pine bark rot	15.42
Sand pine litter	6.77	Sand pine duff	9.49
Deciduous oak litter	3.24	Deciduous oak duff	7.30
Evergreen oak litter	5.29	Evergreen oak duff	12.70
Feather moss	2.84	Wood rot	12.10
Other cryptogams	1.91		

7. Woody material and forest floor loading are reported in tons per acre, and understory loading is reported in pounds per acre. Trace coverage of understory species is indicated as (t).
8. A distinction is made between rotten and sound woody material for pieces larger than 3 inches in diameter.
9. Depth values reported for surface material, duff, and total forest floor are not unit-wide averages (null values are not included in average), and, as such, the total forest floor depth is not the sum of surface material and duff depths. Depth values for surface material subtypes are similarly treated with respect to the overall surface material depth.

SH 01 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 36' 19.44" W 86° 13' 23.34"
Elev: 260 ft Aspect: -- Slope: 0%

Community type: Seepage slope (1.5-year rough)

SAF cover type: Longleaf pine–Slash pine

Stand Information

Trees (% of stems): *Pinus elliottii* (67), *Pinus palustris* (33)

Standing dead trees: 0% of stems
Crown closure: 4%

Understory (% cover): *Aristida stricta* (94), *Ilex glabra* (2), *Vaccinium* spp. (t), *Panicum* spp. (t), *Andropogon virginicus* (t)

Seedlings (% of stems): *Pinus elliottii* (89), *Magnolia* spp. (11)
Density: 151/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	na	<0.1	trace
Hardwood litter	0.0	0.0	0
Conifer litter	na	<0.1	trace
Other	0.0	0.0	0
Duff	0.0	0.0	0
Total	na	<0.1	trace

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	--	*Pinus* (100/0) *elliottii*	*Pinus* (50/0) *palustris*	--	*Pinus* (50/0) *palustris*
Second most common species (percent of stems: live/dead)	--	--	*Pinus* (50/0) *elliottii*	--	*Pinus* (50/0) *elliottii*
Tree density (stems/ac)	0	14	29	0	29
Live	0	14	29	0	29
Dead	0	0	0	0	0
Avg DBH (in)	--	3.1	6.4	--	6.4
Live	--	3.1	6.4	--	6.4
Dead	--	--	--	--	--
Avg height (ft)	--	23.0	36.5	--	36.5
Live	--	23.0	36.5	--	36.5
Dead	--	--	--	--	--
Avg height to crown base (ft)	--	15.0	20.0	--	20.0
Live	--	15.0	20.0	--	20.0
Dead	--	--	--	--	--
Avg height to live crown (ft)	--	16.5	21.8	--	21.8

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Ilex glabra* (2)	na	*Aristida stricta* (94)
Second most common species (% cover)	*Vaccinium* spp. (t)	--	*Andropogon virginicus* (t)
Coverage (percent)	2	5	100
Avg height (ft)	1.6	1.0	1.3
Biomass (lbs/ac)	64	41	814

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.1	0.0	0.1	--	--	--
0.26 - 1.0	0.1	0.0	0.1	--	--	--
1.1 - 3.0	0.0	0.0	0.0	--	--	--
3.1 - 9.0	0.6	0.1	0.7	29	14	43
> 9.0	0.0	0.0	0.0	0	0	0
Total	0.8	0.1	0.9	29	14	43

SH 02 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 36' 44.00" W 86° 17' 10.41"
Elev: 255 ft Aspect: -- Slope: 0%

Community type: Sandhill (3-year rough)

SAF cover type: Sand pine

Stand Information

Trees (% of stems): *Pinus clausa* var. *immuginata* (84), *Quercus geminata* (11), *Diospyros virginiana* (3), *Quercus incana* (2)

Standing dead trees: 13% of stems
Crown closure: 17%

Understory (% cover): *Andropogon virginicus* (29), *Pteridium aquilinum* (1), *Erigeron* spp. (1), *Licania michauxii* (1), *Hieracium* spp. (1), *Crataegus* spp. (t), *Smilax* spp. (t), *Yucca* spp. (t), *Rubus* spp. (t)

Seedlings (% of stems): *Quercus geminata* (72), *Quercus incana* (8), *Pinus palustris* (7), *Quercus laevis* (5), *Pinus clausa* var. *immuginata* (4), *Ilex opaca* (2), *Quercus hemisphaerica* (2), *Quercus margarettiae* (t), *Diospyros virginiana* (t)
Density: 2,513/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.5	2.17	80
Hardwood litter	0.4	0.80	45
Conifer litter	0.6	1.27	33
Other	0.1	0.10	2
Duff	0.5	2.64	55
Total	0.8	4.81	87

SH 02 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 36' 44.00" W 86° 17' 10.41"
Elev: 255 ft Aspect: -- Slope: 0%

Community type: Sandhill (3-year rough)

SAF cover type: Sand pine

Stand Information

Trees (% of stems): *Pinus clausa* var. *immuginata* (84), *Quercus geminata* (11), *Diospyros virginiana* (3), *Quercus incana* (2)

Standing dead trees: 13% of stems
Crown closure: 17%

Understory (% cover): *Andropogon virginicus* (29), *Pteridium aquilinum* (1), *Erigeron* spp. (1), *Licania michauxii* (1), *Hieracium* spp. (1), *Crataegus* spp. (t), *Smilax* spp. (t), *Yucca* spp. (t), *Rubus* spp. (t)

Seedlings (% of stems): *Quercus geminata* (72), *Quercus incana* (8), *Pinus palustris* (7), *Quercus laevis* (5), *Pinus clausa* var. *immuginata* (4), *Ilex opaca* (2), *Quercus hemisphaerica* (2), *Quercus margarettiae* (t), *Diospyros virginiana* (t)
Density: 2,513/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.5	2.17	80
Hardwood litter	0.4	0.80	45
Conifer litter	0.6	1.27	33
Other	0.1	0.10	2
Duff	0.5	2.64	55
Total	0.8	4.81	87

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Pinus* (91/2) *clausa*	*Pinus* (75/0) *clausa*	*Pinus* (100/0) *clausa*	*Quercus* (0/100) *geminata*	*Quercus* (0/63) *geminata*
Second most common species (percent of stems: live/dead)	*Diospyros* (4/0) *virginiana*	*Quercus* (0/25) *geminata*	--	--	*Pinus* (37/0) *clausa*
Tree density (stems/ac)	339	57	22	36	58
Live	332	43	22	0	22
Dead	7	14	0	36	36
Avg DBH (in)	0.8	2.6	4.2	12.6	9.4
Live	0.8	2.4	4.2	--	4.2
Dead	2.0	3.1	--	12.6	12.6
Avg height (ft)	7.1	15.8	22.3	41.5	33.3
Live	7.2	14.7	22.3	--	22.3
Dead	5.0	19.0	--	41.5	41.5
Avg height to crown base (ft)	0.8	5.1	11.3	15.8	14.1
Live	0.7	4.8	11.3	--	11.3
Dead	3.0	6.0	--	15.8	15.8
Avg height to live crown (ft)	0.8	5.7	12.3	--	12.3

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Licania michauxii* (1)	*Pteridium aquilinum* (1)	*Andropogon virginicus* (29)
Second most common species (% cover)	*Crataegus* spp. (t)	*Erigeron* spp. (1)	--
Coverage (percent)	3	3	42
Avg height (ft)	2.1	1.7	2.7
Biomass (lbs/ac)	39	70	2,286

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.8	0.0	0.8	--	--	--
0.26 - 1.0	1.4	0.0	1.4	--	--	--
1.1 - 3.0	4.8	0.0	4.8	--	--	--
3.1 - 9.0	0.5	0.2	0.7	19	10	29
> 9.0	0.0	0.0	0.0	0	0	0
Total	7.5	0.2	7.7	19	10	29

SH 03 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 36' 39.53" W 86° 16' 16.57"
Elev: 230 ft Aspect: -- Slope: 0%

Community type: Sandhill (degraded, 4-year rough)

SAF cover type: Longleaf pine–Scrub oak

Stand Information

Trees (% of stems): *Pinus clausa* var. *immuginata* (38), *Quercus incana* (38), *Quercus laevis* (9), *Prunus serotina* (8), *Pinus palustris* (6), *Quercus geminata* (1)

Standing dead trees: 5% of stems
Crown closure: 61%

Understory (% cover): *Schizachyrium scoparium* (2), *Andropogon virginicus* (2), *Pteridium aquilinum* (1), *Yucca* spp. (t), *Crataegus* spp. (t), *Licania michauxii* (t), *Panicum* spp. (t), *Smilax* spp. (t), *Pityopsis* spp. (t), *Vaccinium* spp. (t)

Seedlings (% of stems): *Pinus clausa* var. *immuginata* (47), *Pinus palustris* (17), *Quercus geminata* (15), *Quercus incana* (14), *Quercus laevis* (3), *Prunus serotina* (2), *Quercus stellata* (2), *Diospyros virginiana* (t)
Density: 6,798 /ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.8	3.38	98
Hardwood litter	1.0	1.45	45
Conifer litter	0.6	1.93	53
Other	0.0	0.0	0
Duff	0.5	1.11	27
Total	0.9	4.49	98

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Quercus* (52/5) *incana*	*Pinus* (64/0) *clausa*	*Pinus* (40/0) *clausa*	*Pinus* (43/14) *clausa*	*Pinus* (44/6) *clausa*
Second most common species (percent of stems: live/dead)	*Pinus* (24/0) *clausa*	*Prunus* (12/0) *serotina*	*Quercus* (20/0) *laevis*	*Pinus* (14/0) *palustris*	*Quercus* (17/0) *laevis*
Tree density (stems/ac)	352	141	72	50	129
Live	335	141	65	43	115
Dead	17	0	7	7	14
Avg DBH (in)	1.0	2.9	5.0	11.8	7.6
Live	1.0	2.9	5.1	11.7	7.5
Dead	1.5	--	4.5	12.6	8.6
Avg height (ft)	9.4	18.6	25.7	44.7	33.2
Live	9.4	18.6	28.0	47.3	35.2
Dead	10.0	--	5.0	29.0	17.0
Avg height to crown base (ft)	3.0	4.3	10.1	13.0	10.9
Live	3.2	4.3	10.1	14.0	11.1
Dead	0.0	--	--	7.0	7.0
Avg height to live crown (ft)	4.1	5.0	10.3	15.7	11.9

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Yucca* spp. (t)	*Pteridium aquilinum* (1)	*Schizachyrium scoparium* (2)
Second most common species (% cover)	*Licania michauxii* (t)	*Pityopsis* spp. (t)	*Andropogon virginicus* (2)
Coverage (percent)	1	1	5
Avg height (ft)	0.5	0.2	0.6
Biomass (lbs/ac)	18	36	252

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.2	0.0	0.2	--	--	--
0.26 - 1.0	0.4	0.0	0.4	--	--	--
1.1 - 3.0	0.3	0.0	0.3	--	--	--
3.1 - 9.0	0.1	0.1	0.2	5	10	15
> 9.0	0.0	0.0	0.0	0	0	0
Total	1.0	0.1	1.1	5	10	15

SH 04 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 31' 21.34" W 86° 24' 19.63"
Elev: 150 ft Aspect: -- Slope: 0%

Community type: Sand pine-Oak forest (>40-year rough)

SAF cover type: Sand pine

Stand Information

Trees (% of stems): *Pinus clausa* var. *immuginata* (71), *Quercus laevis* (14), *Pinus palustris* (11), *Quercus geminata* (4)

Standing dead trees: 5% of stems
Crown closure: 69%

Understory (% cover): *Smilax* spp. (3), *Andropogon virginicus* (1), *Aristida stricta* (t), *Vaccinium arboreum* (t)

Seedlings (% of stems): *Quercus geminata* (74), *Pinus clausa* var. *immuginata* (26)
Density: 2,365/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	1.0	5.04	100
Hardwood litter	1.1	0.73	19
Conifer litter	0.9	4.27	80
Other	1.7	0.04	1
Duff	1.2	10.14	89
Total	2.0	15.18	100

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Pinus* (96/0) *clausa*	*Pinus* (76/0) *clausa*	*Pinus* (41/0) *clausa*	*Pinus* (67/0) *clausa*	*Pinus* (44/0) *clausa*
Second most common species (percent of stems: live/dead)	*Quercus* (4/0) *geminata*	*Quercus* (12/0) *laevis*	*Quercus* (18/14) *laevis*	*Pinus* (33/0) *palustris*	*Quercus* (16/12) *laevis*
Tree density (stems/ac)	403	285	369	50	419
Live	403	285	319	50	369
Dead	0	0	50	0	50
Avg DBH (in)	1.3	3.0	6.2	10.2	6.7
Live	1.3	3.0	6.4	10.2	6.9
Dead	--	--	5.2	--	5.2
Avg height (ft)	12.0	22.8	32.7	49.3	34.7
Live	12.0	22.8	36.6	49.3	38.3
Dead	--	--	8.0	--	8.0
Avg height to crown base (ft)	7.9	10.8	16.4	20.0	16.9
Live	7.9	10.8	16.4	20.0	16.9
Dead	--	--	--	--	--
Avg height to live crown (ft)	8.7	13.3	20.4	27.0	21.3

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Smilax* spp. (3)	--	*Andropogon virginicus* (1)
Second most common species (% cover)	*Vaccinium arboreum* (t)	--	*Aristida stricta* (t)
Coverage (percent)	3	0	1
Avg height (ft)	1.6	--	0.9
Biomass (lbs/ac)	9	0	9

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.3	0.0	0.3	--	--	--
0.26 - 1.0	0.6	0.0	0.6	--	--	--
1.1 - 3.0	0.7	0.0	0.7	--	--	--
3.1 - 9.0	1.5	0.1	1.6	63	5	68
> 9.0	0.0	0.0	0.0	0	0	0
Total	3.1	0.1	3.2	63	5	68

SH 05 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 27' 50.07" W 86° 46' 24.35"
Elev: 100 ft Aspect: -- Slope: 0%

Community type: Sandhill (3-year rough)

SAF cover type: Longleaf pine–Scrub oak

Stand Information

Trees (% of stems): *Diospyros virginiana* (48), *Quercus geminata* (24), *Quercus laevis* (14), *Pinus palustris* (8), *Quercus stellata* (3), *Quercus incana* (2), *Prunus serotina* (1)

Standing dead trees: 25% of stems
Crown closure: 17%

Understory (% cover): *Serenoa repens* (11), *Andropogon virginicus* (10), *Pteridium aquilinum* (7), *Smilax* spp. (3), *Vaccinium* spp. (1), *Panicum* spp. (t), *Schizachyrium scoparium* (t), *Opuntia* spp. (t)

Seedlings (% of stems): *Quercus laevis* (35), *Quercus geminata* (17), *Diospyros virginiana* (17), *Pinus palustris* (12), *Quercus stellata* (10), *Ilex opaca* (6), *Quercus incana* (2), *Prunus serotina* (1)
Density: 6,558/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.4	1.69	94
Hardwood litter	0.5	0.80	54
Conifer litter	0.4	0.89	40
Other	0.0	0.00	0
Duff	0.1	0.04	5
Total	0.4	1.73	94

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Diospyros* (53/0) *virginiana*	*Quercus* (0/100) *laevis*	*Pinus* (25/50) *palustris*	*Pinus* (100/0) *palustris*	*Pinus* (63/25) *palustris*
Second most common species (percent of stems: live/dead)	*Quercus* (6/20) *geminata*	--	*Quercus* (25/0) *geminata*	--	*Quercus* (12/0) *geminata*
Tree density (stems/ac)	585	14	28	29	57
Live	448	0	14	29	43
Dead	137	14	14	0	14
Avg DBH (in)	0.5	2.4	6.5	12.8	9.7
Live	0.4	--	6.4	12.8	10.7
Dead	1.1	2.4	6.6	--	6.6
Avg height (ft)	6.0	6.5	32.0	54.8	43.4
Live	5.9	--	36.5	54.8	48.7
Dead	6.3	6.5	27.5	--	27.5
Avg height to crown base (ft)	2.4	--	22.0	39.0	33.3
Live	2.4	--	22.0	39.0	33.3
Dead	3.0	--	--	--	--
Avg height to live crown (ft)	2.4	--	22.0	39.0	33.3

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Serenoa repens* (11)	*Pteridium aquilinum* (7)	*Andropogon virginicus* (10)
Second most common species (% cover)	*Smilax* spp. (3)	--	*Panicum* spp. (t)
Coverage (percent)	15	7	11
Avg height (ft)	0.7	0.8	0.4
Biomass (lbs/ac)	1,317	506	213

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.2	0.0	0.2	--	--	--
0.26 - 1.0	0.7	0.0	0.7	--	--	--
1.1 - 3.0	1.5	0.0	1.5	--	--	--
3.1 - 9.0	0.1	0.3	0.4	5	15	20
> 9.0	0.0	0.0	0.0	0	0	0
Total	2.5	0.3	2.8	5	15	20

SH 06 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 30' 48.42" W 86° 51' 49.40"
Elev: 140 ft Aspect: -- Slope: 0%

Community type: Sandhill (1-year rough)

SAF cover type: Longleaf pine–Scrub oak

Stand Information

Trees (% of stems): *Pinus palustris* (56), *Quercus laevis* (25), *Diospyros virginiana* (19)

Standing dead trees: 44% of stems
Crown closure: 36%

Understory (% cover): *Pityopsis* spp. (7), *Andropogon virginicus* (6), *Hypericum* spp. (2), *Panicum* spp. (2), *Vaccinium* spp. (2), *Yucca* spp. (2), *Serenoa repens* (1), *Smilax* spp. (t), *Licania michauxii* (t), *Schizachyrium scoparium* (t)

Seedlings (% of stems): *Quercus laevis* (58), *Diospyros virginiana* (37), *Quercus geminata* (3), *Quercus stellata* (1), *Pinus palustris* (1)
Density: 9,326/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.5	1.48	89
Hardwood litter	0.7	0.42	20
Conifer litter	0.4	1.06	69
Other	0.0	0.00	0
Duff	0.2	0.11	7
Total	0.5	1.59	89

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Quercus* (0/47) *laevis*	*Pinus* (83/0) *palustris*	*Pinus* (100/0) *palustris*	*Pinus* (100/0) *palustris*	*Pinus* (100/0) *palustris*
Second most common species (percent of stems: live/dead)	*Diospyros* (0/40) *virginiana*	*Quercus* (0/17) *laevis*	--	--	--
Tree density (stems/ac)	108	43	43	36	79
Live	14	36	43	36	79
Dead	94	7	0	0	0
Avg DBH (in)	0.6	2.5	6.7	10.1	8.2
Live	1.7	2.5	6.7	10.1	8.2
Dead	0.4	2.1	--	--	--
Avg height (ft)	6.5	16.5	45.2	56.2	50.2
Live	11.5	18.0	45.2	56.2	50.2
Dead	5.8	9.0	--	--	--
Avg height to crown base (ft)	7.0	7.6	28.2	36.6	32.0
Live	7.0	7.6	28.2	36.6	32.0
Dead	--	--	--	--	--
Avg height to live crown (ft)	7.0	7.6	28.2	36.6	32.0

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Vaccinium* spp. (2)	*Pityopsis* spp. (7)	*Andropogon virginicus* (6)
Second most common species (% cover)	*Yucca* spp. (2)	*Hypericum* spp. (2)	*Panicum* spp. (2)
Coverage (percent)	5	14	11
Avg height (ft)	1.1	0.6	1.1
Biomass (lbs/ac)	235	159	237

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.1	0.0	0.1	--	--	--
0.26 - 1.0	0.4	0.0	0.4	--	--	--
1.1 - 3.0	0.2	0.0	0.2	--	--	--
3.1 - 9.0	0.0	0.0	0.0	0	0	0
> 9.0	0.0	0.0	0.0	0	0	0
Total	0.7	0.0	0.7	0	0	0

SH 07 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 32' 32.75" W 86° 24' 50.51"
Elev: 155 ft Aspect: E Slope: 10%

Community type: Sandhill (reforestation)

SAF cover type: Longleaf pine–Scrub oak

Stand Information

Trees (% of stems): *Quercus hemisphaerica* (41), *Quercus laevis* (30), *Quercus margarettiae* (12), *Quercus stellata* (8), *Pinus palustris* (3), *Quercus geminata* (3), *Quercus incana* (2), *Acer rubrum* (1)

Standing dead trees: 0% of stems
Crown closure: 3%

Understory (% cover): *Ilex vomitoria* (12), *Andropogon virginicus* (5), *Pteridium aquilinum* (4), *Panicum* spp. (3), *Rhus copallinum* (2), *Smilax* spp. (1), *Rubus* spp. (1), *Crataegus* spp. (1), *Aristida stricta* (t), *Asimina* spp. (t), *Hypericum* spp. (t), *Chrysoma pauciflosculosa* (t)

Seedlings (% of stems): *Quercus geminata* (32), *Quercus hemisphaerica* (23), *Quercus laevis* (18), *Quercus margarettiae* (9), *Pinus palustris* (7), *Pinus clausa* var. *immuginata* (4), *Quercus stellata* (3), *Quercus incana* (2), *Diospyros virginiana* (1), *Prunus* spp. (1), *Magnolia grandiflora* (t), *Ilex opaca* (t)
Density: 4,109/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.8	0.94	54
Hardwood litter	0.8	0.84	52
Conifer litter	0.8	0.08	1
Other	0.4	0.02	1
Duff	1.4	0.34	33
Total	1.4	1.28	64

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Quercus* (41/0) *laurifolia*	--	*Pinus* (100/0) *palustris*	*Pinus* (100/0) *palustris*	*Pinus* (100/0) *palustris*
Second most common species (percent of stems: live/dead)	*Quercus* (30/0) *laevis*	--	--	--	--
Tree density (stems/ac)	1,426	0	7	7	14
Live	1,426	0	7	7	14
Dead	0	0	0	0	0
Avg DBH (in)	0.5	--	8.6	9.6	9.1
Live	0.5	--	8.6	9.6	9.1
Dead	--	--	--	--	--
Avg height (ft)	6.5	--	67.0	59.0	63.0
Live	6.5	--	67.0	59.0	63.0
Dead	--	--	--	--	--
Avg height to crown base (ft)	1.3	--	43.0	41.0	42.0
Live	1.3	--	43.0	41.0	42.0
Dead	--	--	--	--	--
Avg height to live crown (ft)	1.3	--	43.0	41.0	42.0

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Ilex vomitoria* (12)	*Pteridium aquilinum* (4)	*Andropogon virginicus* (5)
Second most common species (% cover)	*Rhus copallinum* (2)	*Hypericum* spp. (t)	*Panicum* spp. (3)
Coverage (percent)	17	4	10
Avg height (ft)	3.0	0.5	0.6
Biomass (lbs/ac)	4,531	84	232

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.2	0.0	0.2	--	--	--
0.26 - 1.0	0.4	0.0	0.4	--	--	--
1.1 - 3.0	1.9	0.0	1.9	--	--	--
3.1 - 9.0	2.9	1.6	4.5	97	78	175
> 9.0	2.4	0.0	2.4	19	0	19
Total	7.8	1.6	9.4	116	78	194

SH 08 Southeast U.S. Sand Hill

Site Information

Site location: N 30° 36' 00.11" W 86° 44' 05.29"
Elev: 170 ft Aspect: -- Slope: 0%

Community type: Sandhill (>20-year rough)

SAF cover type: Longleaf pine–Scrub oak

Stand Information

Trees (% of stems): *Quercus laevis* (46), *Quercus geminata* (33), *Pinus palustris* (10), *Quercus margarettiae* (9), *Diospyros virginiana* (1), *Quercus hemisphaerica* (1)

Standing dead trees: 8% of stems
Crown closure: 65%

Understory (% cover): *Serenoa repens* (18), *Smilax* spp. (15), *Ilex vomitoria* (12), *Pteridium aquilinum* (3), *Vaccinium* spp. (1)

Seedlings (% of stems): *Quercus geminata* (68), *Pinus palustris* (22), *Quercus laevis* (7), *Ilex opaca* (1), *Quercus margarettiae* (1), *Quercus hemisphaerica* (1)
Density: 3,242/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	2.0	2.92	99
Hardwood litter	1.6	1.21	52
Conifer litter	2.4	1.71	47
Other	0.0	0.0	0
Duff	1.9	6.05	95
Total	3.7	8.97	100

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Quercus* (40/0) *geminata*	*Quercus* (27/27) *laevis*	*Quercus* (59/18) *laevis*	*Pinus* (80/0) *palustris*	*Quercus* (45/14) *laevis*
Second most common species (percent of stems: live/dead)	*Quercus* (37/3) *laevis*	*Quercus* (27/0) *geminata*	*Quercus* (12/0) *margarettiae*	*Quercus* (20/0) *geminata*	*Pinus* (18/0) *palustris*
Tree density (stems/ac)	447	80	123	36	159
Live	433	58	101	36	137
Dead	14	22	22	0	22
Avg DBH (in)	0.8	2.7	5.1	12.3	6.8
Live	0.8	2.7	4.9	12.3	6.8
Dead	1.0	2.9	6.4	--	6.4
Avg height (ft)	8.6	15.7	22.6	55.8	30.1
Live	8.6	19.8	24.3	55.8	32.6
Dead	7.5	5.0	14.7	--	14.7
Avg height to crown base (ft)	2.9	4.1	3.6	25.4	8.8
Live	2.9	4.6	3.5	25.4	9.3
Dead	2.5	2.7	4.0	--	4.0
Avg height to live crown (ft)	3.4	5.6	5.1	25.4	10.5

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Serenoa repens* (18)	*Pteridium aquilinum* (3)	na
Second most common species (% cover)	*Smilax* spp. (15)	--	--
Coverage (percent)	46	3	trace
Avg height (ft)	6.0	0.7	na
Biomass (lbs/ac)	2,415	76	2

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.1	0.0	0.1	--	--	--
0.26 - 1.0	0.2	0.0	0.2	--	--	--
1.1 - 3.0	0.2	0.0	0.2	--	--	--
3.1 - 9.0	0.0	0.3	0.3	0	24	24
> 9.0	0.0	0.0	0.0	0	0	0
Total	0.5	0.3	0.8	0	24	24

SH 09 Southeast U.S. Sand Hill

February

November

Site Information

Site location: N 30° 37' 25.94"
W 86° 13' 56.53"
Elev: 175 ft

Aspect: E Slope: 2%

Community type: Sandhill
(sampled with 4-year rough; leaf-off photo taken with 1-year rough)

SAF covertype: Longleaf pine–Scrub oak

Stand Information

Trees (% of stems): *Quercus laevis* (66), *Diospyros virginiana* (13), *Quercus stellata* (12), *Pinus palustris* (4), *Pinus clausa* var. *immuginata* (3), *Quercus incana* (2)

Standing dead trees: 13% of stems Crown closure: 45%

Understory (% cover): *Aristida stricta* (4), *Vaccinium* spp. (1), *Pteridium aquilinum* (t), *Andropogon virginicus* (t), *Licania michauxii* (t), *Smilax* spp. (t)

Seedlings (% of stems): *Quercus laevis* (39), *Pinus clausa* var. *immuginata* (31), *Pinus palustris* (16), *Quercus incana* (4), *Diospyros virginiana* (4), *Quercus geminata* (4), *Quercus stellata* (2)

Density: 8,504/ac

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	1.1	3.57	96
Hardwood litter	1.1	1.99	57
Conifer litter	1.1	1.58	39
Other	0.0	0.0	0
Duff	0.3	0.23	13
Total	1.1	3.86	96

SH 10 SOUTHEAST U.S. SAND HILL

February

November

SITE INFORMATION

Site location: N 30° 36' 13.39"
W 86° 13' 20.31"
Elev: 140 ft

Aspect: -- Slope: 0%

Community type: Upland pine (sampled with 2-year rough; leaf-on photo taken with 4-year rough)

SAF covertype: Longleaf pine–Scrub oak

STAND INFORMATION

Trees (% of stems): *Quercus laevis* (78), *Pinus palustris* (17), *Diospyros virginiana* (3), *Quercus geminata* (2)

Standing dead trees: 28% of stems Crown closure: 34%

Understory (% cover): *Aristida stricta* (19), *Pityopsis* spp. (3), *Vaccinium* spp. (1), *Ilex vomitoria* (1), *Andropogon virginicus* (1), *Serenoa repens* (t), *Smilax* spp. (t)

Seedlings (% of stems): *Quercus laevis* (88), *Quercus geminata* (5), *Diospyros virginiana* (3), *Pinus palustris* (3), *Pinus clausa* var. *immuginata* (1), *Quercus incana* (t)

Density: 7,967/ac

FOREST FLOOR INFORMATION

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.6	1.98	91
Hardwood litter	1.2	0.43	11
Conifer litter	0.5	1.55	80
Other	0.0	0.00	0
Duff	0.4	0.49	11
Total	0.6	2.47	93

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Quercus* (48/38) *laevis*	*Quercus* (100/0) *laevis*	*Pinus* (50/0) *palustris*	*Pinus* (100/0) *palustris*	*Pinus* (78/0) *palustris*
Second most common species (percent of stems: live/dead)	*Pinus* (7/0) *palustris*	--	*Quercus* (50/0) *laevis*	--	*Quercus* (22/0) *laevis*
Tree density (stems/ac)	304	65	29	36	65
Live	181	65	29	36	65
Dead	123	0	0	0	0
Avg DBH (in)	1.1	2.8	6.3	11.7	9.3
Live	1.3	2.8	6.3	11.7	9.3
Dead	0.7	--	--	--	--
Avg height (ft)	9.6	20.1	39.8	60.8	51.4
Live	11.6	20.1	39.8	60.8	51.4
Dead	6.7	--	--	--	--
Avg height to crown base (ft)	5.5	7.3	20.3	32.6	27.1
Live	6.0	7.3	20.3	32.6	27.1
Dead	4.6	--	--	--	--
Avg height to live crown (ft)	6.0	7.3	20.3	32.6	27.1

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Vaccinium* spp. (1)	*Pityopsis* spp. (3)	*Aristida stricta* (19)
Second most common species (% cover)	*Ilex vomitoria* (1)	--	*Andropogon virginicus* (1)
Coverage (percent)	2	3	20
Avg height (ft)	0.5	0.4	0.7
Biomass (lbs/ac)	65	69	204

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	<0.1	0.0	<0.1	--	--	--
0.26 - 1.0	0.3	0.0	0.3	--	--	--
1.1 - 3.0	0.4	0.0	0.4	--	--	--
3.1 - 9.0	0.0	0.0	0.0	0	0	0
> 9.0	0.0	0.0	0.0	0	0	0
Total	0.7	0.0	0.7	0	0	0

SH 11 SOUTHEAST U.S. SAND HILL

February

November

SITE INFORMATION

Site location: N 30° 30' 29.66"
W 86° 55' 18.22"
Elev: 130 ft

Aspect: -- Slope: 0%

Community type: Sandhill
(degraded, sampled and photographed with >10-year rough)

SAF covertype: Longleaf pine–Scrub oak

STAND INFORMATION

Trees (% of stems): *Quercus laevis* (83), *Pinus palustris* (10), *Quercus hemisphaerica* (4), *Quercus incana* (2), *Diospyros virginiana* (1)

Standing dead trees: 6% of stems Crown closure: 41%

Understory (% cover): *Vaccinium* spp. (9), *Chrysoma pauciflosculosa* (2), *Serenoa repens* (t), *Smilax* spp. (t), *Andropogon virginicus* (t), *Yucca* spp. (t)

Seedlings (% of stems): *Quercus laevis* (64), *Pinus palustris* (32), *Quercus geminata* (2), *Diospyros virginiana* (2)
Density: 628/ac

FOREST FLOOR INFORMATION

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	1.7	1.95	97
Hardwood litter	1.7	1.72	84
Conifer litter	1.2	0.15	9
Other	2.5	0.08	4
Duff	1.3	2.22	87
Total	2.9	4.17	99

Saplings and Trees

	Size class (diameter at breast height)				
	≤ 2"	2 - 4"	4 - 9"	> 9"	> 4"
Most common species (percent of stems: live/dead)	*Quercus* (70/11) *laevis*	*Quercus* (93/0) *laevis*	*Quercus* (77/0) *laevis*	--	*Quercus* (77/0) *laevis*
Second most common species (percent of stems: live/dead)	*Pinus* (12/0) *palustris*	*Pinus* (3/0) *palustris*	*Pinus* (14/0) *palustris*	--	*Pinus* (14/0) *palustris*
Tree density (stems/ac)	549	209	159	0	159
Live	491	209	159	0	159
Dead	58	0	0	0	0
Avg DBH (in)	1.0	3.0	5.1	--	5.1
Live	1.0	3.0	5.1	--	5.1
Dead	0.9	--	--	--	--
Avg height (ft)	8.1	15.0	23.1	--	23.1
Live	8.2	15.0	23.1	--	23.1
Dead	7.5	--	--	--	--
Avg height to crown base (ft)	2.1	2.6	3.7	--	3.7
Live	2.1	2.6	3.7	--	3.7
Dead	1.6	--	--	--	--
Avg height to live crown (ft)	3.1	3.5	4.8	--	4.8

Understory Vegetation

	Lifeform		
	Shrub	Forb	Graminoid
Most common species (% cover)	*Vaccinium* spp. (9)	--	*Andropogon virginicus* (t)
Second most common species (% cover)	*Chrysoma pauciflosculosa* (2)	--	--
Coverage (percent)	11	0	trace
Avg height (ft)	1.1	--	0.8
Biomass (lbs/ac)	151	0	5

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.2	0.0	0.2	--	--	--
0.26 - 1.0	0.5	0.0	0.5	--	--	--
1.1 - 3.0	0.3	0.0	0.3	--	--	--
3.1 - 9.0	0.1	0.1	0.2	5	5	10
> 9.0	0.0	0.0	0.0	0	0	0
Total	1.1	0.1	1.2	5	5	10

SOUTHEAST UNITED STATES SAND PINE SCRUB PHOTO SERIES

A SERIES OF 4 SITES
SPS 01 THROUGH SPS 04

SOUTHEAST U.S. SAND PINE SCRUB

NOTES TO USERS:

1. The sites in this series are ordered from highest to lowest density of *Pinus clausa*.
2. *Quercus* spp. is a mix of *Quercus chapmanii* and *Quercus myrtifolia*.
3. Foliage is included in the ≤0.25 inch size class for the UNDERSTORY BIOMASS data table.
4. A list of scientific and common names can be found on pages 7 and 8.
5. The marker in these photographs is a 1-foot square, and the pole is painted in contrasting colors at 1-foot intervals. The pole is 30 feet from the camera.
6. Bulk density values used for calculating surface material and duff loading from depth are:

Surface Material Type	Bulk Density	Duff Type	Bulk Density
	$tons \cdot acre^{-1} \cdot inch^{-1}$		$tons \cdot acre^{-1} \cdot inch^{-1}$
Sand pine litter	6.77	Sand pine duff	9.49
Deciduous oak litter	3.24	Deciduous oak duff	7.30
Evergreen oak litter	5.29	Evergreen oak duff	12.70
Bark slough	8.66	Bark rot	15.42
Cryptogams	1.91	Wood rot	12.10

7. Woody material and forest floor loading are reported in tons per acre, and understory loadings are reported in pounds per acre.
8. A distinction is made between rotten and sound woody material for pieces larger than 3 inches in diameter.
9. Depth values reported for surface material, duff, and total forest floor are not unit-wide averages (null values are not included in average), and, as such, the total forest floor depth is not the sum of surface material and duff depths. Depth values for surface material subtypes are similarly treated with respect to the overall surface material depth.

SPS 01 SOUTHEAST U.S. SAND PINE SCRUB

SITE INFORMATION

Site location: N 29° 02' 58.60" W 81° 41' 29.58"
Elev: 120 ft Aspect: -- Slope: 0%

Community type: Mainland sand pine scrub
Stand age: 15 years

SAF cover type: Sand pine

STAND INFORMATION

Trees (% of stems): *Pinus clausa* var. *clausa* (28), *Quercus geminata* (27), *Quercus myrtifolia* (23), *Quercus chapmanii* (15), *Ilex opaca* (6), *Persea humilis* (1)

Standing dead trees: 2% of stems
Crown closure: 58%

Understory (% cover): *Sabal etonia* (11), *Lyonia* spp. (4), *Ceratiola ericoides* (2), *Vaccinium stamineum* (2), *Carex* spp. (1), *Licania michauxii* (t), *Smilax* spp. (t), *Vitis rotundifolia* (t)
Average shrub height: 3.2 ft

Seedlings (% of stems): *Quercus myrtifolia* (53), *Quercus geminata* (33), *Quercus chapmanii* (14)
Density: 47,046/ac
Average height: 2.4 ft

FOREST FLOOR INFORMATION

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.7	3.84	97
Hardwood litter	0.7	2.36	60
Conifer litter	0.6	1.48	37
Other	0.0	0.0	0
Duff	0.6	5.61	93
Total	1.2	9.45	99

Saplings and Trees

	Size class (diameter at breast height)			
	Saplings (≤ 2")	2 - 4"	> 4"	> 2"
Most common species (percent of stems: live/dead)	*Quercus* (34/0) *geminata*	*Pinus* (100/0) *clausa*	*Pinus* (100/0) *clausa*	*Pinus* (100/0) *clausa*
Associated species (percent of stems: live/dead)	*Quercus* (27/1) *myrtifolia*	--	--	--
	Quercus (19/0) *chapmanii*	--	--	--
	Pinus (10/1) *clausa*	--	--	--
Tree density (stems/ac)	2,845	635	72	707
Live	2,766	635	72	707
Dead	79	0	0	0
Avg DBH (in)	0.6	3.1	4.4	3.2
Live	0.6	3.1	4.4	3.2
Dead	0.6	--	--	--
Avg height (ft)	9.2	24.9	30.0	25.4
Live	9.2	24.9	30.0	25.4
Dead	8.4	--	--	--
Avg height to crown base (ft)	3.0	7.8	6.4	7.7
Live	3.0	7.8	6.4	7.7
Dead	4.1	--	--	--
Avg height to live crown (ft)	4.3	13.6	14.7	13.7

Understory Biomass

Seedlings/Saplings	(% cover)	Biomass by size class (lbs/ac)			
		≤ 0.25"	0.26 - 1.0"	1.1 - 3.0"	Total
Quercus myrtifolia	44	1,749	1,150	0	2,899
Quercus geminata	29	565	391	0	956
Quercus chapmanii	9	319	342	0	661
Ilex opaca	3	121	122	0	243
Subtotal	85	2,754	2,005	0	4,759
Shrubs					
Sabal etonia	11	800	0	0	800
Lyonia spp.	4	179	210	0	389
Other species	2	32	0	0	32
Subtotal	19	1,011	210	0	1,221
Grand total		3,765	2,215	0	5,980

Woody Material

Diameter (in)	Loading (tons/ac)			Density (pieces/ac)		
	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.3	0.0	0.3	--	--	--
0.26 - 1.0	0.1	0.0	0.1	--	--	--
1.1 - 3.0	0.1	0.0	0.1	--	--	--
> 3.0	0.0	0.1	0.1	0	14	14
Total	0.5	0.1	0.6	0	14	14

SPS 02 Southeast U.S. Sand Pine Scrub

Site Information

Site location: N 29° 04' 01.04" W 81° 42' 33.93"
Elev: 60 ft Aspect: -- Slope: 0%

Community type: Mainland sand pine scrub
Stand age: 58 years

SAF cover type: Sand pine

Stand Information

Trees (% of stems): *Quercus myrtifolia* (55), *Quercus geminata* (18), *Pinus clausa* var. *clausa* (16), *Ilex opaca* (5), *Quercus laevis* (4), *Quercus chapmanii* (1), *Persea humilis* (1)

Standing dead trees: 6% of stems
Crown closure: 53%

Understory (% cover): *Sabal etonia* (9), *Vaccinium myrsinites* (t), *Vaccinium stamineum* (t), *Carex* spp. (t)
Average shrub height: 2.7 ft

Seedlings (% of stems): *Quercus geminata* (58), *Quercus myrtifolia* (40), *Quercus chapmanii* (1), *Ilex opaca* (1)
Density: 122,757/ac
Average height: 2.4 ft

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.9	4.19	97
Hardwood litter	0.8	1.69	41
Conifer litter	0.7	1.93	39
Other	1.7	0.57	17
Duff	1.7	20.65	100
Total	2.6	24.84	100

Saplings and Trees

	Size class (diameter at breast height)			
	Saplings (≤ 2')	2 - 4"	> 4"	> 2"
Most common species (percent of stems: live/dead)	*Quercus* (62/3) *myrtifolia*	--	*Pinus* (77/23) *clausa*	*Pinus* (77/23) *clausa*
Associated species (percent of stems: live/dead)	*Quercus* (21/0) *geminata*	--	--	--
	Ilex (6/0) *opaca*	--	--	--
	Quercus (5/0) *laevis*	--	--	--
Tree density (stems/ac)	1,107	0	217	217
Live	1,073	0	166	166
Dead	34	0	51	51
Avg DBH (in)	0.6	--	7.7	7.7
Live	0.6	--	8.2	8.2
Dead	0.8	--	6.0	6.0
Avg height (ft)	6.9	--	58.0	58.0
Live	6.9	--	61.8	61.8
Dead	7.0	--	45.6	45.6
Avg height to crown base (ft)	1.9	--	44.5	44.5
Live	1.8	--	44.6	44.6
Dead	3.5	--	43.8	43.8
Avg height to live crown (ft)	2.2	--	47.2	47.2

Understory Biomass

		Biomass by size class (lbs/ac)			
Seedlings/Saplings	(% cover)	≤ 0.25"	0.26 - 1.0"	1.1 - 3.0"	Total
Quercus myrtifolia	62	4,196	2,560	1,040	7,796
Quercus geminata	32	1,475	933	119	2,527
Ilex opaca	3	559	341	456	1,356
Quercus chapmanii	4	11	4	0	15
Subtotal	100	6,241	3,838	1,615	11,694
Shrubs					
Sabal etonia	9	220	0	0	220
Vaccinium spp.	trace	7	0	0	7
Subtotal	9	227	0	0	227
Grand total		6,468	3,838	1,615	11,921

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.6	0.0	0.6	--	--	--
0.26 - 1.0	0.7	0.0	0.7	--	--	--
1.1 - 3.0	0.8	0.0	0.8	--	--	--
> 3.0	2.1	0.6	2.7	122	58	180
Total	4.2	0.6	4.8	122	58	180

SPS 03 SOUTHEAST U.S. SAND PINE SCRUB

SITE INFORMATION

Site location: N 30° 22' 01.40" W 87° 08' 26.92"
Elev: 20 ft Aspect: ENE Slope: 2%

Community type: Barrier Island sand pine scrub
Stand age: ~70 years

SAF cover type: Sand pine

STAND INFORMATION

Trees (% of stems): *Quercus geminata* (47), *Pinus clausa* var. *immuginata* (21), *Quercus* spp.* (10), *Quercus margarettiae* (9), *Prunus* spp. (8), *Persea* spp. (2), *Magnolia grandiflora* (2), *Quercus laevis* (1)

Standing dead trees: 9% of stems
Crown closure: 93%

Understory (% cover): *Vaccinium arboreum* (24), *Ilex vomitoria* (7), *Serenoa repens* (6), *Smilax* spp. (1), *Ceratiola ericoides* (t), *Vaccinium corymbosum* (t)
Average shrub height: 4.5 ft

Seedlings (% of stems): *Quercus* spp. (83), *Quercus geminata* (11), *Pinus clausa* var. *immuginata* (2), *Quercus margarettiae* (2), *Prunus* spp. (2)
Density: 44,056/ac
Average height: 2.5 ft

*Quercus spp. includes: *Q. chapmanii, Q. myrtifolia, and Q. other*

FOREST FLOOR INFORMATION

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	0.9	5.37	100
Hardwood litter	1.0	3.21	59
Conifer litter	0.8	2.12	40
Other	1.6	0.04	1
Duff	2.1	23.88	100
Total	3.0	29.25	100

Saplings and Trees

	Size class (diameter at breast height)			
	Saplings (≤ 2")	2 - 4"	> 4"	> 2"
Most common species (percent of stems: live/dead)	*Quercus* (25/4) *geminata*	*Quercus* (71/29) *geminata*	*Pinus* (52/5) *clausa*	*Quercus* (51/10) *geminata*
Associated species (percent of stems: live/dead)	*Quercus* (23/0) spp.	--	*Quercus* (41/0) *geminata*	*Pinus* (35/3) *clausa*
	Quercus (21/0) *margarettiae*	--	*Quercus* (2/0) *laevis*	*Quercus* (1/0) *laevis*
	Prunus (19/0) spp.	--	--	--
Tree density (stems/ac)	346	151	303	454
Live	332	108	289	397
Dead	14	43	14	57
Avg DBH (in)	0.9	3.0	7.3	5.8
Live	0.9	3.0	7.3	6.1
Dead	1.4	2.9	7.0	3.9
Avg height (ft)	8.4	14.1	30.9	25.3
Live	8.5	14.4	31.4	26.8
Dead	5.5	13.3	20.5	15.1
Avg height to crown base (ft)	3.9	6.8	13.4	11.3
Live	3.9	6.1	13.4	11.4
Dead	4.0	9.5	13.0	10.2
Avg height to live crown (ft)	4.7	6.1	16.8	13.9

Understory Biomass

		Biomass by size class (lbs/ac)			
Seedlings/Saplings	(% cover)	≤ 0.25"	0.26 - 1.0"	1.1 - 3.0"	Total
Quercus spp.*	26	971	425	184	1,580
Quercus geminata	3	191	106	179	476
Prunus spp.	trace	73	33	6	112
Other species	trace	41	47	112	200
Subtotal	29	1,276	611	481	2,368
Shrubs					
Vaccinium spp.	24	239	559	0	798
Ilex vomitoria	7	387	83	0	470
Serenoa repens	6	393	0	0	393
Subtotal	37	1,019	642	0	1,661
Grand total		2,295	1,253	481	4,029

*Includes: *Quercus margarettiae*

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.8	0.0	0.8	--	--	--
0.26 - 1.0	0.6	0.0	0.6	--	--	--
1.1 - 3.0	0.4	0.0	0.4	--	--	--
> 3.0	<0.1	0.4	0.4	7	14	21
Total	1.8	0.4	2.2	7	14	21

SPS 04 Southeast U.S. Sand Pine Scrub

Site Information

Site location: N 29° 01' 21.44" W 81° 40' 34.03"
Elev: 10 ft Aspect: -- Slope: 0%

Community type: Mainland sand pine scrub
Stand age: 68 years

SAF cover type: Sand pine

Stand Information

Trees (% of stems): *Quercus myrtifolia* (50), *Quercus geminata* (31), *Quercus chapmanii* (17), *Pinus clausa* var. *clausa* (2), *Ilex opaca* (t)

Standing dead trees: 7% of stems
Crown closure: 60%

Understory (% cover): *Vaccinium stamineum* (6), *Sabal etonia* (16), *Garberia heterophylla* (t), *Carex* spp. (t), *Ceratiola ericoides* (t)
Average shrub height: 2.8 ft

Seedlings (% of stems): *Quercus myrtifolia* (91), *Quercus geminata* (5), *Quercus chapmanii* (4), *Persea humilis* (t)
Density: 73,603/ac
Average height: 2.3 ft

Forest Floor Information

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	1.0	4.08	97
Hardwood litter	0.8	2.91	65
Conifer litter	0.6	0.39	11
Cryptogam	1.9	0.78	21
Duff	1.6	19.56	99
Total	2.6	23.64	99

Saplings and Trees

	Size class (diameter at breast height)			
	Saplings (≤ 2')	2 - 4"	> 4"	> 2"
Most common species (percent of stems: live/dead)	*Quercus* (67/2) *myrtifolia*	*Quercus* (41/6) *geminata*	*Quercus* (78/0) *geminata*	*Quercus* (55/4) *geminata*
Associated species (percent of stems: live/dead)	*Quercus* (18/0) *geminata*	*Quercus* (29/12) *chapmanii*	*Pinus* (12/0) *clausa*	*Quercus* (22/7) *chapmanii*
	Quercus (12/0) *chapmanii*	*Quercus* (0/12) *myrtifolia*	*Quercus* (10/0) *chapmanii*	*Quercus* (0/7) *myrtifolia*
	Pinus (1/0) *clausa.*	--	--	*Pinus* (5/0) *clausa*
Tree density (stems/ac)	997	285	173	458
Live	980	201	173	374
Dead	17	84	0	84
Avg DBH (in)	0.6	2.8	6.5	4.2
Live	0.6	2.9	6.5	4.6
Dead	1.6	2.6	--	2.6
Avg height (ft)	7.0	13.4	27.9	18.9
Live	7.0	14.5	27.9	20.7
Dead	8.5	10.7	--	10.7
Avg height to crown base (ft)	3.5	6.2	9.8	7.6
Live	3.5	6.1	9.8	7.8
Dead	7.0	6.5	--	5.2
Avg height to live crown (ft)	3.7	6.5	12.7	9.3

Understory Biomass

Seedlings/Saplings	(% cover)	Biomass by size class (lbs/ac) ≤ 0.25"	0.26 - 1.0"	1.1 - 3.0"	Total
Quercus myrtifolia	40	1,752	602	754	3,108
Quercus geminata	9	56	195	698	949
Quercus chapmanii	8	126	146	137	409
Ilex opaca	trace	78	120	0	198
Subtotal	57	2,012	1,063	1,589	4,664
Shrubs					
Sabal etonia	16	486	0	0	486
Vaccinium stamineum	6	71	38	0	109
Smilax spp.	trace	17	0	0	17
Subtotal	22	574	38	0	612
Grand total		2,586	1,101	1,589	5,276

Woody Material

Diameter (in)	Loading (tons/ac) Sound	Rotten	Total	Density (pieces/ac) Sound	Rotten	Total
≤ 0.25	0.8	0.0	0.8	--	--	--
0.26 - 1.0	1.0	0.0	1.0	--	--	--
1.1 - 3.0	0.7	0.0	0.7	--	--	--
> 3.0	0.3	0.0	0.3	10	0	10
Total	2.8	0.0	2.8	10	0	10

SOUTHEAST UNITED STATES HARDWOODS WITH WHITE PINE PHOTO SERIES

A SERIES OF 7 SITES
HP 01 THROUGH HP 07

SOUTHEAST U.S. HARDWOODS

NOTES TO USERS:

1. The sites in this series are ordered by degrees of *Pinus strobus* invasion, from lowest to highest density.
2. The stem diameters reported in the TREES data table for the ≤1 inch size class are basal diameters, not diameters at breast height.
3. A list of scientific and common names can be found on pages 7 and 8.
4. The marker in these photographs is a 1-foot square, and the pole is painted in contrasting colors at 1-foot intervals. The pole is 30 feet from the camera.
5. Sampling and photography occurred in March 2000 for all sites.
6. A distinction is made between rotten and sound woody material for pieces larger than 3 inches in diameter.
7. Bulk density values used for calculating surface material and duff loading from depth are:

HP 01, HP 04, HP 05, HP 06, and HP07	**Bulk Density**	**HP 02 and HP 03**	**Bulk Density**
	$tons \cdot acre^{-1} \cdot inch^{-1}$		$tons \cdot acre^{-1} \cdot inch^{-1}$
Litter	0.68	Litter	0.96
Duff	6.89	Duff	4.77

8. Woody material and forest floor loading are reported in tons per acre. Trace coverage of understory species is indicated as (t).
9. A distinction is made between rotten and sound woody material for pieces larger than 3 inches in diameter.
10. Depth values reported for surface material, duff, and total forest floor are not unit-wide averages (null values are not included in average), and, as such, the total forest floor depth is not the sum of surface material and duff depths. Depth values for surface material subtypes are similarly treated with respect to the overall surface material depth.

HP 01 Southeast U.S. Hardwoods

Site Information

Site location: N 34° 57' 56" W 84° 36' 54"
Elev: 1,600 ft Aspect: W Slope: 25%

SAF cover type: Shortleaf pine–Oak

Stand Information

Species	Density (stems/acre)			
	Trees		Seedlings*	
	Live	Dead	Live	Dead
Acer rubrum	728	7	2,331	184
Oxydendrum arboreum	230	24	671	168
Quercus coccinea	125	7	772	50
Nyssa sylvatica	79	7	2,298	67
Cornus florida	50	7	101	17
Pinus echinata	43	0	1,124	17
Quercus alba	36	7	889	17
Quercus prinus	7	0	0	0
Quercus velutina	7	0	0	0
Pinus strobus	0	0	772	0
Carya glabra	0	0	101	0
Amelanchier arborea	0	0	34	0
Tsuga canadensis	0	0	17	0
Sassafras albidum	0	0	17	0
Liriodendron tulipifera	0	0	17	0
Total	1,305	59	9,144	520

*Average seedling height: 2.3 ft

Understory

Understory (% cover): *Vaccinium pallidum.* (14), *Leucothoe* spp. (4), *Galax urceolata* (t), *Vaccinium arboreum* (t), *Vaccinium stamineum* (t), *Kalmia latifolia* (t), *Rhododendron* spp. (t), *Rhus glabra* (t)

Trees

	Size class (diameter at breast height)					
	≤ 1"	1 - 4"	4 - 9"	9 - 16"	> 16"	> 4"
Most common species (percent of stems)	*Acer rubrum* (65)	*Oxydendrum arboreum* (30)	*Quercus alba* (25)	*Quercus coccinea* (60)	--	*Quercus coccinea* (31)
Associated species (percent of stems)	*Oxydendrum arboreum* (20)	*Quercus alba* (20)	*Pinus echinata* (19)	*Pinus echinata* (30)	--	*Pinus echinata* (23)
	Quercus coccinea (6)	*Nyssa sylvatica* (20)	*Nyssa sylvatica* (19)	*Quercus velutina* (10)	--	*Quercus alba* (15)
	Nyssa sylvatica (5)	*Quercus prinus* (10)	*Quercus coccinea* (13)	--	--	*Nyssa sylvatica* (12)
Tree density (stems/ac)	1,105	72	115	72	0	187
Live	1,089	36	108	72	0	180
Dead	16	36	7	0	0	7
DBH (in)	0.7*	2.8	6.5	11.8	--	8.5
Live	0.7*	3.2	6.4	11.8	--	8.5
Dead	0.7*	2.5	8.2	--	--	8.2
Height (ft)	6.6	18.1	41.4	67.6	--	51.5
Live	6.6	23.2	41.5	67.6	--	51.9
Dead	5.0	13.0	40.0	--	--	40.0
Live conifer crown height (ft)	--	--	39.3	38.7	--	39.0

*Basal diameter

Forest Floor

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	2.0	1.40	99
Hardwood litter	2.1	1.37	96
Conifer litter	0.3	0.03	3
Duff	0.7	4.92	99
Total	2.7	6.32	100

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.6	0.0	0.6	--	--	--
0.26 - 1.0	0.9	0.0	0.9	--	--	--
1.1 - 3.0	2.3	0.0	2.3	--	--	--
3.1 - 9.0	3.8	1.1	4.9	97	68	165
> 9.0	6.1	0.0	6.1	24	0	24
Total	13.7	1.1	14.8	121	68	189

HP 02 Southeast U.S. Hardwoods

Site Information

Site location: N 35° 12' 21.91" W 84° 20' 08.91"
Elev: 1,780 ft. Aspect: N Slope: 10%

SAF cover type: White oak–Black oak (a variant of White oak–Black oak–Northern red oak)

Stand Information

Species	Density (stems/acre)			
	Trees		Seedlings*	
	Live	Dead	Live	Dead
Nyssa sylvatica	549	7	604	117
Oxydendrum arboreum	233	72	403	67
Acer rubrum	182	72	1,325	17
Quercus alba	108	7	704	117
Cornus florida	31	58	17	50
Sassafras albidum	58	17	872	84
Pinus strobus	34	0	1,174	0
Carya glabra	31	0	184	0
Betula papyrifera	17	0	17	0
Quercus velutina	7	0	755	84
Prunus serotina	0	0	218	0
Ilex opaca	0	0	50	0
Liriodendron tulipifera	0	0	34	0
Pinus echinata	0	0	17	0
Magnolia fraseri	0	0	17	0
Total	1,250	233	6,391	536

*Average seedling height: 1.2 ft

Understory

Understory (% cover): *Smilax rotundifolia* (2), *Vaccinium pallidum* (1), *Chimaphila maculata* (t), *Viola* spp. (t), *Smilax glauca* (t), *Rhododendron* spp. (t), *Vaccinium stamineum* (t)

Trees

	Size class (diameter at breast height)					
	≤ 1"	1 - 4"	4 - 9"	9 - 16"	> 16"	> 4"
Most common species (percent of stems)	*Nyssa sylvatica* (55)	*Oxydendrum arboreum* (30)	*Oxydendrum arboreum* (53)	*Quercus alba* (100)	*Quercus alba* (75)	*Quercus alba* (54)
Associated species (percent of stems)	*Oxydendrum arboreum* (14)	*Acer rubrum* (28)	*Quercus alba* (27)	--	*Quercus velutina* (25)	*Oxydendrum arboreum* (31)
	Acer rubrum (14)	*Nyssa sylvatica* (20)	*Acer rubrum* (13)	--	--	*Acer rubrum* (8)
	Sassafras albidum (8)	*Cornus florida* (15)	*Cornus florida* (7)	--	--	*Quercus velutina* (4)
Tree density (stems/ac)	855	440	108	51	29	188
Live	838	245	87	51	29	167
Dead	17	195	21	0	0	21
DBH (in)	0.9*	2.1	5.8	13.3	17.6	9.6
Live	0.9*	2.1	6.0	13.3	17.6	10.2
Dead	1.4*	2.1	5.1	--	--	5.1
Height (ft)	7.3	21.5	41.5	83.3	81.0	58.8
Live	7.3	24.3	46.2	83.3	81.0	63.5
Dead	11.0	18.1	22.7	--	--	22.7
Live conifer crown height (ft)	0.3	--	--	--	--	--

*Basal diameter

Forest Floor

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	2.3	2.21	100
Hardwood litter	2.3	2.21	100
Conifer litter	0.0	0.00	0
Duff	1.4	6.60	99
Total	3.6	8.81	100

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.4	0.0	0.4	--	--	--
0.26 - 1.0	0.7	0.0	0.7	--	--	--
1.1 - 3.0	1.0	0.0	1.0	--	--	--
3.1 - 9.0	2.0	0.6	2.6	73	34	107
> 9.0	0.0	0.0	0.0	0	0	0
Total	4.1	0.6	4.7	73	34	107

HP 03 SOUTHEAST U.S. HARDWOODS

SITE INFORMATION

Site location: N 35° 12' 03.97" W 84° 19' 39.17"
Elev: 2,080 ft Aspect: SSW Slope: 27%

SAF cover type: Chestnut oak–Scarlet oak (a variant of Chestnut oak)

STAND INFORMATION

	Density (stems/acre)			
	Trees		Seedlings*	
Species	Live	Dead	Live	Dead
Acer rubrum	48	721	4,680	839
Cornus florida	72	647	3,220	570
Sassafras albidum	206	300	788	419
Liriodendron tulipifera	43	343	922	319
Carya glabra	41	335	3,002	1,208
Nyssa sylvatica	34	201	637	34
Quercus velutina	0	158	1,073	151
Carya alba	51	101	520	67
Liquidambar styraciflua	0	67	704	151
Pinus strobus	24	31	0	34
Prunus serotina	0	50	101	0
Quercus rubra	0	50	67	34
Quercus alba	14	17	101	134
Ilex opaca	7	0	184	50
Quercus coccinea	7	0	0	0
Total	547	3,021	15,999	4,010

*Average seedling height: 1.4 ft

UNDERSTORY

Understory (% cover): *Smilax* spp. (7), *Aster* spp. (1), *Panicum* spp. (1), *Euonymus* spp. (t), *Potentilla* spp. (t), *Vitex* spp. (t), *Viola* spp. (t), *Chimaphila maculata* (t), *Hydrangea arborescens* (t), *Mitchella repens* (t), *Carex* spp. (t), *Polystichum acrostichoides* (t), *Mentha* spp.(t)

TREES

	Size class (diameter at breast height)					
	≤ 1"	1 - 4"	4 - 9"	9 - 16"	> 16"	> 4"
Most common species (percent of stems)	*Acer rubrum* (23)	*Cornus florida* (42)	*Cornus florida* (43)	*Carya alba* (50)	*Liriodendron tulipifera* (100)	*Liriodendron tulipifera* (33)
Associated species (percent of stems)	*Cornus florida* (19)	*Sassafras albidum* (16)	*Liriodendron tulipifera* (29)	*Liriodendron tulipifera* (17)	--	*Carya alba* (27)
	Sassafras albidum (15)	*Carya alba* (10)	*Carya alba* (14)	*Carya glabra* (17)	--	*Cornus florida* (20)
	Carya glabra (11)	*Pinus strobus* (10)	*Acer rubrum* (14)	*Quercus coccinea* (16)	--	*Carya glabra* (7)
Tree density (stems/ac)	3,237	224	50	43	14	107
Live	302	152	36	43	14	93
Dead	2,935	72	14	0	0	14
DBH (in)	0.7*	2.2	5.7	12.9	18.1	10.2
Live	0.6*	2.4	5.7	12.9	18.1	10.9
Dead	0.7*	1.9	5.8	--	--	5.8
Height (ft)	7.2	17.7	34.9	80.2	95.0	61.0
Live	5.8	18.8	38.0	80.2	95.0	66.2
Dead	7.3	15.5	27.0	--	--	27.0
Live conifer crown height (ft)	2**	3**	--	--	--	--

*Basal diameter **Estimate

FOREST FLOOR

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	2.2	2.22	99
Hardwood litter	2.2	1.99	94
Conifer litter	1.3	0.23	5
Duff	0.7	2.97	86
Total	2.8	5.19	99

WOODY MATERIAL

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.5	0.0	0.5	--	--	--
0.26 - 1.0	0.9	0.0	0.9	--	--	--
1.1 - 3.0	1.3	0.0	1.3	--	--	--
3.1 - 9.0	1.5	0.3	1.8	83	29	112
> 9.0	0.0	0.0	0.0	0	0	0
Total	4.2	0.3	4.5	83	29	112

HP 04 Southeast U.S. Hardwoods

Site Information

Site location: N 34° 57' 50.09" W 84° 38' 14.12"
Elev: 1,310 ft Aspect: NNW Slope: 30%

SAF cover type: White oak–Black oak (a variant of White oak–Black oak–Northern red oak)

Stand Information

Species	Density (stems/acre)			
	Trees		Seedlings*	
	Live	Dead	Live	Dead
Acer rubrum	331	0	8,571	84
Quercus alba	123	15	252	0
Pinus strobus	50	29	22,828	252
Oxydendrum arboreum	57	0	151	17
Cornus florida	29	14	403	117
Tsuga canadensis	36	7	184	0
Liriodendron tulipifera	31	0	184	0
Pinus virginiana	22	0	0	0
Carpinus caroliniana	17	0	101	0
Ilex opaca	17	0	17	0
Carya glabra	7	0	302	0
Halesia carolina	7	0	0	0
Prunus serotina	0	0	470	0
Sassafras albidum	0	0	218	50
Quercus coccinea	0	0	235	0
Amelanchier arborea	0	0	218	0
Cercis canadensis	0	0	134	0
Quercus velutina	0	0	117	0
Carya alba	0	0	50	0
Fagus grandifolia	0	0	34	0
Nyssa sylvatica	0	0	17	0
Liquidambar styraciflua	0	0	17	0
Total	727	65	34,503	520

*Average seedling height: 0.7 ft

Understory

Understory (% cover): *Calycanthus floridus* (6), *Polystichum acrostichoides* (3), *Smilax* spp.(1), *Asarum* spp. (1), *Vaccinium pallidum* (t), *Chimaphila umbellata* (t)

TREES

	Size class (diameter at breast height)					
	≤ 1"	1 - 4"	4 - 9"	9 - 16"	> 16"	> 4"
Most common species (percent of stems)	*Acer rubrum* (75)	*Pinus strobus* (29)	*Quercus alba* (46)	*Quercus alba* (49)	*Quercus alba* (67)	*Quercus alba* (48)
Associated species (percent of stems)	*Oxydendrum arboreum* (13)	*Cornus florida* (24)	*Tsuga canadensis* (21)	*Pinus virginiana* (17)	*Pinus strobus* (33)	*Pinus strobus* (15)
	Ilex opaca (4)	*Quercus alba* (14)	*Pinus strobus* (13)	*Liriodendron tulipifera* (17)	--	*Tsuga canadensis* (15)
	Liriodendron tulipifera (4)	*Acer rubrum* (14)	*Pinus virginiana* (8)	*Pinus strobus* (17)	--	*Pinus virginiana* (9)
Tree density (stems/ac)	402	151	173	43	22	238
Live	402	101	166	36	22	224
Dead	0	50	7	7	0	14
DBH (in)	0.6*	2.4	6.2	11.9	24.2	8.8
Live	0.6*	2.3	6.1	12.0	24.2	8.8
Dead	--	2.6	7.0	11.4	--	9.2
Height (ft)	6.2	19.2	45.8	67.8	86.7	53.5
Live	6.2	21.5	47.5	76.4	86.7	56.0
Dead	--	14.6	6.0	25.0	--	15.5
Live conifer crown height (ft)	--	6.3	22.8	44.5	40.0	27.8

*Basal diameter

FOREST FLOOR

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	1.9	1.34	100
Hardwood litter	2.0	1.32	99
Conifer litter	0.4	0.02	1
Duff	1.5	9.84	97
Total	3.4	11.18	100

WOODY MATERIAL

Diameter (in)	Loading (tons/ac)			Density (pieces/ac)		
	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.3	0.0	0.3	--	--	--
0.26 - 1.0	0.5	0.0	0.5	--	--	--
1.1 - 3.0	1.1	0.0	1.1	--	--	--
3.1 - 9.0	1.5	1.3	2.8	58	88	146
> 9.0	0.0	0.3	0.3	0	5	5
Total	3.4	1.6	5.0	58	93	151

HP 05 Southeast U.S. Hardwoods

Site Information

Site location: N 34° 58' 00.16" W 84° 38' 10.29"
Elev: 1,315 ft Aspect: W Slope: 30%

SAF cover type: White oak–Black oak (a variant of White oak–Black oak–Northern red oak)

Stand Information

Species	Density (stems/acre)			
	Trees		Seedlings*	
	Live	Dead	Live	Dead
Cornus florida	312	62	17	50
Acer rubrum	286	17	1,342	151
Quercus alba	173	22	134	17
Rhus copallinum	65	65	0	17
Pinus strobus	77	17	2,700	34
Nyssa sylvatica	84	0	17	0
Pinus echinata	65	0	134	17
Carya alba	60	0	0	0
Liquidambar styraciflua	55	0	252	101
Quercus coccinea	22	0	168	0
Carpinus caroliniana	17	0	67	0
Aralia spinosa	0	17	0	0
Oxydendrum arboreum	14	0	0	0
Pinus virginiana	7	7	0	0
Amelanchier arborea	7	0	17	0
Liriodendron tulipifera	7	0	0	0
Prunus serotina	0	0	235	0
Sassafras albidum	0	0	67	34
Viburnum prunifolium	0	0	67	0
Total	1,251	207	5,200	404

*Average seedling height: 1.7 ft

Understory

Understory (% cover): *Polystichum acrostichoides* (1), *Chimaphila maculata* (t), *Aster* spp. (t), *Vaccinium pallidum* (t), *Asarum* spp. (t), *Mitchella repens* (t), *Hepatica nobilis* var. *obtusa* (t)

Trees

	Size class (diameter at breast height)					
	≤ 1"	1 - 4"	4 - 9"	9 - 16"	> 16"	> 4"
Most common species (percent of stems)	*Cornus florida* (31)	*Cornus florida* (31)	*Quercus alba* (70)	*Quercus alba* (64)	*Carya alba* (100)	*Quercus alba* (66)
Associated species (percent of stems)	*Acer rubrum* (24)	*Acer rubrum* (28)	*Carya alba* (20)	*Liquidambar styraciflua* (14)	--	*Carya alba* (17)
	Rhus copallinum (13)	*Pinus strobus* (12)	*Oxydendrum arboreum* (5)	*Pinus virginiana* (7)	--	*Pinus virginiana* (6)
	Nyssa sylvatica (10)	*Quercus alba* (8)	*Pinus virginiana* (5)	*Carya alba* (7)	--	*Liquidambar styraciflua* (6)
Tree density (stems/ac)	837	368	145	101	7	253
Live	695	325	123	101	7	231
Dead	142	43	22	0	0	22
DBH (in)	0.9*	2.0	6.7	10.8	17.4	8.6
Live	0.9*	2.0	6.6	10.8	17.4	8.8
Dead	0.9*	2.4	7.1	--	--	7.1
Height (ft)	8.2	19.6	50.6	72.1	90.0	60.3
Live	8.3	20.3	54.6	72.1	90.0	63.4
Dead	8.0	14.8	28.0	--	--	28.0
Live conifer crown height (ft)	1.8	2.7	--	31.0	--	31.0

*Basal diameter

Forest Floor

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	2.1	1.39	97
Hardwood litter	2.1	1.37	96
Conifer litter	0.4	0.02	1
Duff	1.2	7.53	93
Total	3.1	8.92	100

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.3	0.0	0.3	--	--	--
0.26 - 1.0	0.5	0.0	0.5	--	--	--
1.1 - 3.0	0.9	0.0	0.9	--	--	--
3.1 - 9.0	0.3	0.9	1.2	19	73	92
> 9.0	0.0	0.0	0.0	0	0	0
Total	2.0	0.9	2.9	19	73	92

HP 06 Southeast U.S. Hardwoods

Site Information

Site location: N 34° 57' 05.54" W 84° 36' 32.63"
Elev: 1,730 ft Aspect: NW Slope: 30%

SAF cover type: White oak–Black oak (a variant of White oak–Black oak–Northern red oak)

Stand Information

Species	Density (stems/acre)			
	Trees		Seedlings*	
	Live	Dead	Live	Dead
Pinus strobus	379	17	285	0
Acer rubrum	212	22	1,090	101
Oxydendrum arboreum	125	7	34	0
Cornus florida	96	36	50	50
Nyssa sylvatica	96	0	34	0
Quercus alba	72	7	537	17
Liquidambar styraciflua	74	0	302	17
Liriodendron tulipifera	34	0	84	0
Carya glabra	17	0	0	0
Quercus rubra	14	0	352	0
Quercus velutina	7	0	0	0
Quercus prinus	7	0	0	0
Robinia pseudoacacia	0	7	0	0
Sassafras albidum	0	0	50	67
Prunus serotina	0	0	34	0
Pinus echinata	0	0	17	17
Tsuga canadensis	0	0	17	0
Total	1,132	96	2,886	269

*Average seedling height: 0.9 ft

Understory

Understory (% cover): *Vaccinium* spp. (2), *Polystichum acrstichoides* (t)

TREES

	Size class (diameter at breast height)					
	≤ 1"	1 - 4"	4 - 9"	9 - 16"	> 16"	> 4"
Most common species (percent of stems)	*Pinus strobus* (41)	*Pinus strobus* (33)	*Oxydendrum arboreum* (25)	*Quercus alba* (60)	*Quercus rubra* (67)	*Quercus alba* (32)
Associated species (percent of stems)	*Oxydendrum arboreum* (14)	*Acer rubrum* (24)	*Quercus alba* (25)	*Quercus velutina* (20)	*Quercus alba* (33)	*Oxydendrum arboreum* (18)
	Acer rubrum (14)	*Cornus florida* (21)	*Acer rubrum* (25)	*Robinia pseudoacacia* (20)	--	*Acer rubrum* (18)
	Liquidambar styraciflua (14)	*Nyssa sylvatica* (13)	*Pinus strobus* (10)	--	--	*Quercus rubra* (7)
Tree density (stems/ac)	486	541	144	36	22	202
Live	469	469	144	29	22	195
Dead	17	72	0	7	0	7
DBH (in)	0.9*	2.2	5.6	13.2	17.6	7.6
Live	0.9*	2.1	5.6	13.6	17.6	7.5
Dead	0.8*	2.6	--	11.5	--	11.5
Height (ft)	7.2	21.7	44.4	76.0	96.3	55.6
Live	7.2	21.8	44.4	86.0	96.3	56.3
Dead	8.0	21.1	--	36.0	--	36.0
Live conifer crown height (ft)	2.8	4.1	5.5	--	--	5.5

*Basal diameter

FOREST FLOOR

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	1.5	1.00	99
Hardwood litter	1.5	1.00	99
Conifer litter	0.0	0.00	0
Duff	1.3	8.64	100
Total	2.7	9.64	100

WOODY MATERIAL

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.3	0.0	0.3	--	--	--
0.26 - 1.0	0.5	0.0	0.5	--	--	--
1.1 - 3.0	0.9	0.0	0.9	--	--	--
3.1 - 9.0	0.7	0.4	1.1	49	24	73
> 9.0	0.0	0.0	0.0	0	0	0
Total	2.4	0.4	2.8	49	24	73

HP 07 Southeast U.S. Hardwoods

Site Information

Site location: N 34° 57' 55 " W 84° 36' 54"
Elev.: 1,590 ft Aspect: NW Slope: 10%

SAF cover type: Chestnut oak–Scarlet oak (a variant of Chestnut oak)

Stand Information

Species	Density (stems/acre)			
	Trees		Seedlings*	
	Live	Dead	Live	Dead
Pinus strobus	995	175	1,476	67
Acer rubrum	140	60	4,931	134
Quercus alba	108	22	621	34
Cornus florida	87	14	151	151
Oxydendrum arboreum	75	7	168	17
Carya glabra	38	0	134	0
Quercus prinus	36	0	285	0
Quercus coccinea	29	0	352	34
Pinus echinata	7	7	0	0
Unidentified hardwood	0	7	0	0
Quercus velutina	0	0	235	34
Nyssa sylvatica	0	0	235	17
Prunus serotina	0	0	184	0
Amelanchier arborea	0	0	34	0
Liriodendron tulipifera	0	0	34	0
Ilex opaca	0	0	17	0
Total	1,515	292	8,857	488

*Average seedling height: 0.5 ft

Understory

Understory (% cover): *Vaccinium pallidum* (1), *Smilax glauca* (t), *Mitchella repens* (t), *Rhododendron canescens* (t)

TREES

	Size class (diameter at breast height)					
	≤ 1"	1 - 4"	4 - 9"	9 - 16"	> 16"	> 4"
Most common species (percent of stems)	*Pinus strobus* (88)	*Pinus strobus* (61)	*Pinus strobus* (24)	*Quercus alba* (33)	*Quercus coccinea* (67)	*Quercus alba* (19)
Associated species (percent of stems)	*Acer rubrum* (6)	*Acer rubrum* (14)	*Oxydendrum arboreum* (24)	*Pinus echinata* (17)	*Quercus prinus* (33)	*Quercus coccinea* (15)
	Carya glabra (3)	*Quercus alba* (9)	*Quercus alba* (18)	*Quercus prinus* (17)	--	*Pinus strobus* (15)
	Oxydendrum arboreum (3)	*Cornus florida* (8)	*Acer rubrum* (12)	*Quercus coccinea* (17)	--	*Oxydendrum arboreum* (15)
Tree density (stems/ac)	587	1,032	123	43	22	188
Live	453	881	123	36	22	181
Dead	134	151	0	7	0	7
DBH (in)	1.2*	1.9	6.2	12.5	20.0	9.2
Live	1.2*	1.9	6.2	13.1	20.0	9.2
Dead	1.1*	2.0	--	9.1	--	9.1
Height (ft)	7.9	18.0	44.6	77.2	81.3	56.4
Live	7.8	18.5	44.6	82.6	81.3	56.6
Dead	8.1	15.0	--	50.0	--	50.0
Live conifer crown height (ft)	na	4.6	13.8	50.0	--	21.0

*Basal diameter

FOREST FLOOR

	Depth (in)	Loading (tons/ac)	Constancy (percent)
Surface material	2.2	1.47	100
Hardwood litter	2.2	1.47	100
Conifer litter	0.0	0.00	0
Duff	1.1	7.71	100
Total	3.3	9.18	100

WOODY MATERIAL

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.3	0.0	0.3	--	--	--
0.26 - 1.0	0.6	0.0	0.6	--	--	--
1.1 - 3.0	1.0	0.0	1.0	--	--	--
3.1 - 9.0	2.4	1.1	3.5	58	63	121
> 9.0	4.0	1.5	5.5	24	19	43
Total	8.3	2.6	10.9	82	82	164

SOUTHEAST UNITED STATES LONGLEAF PINE PHOTO SERIES SUPPLEMENT

2 SUPPLEMENTAL SITES FOR VOLUME VI (Ottmar and Vihnanek 2000) LLP 09 AND LLP 10

SOUTHEAST U.S. LONGLEAF PINE SUPPLEMENT

NOTES TO USERS:

1. The sites in this series are ordered from lowest to highest loading of understory vegetation biomass, not including forest floor material.
2. The following pages of this supplemental series can be inserted after page 27 in volume VI (Ottmar and Vihnanek 2000).
3. Although the overstory on these sites is composed of *Pinus elliottii* (slash pine), not *Pinus palustris* (longleaf pine), we are including them as a supplement to the SOUTHEAST U.S. LONGLEAF PINE series for the understory conditions they represent.
4. A list of scientific and common names can be found on pages 7 and 8 of volume VIa, and on page 7 of volume VI.
5. The marker in these photographs is a 1-foot square, and the pole is painted in contrasting colors at 1-foot intervals. The pole is 30 feet from the camera.
6. Sampling and photography occurred in March 2001.
7. Bulk density values used for calculating surface material and duff loading from depth are:

LLP 09	Bulk Density	LLP 10	Bulk Density
	$tons \cdot acre^{-1} \cdot inch^{-1}$		$tons \cdot acre^{-1} \cdot inch^{-1}$
Litter	2.27	Litter	1.17
Duff	5.96	Duff	4.97

8. All loadings are reported in tons per acre.

SITE INFORMATION

Site location: N 29° 30' 09.07" W 81° 15' 11.97"

Species: *Pinus elliottii*, *Nyssa sylvatica*, *Magnolia virginiana*, *Persea borbonia, Ilex glabra, Vitis* spp., *Serenoa repens, Smilax* spp.

SAF cover type: Slash pine
Site type: Wet flatwoods; 20-year rough

Canopy cover: 72%

Maximum tree height: 69 ft
Minimum crown height: 4 ft

Understory vegetation loading: 4.45 tons/ac
Forest floor loading: 30.03 tons/ac

Saplings and Trees

	Size Class (Diameter at Breast Height)			
	Saplings (≤ 4')	4 - 9"	9 - 16"	> 4"
Most common species (percent of stems)	*Pinus elliottii* (90)	*Pinus elliottii* (100)	*Pinus elliottii* (100)	*Pinus elliottii* (100)
Tree density (stems/ac)	1,369	94	36	130
Live	1,352	94	36	130
Dead	17	0	0	0
Avg DBH (in)	1.9	5.1	12.7	7.2
Live	1.9	5.1	12.7	7.2
Dead	1.0	--	--	--
Avg height (ft)	20.0	37.8	60.0	44.0
Live	20.1	37.8	60.0	44.0
Dead	13.0	--	--	--
Avg height to crown base (ft)	15.1	27.8	31.4	28.8
Live	15.1	27.8	31.4	28.8
Dead	--	--	--	--
Avg height to live crown (ft)	15.2	27.8	31.4	28.8
Live crown mass (tons/ac)	1.26	0.49	2.32	2.81

Understory

	Loading (tons/ac)
Live *Serenoa repens* (saw palmetto)	0.92
Dead *Serenoa repens* (saw palmetto)	0.59
Live *Ilex glabra* (gallberry)	2.08
Other woody vegetation	0.86
Grasses and forbs	0.00
Pinus palustris cones	na
Litter (L layer)	5.99
Duff (F and H layers)	24.04

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.11	0.00	0.11	--	--	--
0.26 - 1.0	0.89	0.00	0.89	--	--	--
1.1 - 3.0	0.17	0.00	0.17	--	--	--
> 3.0	0.00	0.00	0.00	0	0	0
Total	1.17	0.00	1.17	0	0	0

LLP 10 SOUTHEAST U.S. LONGLEAF PINE SUPPLEMENT

SITE INFORMATION

Site location: N 29° 33' 16.01" W 81° 13' 17.02"

Species: *Pinus elliottii*, *Quercus geminata*, *Ilex glabra*, *Serenoa repens*, *Smilax spp.*, *Toxicodendron radicans*

SAF cover type: Slash pine
Site type: Wet flatwood; 30-year rough

Canopy cover: 67%

Maximum tree height: 69 ft
Minimum crown height: 20 ft

Understory vegetation loading: 5.54 tons/ac
Forest floor loading: 27.18 tons/ac

Saplings and Trees

	Size Class (Diameter at Breast Height)			
	Saplings (≤ 4')	4 - 9"	9 - 16"	> 4"
Most common species (percent of stems)	*Quercus geminata* (100)	*Pinus elliottii* (75)	*Pinus elliottii* (100)	*Pinus elliottii* (95)
Tree density (stems/ac)	14	29	108	137
Live	14	29	101	130
Dead	0	0	7	7
Avg DBH (in)	2.8	6.8	10.6	9.8
Live	2.8	6.8	10.6	9.7
Dead	--	--	10.8	10.8
Avg height (ft)	16.5	42.0	58.7	55.2
Live	16.5	42.0	60.4	56.3
Dead	--	--	34.0	34.0
Avg height to crown base (ft)	na	28.3	38.8	36.9
Live	na	28.3	38.8	36.9
Dead	--	--	--	--
Avg height to live crown (ft)	na	28.3	38.8	36.9
Live crown mass (tons/ac)	0.04	0.41	4.32	4.73

Understory

	Loading (tons/ac)
Live *Serenoa repens* (saw palmetto)	3.26
Dead *Serenoa repens* (saw palmetto)	2.06
Live *Ilex glabra* (gallberry)	0.22
Other woody vegetation	0.00
Grasses and forbs	0.00
Pinus palustris cones	na
Litter (L layer)	2.55
Duff (F and H layers)	24.63

Woody Material

	Loading (tons/ac)			Density (pieces/ac)		
Diameter (in)	Sound	Rotten	Total	Sound	Rotten	Total
≤ 0.25	0.04	0.0	0.04	--	--	--
0.26 - 1.0	0.25	0.0	0.25	--	--	--
1.1 - 3.0	0.03	0.0	0.03	--	--	--
> 3.0	0.0	0.0	0.0	0	0	0
Total	0.32	0.0	0.32	0	0	0

SOUTHEAST U.S. MARSHGRASS SUPPLEMENT

NOTES TO USERS:

1. The sites in this series are ordered from lowest to highest total biomass loading.
2. The first page of this supplemental series (MG 05A, page 75) can be inserted after page 52 of volume VI; the second page (MG 10, page 77) can be inserted after page 56 of volume VI (Ottmar and Vihnanek 2000).
3. A list of common and scientific names can be found on pages 7 and 8 of volume VIa, and on page 7 of volume VI.
4. The marker in these photographs is a 1-foot square, and the pole is painted in contrasting colors at 1-foot intervals. The pole is 30 feet from the camera.
5. In SITE INFORMATION the loading category "other" refers to litter (MG 05A) or litter and woody vegetation (MG 10).
6. Sampling and photography occurred in March 2001.
7. All loadings are reported in tons per acre.

MG 05A SOUTHEAST U.S. MARSHGRASS SUPPLEMENT

SITE INFORMATION

Site location: N 25° 39' 54.16" W 80° 32' 25.98"

Species: *Cladium* spp., *Juncus* spp.
SRM cover type: Florida saltmarsh

Photographed in March 2001.

Loading (tons/acre)	
Grass:	4.43
Forbs:	0.10
Other:	1.18
TOTAL:	5.71

Sample size (n) = twelve 10.76 square foot plots

MG 10 SOUTHEAST U.S. MARSHGRASS SUPPLEMENT

SITE INFORMATION

Site location: N 25° 28' 38.42" W 81° 07' 22.83"

Species: *Spartina* spp.
SRM cover type: Florida saltmarsh

Photographed in March 2001.

Loading (tons/acre)	
Grass:	13.12
Forbs:	0.06
Other:	4.96
TOTAL:	18.14

Sample size (n) = four 43.03 square foot plots